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AIR FORCE RESEARCH LABORATORY SENSORS DIRECTORATE LEADERSHIP LEGACY, 1960-2011

Compiled by Raymond C. Rang

General Dynamics Information Technology

MARCH 2011
Final Report

AIR FORCE RESEARCH LABORATORY
SENSORS DIRECTORATE
WRIGHT-PATTERSON AIR FORCE BASE, OH 45433-7320
AIR FORCE MATERIEL COMMAND
UNITED STATES AIR FORCE

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14. ABSTRACT

This text is but a piece of an ongoing project to build the story of Air Force avionics research and development, and the people behind that development, from 1918 at McCook Field to the present at Wright Field. This volume contains the biographies of the senior leaders who guided the modern age of avionics development from 1960s Avionics Division to today's Air Force Research Laboratory's Sensors Directorate. Included are biographies of directors/commanders, deputy directors, chief scientists, and chief engineers.

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Preface

This text is but a piece of an ongoing project to build the story of Air Force avionics research and development, and the people behind that development, from 1918 at McCook Field to the present at Wright Field. This volume contains the biographies of the senior leaders who guided the modern age of avionics development from 1960s Avionics Division to today's Air Force Research Laboratory's Sensors Directorate. No attempt has been made to capture the contributions of each to this organization's history; that is left to a future day. However, a student of USAF history will easily note the leadership contributions of many of these individuals to aviation electronics, to the USAF, and to this nation's military superiority.

One may inquire why start in 1960 when we know this golden era of aviation electronics development began in 1918.(Lingle, 1952, p. 10) The "Why" is because it was not until the 1959/60 time frame that this technology area was merged under a lasting singular leadership without competing areas such as air vehicle and propulsion technologies. Aldridge (Aldridge, 1994, fig 3, 8, 10) includes organizational chart figures which indicate the existence of an "equipment branch" as early as 1920. This branch included what we today would call "avionics". However this McCook and Wright Field branch included the Signal Corps' Aircraft Radio Laboratory and a Corps of Engineers photographic laboratory contingent. The same document shows in 1951 a Weapons Components Division within the Wright Air Development Center. This division was the first true precursor of the Avionics Division of 1959/60 and subsequent Avionics Laboratory. However, the 1952 creation of the Directorate of Laboratories again dispersed the components that we now attribute to the discipline of "avionics".

The emphasis on electronics as a force multiplier in aircraft was evolving into the new field called "avionics". This term first appears in WADC's official history in 1953.(Tagg, 2001, p. 63) The situation changed again in 1955 when the Directorate of Laboratories became the Directorate of Development and the Electronic Components Laboratory was reassigned to the Directorate of Research. The Air Research and Development Command's reorganization of the laboratories beginning in 1959 formed, among others, the first Avionics Division. With this reorganization, all the laboratories lost significant manpower. The mission, culture, operations and goals were transformed, as the Directorate of Systems Engineering was created to support the weapon systems program offices, drawing resources from the earlier laboratories. (Aldridge, 1994, pp. 14, 15) These changes came about as a result of Air Force leadership and Scientific Advisory Board concerns that the demanding daily support of operational systems was eroding the Air Force's technology base. (Aldridge, 2005, p. 24) For the first time in Air Corps/Air Force history, the laboratories no longer had systems engineering and in-service engineering responsibility.

Avionics Laboratory annual "Technology Programs and Contacts" books, unit manning documents, official biographies, and personal recollections were used to create the chronology in this document. Every effort has been made to insure accuracy. Limited study of charts and

resumes of record in the late 1950s and early 1960s indicate that prior to the establishment of the Air Force laboratories in 1963, the division person second in command bore the title of "Technical Director". The position of chief scientist first appears in 1963. Deputy director information has been particularly challenging. In numerous cases over the years the incumbent deputy, absent on special assignment, was replaced by an acting deputy who himself was replaced by another acting individual. For the purposes of this document, these temporary assignments are not recorded.

Works Cited

Aldridge, J. F. (1994). *A Historical Overview of the Mission and Organization of the Wright Laboratory 1917 - 1993.* Wright-Patterson AFB, Ohio: History Office, Aeronautical Systems Center, Air Force Materiel Command.

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Lingle, J. C. (1952, March). Weapons Components Division. *WADC Employee Publication* , p. 10.

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Credits and Acknowledgements

This document exists today because of the vision, support, and encouragement of the senior leadership of the AFRL Sensors Directorate to record and commemorate the fascinating history of the Avionics Laboratory/Sensors Directorate. The day-to-day encouragement and patience of the project sponsor, Mr. Douglas Hager, Deputy of the Integration and Operations Division, was crucial to the completion of this document and is greatly appreciated.

Many of the biographies and photographs included here are from the Aeronautical Systems Center's History Office files. Mr. James Aldridge, assigned to that office at that time, was especially helpful in locating biographies. Photographs and text were digitized by Jenny Silver in contract support of Air Force Research Laboratory's Sensors Directorate. Other biographies and photographs are from the USAF official biography files (http://www.af.mil/information/bios/); AFRL History Office files with the assistance of Shari Christy, archivist; or were generated from information graciously provided by the individual himself or his family. Col Cummins' biography was created from his obituary in the Rapid City (South Dakota) Journal that was provided by the Rapid City Society for Genealogical Research from the records of the Rapid City Public Library and from his career summary from the National Personnel Records Center of the National Archives. Photographs were enhanced when necessary by Barbara Rich and Michael Ross of General Dynamics Information Technology in support of this historical research.

All biographies have been edited slightly for clarity and to comply with current privacy act requirements. I performed the editing with the most welcome assistance and advice of Douglas Hager. I also assembled and formatted this document. Great effort has been taken to insure accuracy without disturbing the character of the individual's biography. Any shortcomings are regretted but are solely my own.

Raymond Rang
General Dynamics Information Technology
Contract No.: FA8601-09-F-0024
For
AFRL Sensors Directorate
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Wright-Patterson AFB, OH
16 March 2011

Chronological List of Directors

Chronological List of Directors (Concluded)

Chronological List of Deputy Directors

Chronological List of Chief Scientists

Chronological List of Chief Engineers

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Directors

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Colonel Randal D. Keator
Director
Avionics Division
April 1960 - August 1960

Colonel Randall D. Keator was born in Louisiana and graduated from Northwestern State College, Natchitoches, Louisiana in 1939 with a Bachelor of Science Degree in Physics with a minor in Mathematics.

He was commissioned second lieutenant, U.S. Army Air Corps, on 26 April 1941 upon graduating from U.S. Army Air Force Pilot training at Randolph and Kelly Army Air Force Bases. He was promoted to Lieutenant Colonel in 1944 and Colonel in 1952.

Colonel Keator was a fighter pilot during World War II with one hundred thirty-three hours of combat mission time in both Southwest Pacific and European theaters of operation. He is credited with destroying the first Japanese plane in aerial combat in the Philippine Islands. A command pilot, he had 3,600 flight hours at retirement. Wartime tactical military positions held included Deputy Commander and Chief of Op-

erations of Fighter and Reconnaissance Groups.

He was Chief of the Mechanical Branch, Aircraft Laboratory at Wright Field, Dayton, Ohio from January 1949 to June 1950. This branch was responsible for the Research and Development of all USAF aircraft landing gears, wheels, tires, hydraulic and pneumatic systems and mechanical actuators.

Colonel Keator was Chief of Operations, Aircraft Laboratory, Wright Air Development Center, Wright-Patterson AFB, Ohio from June 1950 to June 1952. Responsibilities included directing, monitoring and guiding the Research and Development efforts of the seven technical branches of the Aircraft Laboratory. Preparation of the 10 million dollar research and development program, and control of the testing programs of the laboratory were part of the many responsibilities of this position.

Colonel Keator served as a USAF Exchange Officer with the Mechanical Engineering Department, Royal Aircraft Establishment, Farnborough, England from August 1952 to October 1954. Responsibilities included research and development of pressure suits, escape ejection seats, parachutes, and aerial drop equipment.

He was Chief of the Development Operations Division of the Aircraft Laboratory from October 1954 to December 1955. This was a technical programming function for a $160 million dollar Research and Development program.

He was Deputy Chief of the Aircraft Laboratory from December 1955 till July 1957.

Colonel Keator became Chief of the Aircraft Laboratory in July 1957 and remained until April 1960. The four positions listed above in the Aircraft Laboratory were progressive assignments beginning with Chief of a branch and finishing 11 years later as Chief of the laboratory. This Aircraft Laboratory was one of the original laboratories of the Air Force, and during its 40 year history it had grown to a personnel strength of approximately 650, of which about half were professional engineers and scientists. The laboratory performed applied research, development, design and tests incident to the continuous improvement of the airframe and airframe components of USAF aircraft and guided missiles. The seven technical branches were Aerodynamics, Wind Tunnel, Structures, Dynamics, Aircraft and Missiles Preliminary Design, Mechanical (landing gear and hydraulic systems) and Special Projects (aircraft emergency escape systems and crew station design). The yearly research and development budget of this laboratory averaged approximately eleven million dollars.

Colonel Keator was Chief of the Avionics Division, Wright Air Development Division, Wright-Patterson AFB, Ohio from April 1960 to August 1960. This Division had four laboratories under its supervision. They were Electronics Technology Laboratory, Aerial Reconnaissance Laboratory, Navigation and Guidance Laboratory, and Communication Laboratory.

At the time of his retirement in 1965, Colonel Keator was Chief, Service Engineering Division, Headquarters Oklahoma City Air Materiel Area, Tinker AFB, Oklahoma. The mission of this 200 engineer organization was providing engineering support to the current operational fleet.

Other Education: George Washington University, Washington, D.C.; Air Force Manpower Management Training Program -1955.

He was a Member of Lambda Delta Lambda honorary physical science fraternity.

Most notable Military Decorations: Distinguished Service Cross and the Air Medal

Biographical content provided by wife, Litha and son, Randal Keator II.

Editor's Comment:

The young Lt Keator's exploits and service during World War II in the South Pacific are documented in history books, museum displays and files, and the internet. Some of that content is included below. His son and sons-in-law have followed in his footsteps, all have served in the United States Air Force.

Lt Keator's photo, diary, Distinguished Flying Cross, and dog tags as displayed in the Pacific Exhibit, National WW II Museum, New Orleans

Louisiana born Randall Keator was assigned to the 24th Pursuit Group, 20th Pursuit Squadron based at Clark Field. On December 8, 1941 he shot down the first Japanese aircraft over the Philippines. Evacuated to Australia he was later assigned to the 49th Fighter Group, 8th Fighter Squadron and flew in the defense of Darwin, and then moved to Port Moresby, New Guinea where the squadron took on the name "Black Sheep Squadron". An avid hunter, he borrowed shotguns and rifles from his unit's armory to hunt pigs and ducks around Port Moresby to supplement their poor rations with fresh meat.

Lt Keator painted his name under the windscreen of his P-40E-1, squadron number 68. The plane was nicknamed "The Spoddessape" (Spotted assed ape) on the left side, in reference to pilot Keator's description of how fast he left the Philippines, 'like a spotted ass ape'. The right side of the aircraft had a pelican with a frog bombardier and crayfish firing a shotgun under the bird's wing and carrying a bomb in its feet.

Detailed recollections of the Japanese attack on the Philippine Islands and the heroism of the three aviators who were able to engage the enemy that fateful day can be found in numerous books. One such is “Dec 8, 1941” by William H. Bartsch.

Principle References:

http://www.nationalww2museum.org/exhibitions/pacific-exhibit-artifacts.html
http://www.pacificwrecks.com/aircraft/p-40/41-25178.html
Picture of P-40 and Lt Keator from 1942 at Humpty Doo. Photo number PH0226/0068, Bob Alford Collection, Northern Territorial Library. http://www.territorystories.nt.gov.au/handle/10070/19491

The Army Air Forces “Black Sheep” 8th Fighter squadron should not be confused with the Marine squadron of that name made famous on television, though its exploits were probably not much different. Today, the USAF 8th Fighter Squadron is an operational F-22A Raptor squadron and it retains the name and patch of the Black Sheep.

Colonel Tristram J. Cummins
Director
Avionics Directorate
1 November 1960 - 31 March1962

Colonel Tristram J. Cummins was a graduate of Montana State University with a degree in chemical engineering. Later, while in the Air Force, he received a Master's Degree in economics from the University of Chicago. He taught school in Clyde Park, Montana, was a chemist for the Holly Sugar Company, and worked for the Burlington Northern Railroad in Billings, Montana before entering the US Army in September, 1940.

Colonel Cummins' World War II service is sketchy. He served a little over two years in the Pacific Theater and by February 1945 received field promotions up to the rank of Lieutenant Colonel. He was awarded the Legion of Merit.

From July 1947 to June 1949, Colonel Cummins served as Chemical

Officer at Headquarters Tactical Air Command, Langley AFB, Virginia, advancing to Chief of the Training Programs Division at the headquarters. He then participated in the Air Force Institute of Technology Industrial Mobilization program for one year at E. I. DuPont Corporation.

From July 1950 to 1 January 1952, Colonel Cummins was assigned to the Headquarters Squadron, Air Materiel Armament Test Center, Air Research and Development Command (ARDC), Eglin Air Force Base, Florida. He first served as Chief of the Chemical Branch and advanced to become the technical director of the squadron.

In March 1953, after completing studies at the University of Chicago, he became Chief of the Technical Management Office of the Directorate of Laboratories, Headquarters Wright Air Development Center (WADC), ARDC, Wright-Patterson AFB, Ohio

Colonel Cummins became Assistant Chief of the Weapon Guidance Laboratory, Directorate of Laboratories of WADC on 1 July 1957 and became chief on 1 July 1957. In April 1960 after laboratory reorganization, he was Chief, Navigation and Guidance Laboratory, Avionics Division, Directorate of Advanced Systems Technology, Wright Air Development Division of ARDC.

On 1 November 1960, Colonel Cummins became Chief of the Avionics Division, Directorate of Advanced Systems Technology at Wright Air Development Division. With the establishment of the Air Force Systems Command, on 1 April 1961 Colonel Cummins became Director of the Directorate of Avionics of the Deputy for Technology, Aeronautical Systems Division of the headquarters.

Colonel Cummins retired in 1962 from the United States Air Force after 21 years of service and died 3 November 1984 in Rapid City, South Dakota at the age of 75.

This biography generated from Col Cummins' obituary published 4 November 1984 in the Rapid City (South Dakota) Journal, page 9; and summary of military service, National Archives and Records Administration. Photograph from the National Archives. Both documents on file in Sensors Directorate archives.

Colonel Walter P. Glover
Director and Commander
Air Force Avionics Laboratory
1962 - July 1964

Colonel Glover earned a Bachelor of Science Degree in Mechanical Engineering from Virginia Polytechnic Institute, Blacksburg, Virginia; Bachelor of Science Degree in Electronics from Air Force Institute of Technology, Wright-Patterson AFB, Ohio; and a Master's Degree in Research and Development Management from the University of Chicago.

Colonel Glover began his military career as an Ordnance officer but got started in research with work on the "Ruby Project" in England in 1946. The Ruby Project studied the effects of bombs on concrete. Bombs from 2,000 to the 22,000 pound British “Grand Slam” and a 4,500 pound rocket-assisted armor-piercing bomb were studied. Long-range delivery of the “Grand Slam” was demonstrated utilizing the B-29.

This was followed by two tours at the Air Proving Ground Center, Eglin AFB, Florida, one tour conducting cold weather testing of armament in Alaska and a tour in the Pentagon.

Colonel Glover was selected as the first Director and Commander of the Air Force Avionics Laboratory following a four year tour at the Air War College, Maxwell AFB, Alabama.

Reference for Ruby Project:
http://www.flightglobal.com/pdfarchive/view/1946/1946%20-%201049.html
("Flight", May 30, 1946)

Mr. Peter R. Murray
Director
Air Force Avionics Laboratory
August 1964 - June 1967

Mr. Peter R. Murray received a Bachelor of Science Degree from Antioch College, Yellow Springs, Ohio in 1938.

He began his career early as an engineering aide co-op student in the Aircraft Radio Laboratory of the Army Signal Corps at Wright Field in 1935. Upon graduation in 1938, he continued with the Aircraft Radio Laboratory as a radio engineer until 1945.

Entering military service in 1945, Mr. Murray was Officer in Charge of the Pilotless Aircraft Unit, Engineering Division, Air Materiel Command through 1946. Returning to civilian status, he then was electronics staff engineer for guided missiles in the division until 1951.

Re-entering military service, Mr. Murray served as a staff engineer for the Weapons Components Laboratory and then as Technical Director for Guided Missiles at the Wright Air Development Center at Wright-Patterson Air Force Base. He retained the position when he was discharged in 1953 and continued as Technical Director until 1961. During this period he led development of Matador, Falcon, Mace, Snark, Bomarc, Atlas, Hound Dog, and Skybolt missiles.

From 1961 until 1964 Mr. Murray was Technical Director for Wright Air Development Division's Directorate for Technology, providing technical leadership to the laboratories at Wright Field.

Mr. Murray became the second Director of the Air Force Avionics Laboratory in 1964 and remained in that position until June 1967 when he was appointed Deputy Director of the Research and Technology Division, Air Force Systems Command at Bolling Air Force Base, Washington DC. He continued in that position as it evolved into the Directorate of Laboratories at Andrews, Air Force Base, Maryland. He subsequently assumed the position of Acting Director in 1970 until his retirement in 1972.

Mr. Murray was awarded patents for remote control systems for aircraft landing gear and landing flaps, automatic transmission of data from aircraft, and remote control systems for aircraft. Among his most significant papers were: "Remote Control of Pilotless Aircraft," 1946; "You Don't Walk Home from Outer Space!" 1960; and System Acquisition Cost and Control," 1961.

In 1946 he received the Lawrence Sperry Award from the Institute of Aeronautical Sciences for his early career contributions to pilotless aircraft, drones, and missiles. He received the Army Commendation Medal in 1947 for providing the first drone aircraft to fly through atomic clouds. Mr. Murray twice received the Exceptional Civilian Service Award. He was recognized by the Institute of Electrical and Electronics Engineers' Pioneer Award in 1979 for his original work in guidance and control of pilotless vehicles. In 1964 he was presented the American Management Association Honor Award Plaque for "extraordinary and continuing contribution of his services to education for management by management." In 1966 he was chosen by the Dayton, Ohio chapter of the Society of Personnel Administration as the Dayton area's outstanding professional. Since 1989, the Avionics Laboratory, and now the Sensors Directorate, annually presents the Peter R. Murray Award to the outstanding manager of the year in the organization.

Mr. Murray was a senior member of the Institute of Radio Engineers, a member of the Scientific Research Society of America, and a consultant to the American Ordnance Association.

Colonel James L. Dick
Director and Commander
Air Force Avionics Laboratory
July 1967 - May 1969

Colonel James L. Dick served as Commander and Director of the Air Force Avionics Laboratory, Air Force Systems Command from July 10, 1967 till May 1969.

Colonel Dick graduated from Indiana University with a Bachelor of Science in Education. He earned a Master of Science degree in Inorganic Chemistry from the University of Pittsburg, and received his Doctorate in Nuclear Chemistry from The Ohio State University.

His prior assignment was Vice Commander of Air Force Cambridge Research Laboratories (AFCRL), Bedford, Massachusetts which began in July 1965.

Colonel Dick completed an earlier tour with AFCRL which began in 1954, and from 1959 to 1962 he was with AFCRL's headquarters as Chief of Research Planning, DCS/Plans and Requirement. During that time he also served part-time as Assistant Deputy for Sciences in the Office of Scientific Research.

From 1962 to 1963 Colonel Dick was assigned to Headquarters, Defense Atomic Support Agency, Washington, D.C., as director of Project Roller Coaster, a study of radiation hazards associated with nuclear weapons.

For his work on this thousand-man research program, sponsored by the Department of Defense, Atomic Energy Commission and the United Kingdom, Colonel Dick was awarded the Department of Defense Commendation Medal.

Colonel Dick also was awarded the Air Force Commendation Medal for his work on several nuclear test series in which he studied the effects of radioactive debris on flight crews.

A master navigator, meteorologist, and nuclear chemist, Colonel Dick was a navigator instructor and meteorologist during World War II. He received his training as a meteorologist at Chanute Field, Ill., and was a forecaster at Trenton, N.J., and Pittsburgh, Pa.

In the Korean conflict, Colonel Dick was navigator on B-29s and compiled 758 combat hours in 78 missions.

Source: Correspondence from Col Dick.

Colonel John E. Kulpa, Jr.
Director and Commander
Air Force Avionics Laboratory
August 1969 - June 1971

Retired April 1, 1983.

Major General John E. Kulpa, Jr. graduated from Bloomfield (N.J.) High School in 1946 and entered the U.S. Military Academy at West Point, N.Y. He graduated from the academy in 1950 with a Bachelor of Science Degree in Military Engineering. The general earned a Master of Science Degree in Aeronautical Engineering from the Air Force Institute of Technology at Wright-Patterson Air Force Base, Ohio. General Kulpa completed Squadron Officer School and the Air Command and Staff College, both located at Maxwell Air Force Base, Ala.; and the National War College, Fort Lesley J. McNair, Washington, D.C.

After graduation from the academy, he received flight training at James

Connally and Ellington Air Force bases, Texas, and was awarded navigator wings in September 1951. In October 1951 he was assigned to the 343rd Strategic Reconnaissance Squadron at Ramey Air Force Base, Puerto Rico, and in March 1952 he was assigned temporary duty at Yokota Air Base, Japan, where he completed a Korean War combat tour of duty.

In November 1952 the general returned to the 343rd Strategic Reconnaissance Squadron which had relocated to Forbes Air Force Base, Kan. In March 1954 he was assigned to England with detachments of the 55th Strategic Reconnaissance Wing at Royal Air Force stations Mildenhall and Lakenheath.

Upon his return to the United States in November 1954, he joined the 4024th Bombardment Squadron at Biggs Air Force Base, Texas, as a lead navigator on a select aircrew. He became the ground training officer for the 97th Bombardment Wing, also at Biggs Air Force Base, in October 1955.

After completing the Air Force Institute of Technology program at Wright-Patterson Air Force Base in August 1957, General Kulpa was assigned to the Wright Air Development Center, also at Wright-Patterson Air Force Base. During this time the center was being structured into the Wright Air Development Division and ultimately into the Aeronautical Systems Division. He was project engineer for propulsion and flight test in the Snark Weapon System Project Office and then operational manager in the GAM-77 Hound Dog Project Office. As operational manager he was the key individual within Air Force Systems Command for assuring the smooth and successful transition of the Hound Dog missile into the Strategic Air Command inventory.

From August 1962 to July 1963, he attended Air Command and Staff College and in August 1963 he joined Space Systems Division at Los Angeles Air Force Station as a project manager responsible for the development of a research sub-satellite. In February 1965 he became system program director of an active Air Force satellite program.

Following graduation from the National War College in August 1969, General Kulpa became Commander and Director of the Air Force Avionics Laboratory at Wright-Patterson Air Force Base. From August 1971 to August 1972, he served as Deputy for Engineering at the Aeronautical Systems Division, directing the largest in-house system engineering capability in the U.S. Air Force. He was then assigned to the Office of the Secretary of the Air Force in Washington, D.C., as Deputy Director for Programs, Office of Space Systems and, in January 1973, became the director.

General Kulpa was Principal Deputy for Plans to the Deputy Director of

Central Intelligence for the Intelligence Community, Washington, D.C., from October 1974 to July 1975.

In August 1975 General Kulpa was assigned Director of Special projects, Office of the Secretary of the Air Force, and in February 1980 he assumed the additional duties of Deputy Commander for Space Operations, Space Division, Los Angeles Air Force Station, California until his retirement.

His military decorations and awards include the Distinguished Service Medal with oak leaf cluster, Legion of Merit with oak leaf cluster, Distinguished Flying Cross, Air Medal, Air Force Commendation Medal with oak leaf cluster and Distinguished Unit Citation emblem. He was the recipient of the prestigious General Thomas D. White Space Trophy in 1980.

He was promoted to major general Feb. 6, 1976, with date of rank June 14, 1973.

General Kulpa's hometown is Bloomfield, N.J.

(Current as of March 1982)

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Colonel M. Michael Bonner
Director and Commander
Air Force Avionics Laboratory
June 1971 - July 1974

At the time of his retirement in July 1974, Colonel Bonner had served as Commander and Director of the Air Force Avionics Laboratory at Wright-Patterson AFB, Ohio since June 1971. The organization reported to the Directorate of Laboratories, Air Force Systems Command, Andrews AFB, Maryland. He was awarded the Legion of Merit (1st Oak Leaf Cluster) for his service.

Colonel Bonner enlisted in the U.S. Army Air Corps in June 1943, entering the Army at Fort Benjamin Harrison, Indiana. During the Second World War, he attended Air Corps basic training, West Point Preparatory School at Cornell Univ. and served briefly in the 71st Cavalry Reconnaissance Troop of the 71st Infantry Division where he was awarded the Army Good Conduct Medal.

Colonel Bonner was honorably discharged in February 1945 to accept an appointment to the U.S. Naval Academy in June 1945. He graduated in June 1949 and was immediately commissioned a 2nd Lieutenant in the U.S. Air Force. He entered pilot training at Randolph AFB, TX and graduated in August 1950.

He was assigned as a pilot to the 10th Troop Carrier Squadron, Rhine-Main AFB, Germany flying C-82 and C-119 aircraft. Later he was Aircraft Commander and then also Squadron Maintenance Officer and Instructor Pilot.

In August 1953 Colonel Bonner was assigned to the Flight Test Operations Office of the Air Force Flight Test Center, Edwards AFB, CA.

In June 1954 Colonel Bonner was selected for the AFIT graduate program and was assigned to the University of Michigan where he was awarded dual Masters of Science in Engineering degrees in Aeronautical Engineering and Instrumentation Engineering.

In June 1956 he was assigned to the Directorate of R&D at Headquarters USAF, Washington, DC as an R&D Staff Officer until he assumed similar duties at Headquarters Air Defense Command, Colorado Springs, Colorado in July 1959. While there, he was awarded the Air Force Commendation Medal.

In June 1963 Colonel Bonner again journeyed to the University of Michigan under the AFIT Graduate program and was awarded a Doctorate in Aerospace Engineering.

In December 1965 Colonel Bonner assumed the post of Deputy Director of Advanced Technology at the National Reconnaissance Office, and was stationed at the Air Force Space Systems Division, Los Angeles, California. While there he was awarded the Legion of Merit.

Written from draft provided by Col Bonner, on file.

Dr. Bernard H. List
Director
Air Force Avionics Laboratory
July 1974 - June 1975

Dr. Bernard List, a native of Baltimore, Maryland, studied at Johns Hopkins University where he received his Bachelor of Science Degree in Electrical Engineering in 1947 and his Doctorate in Electrical Engineering in 1951. Dr. List's studies included work in electrical and magnetic properties of high-current arcs and the dielectric properties of insulating materials.

Dr. List became Director of the Air Force Avionics Laboratory at Wright-Patterson AFB, Ohio in July 1974. He served in that role until June 1975, when he accepted a position in The Department of Defense Department of Research and Engineering.

Dr. List had been with the Avionics Laboratory since 1971, first as Chief

Scientist and later as Deputy Director. Prior to the Avionics Laboratory, he was employed by Texas Instruments Inc. (TI), a Dallas manufacturer of electronic equipment and components. At TI, Dr. List was director of the Systems and Information Sciences Laboratory. His work there included research in systems and information sciences from a theoretical and applied standpoint. Earlier assignments included technical studies and advanced development programs in fields of interest to the company such as aerospace electronics, undersea warfare systems, surveillance systems and weapons.

At one time he was manager of Advanced Planning of the Components group at TI where he was responsible for developing long-range plans and conducting market research. He was responsible for the development of the metastable helium magnetometer at TI from the research phase through the development and production of helium magnetometers for a number of applications.

Chief of the Electrical Engineering Division at Battelle Memorial Institute prior to his TI assignment, Dr. List spent six years in the fields of electrical guidance control and instrumentation systems for air weapons and studies of means of reducing the radar cross section of aircraft.

Dr. List was a member of the Institute of Electrical and Electronic Engineers with a special membership in Systems and Cybernetics, Information Theory, Computers, Reliability, Engineering Management, and Electronic Circuits. Other professional societies include the Association of Old Crows and Sigma Xi. He was a registered professional engineer in both Ohio and Texas.

Source: 16 June 1967 WPAFB Skywrighter, page 1.

Dr. William C. Eppers, Jr.
Director
Air Force Avionics Laboratory
July 1975 - May 1977

Dr. William Eppers earned a Bachelor of Science Degree and a Doctor of Engineering degree, both in Electrical Engineering, from the Johns Hopkins University.

From November 1950 to October 1951, he was a geophysicist with the U.S. Geological Survey in Washington, D.C. From July 1952 to July 1953 he worked as an electronic consultant to the U.S. Public Health Service National Heart Institute in Bethesda, Maryland.

During the period from October 1951 to March 1955, Dr. Eppers was a research assistant for the Institute for Cooperative Research at the Johns Hopkins University. From March 1955 to March 1957, he was an instructor in electrical engineering at the Air Force Institute of Technology at Wright-

Patterson Air Force Base, Ohio. He became an assistant professor of engineering at AFIT in March 1957.

Dr. Eppers came to the Air Force Avionics Laboratory (as it was then called) in September 1960 and was named Director in July 1975, serving in that role until May 1977.

At the time of his retirement, Dr. Eppers was the Deputy Director of the Avionics Laboratory, of the Air Force Wright Aeronautical Laboratories at Wright-Patterson Air Force Base, Ohio.

He was elected a Fellow of the Institute of Electrical and Electronic Engineers in 1976 and in 1992 he received the IEEE Aerospace and Electronic Systems' Pioneer Award recognizing his laser research. Other honors and awards include being named an Outstanding Engineer in the Dayton area in 1972. He received the Samuel M. Burka Award in 1969 and has served on numerous technical panels. He is the author of numerous technical papers.

After coming to the Avionics Laboratory, Dr. Eppers had been involved in many programs including initiating the Department of Defense and Air Force program in gas dynamic lasers and provided the technical direction. The effort has grown to multimillion dollar programs in all services. He also directed the first study on the use of high energy gas dynamic lasers.

Dr. Eppers also initiated and served as Program Director of the Air Force Program 405B laser communications space data relay. He was a co-developer of the high power carbon monoxide laser, the second most efficient and powerful gas laser to carbon dioxide. He also was the first to successfully explain the ion velocity distribution at the cathode of the glow discharge.

He was the initial developer of the x-ray fluorescent technique to measure gas densities in gas discharges, was a project engineer on the Italian-U.S. and Swedish-U.S. exchange program on plasma physics, and developed the first laser made by the Air Force in June 1962.

Dr. Eppers retired in March 1985.

Colonel James D. Everett
Director and Commander
Air Force Avionics Laboratory
May 1977 — July 1978

Colonel James D. Everett's mother died when he was a child and he and his brother and sister were admitted to the Barium Springs Home for Children, a Presbyterian Orphanage in Barium Springs, North Carolina. He graduated from high school there in 1949 as class valedictorian and attended college at North Carolina State College through December 1950, leaving upon receiving an appointment to the US Naval Academy. He graduated from the academy in 1955 and was commissioned in the US Air Force.

Colonel Everett's first assignment was Pilot training (Class 56 Tango) at Moore Air Base, McAllen Texas. After 100 hours of training, he was disqualified for medical reasons.

Colonel Everett was reassigned to the Office of Special Investigation, Langley AFB, Va. After attending school and qualifying as a Special Agent, he was sent to the 7493rd SIW, Wiesbaden Air Base, Germany in May 1957. He returned to the United States three years later and was assigned to District Office #2, in New York City. In January 1962 he entered the University of New Hampshire to pursue a Masters in Electrical Engineering. He finished course work in November 1963 but due to illness did not receive a degree.

In 1964, Colonel Everett was assigned to the Air Force Eastern Test Range, Patrick Air Force Base, Florida. His principle job was equipping two re-entry vehicle tracking ships with appropriate instrumentation. These two ships, the Arnold and the Vandenberg, operated primarily in the Pacific Ocean supporting Minuteman Re-entry Vehicle Tests.

Colonel Everett was assigned to the Space Launch Test Wing, Vandenberg, Air Force Base, California in 1967. While there he managed launch pad modifications to accept a new launch vehicle and satellite, coordinated contractor/military launch vehicle check out and testing, and certified to the launch commander that all systems were go. Colonel Everett considers his participation in the deployment of the first satellite in this highly critical system as a high level mark in his career.

He earned a Master of Science Degree in Aerospace Operation from The University of Southern California while at Vandenberg.

In 1972, while assigned to the Secretary of the Air Force Special Projects (SAFSP) Los Angeles, Colonel Everett acquired all Agena launch vehicles and coordinated systems needed for satellites with the Launch Vehicle Acquisition Office. Responsible for checkout and launch readiness, he interfaced with the Test Wings at Patrick AFB and Vandenberg AFB. No launches were lost during his tenure. In 1974, he moved up to Assistant Deputy Director, assisting the Deputy Director with the overall management for the design, build and launch of four satellite systems. In 1975 he was assigned as Deputy Director of a new Special Program Office (SPO) with responsibility for the design, build and launch of two systems and procuring the necessary ground equipment. While in Los Angeles, he completed the Armed Forces Staff College Correspondence Course.

Colonel Everett was assigned to System Avionics Division, Air Force Avionics Laboratory, Wright-Patterson AFB, Ohio in 1976. In May 1977, he relieved Colonel John Rich and became Commander and Director of the Air Force Avionics Laboratory. During his tenure, the Laboratory initiated its first briefing to industry in an attempt to get much more interaction with industry and increased technology transfer in both directions. Also the Laboratory initiated the first joint weapons program with Aeronautical Systems Division.

Within the Operations Division, a cost tracking system was implemented which enabled the Commander to readily maintain awareness of troubled programs and to redirect resources to that program through reprogramming actions.

Colonel James D. Everett relinquished command and retired from the Air Force on 31 July 1978.

Source: email correspondence from Col Everett

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Colonel Robert F. Lopina
Director and Commander
Avionics Laboratory
August 1978 - June 1980

Colonel Lopina graduated from Niles Township High School, Skokie, IL in 1953. He received a Bachelor of Science Degree in Mechanical Engineering from Purdue University, West Lafayette, Indiana, and was commissioned a second lieutenant through the Air Force Reserve Officer Training Corps in 1957. He earned a Master of Science Degree in Mechanical Engineering, and Doctor of Philosophy degree with specialization in heat transfer during the period 1964 to 1967 at the Massachusetts Institute of Technology. He graduated from the Armed Forces Staff College, Norfolk, Virginia, in 1971, and the Air War College, Maxwell Air Force Base, Ala., in 1977.

After completing Communications Officer's School at Keesler Air Force Base, Miss. he was assigned to the Los Angeles Air Defense Sector, Norton

Air Force Base, Calif., until November 1963. The following year, he served as a communications and radar maintenance officer for the 931st Aircraft Control and Warning Squadron, Thule Air Base, Greenland.

In June, 1967, Colonel Lopina was assigned to the Department of Aeronautics, U.S. Air Force Academy, Boulder, Colo., where he performed research and taught courses in aerodynamics, thermodynamics, heat transfer, propulsion and experimental methods. During 1973, he served as chief of a mobile training team at the Royal Thai Air Force Academy in Bangkok, Thailand.

From June 1974 to July 1976, Colonel Lopina was Chief Scientist for the European Office of Aerospace Research and Development, Air Force Systems Command, London, England. In June 1977, he was assigned to the Flight Dynamics Laboratory, Wright-Patterson, where he served as Chief of the Flight Control Division. He became the Commander and Director of the Avionics Laboratory in August 1978, and then Deputy for Engineering, ASD, in June 1980. He assumed duties as Deputy, Reconnaissance/Strike with Aeronautical Systems Division in September 1982.

His military decorations and awards included the Legion of Merit, the Meritorious Service Medal with one oak leaf cluster and the Vietnam Service Medal.

Colonel Robert R. Rankine, Jr.
Director
Avionics Laboratory
October 1980 - May 1981

Retired July 1, 1992.

Major Geneneral Robert R. Rankine Jr. was born in 1936, in Chicago and graduated from Arlington Heights (Ill.) High School in 1954. He earned a Bachelor of Science Degree in Electrical Engineering from the University of Illinois in 1958, a Master of Science Degree in Electrical Engineering from the Air Force Institute of Technology in 1964, and a Doctorate in Engineering from the University of California at Los Angeles in 1970. The general completed Squadron Officer School in 1962, Armed Forces Staff College in 1973 and Industrial College of the Armed Forces in 1978.

Commissioned in the Air Force in June 1958 through the Reserve Officer Training Corps program at the University of Illinois, General Rankine

entered active duty in September 1958 as the radar maintenance officer with the 702nd Radar Squadron, Hunter Air Force Base, Ga. He subsequently served as communications and electronics officer until April 1962.

After completing Squadron Officer School in August 1962, the general entered the School of Engineering, Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio, and completed his master's degree. In June 1964 he transferred to the Air Force Flight Dynamics Laboratory as control techniques group leader in the Flight Control Division. During that time he also spent two months in Southeast Asia as a member of an Air Force Systems Command team investigating aircraft survivability. In May 1968 he entered the University of California at Los Angeles for graduate study. He received a Doctor of Philosophy Degree in Engineering in December 1970 and subsequently was assigned to the Air Force Institute of Technology as an assistant professor of electrical engineering.

Upon completion of the Armed Forces Staff College in January 1973, General Rankine was assigned to the Office of the Assistant Chief of Staff, Studies and Analyses, Headquarters U.S. Air Force, Washington, D.C. While there he conducted several studies of fighter weapons, aircraft and force structure, and was Chief of the Fighter Division at the time of his selection to attend the Industrial College of the Armed Forces in August 1977.

He returned to Air Force headquarters in June 1978 as Executive Assistant to the Assistant Secretary of Defense for Communications, Command, Control and Intelligence. During that tour of duty, General Rankine accompanied the assistant secretary on an official visit to the People's Republic of China as part of the administration's attempt to improve Sino-U.S. relations. The general transferred to Wright-Patterson Air Force Base in September 1980 as Director of the Avionics Laboratory. In June 1981 he became Commander of the Air Force Wright Aeronautical Laboratories at Wright-Patterson.

In August 1982 General Rankine became Deputy Director for Space Systems and Command, Control and Communications in the Office of the Deputy Chief of Staff for Research, Development and Acquisition at Air Force headquarters. In October 1983 he was assigned to the Office of the Undersecretary of Defense for Research and Engineering as the assistant for directed energy weapons, and had responsibility for the initial planning of the president's Strategic Defense Initiative. He later assisted in the formation of the Strategic Defense Initiative Organization by serving as its first deputy director, beginning in April 1984.

In September 1984 the general was assigned in the dual capacity of special assistant for the Strategic Defense Initiative to the Deputy Chief of Staff for Research, Development and Acquisition at Air Force headquarters and to

the Vice Commander, Air Force Systems Command, Andrews Air Force Base. There he developed the Air Force's policies and procedures for executing the Strategic Defense Initiative program. While at Air Force headquarters he was responsible for the Air Force's science and technology programs, including the initiation of the national aerospace plane program. In June 1986 he became director of space systems and command, control and communications, Office of the Deputy Chief of Staff for Research, Development and Acquisition, Air Force headquarters. He served in this position until March 1987, when a reorganization of the headquarters resulted in a merger of most of the responsibilities of his two prior positions into a single new position in the Office of the Assistant Secretary of the Air Force (Acquisition): Director of space and Strategic Defense Initiative programs, military deputy for acquisition.

General Rankine again simultaneously held the position of special assistant for Strategic Defense Initiative to the Vice Commander, Air Force Systems Command. In November 1987 he became Vice Commander, Space Systems Division, Los Angeles Air Force Base, Calif.

Gen Rankine was assigned the Deputy Chief of Staff for Technology, Headquarters Air Force Systems Command, Andrews Air Force Base, Maryland in April 1990.

The general is a registered professional engineer in Ohio. His military awards and decorations include the Defense Distinguished Service Medal, Defense Superior Service Medal and Legion of Merit with two oak leaf clusters. He also wore the Master Space Badge.

He was promoted to Major General May 1, 1987, with same date of rank.

(Current as of May 1990)

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Colonel Barton Krawetz
Director
Avionics Laboratory
September 1981 - December 1982

Colonel Barton Krawetz was born Sept. 1, 1939 in Miami, Fla., and graduated from Bayside High School, Bayside, Long Island, N.Y., in 1956. He received; a Bachelor of Science Degree in Electrical Engineering from the Massachusetts Institute of Technology (MIT) in 1960; a Master of Science Degree in Space Physics from the Air Force Institute of Technology (AFIT) in 1965; and a Doctorate in Applied Science (physics) from the University of California at Davis in 1972 while serving as a research associate at the Lawrence Livermore Laboratory, Livermore, Calif. He also attended the Air Command and Staff College at Maxwell Air Force Base, Ala., in 1973.

Upon graduation from MIT, the Colonel was commissioned a second lieutenant through the Reserve Officers' Training Corps. His first assignment was

to Vandenberg Air Force Base, Calif., in 1961, where he served as an engineer with the 6555th Test Wing. In 1963 he was assigned to AFIT at Wright-Patterson Air Force Base as a graduate student. Two years later, he was transferred to Headquarters Ballistic Systems Division at Norton Air Force Base, Calif., as an inertial navigation engineer in the Deputy for Engineering Office.

In 1968, Colonel Krawetz was assigned to the Lawrence Livermore Laboratory, Livermore, Calif. He then became staff assistant to the Deputy Assistant Secretary for Intelligence, Office of the Secretary of Defense at the Pentagon in 1973.

In 1976, the Colonel served on the Air Staff for the Assistant Chief of Staff for Studies and Analysis as Chief of the Tactical Systems Division at the Pentagon. The following year he became the Deputy Chief of Staff for Studies and Analysis at the Tactical Fighter Weapons Center, Nellis Air Force Base, Nev.

In October 1979, Colonel Krawetz was named executive to the principal Deputy Undersecretary of Defense, Research and Engineering, Office of" the Secretary of Defense at the Pentagon. He then returned to Wright-Patterson in September 1981 as the Director of Aeronautical Systems Division's Avionics Laboratory. In December 1982, Colonel Krawetz was named Deputy for Engineering at Aeronautical Systems Division. He assumed the position as Commander of the Air Force Wright Aeronautical Laboratories, Aeronautical Systems Division, Wright-Patterson Air Force Base, Ohio. Air Force Systems Command, in May 1984.

Colonel Krawetz' s military awards and decorations included the Defense Superior Service Medal, Legion of Merit, Meritorious Service Medal and Air Force Commendation Medal.

(Current as of May 1984)

Colonel Ernest F. Moore
Director
Avionics Laboratory
December 1982 - January 1985

Colonel Ernest F. Moore was born Sept. 11, 1936, in Morristown, Tenn., and graduated from Manual Training High School, Peoria, Ill., in 1954. He received a Bachelor of Science Degree in Mechanical Engineering from Bradley University, Peoria, in 1958; a Master of Science Degree in Aeronautical Engineering in 1967; and a Doctorate Degree in Aeronautical Engineering in 1977, both from the Air Force Institute of Technology, Wright-Patterson Air Force Base. He completed Squadron Officer School at Maxwell Air Force Base, Ala., in 1962.

He was commissioned a second lieutenant through the Air Force Reserve Officers' Training Corps program concurrent with his degree in 1958, and entered active duty at Lackland Air Force Base, Texas, in April 1959. He completed navigation training at James Connelly Air Force Base, Texas, in 1960;

electronic warfare officer training at Keesler Air Force Base, Miss., and B-52H training at Castle Air Force Base, Calif., both in 1961.

From September 1961 to September 1965, Colonel Moore was assigned to the 93rd Bomb Squadron, 2nd Air Force, Strategic Air Command, Kincheloe Air Force Base, Mich. During this assignment he served as an electronics warfare officer on the B-52H as a flight instructor, and later as Chief of the Penetration Aids Branch, 449th Bomb Wing, where he was responsible for annual training requirements and proficiency of all electronics warfare offices and gunners of the Bomb Wing, the development of scenarios and combat mission profiles in support of the SAC mission, and the installation, operation and scheduling of a new electronic combat simulation facility.

After completing graduate studies in 1967, Colonel Moore was assigned to the 42nd Tactical Electronic Warfare Squadron, 355th Tactical Fighter Wing (PACAF), Takhli Royal Thai Air Force Base, Thailand. While there he served as an electronics warfare officer and flight instructor on the EB-66 aircraft, as well as in numerous squadron staff positions. Through August 1968, he flew 100 combat missions including 30 over North Vietnam.

Upon returning to the United States in August 1968, Colonel Moore was assigned to the Research Projects Branch, Aeronautical Systems Division, Wright Patterson Air Force Base, where he served in several positions including data and configuration manager, test and deployment officer, and project manager for Southeast Asia systems in support of Igloo White and the building of McNamara's fence.

After completing academic requirements for a doctoral degree in January 1973, he was assigned as a project manager to the Air Force Flight Dynamics Laboratory at Wright-Patterson Air Force Base. During this assignment he established a cadre to identify, plan, develop, and integrate key sets of technology programs to improve the lethality and survivability of future tactical fighter aircraft. These programs were the Laboratory's major flight test programs for improving both air-to-air and air-to-ground combat effectiveness.

From September 1973 to February 1980, the Colonel served as the first program manager for both the F-15 Integrated Flight/Fire Control (F-15) and the Advanced Fighter Technology Integration (AFTI/F-16) programs, which have since influenced the configurations of future versions of these fighters, and the planning for the next generation tactical fighter.

In March 1980, Colonel Moore was assigned to Headquarters Air Force Systems Command, Andrews Air Force Base, Md., as the Director of Electronics and Space Technology. While there he was responsible for directing the technology programs of the Space Division, Los Angeles Air Force Station,

Calif.; Rome Air Development Center, Griffiss Air Force Base, Rome, N.Y.; the Lincoln Laboratory, Lexington, Mass.; and certain programs for the Air Force Wright Aeronautical Laboratories.

In December 1981 he returned to Wright-Patterson as chief of the Flight Control Division, Flight Dynamics Laboratory.

Colonel "Frank" Moore became director of the Avionics Laboratory, Air Force Wright Aeronautical Laboratories, Aeronautical Systems Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio in December 1982.

His military decorations and awards included the Distinguished Flying Cross, Meritorious Service Medal with one oak leaf cluster, Air Medal with seven oak leaf clusters, Presidential Unit Citation, Air Force Outstanding Unit Award with V device, Combat Readiness Medal, Air Force Organizational Excellence Award, Vietnam Service Medal with four service stars, Republic of Vietnam Gallantry Cross with palm, and the Republic of Vietnam Campaign Medal.

(Current as of November 1983)

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Colonel James D. Lang
Director
Avionics Laboratory
March 1985 - April 1986

Colonel Lang was born March 22, 1942, in Chicago and graduated from Steinmetz High School there in 1959. He graduated from the U.S. Military Academy, West Point, N.Y., in 1963 as a distinguished graduate where he received a Bachelor of Science Degree in Military Engineering and was commissioned as a second lieutenant in the U.S. Air Force. He received a Master of Science Degree in Aeronautics and Astronautics from Stanford University, Stanford, Calif., in 1969, and a Doctoral degree in Aerodynamics from the Cranfield Institute of Technology, England, in 1975. He completed Squadron Officers' School in 1970; Air Command and Staff College in 1976; and the Industrial College of the Armed Forces in 1976, all by correspondence. He completed the Air War College by seminar in 1978 and graduated from the Industrial College of the Armed Forces, Fort Lesley J. McNair, Washington, D.C., in 1983.

Colonel Lang attended pilot training at Williams Air Force Base, Ariz., and received his pilot wings in August 1964. He then served as a transport pilot, 8th Military Airlift Squadron, McChord Air Force Base, Wash. From November 1966 through November 1967, he was assigned to the 20th Tactical Air Support Squadron, with duty at Hue and DaNang, Vietnam. While in Vietnam, he served as a forward air controller and air operations officer and flew 320 combat missions in 0-1 "Bird Dog" aircraft.

The U.S. Air Force Academy sponsored his graduate education at Stanford University beginning in January 1968. In June 1969, upon completion of his master's degree, Colonel Lang became an instructor of aeronautics at the U.S. Air Force Academy. In October 1971, he went to England for doctoral studies at the Cranfield Institute of Technology. He returned to the U.S. Air Force Academy in January 1974, as an associate professor of aeronautics. While at the Academy, Colonel Lang edited and co-authored a text on aircraft performance, stability and control, and served as an assistant head of the Department of Aeronautics.

In January 1978, Colonel Lang was assigned to the 4950th Test Wing, Aeronautical Systems Division, Wright-Patterson Air Force Base, Ohio, where he served as an engineering test pilot and as the Air Launched Cruise Missile projects manager and later as the Deputy Director, Flight Test Engineering. In June 1983, after returning to Wright-Patterson Air Force Base from schooling in Washington D.C., Colonel Lang became Chief of the Flight Control Division, Flight Dynamics Laboratory, Air Force Wright Aeronautical Laboratories, Aeronautical Systems Division. He was assigned as Director of the Avionics Laboratory in March 1985. In April 1986, he assumed his present position as Deputy for Engineering, Aeronautical Systems Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.

The colonel is a command pilot with over 3000 flying hours. His military decorations and awards included the Distinguished Flying Cross with one oak leaf cluster, the Purple Heart, the Meritorious Service Medal with one oak leaf cluster, the Air Medal with 15 oak leaf clusters, the Air Force Commendation Medal, and the Republic of Vietnam Honor Medal First Class. He was awarded National Science Foundation fellowships for his master's and doctoral studies. Colonel Lang was an associate fellow of the American Institute of Aeronautics and Astronautics, a member of the Society of Flight Test Engineers, and a member of the Association of Old Crows. He is a registered professional engineer in Colorado. He has published over twenty papers in the areas of fluid dynamics, flight mechanics, and engineering management.

He was promoted to Colonel 1 November 1983.

(Current as of November 1986)

Colonel Bruce C. Tompkins
Director
Avionics Laboratory
April 1986 - August 1988

Colonel Tompkins was born July 31, 1943, in Albany, N.Y., and graduated from Vincentian Institute, Albany, N.Y., in 1961. He graduated from Manhattan College, New York City, in 1965 with a Bachelor of Science Degree in Electrical Engineering and a commission as a second lieutenant through the Air Force Reserve Officers Training Corps. He attended Squadron Officer School in 1971 and Air Command and Staff College in 1973. He received a Master of Science degree in Systems Management from the University of Southern California, Los Angeles, in 1974. He graduated from the Defense Systems Management College in 1978 and the Air War College in 1984.

Following entry into the Air Force in 1965, Colonel Tompkins was assigned to the Air Force Communications Services, Andrews Air Force Base,

Md. He served as a communications engineer and operations officer with units in Washington, D.C., Syracuse, N.Y., Wahiawa, Hawaii, and Croughton, England, for two years.

In 1968, Colonel Tompkins was assigned to Wiesbaden, Germany, as an aide-de-camp and executive officer at Headquarters U.S. Air Forces in Europe. He returned to the U.S. in 1970 to command the 1960th Communications Squadron, Kirtland Air Force Base, N.M. From 1972 until 1974, he was Chief of Systems Analysis at Headquarters Northern Communications Area, Griffiss Air Force Base, N.Y. In 1974, he became a program engineer at Electronics Systems Division (AFSC), Hanscom Air Force Base, Mass., where he later served as Chief of Engineering and Chief of Programs for the Strategic Air Command Automated Total Information Network/SAC Digital Network (SATIN IV/SACDIN) System Program Office.

In 1979, he was assigned to the Armament Division (AFSC), Eglin Air Force Base, Fla. While at Eglin, he served as program manager, Air Combat Maneuvering Instrumentation (ACMI) systems and ranges, Director of Technical Operations and Assistant Deputy for Range Systems.

In June 1984, Colonel Tompkins was assigned to Aeronautical Systems Division, Wright-Patterson Air Force Base, Ohio, as System Program Director of the Subsystems/Support Equipment SPO, responsible for aircraft common support equipment, automatic test equipment, and common avionics systems. In August 1985, he was selected as Director of Common Avionics. As System Program Director of Common Avionics, he established the Interdivisional System Program Office for Advanced Avionics.

Colonel Tompkins assumed the position as Director of the Avionics Laboratory, Air Force Wright Aeronautical Laboratories, Air Force Systems Command, Aeronautical Systems Division, Wright-Patterson Air Force Base, Ohio in April 1986.

The colonel's military decorations and awards included the Meritorious Service Medal with two oak leaf clusters, the Air Force Commendation Medal with one oak leaf cluster, the Humanitarian Service Medal, the National Defense Service Medal, the Air Force Outstanding Unit Award, and the Air Force Excellence Unit Award with one oak leaf cluster.

(Current as of March 1987)

Mr. Marvin Spector
Director
Avionics Laboratory
August 1988 - April 1992

Retired April 1992

Mr. Spector was born April 4, 1942, in New York, N.Y., and graduated from the Bronx High School of Science in 1959. He graduated from the City College of New York in 1964, with a Bachelor of Science Degree in Electrical Engineering. He received a Master of Science Degree in Electrical Engineering from the University of Dayton in 1969, and a Master of Science degree in Systems Engineering in 1973 from the Air Force Institute of Technology (AFIT), Wright-Patterson Air Force Base, Ohio.

In 1964, Mr. Spector joined the Aeronautical Systems Division and served in varied engineering capacities involving engineering development and production programs on air-to-surface missiles and aircraft fire control sys-

tems. He concluded this tour of duty as Acting Chief, Avionics Engineering, Maverick System Program Office.

In 1973, Mr. Spector transferred to the Air Force Avionics Laboratory and served as Technical Director and, subsequently, program manager for the Air Force Weapon Guidance Technology Program through 1976.

From 1976 to 1978, Mr. Spector served in various branch positions as a technical advisor in the areas of navigation, weapon control and target acquisition. Following a reorganization in 1978, Mr. Spector became Chief, Fire Control Branch, (later named the Applications Branch), Mission Avionics Division, Air Force Avionics Laboratory. During this period, he worked on fire control software, cruise missile guidance, and target identification.

In February 1985, Mr. Spector was named Chief, System Avionics Division, Avionics Laboratory with primary focus on an advanced avionics architecture (Pave Pillar) using emerging Very High Speed Integrated Circuit (VHSIC) technology for transition to the Advanced Tactical Fighter (ATF). Division research included work in navigation and airborne communication, information processing, software supportability and development of an in-house capability for evaluating and developing avionics integration concepts.

In 1987, Mr. Spector was named Acting Deputy Director, Avionics Laboratory, and, in 1988, he became Director, Avionics Laboratory, Wright Laboratory, Aeronautical Systems Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio. The mission included Air Force R&D in mission avionics (radar and electro-optical sensors, target recognition, sensor evaluation, and fire control), electronic warfare (active and passive countermeasures, survivability, and electronic combat test & evaluation), and system avionics (communication, navigation, information processing, architectures, and integration). He was responsible for development of Air Force Science and Technology, Avionics Technology Area Plan.

His memberships in professional and technical societies included the Institute of Electrical Engineers, Phi Beta Tau, Sigma Xi, the Association of Old Crows, and the American Defense Preparedness Association.

(Current as of September 1991)

Mr. William J. Edwards
Director
Electronic Technology Laboratory
November 1988 – December 1990
Solid State Electronics Directorate
December 1990 – April 1995

Retired April 1995

Mr. William J. Edwards was director of the Electronic Technology Division, Avionics Laboratory, Air Force Wright Aeronautical Laboratories, Aeronautical Systems Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio. He managed the major Air Force organization concerned with electronic device programs which supported avionics systems. His division was responsible for basic research, exploratory development and advanced development programs which encompassed microelectronic devices, laser and electro-optical devices, radar technology, and microwave devices and techniques.

Mr. Edwards was born April 15, 1934, in Beaverdale, Pa. He graduated from Beaverdale High School and the University of Pennsylvania, Philadelphia,

Pa., with a Bachelor of Science Degree in Electrical Engineering in 1956 and a commission as a second lieutenant in the U.S. Air Force Reserves. He received a Master of Science Degree in Electrical Engineering in 1961, and continued graduate work from 1970 to 1975 at Wright State University, Dayton, Ohio.

From 1956 to 1958, Mr. Edwards was employed as a design engineer on digital communications systems with the Government and Industrial Division of the Philco Corporation in Philadelphia, Pa.

He entered active duty as a second lieutenant in November 1958 at Wright-Patterson Air Force Base, Ohio, where he served as a project engineer with the Communications-Navigation Laboratory, Wright Air Development Center, Air Research and Development Command.

He separated from the U.S. Air Force in June 1962 and joined the Molecular Electronics Branch, Electronic Technology Division, Avionics Laboratory, at Wright-Patterson. He served there as a project engineer in the development of solid state microwave devices and circuits.

In April 1963, Mr. Edwards was promoted to Chief, Microwave Device Group, Electronic Technology Division, where he was involved for eight years in the development of a solid state microwave technology base, with emphasis on integrated microwave circuit technology.

Under a major reorganization of the Avionics Laboratory, Mr. Edwards established and became Chief of the Radar and Microwave Technology Branch in March 1971. He directed exploratory and advanced development programs for devices and circuits, antennas, arrays, radars, propagation, sensor processing and target signatures for future Air Force avionics systems.

From 1974 to 1976 he served as Acting Chief and subsequently assumed the position as Chief of the Electronic Technology Laboratory of the Wright Aeronautical Laboratories in June 1976. He retained this position as the organization was renamed the Solid State Electronics Directorate of Wright Laboratory of Air Force Systems Command, later Air Force Materiel Command in 1992.

Mr. Edwards was Director of Air Force Very High Speed Integrated Circuit Program and the Air Force representative of the joint-service VHSIC Steering Committee.

He was an active participant in the Department of Defense Advisory Group for Electron Devices for more than 30 years. He served at the working group level and held the position of Air Force Main Group Member.

He was promoted to the Senior Executive Service September 30, 1984.

Mr. John P. Brailey
Director
Avionics Directorate
April 1992 — January 1994

Mr. Brailey was born May 30, 1933, in New London, Conn., and graduated from Bulkeley High School there in 1951. He earned a Bachelor of Science Degree in Electrical Engineering from the University of Connecticut, Storrs, in 1955 and was commissioned a second lieutenant in the U.S. Air Force Reserves through the Reserve Officer Training Corps program there. In 1968 he earned a Master of Science Degree in Mathematics from Ohio State University, Columbus, Ohio. In 1969 he completed a National Institute of Public Affairs-sponsored fellowship in public administration at the University of Virginia, Charlottesville.

Mr. Brailey joined the International Business Machine Corporation's, Military Systems Division, Owego, N.Y., in 1955 and worked in the research

and development of airborne computers. In July 1956, he entered active Air Force service as a second lieutenant and was assigned as a project officer in the Strategic Bombing Branch, Weapons Guidance Laboratory, Wright-Patterson Air Force Base. He separated from the Air Force in 1958 and began his civil service career as a project engineer in the Advanced Development Section of the Laboratory.

Mr. Brailey was assigned to the Deputy for Engineering, Aeronautical Systems Division at Wright-Patterson in 1960, in the newly formed GAM-87 Missile Systems Program Office as director of the reliability and maintainability engineering program. In 1963, he was appointed Chief, Analysis and Design Branch, Directorate of Reconnaissance Engineering, and continued in a similar capacity when the directorate was merged into the Directorate of Avionics Engineering in 1973. In these assignments, Mr. Brailey played a major role in the development of the Avionics Engineering Facility that supported all avionics engineering activities at the Aeronautical Systems Division.

In October 1975, Mr. Brailey was appointed Chief Avionics Engineer for the F-15 and worked in the Deputy for F-15 until it was integrated into the Deputy for Tactical Systems in April 1980. He then became Chief Avionics Engineer for Tactical Systems. In April 1981, he was named Chief Engineer in the F-15 System Program Office, Deputy for Tactical Systems.

Mr. Brailey became the Chief Systems Engineer, Deputy for F-16 in January 1982. In October 1983, he was appointed Acting Director of Engineering within that organization, serving also as Technical Advisor to the F-16 System Program Director. He was promoted to Director of Engineering, F-16 System Program Office, Aeronautical Systems Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio in September 1984. Mr. Brailey became Director of the Avionics Directorate, Air Force Wright Laboratory, from April 1992 till January 1994.

Mr. Brailey received the Armed Forces Communication Association Honor Award as the Outstanding Electrical Engineer Air Force ROTC senior at the University of Connecticut in 1955. He was Directorate of Avionics Engineering Senior Division Engineer of the Year in 1977 and has received numerous Sustained Superior and Outstanding Performance Ratings during his career. He was a member of Tau Beta Pi and Eta Kappa Nu honorary engineering societies.

Dr. Jesse C. Ryles
Director
Avionics Directorate
February 1994 — January 1997

Dr. Jesse C. Ryles was born in Lexington, Ky., and received a Bachelor of Science Degree in Mechanical/Aeronautical Engineering from the University of Kentucky, Lexington, Ky. in 1956; and a Master of Science Degree and a Doctor of Philosophy Degree, both in Electrical Engineering, from Ohio State University, Columbus, Ohio.

In 1957, Dr. Ryles was employed as an aerospace engineer in the Air Force Powerplant Laboratory, Wright-Patterson Air Force Base. In this position he performed research and development assignments related to advanced solid and liquid propellant rocket propulsion systems. Later that year, he was commissioned a second lieutenant in the U.S. Air Force and entered active duty. During his military career his assignments included duties as an aircraft maintenance, communications and electronics officer with the Air Training

Command, Airways and Air Communications Service; and Air Defense Command, in Illinois, Georgia, Florida, and Maine.

Upon separation from military service in 1961, Dr. Ryles returned to Wright-Patterson Air Force Base. In June 1961, he was employed as an aerospace engineer by the Air Force Aero Propulsion Laboratory, performing task and lead engineer research and development work on supersonic/hypersonic ramjet engine and control concepts and multimode hybrid propulsion concepts for aerospace vehicles.

In 1965, he served as an aerospace and electronics engineer in the Deputy for Advanced Systems Studies and Analysis in the Systems Engineering Group at Aeronautical Systems Division. In this position he performed engineering and technical manager assignments on a highly advanced and innovative aerospace aircraft concept, and advanced air-to-surface weapon guidance developments. From 1966 to 1968, Dr. Ryles served as lead engineer and technical manager in the Advanced Air-to-Surface Weapon Guidance Development Program in the Air Force Avionics Laboratory.

After completing long-term training at Ohio State University in 1970, Dr. Ryles returned to the Air Force Avionics Laboratory at Wright-Patterson Air Force Base and served as an electronics engineer in the Electro-Optical Identification and Tracking Group, accomplishing studies on advanced weapon guidance and identification approaches. In 1971 he became Technical Director for the Advanced Air-to-Surface Weapon Delivery Program 679A, Navigation and Guidance Division. The following year he was named technical manager for the Reference Systems Technology Center, Reconnaissance and Weapon Delivery Division. He was responsible for establishing an in-house center-of-excellence in reference/navigation systems technology.

In 1973 Dr. Ryles became Chief of the Analysis and Evaluation Branch in the Air Force Avionics Laboratory, where he was tasked to develop a major in-house capability to support the Reconnaissance and Weapon Delivery Division. In 1974 he was named Senior Scientist of the Air Force Avionics Laboratory.

Dr. Ryles served as Chief Scientist of the Avionics Laboratory, Air Force Wright Aeronautical Laboratories, Aeronautical Systems Division, Wright-Patterson Air Force Base, Ohio from February 1978 to February 1994. In this position he was principal advisor to the laboratory director on technical/research activities in basic research, exploratory and advanced development, aerospace vehicle avionics/electronics programs, navigation, surveillance, reconnaissance, electromagnetic warfare, fire control, weapon delivery, communications, information processing and control, and electronic/electromagnetic

devices. He also provided technical assistance to other AFSC product divisions, USAF operational commands and other services as required.

In 1994, Dr Ryles assumed the position as Director, Avionics Directorate, Wright Laboratory. He held this position till his retirement in January 1997.

His memberships in professional and technical societies included: The Institute of Electrical and Electronics Engineers, Pi Tau Sigma, Sigma Xi, the Association of Old Crows and the American Defense Preparedness Association.

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Mr. Lester McFawn
Director

Avionics Directorate	Sensors Directorate
January 1997 - October 1997	October 1997 – September 1999

Retired Jan. 3, 2008.

Mr. Lester McFawn, a member of the Senior Executive Service, was Executive Director, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio. He was the Principal Assistant to the Commander and the senior civilian executive responsible for managing the Air Force's $1.3 billion science and technology program, additional customer funded research and development of $1.1 billion, and a workforce of approximately 5,700 people.

Mr. McFawn entered federal civil service in 1972. He has served in a variety of engineering and senior technical management positions within the Air Force laboratory system, leading the development and transition of advanced avionics and sensor technologies to the Maverick missile, F-15, F-16, F-22,

Combat Talon II, Joint Strike Fighter and numerous intelligence, reconnaissance and surveillance applications. He served as Director of the Plans and Programs Directorate with the Air Armament Center, Eglin AFB, Fla., where he was responsible for the center's policy and products in strategic planning, resource programming, manpower and organization, and business development. He ha served as Deputy Director, Plans and Programs Directorate, Headquarters Air Force Materiel Command, Wright-Patterson AFB, Ohio. In this position he was responsible for the command's strategic planning, manpower and organization, legislative affairs, base closure, and resource programming for approximately $43 billion and 78,000 positions. Mr. McFawn was appointed to the Senior Executive Service in 1997.

EDUCATION

1968 Bachelor's degree in Electronics Engineering, Florida State University, Tallahassee
1969 Master's degree in Electronics Engineering, Florida State University, Tallahassee
1977 Master's degree in Computer Engineering, University of Michigan, Ann Arbor
1995 Executive Development Program, Carnegie-Mellon University, Pittsburgh, Pa.
1997 Federal Executive Institute, Charlottesville, Va.
1997 Senior Leadership Orientation Course, Washington, D.C.
1999 National Security Leadership Program, Johns Hopkins University, Baltimore, Md.
2000 Defense Systems Management College, Fort Belvoir, Va.
2000 APEX Orientation Program, Federal Executive Institute, Charlottesville, Va.
2003 Senior Information Warfare Course, Maxwell AFB, Ala.
2003 Senior Executive Service Air and Space Seminar, Maxwell AFB, Ala.

CAREER CHRONOLOGY

1. August 1969 - December 1972, project engineer, (Air Force lieutenant), Avionics Laboratory, Wright-Patterson AFB, Ohio
2. December 1972 - February 1975, senior lead engineer, imaging infrared guidance advanced development captive flight test and free-flight test programs, Avionics Laboratory, Wright-Patterson AFB, Ohio
3. February 1975 - August 1975, avionics engineer, Maverick System Program Office, Aeronautical Systems Division, Wright-Patterson AFB, Ohio
4. September 1975 - June 1977, graduate student, University of Michigan, Ann Arbor
5. July 1977 - December 1978, Program Manager, Advanced Development Project 1177, Avionics Laboratory, Wright-Patterson AFB, Ohio
6. December 1978 - December 1979, Technical Manager, Fire Control Technology Group, Avionics Laboratory, Wright-Patterson AFB, Ohio

7. December 1979 - April 1985, Technical Manager, Surface Strike Group, Avionics Laboratory, Wright-Patterson AFB, Ohio
8. April 1985 - December 1990, Chief, System Integration Branch, Avionics Laboratory, Wright Research and Development Center, Wright-Patterson AFB, Ohio
9. January 1991 - December 1995, Chief, Mission Avionics Division, Avionics Directorate, Wright Laboratory, Wright-Patterson AFB, Ohio
10. January 1996 - December 1996, Chief, Mission Applications Division, Avionics Directorate, Wright Laboratory, Wright-Patterson AFB, Ohio
11. January 1997 - September 1997, Director, Avionics Directorate, AFRL, Wright-Patterson AFB, Ohio
12. October 1997 - September 1999, Director, Sensors Directorate, AFRL, Wright-Patterson AFB, Ohio
13. October 1999 - June 2002, Director, Plans and Programs Directorate, AAC, Eglin AFB, Fla.
14. July 2002 - September 2003, Deputy Director, Plans and Program Directorate, Headquarters AFMC, Wright-Patterson AFB, Ohio
15. September 2003 - January 2008, Executive Director, Air Force Research Laboratory, Wright-Patterson AFB, Ohio

AWARDS AND HONORS
Joint Logistics Commanders' Certificate of Merit
Defense Acquisition Executive Certificate of Achievement
Meritorious Executive Presidential Rank Award

OTHER ACHIEVEMENTS
Former Chairman and Air Force Principal, Defense Technical Area Planning Team for Sensors and Electronics, Director of Defense Research and Engineering Defense Reliance

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS
National Defense Industrial Association
Senior Executive Association
Board of Trustees, Dayton Area Graduate Studies Institute
Board of Trustees, Ohio Aerospace Institute
Board of Trustees, Wright Brothers Institute

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Dr. Horst R. Wittman
Associate Director
Sensors Directorate
November 1997 – August 2001

Dr. Horst R. Wittmann was Associate Director of the Sensors Directorate, Air Force Research Laboratory. He was co-responsible for executing a $150 million science and technology program in a broad spectrum of disciplines supporting advanced sensor technology. He also served as advisor to various Department of Defense research activities and is Department of Defense representative to NATO, Research and Technology Board, Science and Electronics Technology Panel. He was appointed to the Senior Executive Service in September 1984.

His previous assignments were Director of Electromagnetics and Reliability at Rome Laboratory, Hanscom Air Force Base, Massachusetts, and Director of Physics and Electronics at the Air Force Office of Scientific Research.

Before joining the Air Force in 1984, Dr. Wittmann was Associate Director of the Electronics Division, U.S. Army Research Office. During this time, he also held the position of adjunct associate professor in the Electrical Engineering Department of North Carolina State University. Dr. Wittmann has authored more than 20 research publications and holds one U.S. patent.

Dr. Wittmann is a naturalized citizen from Austria, where he received his graduate education. His field of scientific specialization is solid state physics.

EDUCATION:

1959 Bachelor of Science degree in Physics, University of Erlangen, Germany
1964 Doctor of Philosophy degree in Physics, University of Graz, Austria
1993 Air Force Certified Acquisition Professional, Level III

CAREER CHRONOLOGY:

1. 1964 - 1966, space systems engineer, Bolkow GmbH, Munich, Germany
2. 1966 - 1970, group leader, Physics Laboratory, United States Army, (USA) MICOM, Hunstville, Ala.
3. 1970 -1984, Associate Director, Electronics Division, USA Research Office, Durham, N.C.
4. 1984 - 1996, Director of Physics and Electronics, USAF Office of Scientific Research, Washington, D.C.
5. 1996 - 1997, Director, Electromagnetics and Reliability Directorate, Rome Laboratory, Hanscom AFB, Mass.
6. 1997 - August 2001, Associate Director, Sensors, Air Force Research Laboratory, Wright-Patterson AFB, Ohio

MAJOR AWARDS AND HONORS:

1977 Fulbright Hays Fellowship
1977 Secretary of the Army Fellowship
1993 Fellow, Institute of Electrical and Electronic Engineers
1996 Fellow, American Association for the Advancement of Science

CURRENT PROFESSIONAL MEMBERSHIPS / AFFILIATIONS:

Institute of Electrical and Electronics Engineers (IEEE)
American Physical Society (APS)
American Association for the Advancement of Science (AAAS)
NATO, Research and Technology Board, Panel on Sensors and Electronics Technology, U.S. representative.

Dr. Donald W. Hanson
Director
Sensors Directorate
September 1999 — May 2005

Retired June 3, 2009.

Dr. Donald W. Hanson, a member of the Senior Executive Service, was Director, Information Directorate, Air Force Research Laboratory, Rome, N.Y. The directorate is the center for the advancement and application of information systems science and technology to enable information dominance for the Air Force. The directorate's areas of investigation include a broad spectrum of information technologies for fusion, communication, collaborative environments, modeling and simulation, defensive information warfare, and intelligent information systems. As Director, he oversaw an annual budget of more than $500 million, and he directed the activities of approximately 825 military and civilian scientists, engineers and administrative and support people.

Dr. Hanson began his career with the Air Force in 1968 when he joined the Rome Air Development Center. He has held a variety of assignments with progressive responsibility in both management and technical leadership positions, ending in his current position, which he assumed in May 2005. His principal technical work was conducted in the fields of photonics, radar and adaptive optics. He has written or co-written more than 10 publications in these areas, and holds two patents with co-inventors.

EDUCATION

1968 Bachelor of Science degree in Electrical Engineering, Rochester Institute of Technology, Rochester, N.Y.
1973 Master of Science degree in Electrical Engineering, Syracuse University, N.Y.
1981 Doctor of Philosophy in Electrical Engineering, Syracuse University, N.Y.
1991 Leadership for a Democratic Society, Federal Executive Institute, Charlottesville, Va.
1996 Management and Public Policy, Department of Public Administration, Maxwell School of Citizenship and Public Affairs, Syracuse University, N.Y.
1996 Creating the Future: The Challenge of Transformation Leadership, Darden Graduate School of Business Administration, University of Virginia, Charlottesville

CAREER CHRONOLOGY

1. 1968 - 1973, technical staff member, Electronic Counter Countermeasures and Navigation Branch, Rome Air Development Center, Griffiss Air Force Base, N.Y.
2. 1973 - 1979, technical staff member, Electro-Optical Surveillance Division, Rome Air Development Center, Griffiss AFB, N.Y.
3. 1979 - 1983, principal investigator and program manager, Compensated Imaging Program, Rome Air Development Center, Griffiss AFB, N.Y.
4. 1983 - 1986, Chief Scientist and program manager, Advanced Optics Development and Evaluation Program, Rome Air Development Center, Griffiss AFB, N.Y.
5. 1986 - 1987, Technical Adviser, Electro-Optical Surveillance Division, Rome Air Development Center, Griffiss AFB, N.Y.
6. 1987 - 1989, Associate Director, Photonics Laboratory, Rome Air Development Center, Griffiss AFB, N.Y.
7. 1989 - 1990, Director, Photonics Laboratory, Rome Air Development Center, Griffiss AFB, N.Y.
8. 1990 - 1992, Director, Surveillance Directorate, Rome Laboratory, Griffiss AFB, N.Y.
9. 1992 - 1997, Director, Surveillance and Photonics Directorate, Rome Laboratory, Rome, N.Y.
10. 1997 - 1999, Senior Scientist for Photonics, Sensors Directorate, Air Force Research Laboratory, Rome, N.Y.

11. 1999 - 2000, Acting Director, Sensors Directorate, AFRL, Wright-Patterson AFB, Ohio
12. 2000 - 2005, Director, Sensors Directorate, AFRL, Wright-Patterson AFB, Ohio
13. 2005 - 2009, Director, Information Directorate, AFRL, Rome, N.Y.

OTHER ACHIEVEMENTS
1982 - 1986, Reviewer, "Optics Letters," Optical Society of America
2005 Meritorious Executive Presidential Rank Award

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS
1983 Co-chairman, International Society for Optical Engineering Symposium on Adaptive Optics
1995 - 1996, Secretary, Mohawk Valley Chapter, Institute of Electrical and Electronic Engineers
2004 Fellow, IEEE

PROFESSIONAL CERTIFICATIONS
1993 Systems Planning, Research, Development and Engineering, Level III

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Mr. Joe Sciabica
Director
Sensors Directorate
May 2005 – January 2008

Mr. Joe Sciabica, a member of the Senior Executive Service, is Executive Director, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio. He is the principal assistant to the commander and the senior civilian executive responsible for managing the Air Force's $2 billion science and technology program; additional customer funded research and development of $1.7 billion; and a workforce of approximately 9,500 people in the laboratory's component technology directorates and the Air Force Office of Scientific Research.

Mr. Sciabica began his career with the Air Force in 1982 at the Air Force Rocket Propulsion Laboratory, Edwards AFB, Calif., developing technologies for small intercontinental ballistic missiles and in-space structures dynamics

and control. He has served in a variety of engineering and senior technical management positions within the Air Force laboratory system, leading the development and transition of advanced rocket, space and sensor technologies to air, space and missile systems. Prior to his current assignment, he served as the AFRL Sensors Directorate Director, specializing in the science and technology needed for superior U.S. air, space and cyberspace systems for reconnaissance, surveillance, precision engagement and electronic warfare. A graduate of the Defense Systems Management College and National War College, Mr. Sciabica was appointed to the Senior Executive Service in 2003.

EDUCATION

1979 Associate of Arts degree in Physical Science, San Joaquin Delta College, Stockton, Calif.
1982 Bachelor of Science degree in Chemical Engineering, University of California at Santa Barbara
1986 Master of Science degree in Systems Management, University of Southern California, Edwards AFB Satellite Campus
2000 Master of Science degree in National Security Strategy, National War College, Fort Lesley J. McNair, Washington, D.C.

CAREER CHRONOLOGY

1. September 1982 - February 1988, mechanical engineer and program manager, Nozzle Technology Section, Air Force Rocket Propulsion Laboratory, Edwards AFB, Calif.
2. February 1988 - April 1989, mechanical engineer and program manager, Air Force Astronautics Laboratory, Edwards AFB, Calif.
3. April 1989 - January 1991, space technology plans officer, Air Force Astronautics Laboratory, Edwards AFB, Calif.
4. January 1991 - March 1996, Chief, Spacecraft Technology Plans Division, Phillips Laboratory, Kirtland AFB, N.M.
5. April 1996 - July 1997, Chief, Projects Division, Space Experiments Directorate, Phillips Laboratory, Kirtland AFB, N.M.
6. July 1997 - Feb 1998, Deputy, Integrated Experiments and Structures Division, Space Vehicles Directorate, Air Force Research Laboratory, Kirtland AFB, N.M.
7. March 1998 - July 1999, Chief, Integration and Operations Division, Space Vehicles Directorate, AFRL, Kirtland AFB, N.M.
8. August 1999 - June 2000, student, National War College, Fort Lesley J. McNair, Washington, D.C.
9. June 2000 - June 2001, senior engineer, Future Technology Integration, Deputy Chief of Staff for Plans and Programs, Headquarters U.S. Air Force, Washington, D.C.
10. July 2001 - April 2003, Deputy Director, Space Vehicles Directorate, AFRL, Kirtland AFB, N.M.
11. April 2003 - May 2005, Associate Director for Space Technology, AFRL,

Kirtland AFB, N.M.
12. May 2005 - January 2008, Director, Sensors Directorate, AFRL, Wright-Patterson AFB, Ohio
13. January 2008 - present, Executive Director, AFRL, Wright-Patterson AFB, Ohio

AWARDS AND HONORS
1987 Nominated for Outstanding Professional, Federal Executive Board of Los Angeles
1991 Certificate of Recognition, Joint Army/Navy/NASA/Air Force Chemical Propulsion Information Agency Executive Committee
1993 Letter of Commendation, Phillips Laboratory
1997 Outstanding Senior S&E of the year, Space Experiments Directorate, Phillips Laboratory
1999 Special Act/Service Award, Space Vehicles Directorate, AFRL
2000 Acquisition Corps Member
2001 Letter of Commendation, Deputy Chief of Staff for Plans and Programs, Headquarters U.S. Air Force
2005 Civilian Achievement Award
2005 Small Business Special Achievement Award - Team, Air Force Materiel Command
2005 Small Business Special Achievement Award, Secretary of the Air Force
2008 Director of the Year, Federal Laboratory Consortium Laboratory
2008 Meritorious Executive Presidential Rank Award

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS
National War College Alumni Association
Air Force Association
Senior Executives Association
Board of Trustees, Dayton Area Graduate Studies Institute
Board of Trustees, Ohio Aerospace Institute
Board of Trustees, Wright Brothers Institute
Board member, Wright State College of Science and Medicine
President, Wright-Patterson Educational Fund
Armed Forces Communications and Electronics Association
Association of Old Crows

PROFESSIONAL CERTIFICATIONS
Test and Evaluation, Level I
Program Management, Level II
Systems Planning, Research, Development and Engineering, Level III

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Dr. David M. Jerome
Director
Sensors Directorate
February 2008 - January 2011

Retired 3 January 2011

Dr. David M. Jerome, a member of the Senior Executive Service, was Director, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio. The directorate specializes in developing the science and technology necessary for superior U.S. air and space systems in the areas of intelligence, surveillance, reconnaissance, precision engagement and electronic warfare. The directorate's primary areas of technology investment include radio frequency sensors and countermeasures; electro-optical sensors and countermeasures; automatic target recognition and sensor fusion. As Director, Dr. Jerome oversaw an annual budget of more than $500 million, and directs the activities of approximately 1,350 scientists, engineers and support personnel at three different geographic locations.

Dr. Jerome has held a variety of leadership positions in science and technology, engineering and technical management, and test and evaluation. He has also served in an Office of the Secretary of Defense staff assignment where he assisted the Director of Operational Test and Evaluation in prescribing policies and procedures for determining the operations and composition of the test and evaluation infrastructure for the Department of Defense. He also served as the director's principal staff specialist for all Base Realignment and Closure 2005 activities.

The Ohio native is the author of more than 30 scientific publications and three inventions, and a member of the editorial review staff for three scientific journals. He also held an adjunct faculty appointment with the University of Florida, where he taught graduate-level courses in engineering. Dr. Jerome has served as the Deputy Director of Air, Space and Information Operations, Air Force Materiel Command, Wright-Patterson AFB. He was appointed to the Senior Executive Service in March 2006.

EDUCATION

1975 Bachelor of Science degree in Agriculture, Ohio State University, Columbus
1981 Bachelor of Science degree in Mechanical Engineering, Ohio State University, Columbus
1987 Master of Science degree in Engineering Mechanics, University of Florida, Gainesville
1996 Doctor of Philosophy degree in Engineering Mechanics, University of Florida, Gainesville
2004 Leadership for a Democratic Society, Federal Executive Institute, Charlottesville, Va.
2005 Senior Acquisition Course, National Defense University, Washington, D.C.
2005 Master of Science degree in National Resource Strategy, National Defense University, Washington, D.C.

CAREER CHRONOLOGY

1. September 1981 - April 1989, mechanical engineer, Vulnerability Assessment Branch, Air Force Armament Laboratory, Eglin AFB, Fla.
2. April 1989 - April 1992, Section Chief, Technology Assessment Branch, Armament Directorate, Wright Laboratory, Eglin AFB, Fla.
3. April 1992 - December 1995, engineering technical adviser, Lethality and Vulnerability Branch, Armament Directorate, Wright Laboratory, Eglin AFB, Fla.
4. December 1995 - February 1997, Chief, Lethality and Vulnerability Branch, Armament Directorate, Wright Laboratory, Eglin AFB, Fla.
5. February 1997 - April 2001, Lead Scientist and Core Competency Leader

for Advanced Unitary Warhead Technology, Air Force Research Laboratory Munitions Directorate, Eglin AFB, Fla.
6. April 2001 - June 2002, Technical Director, Munitions Test Division, 46th Test Wing, Air Armament Center, Eglin AFB, Fla.
7. June 2002 - August 2003, Director, Munitions Test Division, 46th Test Wing, AAC, Eglin AFB, Fla.
8. August 2003 - August 2004, Principal Deputy Director, Systems and Test Resources, Operational Test and Evaluation, Office of the Secretary of Defense, the Pentagon, Washington, D.C.
9. August 2004 - June 2005, graduate student, Industrial College of the Armed Forces, National Defense University, Fort Lesley J. McNair, Washington, D.C.
10. June 2005 - August 2005, Special Assistant to the Director, Directorate of Engineering and Acquisition Excellence, AAC, Eglin AFB, Fla.
11. August 2005 - March 2006, Executive Director, Arnold Engineering Development Center, Arnold AFB, Tenn.
12. March 2006 - February 2008, Deputy Director of Air, Space and Information Operations, Air Force Materiel Command, Wright-Patterson AFB, Ohio
13. February 2008 - January 2011, Director, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson AFB, Ohio

AWARDS AND HONORS
1989 Program Manager of the Year, Air Force Armament Laboratory
1993 Director's Award, Defense Nuclear Agency
2001 Exemplary Civilian Service Award, Department of the Air Force
2004 Award for Excellence, Office of the Secretary of Defense
Invention Awards, Department of the Air Force (3)
Special Act or Service Awards, Department of the Air Force (5)
Notable Achievement Awards, Department of the Air Force (3)

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS
Life member, National Defense Industrial Association
Senior Executive Association
International Test and Evaluation Association
American Society of Mechanical Engineers
American Institute of Aeronautics and Astronautics
Society for Experimental Mechanics
Directed Energy Professional Society
American Concrete Institute
Pi Tau Sigma National Honorary Mechanical Engineering Fraternity

PROFESSIONAL CERTIFICATIONS
Systems Planning, Research, Development and Engineering, Level III
Test and Evaluation, Level III

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Mr. Wendell D. Banks
Director
Sensors Directorate
3 January 2011 - Present

Mr. Wendell D. Banks, a member of the Senior Executive Service, is Director, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio. The directorate specializes in developing science and technology for superior Air Force systems in the areas of intelligence, surveillance, reconnaissance, precision engagement and electronic warfare. The directorate's primary areas of technology investment include radio frequency sensing; net-centric spectrum warfare; electro-optical sensors and countermeasures; automatic target recognition; performance based sensing; and electronic devices. Mr. Banks oversees an annual budget of more than $850 million, and directs the activities of approximately 1,300 scientists, engineers and support personnel at three different geographic locations.

Mr. Banks was born in Verona, Ohio. He began his federal service in the Air Force Flight Dynamics Laboratory in 1982 as a researcher and program manager. He has held numerous management and technical positions within the Air Force laboratory and acquisition communities. He most recently served as Director, Plans and Programs Directorate, AFRL, responsible for developing and managing the processes that define the laboratory's $2 billion annual technology investment.

EDUCATION

1981 Bachelor's degree in Mechanical Engineering, University of Dayton, Ohio
1985 Master of Science degree in Mechanical Engineering, University of Dayton, Ohio
1991 Air War College, Maxwell AFB, Ala.
1997 Leadership for a Democratic Society, Federal Executive Institute, Charlottesville, Va.
1999 Senior Executive Fellow, John F. Kennedy School of Government, Harvard University, Cambridge, Mass.

CAREER CHRONOLOGY

1. January 1982 - September 1986, mechanical engineer, Air Force Flight Dynamics Laboratory, Wright-Patterson AFB, Ohio
2. September 1986 - August 1987, corporate representative, General Dynamics Corporation, Dayton, Ohio
3. August 1987 - November 1989, systems integration engineer, Aeronautical Systems Division, Wright-Patterson AFB, Ohio
4. November 1989 - December 1991, senior engineer, Technology Integration Division, Headquarters Armstrong Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio
5. December 1991 - January 1993, Chief, Plans and Programs Branch, Armstrong Laboratory, Wright-Patterson AFB, Ohio
6. January 1993 - October 1997, Chief, Programs and Operations Division, Armstrong Laboratory, Wright-Patterson AFB, Ohio
7. October 1997 - May 1999, Chief, Integration and Operations Division, Human Effectiveness Directorate, Air Force Research Laboratory, Wright-Patterson AFB, Ohio
8. May 1999 - May 2000, Chief, Modernization Planning Integration Division, Plans and Programs Directorate, Aeronautical Systems Center, Wright-Patterson AFB, Ohio
9. May 2000 - June 2003, Chief Technology Officer, Human Effectiveness Directorate, AFRL, Wright-Patterson AFB, Ohio

10. June 2003 - June 2004, Command Transformation Program Manager, Headquarters Air Force Materiel Command, Wright-Patterson AFB, Ohio
11. June 2004 - October 2004, Chief, Command Transformation Branch, Headquarters AFMC, Wright-Patterson AFB, Ohio
12. October 2004 - May 2005, Chief Transformation Officer, Human Effectiveness Directorate, AFRL, Wright-Patterson AFB, Ohio
13. May 2005 - November 2005, Deputy Director, Base Realignment and Closure, Headquarters AFMC, Wright-Patterson AFB, Ohio
14. November 2005 - January 2006, Chief, Base Realignment and Closure Office, AFRL, Wright-Patterson AFB, Ohio
15. January 2006 - July 2006, Deputy Chief, Warfighter Training Research Division, AFRL, Mesa, Ariz.
16. July 2006 - January 2008, Chief, Airbase Technologies Division, Tyndall AFB, Fla.
17. January 2008 - June 2008, Director, Human Effectiveness Directorate, AFRL, Wright-Patterson AFB, Ohio
18. June 2008 - January 2011, Director, Plans and Programs, AFRL, Wright-Patterson AFB, Ohio
19. January 2011 - present, Director, Sensors Directorate, AFRL, Wright-Patterson AFB, Ohio

AWARDS AND HONORS

1999 and 2004 Meritorious Civilian Service Award
2005 Exemplary Civilian Service Award

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS

Sigma Xi International Society for Scientific and Engineering Research

PROFESSIONAL CERTIFICATIONS

Science and Technology Manager, Level III
Program Management, Level II
Hammer Process Master Certification Course

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Deputy Directors

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Mr. Raymond J. Nordlund
Technical Director Deputy Director
Avionics Division Air Force Avionics Laboratory
November 1960 - 1964

Mr. Raymond J. Nordlund was born 20 April 1911 in New Effington, South Dakota, graduating from South Dakota State University in 1933 with a Bachelor of Science degree in Electrical Engineering. He completed 37 hours of graduate study at Ohio State University in the 1946 through 1949 time frame.

Mr. Nordlund began his career in 1934 as a highway design engineer with the State of South Dakota, leaving in 1941 to become a member of the Aircraft Radio Laboratory. He was a project engineer in the Navigation and Bombing Systems Branch until 1948. From 1948 to 1951 he was branch Chief of the Strategic Bombing Branch of the Aircraft Radio Laboratory.

Mr. Nordlund was consultant to the Chief of the Armament Laboratory

from 1951 to 1956 and Chief of Plans and Requirements of the Directorate of Development in 1956 to1957. As the organization evolved, he was Technical Director of the Weapons Guidance Laboratory from 1957 to 1960 and of the Navigation and Guidance Laboratory in 1960 and 1961. Mr. Nordlund became Technical Director of the Avionics Directorate from 1961 to 1963. The Air Force Avionics Laboratory was established in 1963 with Mr. Nordlund as its first Deputy Director. Mr. Nordlund became Chief Scientist in 1964, serving until his retirement in 1970.

Mr. Nordlund pioneered radio compass "Night Effect" research and organized and guided USAF inertial navigation and solid state computer programs. He contributed to solutions for electronics reliability and organized Wright-Patterson's dynamic system analysis capability. Mr. Nordlund was listed in "Who's Who" in Engineering.

Mr. Nordlund was a senior member of the IEEE and a member of the Scientific Research Society of America. He was a registered professional engineer in Ohio.

Mr. Nordlund passed away shortly after retirement.

Colonel Tyler Redfield
Deputy Director and Commander
Air Force Avionics Laboratory
1965 - 1967

Colonel Tyler A. Redfield was the Deputy Director and Commander of the US Air Force Avionics Laboratory of the Research and Technology Division of the Air Force Systems Command.

Colonel Redfield was born on 16 November 1918 in Greenwich, Connecticut. He graduated cum laude in 1940 from Williams College with a Bachelor of Arts in Mathematics. His early military career is unknown, however his continuing education reveals the Air Force's grooming of Colonel Redfield for aircraft nuclear propulsion research. In 1950, he received a Master of Science degree in Nuclear Chemistry from Ohio State University. He is a 1951 graduate of Oak Ridge School of Reactor Technology.

Colonel Redfield began his aircraft nuclear propulsion research as a

project engineer in the Aircraft Reactors Branch of the US Atomic Energy Commission from 1951 through 1955. From 1955 to 1958 he was Deputy Chief of the Aircraft Projects Section and in 1958 Deputy Chief, Plans and Programs Section of the Aircraft Nuclear Propulsion Office.

Still with the US Atomic Energy Commission, Colonel Redfield served as Director of the Idaho Aircraft Reactors Test Division from 1958 to 1960. His final position with the commission was as Assistant Manager for Test Operations at the Lackland Aircraft Reactors Operations Office from 1960 to 1961.

From 1961 through 1965 Colonel Redfield was assigned to the Air Force Special Weapons Center. His first assignment was as Chief of the Technical Operations Division, DCS/Plans and Operations and he advanced to Chief of the Plans and Requirements Office.

Colonel Redfield became Deputy Director and Commander of the Air Force Avionics Laboratory in 1965.

Memberships:
Phi Beta Kappa, Institute of Navigation, and Sigma Xi

This biography based on career sketch in “Who’s Who in the Air Force Avionics Laboratory”, 1965. Sensors Directorate Archives.

Mr. Robert J. Doran
Deputy Director
Air Force Avionics Laboratory
July 1967 - 1969

Mr. Robert J. Doran served as Deputy Director of the Air Force Avionics Laboratory from 1967 till his retirement in 1969.

Mr. Doran was born in 1915 in Watertown, New York and received his Bachelor of Science in Electrical Engineering from Virginia Polytechnic Institute in 1939. He completed postgraduate education at both the Ohio State and George Washington Universities.

His wartime military experience included serving as an Army Signal Corps radar research officer with the Royal Air Force Radar Research Establishment in England from 1942 to 1943. Returning state-side as a Signal Corps Aircraft Radio and Radar Lab R&D Officer, he first was embedded with the Massachusetts Institute of technology (1943-1944) and then the Bell

Telephone New York City location (1944-1945).

Civilian Career:
1. 1947-1951, Chief, Bombing-Navigation Equipment Section, Armament Laboratory
2. 1954-1955, Chief, Bomber Armament Section, Staff, Armament Laboratory
3. 1955-1956, Chief, Weapons Defense, Staff, Weapons Guidance Laboratory
4. 1956-1958, Chief, Research & Technology Development Branch., Staff, Weapon Guidance Laboratory
5. 1958-1960, Chief, Guidance Development Division, Weapons Guidance Laboratory
6. 1960-1962, Chief, Technology Development Branch, Staff, Air Force Avionics Laboratory
7. 1962-1965, Technical Director, Navigation and Guidance Division, Air Force Avionics Laboratory
8. 1965-1967, Deputy Director, Navigation & Guidance Division, Air Force Avionics Laboratory
8. 1967-1969, Deputy Director, Air Force Avionics Laboratory

Achievements:

He pioneered X-band airborne radar with British and High Precision Radar Bombing research and development with USAF. He contributed to the development of strategic bombing equipment for B-50 through B-58 bombers. He was instrumental in the design of the weapons defense strategic bomber penetration survival model. Consultant, USAF Committee with RAF, RCAF, and French AF; OSD Reliability Committee, AGREE; and the Army Ordnance Association. He authored numerous papers on aircraft guidance and bombing.

Professional Memberships and Associations:

IEEE; Past President and Chairman, Board of Directors, NAECON; Scientific Research Society of America

This biography based on career sketch in “Who’s Who in the Air Force Avionics Laboratory”, 1965. Sensors Directorate Archives.

Mr. James V. Burke
Deputy Director
Air Force Avionics Laboratory
1969 - 1972

No biography available at time of printing.

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Dr. Bernard H. List
Deputy Director
Air Force Avionics Laboratory
1973 - July 1974

Dr. Bernard List, a native of Baltimore, Maryland, studied at Johns Hopkins University where he received his Bachelor of Science Degree in Electrical Engineering in 1947 and his Doctorate in Electrical Engineering in 1951. Dr. List's studies included work in electrical and magnetic properties of high-current arcs and the dielectric properties of insulating materials.

Dr. List became Director of the Air Force Avionics Laboratory at Wright-Patterson AFB, Ohio in July 1974. He served in that role until June 1975, when he accepted a position in The Department of Defense Department of Research and Engineering.

Dr. List had been with the Avionics Laboratory since 1971, first as Chief

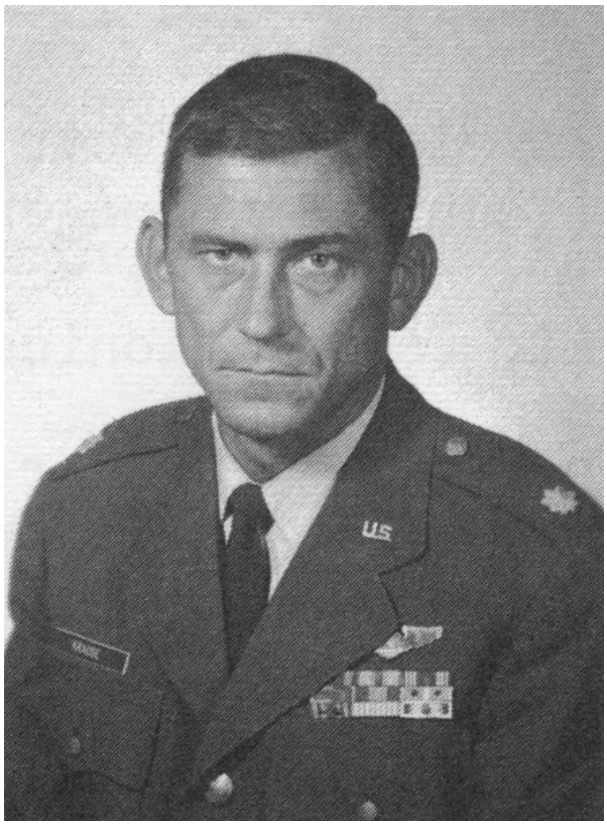
Scientist and later as Deputy Director. Prior to the Avionics Laboratory, he wasemployed by Texas Instruments Inc. (TI), a Dallas manufacturer of electronic equipment and components. At TI, Dr. List was director of the Systems and Information Sciences Laboratory. His work there included research in systems and information sciences from a theoretical and applied standpoint. Earlier assignments included technical studies and advanced development programs in fields of interest to the company such as aerospace electronics, undersea warfare systems, surveillance systems and weapons.

At one time he was manager of Advanced Planning of the Components group at TI where he was responsible for developing long-range plans and conducting market research. He was responsible for the development of the metastable helium magnetometer at TI from the research phase through the development and production of helium magnetometers for a number of applications.

Chief of the Electrical Engineering Division at Battelle Memorial Institute prior to his TI assignment, Dr. List spent six years in the fields of electrical guidance control and instrumentation systems for air weapons and studies of means of reducing the radar cross section of aircraft.

Dr. List was a member of the Institute of Electrical and Electronic Engineers with a special membership in Systems and Cybernetics, Information Theory, Computers, Reliability, Engineering Management, and Electronic Circuits. Other professional societies include the Association of Old Crows and Sigma Xi. He was a registered professional engineer in both Ohio and Texas.

Source: 16 June 1967 WPAFB Skywrighter, page 1.



Colonel James R. Krause
Deputy Director and Commander
Air Force Avionics Laboratory
July 1974 - 1976

A native of Tripp, South Dakota, Colonel James R. Krause was born in Milbank, South Dakota on 1 January 1929 and was a graduate of Yankton College, South Dakota with a Bachelor of Arts Degree in Mathematics.

Colonel Krause entered the Air Force in 1951 and from 1952 to 1958 was a Strategic Air Command navigator. He came to Wright-Patterson in 1958 and attended the Air Force Institute of Technology where he earned a Bachelor of Science Degree in Electrical Engineering in 1960. He served as a project officer with the Joint BOMARC Test Organization at Eglin AFB, Florida, from 1960 to 1963.

He returned to Wright-Patterson in 1963 with the Reconnaissance Division of the Air Force Avionics Laboratory. During his earlier assignment at

AFIT, he had studied infrared imaging with Reconnaissance Division experts. Not long after his arrival, he was leading the Air Force Avionics Laboratory's portion of the Gunship Program. From August to December 1967 he was flight evaluator engineer and special assistant to the Task Commander of the Gunship II Program and received the Distinguished Flying Cross for aerial skill in Southeast Asia.

Reassigned to the position of Chief of Special Programs with the Deputy for Tactical Warfare, Aeronautical Systems Division, Colonel Krause returned to Southeast Asia numerous times as an airborne infrared sensor training instructor and AC-130 and Surprise Package Mission Commander.

Colonel Krause returned to the Avionics Laboratory in 1974 as deputy director and commander. In 1976 he was assigned as special assistant to the Commander of the Air Force Wright Aeronautical Laboratories, before returning once again to the Deputy for Tactical Warfare.

Awards:

Silver Star
Bronze Star
Distinguished Flying Cross
Legion of Merit
Air Medal with 12 oak leaf clusters
Air Force Commendation Medal, with one oak leaf cluster Distinguished Unit Citation, with one oak leaf cluster
Air Force Outstanding Unit Award.

This biography based on career sketch in "Who's Who in the Air Force Avionics Laboratory", 1965, and Silver Star Citation. Sensors Directorate Archives.

Colonel James C. Rich
Deputy Director and Commander
Air Force Avionics Laboratory
July 1976 - May 1977

Colonel John C. Rich assumed the position of Deputy Director of the Air Force Avionics Laboratory, Wright-Patterson Air Force Base, Ohio in July 1976. Colonel Rich also served as commander of AFAL's military staff of 179 officers and enlisted men -- about one fifth of the Laboratory staff.

He was born October 12, 1937 in Wichita, Kansas. He graduated from Central High School, Tulsa, Oklahoma, in 1955. He earned a Bachelor of Arts in 1959, Master of Arts in 1960, and Doctorate in Astrophysics in 1967 from Harvard University, and is a graduate of the Air War College, Class of 1976.

Colonel Rich was commissioned through the ROTC Program at Harvard University. After temporary employment in industry, he entered the

Air Force in October 1960 as a physicist at the Air Force Special Weapons Center, Kirtland Air Force Base, New Mexico. He was part of the original contingent of the Air Force Weapons Laboratory as it was formed at Kirtland Air Force Base in 1963.

Following an AFIT tour at Harvard, Colonel Rich was assigned in September 1966, to the Technical Directorate of the Air Force Technical Applications Center, Washington D.C. He was reassigned to the Air Force Weapons Laboratory in 1970 and has held various positions in the Air Force's High Energy Laser Program, completing that tour as Chief of the Advanced Laser Technology Division.

After a year at the Air War College at Maxwell Air Force Base, Alabama, Colonel Rich was assigned as Deputy Director of the Air Force Avionics Laboratory in July 1976.

Colonel Rich has been awarded the Legion of Merit, the Meritorious Service Medal with one Oak Leaf Cluster, and the Air Force Commendation Medal.

Dr. William C. Eppers, Jr.
Deputy Director
Air Force Avionics Laboratory
May 1977 - March 1985

Dr. William Eppers earned a Bachelor of Science Degree and a Doctor of Engineering degree, both in Electrical Engineering, from the Johns Hopkins University.

From November 1950 to October 1951, he was a geophysicist with the U.S. Geological Survey in Washington, D.C. From July 1952 to July 1953 he worked as an electronic consultant to the U.S. Public Health Service National Heart Institute in Bethesda, Maryland.

During the period from October 1951 to March 1955, Dr. Eppers was a research assistant for the Institute for Cooperative Research at the Johns

Hopkins University. From March 1955 to March 1957, he was an instructor in electrical engineering at the Air Force Institute of Technology at Wright-Patterson Air Force Base, Ohio. He became an assistant professor of engineering at AFIT in March 1957.

Dr. Eppers came to the Air Force Avionics Laboratory (as it was then called) in September 1960 and was named Director in July 1975, serving in that role until May 1977.

At the time of his retirement, Dr. Eppers was the Deputy Director of the Avionics Laboratory, of the Air Force Wright Aeronautical Laboratories at Wright-Patterson Air Force Base, Ohio.

He was elected a Fellow of the Institute of Electrical and Electronic Engineers in 1976 and in 1992 he received the IEEE Aerospace and Electronic Systems' Pioneer Award recognizing his laser research. Other honors and awards include being named an Outstanding Engineer in the Dayton area in 1972. He received the Samuel M. Burka Award in 1969 and has served on numerous technical panels. He is the author of numerous technical papers.

After coming to the Avionics Laboratory, Dr. Eppers had been involved in many programs including initiating the Department of Defense and Air Force program in gas dynamic lasers and provided the technical direction. The effort has grown to multimillion dollar programs in all services. He also directed the first study on the use of high energy gas dynamic lasers.

Dr. Eppers also initiated and served as Program Director of the Air Force Program 405B laser communications space data relay. He was a co-developer of the high power carbon monoxide laser, the second most efficient and powerful gas laser to carbon dioxide. He also was the first to Successfully explain the ion velocity distribution at the cathode of the glow discharge.

He was the initial developer of the x-ray fluorescent technique to measure gas densities in gas discharges, was a project engineer on the Italian-U.S. and Swedish-U.S. exchange program on plasma physics, and developed the first laser made by the Air Force in June 1962.

Dr. Eppers retired in March 1985.

Dr. Charles "Mike" H. Krueger Jr.
Deputy Director
Avionics Laboratory
1986 - 1987

Dr. Charles (Mike) H. Krueger was born in 1939 in Dayton, Ohio. Dr. Krueger has an Electrical Engineering Degree from the University of Cincinnati (1962) and a Master's of Science and Doctorate of Philosophy degrees in Electrical Engineering from the Ohio State University (1972, 1977).

Throughout his career, Dr. Krueger has led Air Force electronic warfare through leadership of numerous organizations and committees. He was the Air Force electronic warfare lead for developing cooperative research and development programs with Japan, South Korea, Brazil, Israel, France, UK, Canada, Australia, and India. He was temporarily assigned to the Pentagon to serve as the Acting Staff Specialist for Sensors at DOD (DDR&E (AT)), and was DOD lead for the development of DOD Technology Development Approach for Avionics. He served as member of Air Force Scientific Advisory Board Summer Study of Aging Aircraft.

He led Aeronautical System Center Independent Review Team (IRT) for the EW sub system on the B-2. He was a member of the Advisory Group for Aerospace Research & Development Panel (AGARD) of the North Atlantic Treaty Organization (NATO). The panel hosted symposia, workshops and lecture series on avionics research being conducted in NATO countries. Dr. Krueger served as chairman for three technical symposia and one lecture series. As Air Force and DOD lead for Joint Director of Laboratory Technology Panel for Electronic Warfare - tri-service organization he jointly planed DOD research in electronic warfare.

Career Chronology

1962-1965 Aeronautical System Division, WPAFB, OH – Project engineer for engineering development of Air Force tactical fighter radar homing and warming receivers.

1965-1974 Air Force Avionics Laboratory WPAFB, OH - Team Leader for Stealth Technology, responsible for development of techniques and materials for reducing the radar cross section (RCS) of Air Force aircraft.

1974-1980 Avionics Laboratory, Air Force Wright Aeronautical Laboratories, WPAFB, OH - Chief of ESM Group, responsible for exploratory and advanced development of ESM, ELINT, IR warning receiver technology.

1980-1984 Avionics Directorate, Air Force Wright Laboratory, WPAFB, OH - Chief of EW Advanced Development Branch responsible for all advanced development electronic warfare activities.

1985-1986 Avionics Directorate, Air Force Wright Laboratory, WPAFB, OH - Deputy Chief of Electronic Warfare Division. Major technology areas included RF/IR/EO/ COM countermeasures, stealth, ESM, SIGINT, radar/missile/laser warning receivers, expendable countermeasures, simulation and modeling.

1986-1987 Deputy Director of Avionics Directorate, Air Force Wright Laboratory, WPAFB, OH

1987-1995 Avionics Directorate, Air Force Wright Laboratory, WPAFB, OH - Chief Systems Avionics Division. Major technology areas included avionics architecture, electronics packaging and cooling, data buses, real time software, navigation, communication, digital signal and data processing, machine intelligence, simulation and modeling.

1995-1997 Sensors Directorate, Air Force Research Laboratory, WPAFB, OH - Chief RF Technology Division. Major technology areas include radar, electronic warfare, communications, RF antennas and receivers, adaptive processing, and design tool development for RF avionics.

January 1997 Dr. Krueger retired from the Air Force civil service.

1997– Present Consultant to the Air Force for Wright Technology Network (WTN), Anteon Inc, General Dynamics Information Technology (GDIT), MacAulay Brown (MACB), Inc. Part time Air Force consultant at WPAFB for proposal evaluation, technology transition, studies, war games.

Professional Memberships and Associations

Dr. Krueger was a Charter Member of the Association of Old Crows (AOC); Former member of Advisory Board for University of Dayton School of Engineering; past president of Trotwood Madison Board of Education; Vice President for Technical Program National Aerospace Electronics Conference (NAECON) for 1997.

Awards and Honors

Dr. Krueger was co-winner of the Avionics Directorate Burka Award for most outstanding technical achievement in 1974 and 1975; AFSC Science and Technology Achievement Award for advances in stealth technology in 1972; AOC Joint Service Medal For Exceptional Leadership in coordinating tri-service electronic warfare technology, 1986.

Professional Certifications

Dr. Krueger is a registered professional electrical engineer in Ohio and a level III certified acquisition professional.

Composed from biographical text provided by Dr. Krueger. Sensors Directorate archives

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Mr. Marvin Spector
Deputy Director
Avionics Laboratory
1987 - August 1988

Retired April 1992

Mr. Spector was born April 4, 1942, in New York, N.Y., and graduated from the Bronx High School of Science in 1959. He graduated from the City College of New York in 1964, with a Bachelor of Science Degree in Electrical Engineering. He received a Master of Science Degree in Electrical Engineering from the University of Dayton in 1969, and a Master of Science degree in Systems Engineering in 1973 from the Air Force Institute of Technology (AFIT), Wright-Patterson Air Force Base, Ohio.

In 1964, Mr Spector joined Aeronautical Systems Division and served in varied engineering capacities involving engineering development and production programs on air-to-surface missiles and aircraft fire control systems. He

concluded this tour of duty as Acting Chief, Avionics Engineering, Maverick System Program Office.

In 1973, Mr. Spector transferred to the Air Force Avionics Laboratory and served as Technical Director and, subsequently, program manager for the Air Force Weapon Guidance Technology Program through 1976.

From 1976 to 1978, Mr. Spector served in various branch positions as a technical advisor in the areas of navigation, weapon control and target acquisition. Following a reorganization in 1978, Mr. Spector became Chief, Fire Control Branch, (later named the Applications Branch), Mission Avionics Division, Air Force Avionics Laboratory. During this period, he worked on fire control software, cruise missile guidance, and target identification.

In February 1985, Mr. Spector was named Chief, System Avionics Division, Avionics Laboratory with primary focus on an advanced avionics architecture (Pave Pillar) using emerging Very High Speed Integrated Circuit (VHSIC) technology for transition to the Advanced Tactical Fighter (ATF). Division research included work in navigation and airborne communication, information processing, software supportability and development of an in-house capability for evaluating and developing avionics integration concepts.

In 1987, Mr. Spector was named Acting Deputy Director, Avionics Laboratory, and, in 1988, he became Director, Avionics Laboratory, Wright Laboratory, Aeronautical Systems Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio. The mission included Air Force R&D in mission avionics (radar and electro-optical sensors, target recognition, sensor evaluation, and fire control), electronic warfare (active and passive countermeasures, survivability, and electronic combat test & evaluation), and system avionics (communication, navigation, information processing, architectures, and integration). He was responsible for development of Air Force Science and Technology, Avionics Technology Area Plan.

His memberships in professional and technical societies included the Institute of Electrical Engineers, Phi Beta Tau, Sigma Xi, the Association of Old Crows, and the American Defense Preparedness Association.

(Current as of September 1991)

Lt Col Patrick L. Sisson
Deputy Director
Avionics Laboratory
August 1988 - 31 August 1990

Lieutenant Colonel Patrick L. Sisson, as Deputy Director of the Avionics Laboratory, led 550 scientists, engineers and staff conducting research and development in basic, exploratory, and advanced research. The Laboratory's focus was to develop technologies that: detect, recognize, identify, and strike non-cooperative targets at long ranges, in all weather, day or night; provide multi-mission protection and survivability against electronic combat threats; and enable totally integrated and effective avionic suites. Lt Col Sisson formulated investment strategy and coordinated program development and execution.

Education:

1969, Bachelor of Science Degree in Electrical Engineering, United States Air

Force Academy, Colorado
1977, Master of Science Degree in Electrical Engineering, Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio
1973, Squadron Officers' School, Montgomery, Alabama
1978, Knowledge Based System Design, Palo Alto, California
1979, Robotic Design, San Diego, California
1981, Numeric Solutions to Induced Antenna Surface Currents, Syracuse, New York
1980, Air Command and Staff College, Seminar, USAF Academy, Colorado
1982, Air Command and Staff College, Montgomery, Alabama
1985, National Security Management, Correspondence, Dayton, Ohio
1986, Air War College, Seminar, Dayton, Ohio
1988, Defense System Management (Basics) College, Fort Belvoir, Virginia

Assignments:

1969 Undergraduate Pilot Training, Columbus Air Force Base, Mississippi
1969-1975, Command Pilot, C-141 at Dover Air Force Base, Delaware and Charleston Air Force Base, South Carolina. Flight Examiner and Instructor Pilot for operational and undergraduate pilot training aircraft.
1975-1977, Student in Electrical Engineering at Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio
1977-1983, Assistant Professor of Electrical Engineering, USAF Academy, Colorado
1983 – 1986, Chief, Electronic Warfare Division, 4950th Test Wing, Wright-Patterson Air Force Base, Ohio
1986 – 1988, Deputy Chief, System Avionics Division, Avionics Laboratory, Wright Research and Development Center, Wright-Patterson Air Force Base, Ohio
1988 – 1990, Deputy Director, Avionics Laboratory, Wright Research and Development Center, Wright-Patterson Air Force Base, Ohio

Awards and Decorations:

Meritorious Service Metal with two Oak Leaf Clusters
Air Force Commendation Medal
AF Outstanding Unit Award with one Oak Leaf Custer
AF Organizational Excellence award with one Oak Leaf Custer
National Defense Service Medal
Vietnam Service Medal with one Bronze Service Star
Air Force Overseas Short Tour Ribbon
AF Longevity Service Award Ribbon with one Silver Oak Leaf Cluster
Small Arms Expert Marksmanship Ribbon
AF Training Ribbon
Republic of Vietnam Gallantry Cross with Palm

Republic of Vietnam Campaign Medal

Professional Memberships:

Association of Old Crows
Miami Valley Astronomical Society
Electronic Engineering and Manufacturing Group

Composed from biographical text provided by Col Sisson. Sensors Directorate archives

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Colonel Zdzislaw H. "Stan" Lewantowicz
Deputy Director
Sensors Directorate
November 1990 - 1995

Colonel Zdzislaw H. "Stan" Lewantowicz was the Deputy Director, Avionics Directorate, Wright Laboratory (WL), Wright-Patterson AFB, Ohio, where he directed the Avionics Laboratory's 550 scientists, engineers, and staff conducting research and development totaling over $400 million. He was a leader and senior counselor for 90 military officers and airmen and was a member of the Wright Laboratory Working Management Group.

Colonel Lewantowicz was commissioned a second lieutenant (ROTC distinguished graduate) in June 1968 and entered active duty in December 1968. Colonel Lewantowicz was a Senior Pilot, with more than 2500 flying hours. He is a member of several technical and professional societies: The Institute of Electrical and Electronics Engineers (IEEE) (Senior Member), The Institute of Navigation (ION), Eta Kappa Nu, Tau Beta Pi, Sigma Xi Research Honor

Society, the Air Force Association, and the Association of Old Crows. He was an Adjunct Professor of Electrical Engineering at AFIT and a Member, Board of Directors for the Honor Seminars of Metropolitan Dayton, Inc. Colonel Lewantowicz continued to pursue his research interests in navigation and other system analytic integration. He has published numerous technical papers in areas such as integrated navigation systems and adaptive optics.

EDUCATION:

1968 Bachelor of Science Degree in Electrical Engineering, Lowell Technological Institute (currently University of Massachusetts at Lowell), Lowell MA
1976 Master of Science Degree in Electrical Engineering degree (with distinction) from the Air Force Institute of Technology (AFIT)
1986 Master of Science Degree in Aeronautics and Astronautics from the Massachusetts Institute of Technology
1973 Squadron Officers School (in residence)
1983 Air Command and Staff College (ACSC) (seminar)
1988 Air War College in 1988, (seminar)

ASSIGNMENTS:

1. December 1968 – December 1969, Undergraduate Pilot Training (UPT), Laredo AFB, Texas
2. January 1969 – April 1970, O-1E Forward Air Controller (FAC) training, Holley Field and Hurlburt AFB FL
3. May 1970 – December 1971, O-1E Forward Air Controller (FAC) in the Republic of Viet Nam, flew over 500 hours and 100 combat missions
4. January 1971 – May 1971, Squadron Assistant Operations Officer, 22 TASS, Bien Hoa AB, Republic of Vietnam
5. June 1971 – September 1971, T-37 Instructor Pilot Training, Randolph AFB, TX
6. October 1971 – January 1973, T-37 Flight instructor, Check Section Pilot, Laredo AFB, TX
7. February 1973 – July 1973, T-37 Wing Air Operations Officer, Laredo AFB, TX responsible for T-37 flying procedures.
8. August 1973 – May 1975, T-37 Wing Air Operations Officer procedures; designed and implemented T-37 all-radar (Category VI) air traffic control and flying procedures, Craig AFB, AL
9. June 1975 – December 1976, MS Graduate Student in Electrical Engineering program, Air Force Institute of Technology (AFIT), Wright-Patterson AFB, OH
10. January 1977 – January 1981, Chief of Systems Technology Section, Advanced Beam Control Branch, Air Force Weapons Laboratory, Kirtland AFB, NM. His section earned two Air Force Systems Command Quarterly Outstanding Technical Achievement awards
11. February 1981 – May 1981, C-130E RTU, Little Rock AFB, AR
12. June 1981 – July 1983, C-130 Aircraft Commander and Chief of

Squadron Training Section, 41 Tactical Airlift Squadron, 317 Tactical Airlift Wing, Pope AFB NC
13.July 1983 – December 1985, Graduate Student at the Massachusetts Institute of Technology, Cambridge, MA
14. January 1985 – August 1990, Assistant Professor and Deputy Head, Department of Electrical and Computer Engineering, AFIT, Wright-Patterson AFB, OH
15. September 1990 – October 1995, Deputy Director, Avionics Directorate, Wright Laboratory (WL), Wright-Patterson AFB, OH

MAJOR AWARDS AND DECORATIONS:

Distinguished Flying Cross,
Meritorious Service Medal (3)
Air Medal (11)
Air Force Commendation Medal (2)
Nominated by USAF for the 1988 Thomas L. Thurlow Award (ION)
Nominated by the Air University for 1989 USAF Research and Development Award.

EFFECTIVE DATES OF PROMOTIONS:

Second Lieutenant December 31, 1968
First Lieutenant June 30, 1970
Captain December 5 1971
Major June 1, 1980
Lieutenant Colonel January 1, 1985
Colonel November 1, 1990

Composed from biographical text provided by Col Lewantowicz. Sensors Directorate archives

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Colonel Gerald T. O'Connor
Deputy Director
Sensors Directorate
1995 -July 1998
August 2002 - July 2003

Colonel Gerald T. O'Connor served two tours as Deputy Director of the Sensors Directorate at Wright-Patterson AFB, Ohio. These tours were separated by an assignment as Chief, of the European Office of Aerospace Research. His first assignment from 1995 to 1998 coincided with the realignment and mission change of the Avionics Directorate of the Wright Aeronautical Laboratories to the Sensors Directorate of the newly created Air Force Research Laboratory in October 1997. With this action, the new Sensors Directorate gained operating locations at Rome, New York and Hanscom Air Force Base, Massachusetts, each with its own ancillary sites.

Colonel O'Connor entered the Air Force as a cadet at the Air Force Academy in 1969 and graduated in 1973 with a Bachelor of Science degree in

Mathematics and Physics. He also received a Master of Science degree in Optical Sciences form the University of Arizona in 1992. Professional education includes Program Management Course, Defense Systems Management College in 1989 and Senior Executive Fellows Program, Harvard University in 2001.

Career Chronology:
1973-1986. Various operational assignments as Aircraft Commander and Flight Commander and pilot of T-38 and B-52 aircraft
1986-1989. Chief, Advanced Research Division, Air Force Systems Command Foreign Technology Division. Led system threat assessment for the Advanced Tactical Fighter.
1989-1992. Program Manager, Enhanced Flight Screener, WPAFB OH
1993-1995. Program Element Monitor for Air Vehicles & Munitions, in the office of the Secretary of the Air Force for Acquisition, Pentagon, Washington DC
1995-1998. Deputy Director, Sensors Directorate, AF Research Laboratory (AFRL), WPAFB OH
1998-2002. Commander, European Office of Aerospace Research & Development (EOARD), AF Office of Scientific Research, London, UK,
2002-2003. Deputy Director, Sensors Directorate, AF Research Laboratory (AFRL), WPAFB OH

Certifications:
Acquisition Program Manager, Level 3
Systems Program Research, Development, and Engineering, Level 2

Composed from biographical text provided by Col O'Connor. Sensors Directorate archives

Colonel Larry D. Strawser
Deputy Director
Sensors Directorate
January 1999 -August 2002

Colonel Larry D. Strawser was the Commander of Detachment 1, Air Force Research Laboratory (AFRL), and Deputy Director of the Sensors Directorate, Air Force Research Laboratory, Air Force Materiel Command, Wright-Patterson AFB, Ohio. He was a leader and senior counselor for 80 military officers. The 2,100-person Detachment hosts Air Force Research Laboratory Headquarters and five Air Force Research Laboratory Directorates. As Deputy Director of the Sensors Directorate, he directed over 1,000 military, civilian, and contractor personnel who discover, develop, integrate, and transition advanced sensor technology at three sites: Wright-Patterson Air Force Base; Hanscom Air Force Base, Massachusetts; and Rome, New York. The men and women of the Sensors Directorate executed a research and development program totaling more than $320 million annually that focused on meeting Air

Force Aerospace Global Awareness, Precision Engagement, and Survivability needs for space, air, and ground sensors.

After leaving the Sensors Directorate, Colonel Strawser was the Assistant Deputy for Advanced Systems for the Missile Defense Agency where he was the senior military leader of the Ballistic Missile Defense System advanced technology development.

EDUCATION:
1971 Bachelor of Arts degree in Chemistry, University of Michigan
1976 Doctor of Philosophy degree in Biochemistry, University of Memphis
1982 Outstanding Contributor, Squadron Officer School, Maxwell Air Force Base, Alabama
1990 Distinguished Graduate, Air Command and Staff College, Maxwell Air Force Base, Alabama
1994 Distinguished Graduate, Air War College, by seminar
1995 Air War College, Maxwell Air Force Base, Alabama

ASSIGNMENTS:
1. September 1979 – December 1979, student, Computer Systems Programming, Keesler Air Force Base, Mississippi
2. December 1979 – June 1982, instructor, Communications-Computer Programmer School, Keesler Air Force Base, Mississippi
3. June 1982 – October 1986, instructor, assistant professor, associate professor, United States Air Force Academy, Colorado
4. November 1986 – July 1989, technical analyst, Command Support and Plans, Defense Intelligence Agency, J-2, Pentagon, Washington D.C.
5. August 1989 – June 1990, student, Air Command and Staff College, Maxwell Air Force Base, Alabama
6. June 1990 – July 1994, deputy head for advanced programs, associate professor of chemistry, United States Air Force Academy, Colorado
7. August 1994 – June 1995, student, Air War College, Maxwell Air Force Base, Alabama
8. June 1995 – July 1998, deputy head for operations and research, associate professor of chemistry, United States Air Force Academy, Colorado
9. July 1998 – January 1999, Director of Research, United States Air Force Academy, Colorado
10. February 1999 – August 2002, Deputy Director, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio
May 1999 – August 2002, Commander, Detachment 1, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio
August 2002 - unknown, Assistant Deputy for Advanced Systems for the Missile Defense Agency

MAJOR AWARDS AND DECORATIONS:

Defense Superior Meritorious Service Medal
Air Force Meritorious Service Medal with three oak leaf clusters
Air Force Commendation Medal
Legion of Merit
Head Mentor of United States National Chemistry Olympiad program in 1999 that placed first at the International Chemistry Olympiad competition held that year in Bangkok, Thailand.

EFFECTIVE DATES OF PROMOTION:
Second Lieutenant 25 August 1979
First Lieutenant 25 August 1981
Captain 25 August 1983
Major 1 March 1988
Lieutenant Colonel 1 June 1993
Colonel 1 April 1999

Composed from biographical text provided by Col Strawser. Sensors Directorate archives

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Colonel Samuel K. Ryals
Deputy Director
Sensors Directorate
September 2003 - June 2005

Colonel Samuel K. Ryals led the 1,232-person Sensors Directorate of the Air Force Research Laboratory. This directorate was in three geographically separated locations and conducted leading-edge scientific research on electro-optics, radio frequency sensors, countermeasures, software anti-tampering and protection, and automatic target recognition. He led the planning, programming, budgeting, and oversight of $443M annual research & development budget supporting over 1,100 scientific projects and experiments.

Colonel Ryals was a Command pilot with over 4,300 flying hours in over 100 different aircraft.

Education
Bachelor of Science Degree in Astronautical Engineering, United States Air Force Academy
Master of Science Degree in Systems Management, University of Southern California
Master of Science Degree in Aerospace Engineering, University of Dayton
Board President Course for Aircraft Safety and Accident Investigations
Defense Systems Management College
National War College, National Defense University
Air War College
Army Command and General Staff College
USAF Test Pilot School
Air Command and Staff College
Squadron Officer School

CAREER CHRONOLOGY
1988-1997 Chief, Space & C3I Management, Sacramento, California
Chief, Integrated Tactical Warning & Attack Assess, Sacramento, California
Program Manager, AC-130U Gunship, Wright-Patterson AFB, Ohio
Program Manager, C-27A Spartan, Wright-Patterson AFB, Ohio
Flight Commander/Experimental Test Pilot, Wright-Patterson AFB, Ohio
1997-1998 Director, Specialized Management and F-117A Director, Sacramento, CA
1998-1999 Program Director, F-117A Stealth Fighter Systems Program Office, Wright-Patterson AFB, Ohio
1999-2003 Program Director, Special Operations Forces Systems Program Office, Wright-Patterson AFB, Ohio
2003-2005 Deputy Director, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson AFB, Ohio
2005-2005 Senior Associate, Dayton Aerospace, Inc., Dayton, OH
2006-2010 Director, R&D Plans and Programs, Goodrich Corporation

Awards and Honors
2002 Air Force Organizational Excellence Award
1998 Defense Acquisition Executive award for acquisition excellence
1998/2002 Finalist, Aeronautical Systems Center Stewart Award as Program Director of the Year
1998 Federally Employed Women's Miami Valley Chapter Supervisor of the Year
Vice Presidential Hammer Award for innovation and government savings
SECAF Lightening Bolt Award for initiative in acquisition reform.

Professional Memberships
Society of Experimental Test Pilots

PROFESSIONAL CERTIFICATIONS
Certified Acquisition Professional, Program Management, Level III
Certified Acquisition Professional, Acquisition Logistics, Level III
Certified Acquisition Professional, Test & Evaluation, Level III
Certified Acquisition Professional, Sys Planning Research Development Engineering, Level III

Source: Received from Col Ryals.

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Colonel Gary L. Hopper
Deputy Director
Sensors Directorate
September 2005 -May 2008

Retired September 2009

Colonel Gary L. Hopper was the Deputy Director of the Air Force Research Laboratory. He assists the Commander in accomplishing AFRL's mission of leading the discovery, development, and integration of warfighting technologies for our air, space and cyberspace forces. He played a key role in directing the Air Force's $2 billion science and technology program as well as additional customer funded research and development of $1.7 billion. He was also responsible for a workforce of approximately 9,500 people in the laboratory's component technology directorates and the Air Force Office of Scientific Research.

EDUCATION:
1983 Bachelor of Science Degree in Physics, United States Air Force Academy, CO
1990 Squadron Officer School, Maxwell AFB
1994 Master of Science Degree in Physics, University of Washington, Seattle, WA
1997 Command and General Staff College, Ft Leavenworth, KS
2002 Master of Science Degree in National Security Strategy, National War College, Ft McNair, Washington, DC

ASSIGNMENTS:
1. Jul 83 - Mar 84, Student Navigator, Undergraduate Navigator Training, 451St Flying Training Squadron, Mather AFB, CA.
2. Apr 84 - Nov 84, Student Electronic Warfare Officer, 453rd Flying Training Squadron, Mather AFB, CA.
3. Jan 85 - Aug 85, Student Weapons Systems Officer, F-4E RTU, 307th Fighter Squadron, Homestead AFB, FL.
4. Sep 85 - Nov 87, Weapons Systems Officer, 69th Tactical Fighter Squadron, Moody AFB, GA.
5. Dec 87 - Nov 90, Wild Weasel Electronic Warfare Officer and Flight Safety Officer, 90th Tactical Fighter Squadron, Clark AB, Philippines.
6. Dec 90 - Aug 92, Instructor Electronic Warfare Officer, 561st / 562nd Tactical Fighter Squadrons, George AFB, CA.
7. Aug 92 - Jun 94, Graduate Student, Physics, University of Washington, Seattle, WA.
8. Jul 94 - Jun 96, Executive Officer and Instructor of Physics, Department of Physics, Dean of the Faculty, United States Air Force Academy, CO.
9. Jun 96 - Jun 97, Student, Command and General Staff College, Ft Leavenworth, KS.
10. Jun 97 - Jun 98, Electronic Warfare Program Element Monitor, Common Systems Division, Directorate of Global Power Programs, Assistant Secretary of the Air Force (Acquisitions), Pentagon, Washington, DC.
11. Jun 98 - Oct 99, Chief, Electronic Warfare Programs and Policy Branch, Agile Combat Support Division, Directorate of Global Power Programs, Assistant Secretary of the Air Force (Acquisitions), Pentagon, Washington, DC.
12. Nov 99 - May 00, F-117 Program Element Monitor, Power Projection Division, Directorate of Global Power Programs, Assistant Secretary of the Air Force (Acquisitions), Pentagon, Washington, DC.
13. May 00 - Jul 01, Chief of Fighter Programs, Directorate of Aerospace Operations and Requirements, Office of Air Force Reserve (HAF), Pentagon, Washington, DC.
14. Aug 01 - Jun 02, Student, National War College, Ft McNair, DC.
15. Jul 02 - Jul 03, Chief, Exercise Plans and FOAL EAGLE Branch, HQ ROKUS Combined Forces Command, Yongsan Garrison, Seoul, Republic of Korea.

16. Aug 03 - Jul 05, Politico-Military Planner for Korea, North East Asia Division, Directorate of Strategic Plans and Policy, J-5, Joint Staff, Pentagon, Washington, DC.
17. Jul 05 - May 08, Deputy Director, Sensors, Air Force Research Laboratory, Wright-Patterson AFB, OH.
18. May 08 - Sep 09, Deputy Director, Air Force Research Laboratory, Wright-Patterson AFB, OH.

FLIGHT INFORMATION:
Rating: Senior Navigator Flight Hours: 1300+
Aircraft: F-4 D/E/G, T-43

MAJOR AWARDS AND DECORATIONS:
Defense Meritorious Service Medal (1 OLC) Meritorious Service Medal (1 OLC)
Air Medal
Air Force Commendation Medal (2 OLC) Joint Service Achievement Medal
Air Force Achievement Medal

OTHER ACHIEVEMENTS:
Distinguished Military Graduate, United States Air Force Academy
Distinguished Graduate, Undergraduate Navigator Training
Top Gun WSO, F-4E RTU
Distinguished Graduate, Squadron Officer School

EFFECTIVE DATES OF PROMOTION:
Second Lieutenant June 1, 1983
First Lieutenant June 1, 1985
Captain June 1, 1987
Major March 1, 1995
Lieutenant Colonel October 1, 1999
Colonel July 1, 2005

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Colonel Cleophas S. Hockaday, Jr.
Deputy Director
Sensors Directorate
July 2009 - January 2011

Retired January 2011

Colonel Cleophas S. Hockaday was Deputy Director, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio. The directorate specializes in developing the science and technology necessary for superior U.S. air and space systems in the areas of intelligence, surveillance, reconnaissance, precision engagement and electronic warfare. The directorate's primary areas of technology investment include radio frequency sensors and countermeasures; electro-optical sensors and countermeasures; automatic target recognition and sensor fusion.

Colonel Sandy Hockaday was a 1983 graduate of the U.S. Air Force Academy. He served in a variety of flying positions during his career in the B-52

and RC-135. His career included staff positions at Headquarters Air Combat Command, the Department of Defense Community ELINT Management Office, and the NATO Defense College. He had commanded an RC-135 squadron and deployed supporting Operations SOUTHERN WATCH, ALLIED FORCE and JOINT GUARDIAN.

He was a master navigator with more than 4000 hours in the RC-135U/V/W, WC-135, B-52G/H, T-43A. As an electronic warfare officer, Colonel Hockaday flew in the RC-135 and logged 70 combat hours and 374 combat support hours.

EDUCATION:
1983 Bachelor of Science degree in Mechanical Engineering, U. S. Air Force Academy CO
1989 Squadron Officer's School, Distinguished Graduate
1992 Master of Science degree in Aeronautical Science, Embry-Riddle Aeronautical University
1996 Air Command and Staff (correspondence)
2001 Air War College (correspondence)
2007 NATO Defense College, Rome, Italy

ASSIGNMENTS:
June 1983 - August 1984, Undergraduate Navigator Training, student Electronic Warfare Officer training, Mather AFB CA.
August 1984 - January 1985, B-52 student B-52 Combat Crew Training, Castle AFB CA
January 1985 - October 1986, B-52G Electronic Warfare Officer, later Instructor Electronic Warfare officer, 46th Bomb Squadron, Grand Forks AFB ND
October 1986 - April 1988, B-52H Instructor Electronic Warfare Officer, later Training Flight Instructor, 325th Bomb Squadron, 92d Bomb Wing, Fairchild AFB WA
April 1988 - September 1989, Standardization and Evaluation Electronic Warfare Officer, 325th Bomb Squadron, 92d Bomb Wing, Fairchild AFB WA
September 1989 - January 1990, Senior Standardization and Evaluation Electronic Warfare Officer, 325th Bomb Squadron, 92d Bomb Wing, Fairchild AFB WA
January 1990 - December 1992, B-52G FTU flight line instructor, 328th Bomb Squadron, 93d Bomb Wing, Castle AFB CA.
January 1992 - December 1992, 329th Bomb Squadron, B-52 Academic Instructor, Squadron Scheduler, 329th Bomb Squadron, 93d Bomb Wing, Castle AFB CA
December 1992 - December 1993, B-52 Combat Flight Instructor Course Instructor Electronic Warfare Officer, 329th Bomb Squadron, 93d Bomb Wing, Castle AFB CA
December 1993 - December 1994, Chief Wing Plans & Evaluations, 93d Bomb Wing, Castle AFB CA

December 1994 - December 1995, B-52 Weapons and Tactics Program Manager, Weapons and Tactics Branch, HQ ACC/DOT, Langley AFB VA
December 1995 - December 1996, Chief, Electronic Combat Policy, Electronic Combat Operations, HQ ACC/DOT, Langley AFB VA
December 1996 - December 1997, Chief Electronic Combat Policy, Offensive Information Warfare Branch, HQ ACC/DII, Langley AFB, VA
January 1998 - May 1998, student, RC-135 Rivet Joint electronic warfare officer
July 1998 - January 1999, Crew Commander, Instructor Electronic Warfare Officer, 343d Reconnaissance Squadron, 55th Wing, Offutt AFB NE
January 1999 - May 1999, Flight Commander, Instructor Electronic Warfare Officer, 343d Reconnaissance Squadron, 55th Wing, Offutt AFB NE
May 2000 - May 2002, Director of Operations, 82d Reconnaissance Squadron, 55th Wing, Kadena AB, Japan
May 2002 - May 2004, Commander, 82d Reconnaissance Squadron, 55th Wing, Kadena AB, Japan
May 2004 - Oct 2005, Chief, ISR Division, CEMO, Ft. George Meade, MD
Oct 2005 - Jul 2007, Deputy Director Community ELINT Management Office, Ft George Meade, MD
Jul 2007 - Feb 2008 - Student, NATO Defense College, Rome, It
Feb 2008 - Jun 2009 - Faculty Advisor, Senior National USAF Representative, NATO Defense College, Rome, IT
Jul 2009 - January 2011 - Deputy Director, Sensors Directorate, Air Force Research Laboratory, WPAFB, OH

FLIGHT INFORMATION:
Rating: Master Navigator, Parachutist
Flight hours: Over 4,000
Aircraft flown: RC-135U/V/W, WC-135, B-52G/H, and T-43A

MAJOR AWARDS AND DECORATIONS:

Defense Meritorious Service Medal
Meritorious Service Medal with two oak leaf clusters
Air Medal
Aerial Achievement Medal with five oak leaf clusters
Air Force Commendation Medal with oak leaf cluster
Air Force Achievement Medal with oak leaf cluster
Air Force Outstanding Unit Award with "V" device and five oak leaf clusters
Air Force Organizational Excellence Award
Combat Readiness Medal with three oak leaf clusters
National Defense Service Medal with bronze star
Armed Forces Expeditionary Medal
Global War on Terrorism Service Medal
Armed Forces Service Medal with oak leaf cluster

EFFECTIVE DATES OF PROMOTION:
Second Lieutenant Jun 1, 1983

First Lieutenant	Jun 1, 1985
Captain	Jun 1, 1987
Major	April 1, 1995
Lieutenant Colonel	Oct 1, 1999
Colonel	Oct 1, 2005

Colonel Duncan A. Dversdall
Deputy Director
Sensors Directorate
February 2011 - Present

Colonel Duncan "D-Squared" Dversdall is the Deputy Director for the Sensors Directorate, Air Force Research Laboratory, Wright-Patterson AFB, Ohio. He directs the Air Forces' research into sensors and electronic systems and guides the day to day operation for over 1400 personnel.

Colonel Dversdall graduated from the University of Oklahoma and was commissioned into the Air Force in 1987. After commissioning, Colonel Dversdall was assigned to the Windshield Systems Program Office, Wright Laboratory (now Air Force Research Laboratory) at Wright Patterson AFB, Ohio. There, he led the technology development and transition programs that resulted in new windshield designs being fielded for theT-38, F-16, F-15 and B -1B. While at Wright Patterson AFB, he graduated from the University of Dayton with a Master of Science Degree in Mechanical Engineering. Colonel

Dversdall was then assigned to the test and evaluation office of the B-1B Systems Program Office, Tinker AFB, Oklahoma. In that position, he led the test management and planning for the first two phases of the B-1B Conventional Missions Upgrade Program. In December 1996, he graduated from the USAF Test Pilot School and was assigned to the 419th Flight Test Squadron at Edwards AFB, California.

At the 419 FLTS, he led the Block D Conventional Missions Upgrade program. This project included the integration of the Joint Direct Attack Munition, providing the B-1B with its first guided conventional weapon capability. Upon the successful completion of this project, he was assigned as the Branch Chief for Project Management where he was responsible for the overall management of flight testing on all USAF bombers (B-1B, B-2A and B-52H), Unmanned Aerial Vehicles (Global Hawk and Dark Star) and the initial provisioning for the Airborne Laser program. Colonel Dversdall was chosen the AFMC Tester of the Year for 1998. In January 2000, he was assigned to the Air Force Red Team, Directorate of Special Programs, Assistant Secretary of the Air Force for Acquisition, Pentagon, Washington D.C. There, he led independent technical assessments of the vulnerabilities of aircraft, sensors and weapon systems. In July 2003, Colonel Dversdall was assigned as the Deputy Commander 412th Operations Group, Edwards AFB, California, where led the execution of flight testing in 10 flight test squadrons and over 2,700 personnel including 400 aircrew. He also served as the Chief Flight Test Engineer at the Air Force Flight Test Center, developing operating procedures and mentoring the 72 flight test engineers assigned to the Center. In June 2005, Colonel Dversdall assumed command of the 846 Test Squadron, Holloman AFB, New Mexico where he led the Holloman High Speed Test Track achieving unprecedented levels of precision and accuracy in testing at hypersonic speeds. As the Chief of the Materials and Manufacturing Directorate's Systems Support Division, he led the campaign to apply the laboratory's materials expertise to solve real time problems in the Air Force including materials forensics in support of accident investigations and extensive subject matter expertise consultation with the engineering community across the Air Force. His decorations include the Meritorious Service Medal with three oak leaf clusters, the Aerial Achievement Medal, the Commendation Medal with one oak leaf cluster and the Achievement Medal with one oak leaf cluster.

EDUCATION:

2001 Advanced Program Managers Course, Defense Systems Management College
1999 Air Command and Staff College in seminar
1996 USAF Test Pilot School, Flight Test Engineer Course
1993 Squadron Officer School in Residence
1993 University of Dayton, Master of Science in Mechanical Engineering

1987 University of Oklahoma, Bachelor of Science in Aerospace Engineering

ASSIGNMENTS:
June 1988 - July 1990: Project Engineer, Aircraft Windshield Systems Program Office, Wright Laboratory, Wright-Patterson AFB, Ohio

August 1990 - July 1991: Executive Officer, Flight Dynamics Directorate, Wright Laboratory, Wright-Patterson AFB, Ohio

August 1991 - July 1993: Chief, Aircraft Windshield Systems Program Office, Wright Laboratory, Wright-Patterson AFB, Ohio

August 1993 - December 1995: B-1B Test and Evaluation Manager, Oklahoma City Air Logistics Center, Tinker AFB, Oklahoma

January 1996 - December 1996: Student, United States Test Pilot School, Edwards AFB, California

January 1997 - July 1998: Project Manager, B-1B Block D/JDAM flight test program, 419th Flight Test Squadron, Edwards AFB, California

August 1998 - December 1999: Chief, Project Management Flight, 419th Flight Test Squadron, Edwards AFB, California

January 2000 - July 2002: Chief, Global Power Vulnerabilities Branch, Air Force Red Team, SAF/AQLR, Pentagon, Washington DC.

July 2002 - July 2003: Deputy Chief, Special Studies and Analysis Division, SAF/AQLR, Pentagon, Washington DC.

August 2003 - June 2005: Deputy Commander, 412th Operations Group, Edwards AFB, California

June 2005 - July 2007: Commander, 846th Test Squadron, Holloman AFB, New Mexico

August 2007 – Dec 2010: Chief, Systems Support Division, Materials and Manufacturing Directorate, Air Force Research Laboratory, Wright-Patterson AFB, Ohio

Dec 2010 – Present: Deputy Director, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson AFB, Ohio

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Chief Scientists

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Mr. Raymond J. Nordlund
Chief Scientist
Air Force Avionics Laboratory
1964 - 1970

Mr. Raymond J. Nordlund was born 20 April 1911 in New Effington, South Dakota, graduating from South Dakota State University in 1933 with a Bachelor's degree in Electrical Engineering. He completed 37 hours of graduate study at Ohio State University in the 1946 through 1949 time frame.

Mr. Nordlund began his career in 1934 as a highway design engineer with the State of South Dakota, leaving in 1941 to become a member of the Aircraft Radio Laboratory. He was a project engineer in the Navigation and Bombing Systems Branch until 1948. From 1948 to 1951 he was Branch Chief of the Strategic Bombing Branch of the Aircraft Radio Laboratory.

Mr. Nordlund was consultant to the Chief of the Armament Laboratory

from 1951 to 1956 and Chief of Plans and Requirements of the Directorate of Development in 1956 to1957. As the organization evolved, he was Technical Director of the Weapons Guidance Laboratory from 1957 to 1960 and of the Navigation and Guidance Laboratory in 1960 and 1961.

Mr. Nordlund became Technical Director of the Avionics Directorate from 1961 to 1963. The Air Force Avionics Laboratory was established in 1963 with Mr. Nordlund as its first Deputy Director. Mr. Nordlund became Chief Scientist in 1964, serving until his retirement in 1970.

Mr. Nordlund pioneered radio compass "Night Effect" research and organized and guided USAF inertial navigation and solid state computer programs. He contributed to solutions for electronics reliability and organized Wright-Patterson's dynamic system analysis capability. Mr. Nordlund was listed in "Who's Who" in Engineering.

Mr. Nordlund was a senior member of the IEEE and a member of the Scientific Research Society of America. He was a registered professional engineer in Ohio.

Mr. Nordlund passed away shortly after retirement.

Dr. Bernard H. List
Chief Scientist
Air Force Avionics Laboratory
1971 - June 1974

Dr. Bernard List, a native of Baltimore, Maryland, studied at Johns Hopkins University where he received his Bachelor of Science Degree in Electrical Engineering in 1947 and his Doctorate in Electrical Engineering in 1951. Dr. List's studies included work in electrical and magnetic properties of high-current arcs and the dielectric properties of insulating materials.

Dr. List became Director of the Air Force Avionics Laboratory at Wright-Patterson AFB, Ohio in July 1974. He served in that role until June 1975, when he accepted a position in The Department of Defense Department of Research and Engineering.

Dr. List had been with the Avionics Laboratory since 1971, first as Chief Scientist and later as Deputy Director. Prior to the Avionics Laboratory, he

was employed by Texas Instruments Inc. (TI), a Dallas manufacturer of electronic equipment and components. At TI, Dr. List was director of the Systems and Information Sciences Laboratory. His work there included research in systems and information sciences from a theoretical and applied standpoint. Earlier assignments included technical studies and advanced development programs in fields of interest to the company such as aerospace electronics, undersea warfare systems, surveillance systems and weapons.

At one time he was manager of Advanced Planning of the Components group at TI where he was responsible for developing long-range plans and conducting market research. He was responsible for the development of the metastable helium magnetometer at TI from the research phase through the development and production of helium magnetometers for a number of applications.

Chief of the Electrical Engineering Division at Battelle Memorial Institute prior to his TI assignment, Dr. List spent six years in the fields of electrical guidance control and instrumentation systems for air weapons and studies of means of reducing the radar cross section of aircraft.

Dr. List was a member of the Institute of Electrical and Electronic Engineers with a special membership in Systems and Cybernetics, Information Theory, Computers, Reliability, Engineering Management, and Electronic Circuits. Other professional societies include the Association of Old Crows and Sigma Xi. He was a registered professional engineer in both Ohio and Texas.

Source: 16 June 1967 WPAFB Skywrighter, page 1.

Dr. William C. Eppers, Jr.
Chief Scientist
Air Force Avionics Laboratory
July 1974 - June 1975

Retired March 1985

Dr. William Eppers earned a Bachelor of Science Degree and a Doctor of Engineering Degree, both in Electrical Engineering, from the Johns Hopkins University.

From November 1950 to October 1951, he was a geophysicist with the U.S. Geological Survey in Washington, D.C. From July 1952 to July 1953 he worked as an electronic consultant to the U.S. Public Health Service National Heart Institute in Bethesda, Maryland.

During the period from October 1951 to March 1955, Dr. Eppers was a research assistant for the Institute for Cooperative Research at the Johns Johns Hopkins University. From March 1955 to March 1957, he was an instructor in electrical engineering at the Air Force Institute of Technology at Wright-Patterson Air Force Base, Ohio. He became an assistant professor of engineering at AFIT in March 1957.

Dr. Eppers came to the Air Force Avionics Laboratory (as it was then called) in September 1960 and was named Director in July 1975, serving in that role until May 1977.

At the time of his retirement, Dr. Eppers was the Deputy Director of the Avionics Laboratory, of the Air Force Wright Aeronautical Laboratories at Wright-Patterson Air Force Base, Ohio.

He was elected a Fellow of the Institute of Electrical and Electronic Engineers in 1976 and in 1992 he received the IEEE Aerospace and Electronic Systems' Pioneer Award recognizing his laser research. Other honors and awards include being named an Outstanding Engineer in the Dayton area in 1972. He received the Samuel M. Burka Award in 1969 and has served on numerous technical panels. He is the author of numerous technical papers.

After coming to the Avionics Laboratory, Dr. Eppers had been involved in many programs including initiating the Department of Defense and Air Force program in gas dynamic lasers and provided the technical direction. The effort has grown to multimillion dollar programs in all services. He also directed the first study on the use of high energy gas dynamic lasers.

Dr. Eppers also initiated and served as Program Director of the Air Force Program 405B laser communications space data relay. He was a co-developer of the high power carbon monoxide laser, the second most efficient and powerful gas laser to carbon dioxide. He also was the first to Successfully explain the ion velocity distribution at the cathode of the glow discharge.

He was the initial developer of the x-ray fluorescent technique to measure gas densities in gas discharges, was a project engineer on the Italian-U.S. and Swedish-U.S. exchange program on plasma physics, and developed the first laser made by the Air Force in June 1962.

Dr. Eppers retired in March 1985.

Dr. Jesse C. Ryles
Chief Scientist
Avionics Directorate
July 1975 - January 1994

Retired January 1994

Dr. Jesse C. Ryles was born in Lexington, Ky., and received a Bachelor of Science Degree in Mechanical/Aeronautical Engineering from the University of Kentucky, Lexington, Ky. in 1956; and a Master of Science Degree and a Doctor of Philosophy Degree, both in Electrical Engineering, from Ohio State University, Columbus, Ohio.

In 1957, Dr. Ryles was employed as an aerospace engineer in the Air Force Powerplant Laboratory, Wright-Patterson Air Force Base. In this position he performed research and development assignments related to advanced solid and liquid propellant rocket propulsion systems. Later that year, he was commissioned a second lieutenant in the U.S. Air Force and entered active

duty. During his military career his assignments included duties as an aircraft maintenance, communications and electronics officer with the Air Training Command, Airways and Air Communications Service; and Air Defense Command, in Illinois, Georgia, Florida, and Maine.

Upon separation from military service in 1961, Dr. Ryles returned to Wright-Patterson Air Force Base. In June 1961, he was employed as an aerospace engineer by the Air Force Aero Propulsion Laboratory, performing task and lead engineer research and development work on supersonic/hypersonic ramjet engine and control concepts and multimode hybrid propulsion concepts for aerospace vehicles.

In 1965, he served as an aerospace and electronics engineer in the Deputy for Advanced Systems Studies and Analysis in the Systems Engineering Group at Aeronautical Systems Division. In this position he performed engineering and technical manager assignments on a highly advanced and innovative aerospace aircraft concept, and advanced air-to-surface weapon guidance developments. From 1966 to 1968, Dr. Ryles served as lead engineer and technical manager in the Advanced Air-to-Surface Weapon Guidance Development Program in the Air Force Avionics Laboratory.

After completing long-term training at Ohio State University in 1970, Dr. Ryles returned to the Air Force Avionics Laboratory at Wright-Patterson Air Force Base and served as an electronics engineer in the Electro-Optical Identification and Tracking Group, accomplishing studies on advanced weapon guidance and identification approaches. In 1971 he became Technical Director for the Advanced Air-to-Surface Weapon Delivery Program 679A, Navigation and Guidance Division. The following year he was named technical manager for the Reference Systems Technology Center, Reconnaissance and Weapon Delivery Division. He was responsible for establishing an in-house center-of-excellence in reference/navigation systems technology.

In 1973 Dr. Ryles became Chief of the Analysis and Evaluation Branch in the Air Force Avionics Laboratory, where he was tasked to develop a major in-house capability to support the Reconnaissance and Weapon Delivery Division. In 1974 he was named Senior Scientist of the Air Force Avionics Laboratory.

Dr. Ryles served as Chief Scientist of the Avionics Laboratory, Air Force Wright Aeronautical Laboratories, Aeronautical Systems Division, Wright-Patterson Air Force Base, Ohio from February 1978 to February 1994. In this position he was principal advisor to the laboratory director on technical/research activities in basic research, exploratory and advanced development, aerospace vehicle avionics/electronics programs, navigation, surveillance,

reconnaissance, electromagnetic warfare, fire control, weapon delivery, communications, information processing and control, and electronic/electromagnetic devices. He also provided technical assistance to other AFSC product divisions, USAF operational commands and other services as required.

In 1994, Dr Ryles assumed the position as Director, Avionics Directorate, Wright Laboratory. He held this position till his retirement in January 1997.

His memberships in professional and technical societies included: The Institute of Electrical and Electronics Engineers, Pi Tau Sigma, Sigma Xi, the Association of Old Crows and the American Defense Preparedness Association.

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Dr. Edwin B. Champagne
Chief Scientist

Electronic Technology Laboratory	Solid State Electronics Directorate
1988 – December 1990	December 1990 – November 1995

Retired 3 November 1995

Dr. Edwin B. Champagne was Chief Scientist for the Electronic Technology Laboratory, Wright Research and Development Center, Aeronautical Systems Division, Air Force Systems Command, Wright-Patterson AFB, Ohio.

Dr. Champagne was born June 7, 1935, in Barton City, Mich., and graduated from Harrisville High School, Harrisville, Mich., in 1952. He received a Bachelor of Science Degree in Electrical Engineering from Michigan State University, East Lansing, in 1956, and was commissioned a second lieutenant in the United States Air Force Reserve. He received a Master of Science Degree in Electrical Engineering from the University of Southern California, Los Angeles, in 1958 and a Doctoral Degree in Electrical

Engineering from Ohio State University, Columbus, Ohio in 1967. Dr. Champagne has attended many short courses on microelectronic, microwave and optical techniques and devices.

From 1956 to 1958, Dr. Champagne was a Hughes Cooperative Fellow and worked for Hughes Aircraft Company, Culver City, Calif., in the area of missile test equipment design.

He entered active duty as a second lieutenant in July 1958 at Wright-Patterson Air Force Base, Ohio, where he served as a project engineer in the Electronic Components Laboratory, Wright Air Development Division, Air Research and Development Command. His responsibilities initially were in the microwave tube area and later involved lasers and their applications.

Dr. Champagne separated from the service in July 1961 and joined the Thermionics Branch, Electronic Technology Laboratory, Directorate of Avionics, Deputy for Technology, Aeronautical Systems Division, Wright-Patterson Air Force Base. He continued to serve as a project engineer in the areas of microwave tubes and laser applications.

In February 1962, Dr. Champagne was reassigned to the Weapons Techniques Branch of the Navigation and Guidance Laboratory as a project engineer on the application of lasers as weapons. While in this position he attended the Ohio State University as a long-term, full-time training selectee during the 1962-1963 school year. He returned to Wright-Patterson Air Force Base in 1963 to the Reconnaissance Division of the Avionics Laboratory.

After returning from Ohio State in June 1963, Dr. Champagne became involved with in-house research and analysis. He developed methods for the analysis of laser-based systems analogous to those of their microwave counterparts. During this period Dr. Champagne performed some of the initial experiments on holographic imaging and developed a general theory for off-axis holographic imaging. This work formed the basis for his doctoral dissertation. A paper he published in the Journal of the Optical Society on this topic was recognized as a "citation classic" in the Dec. 5, 1983, issue of Current Contents.

In 1967 Dr. Champagne joined KMS Industries in Ann Arbor, Mich., where he performed experiments in the areas of optical processing, optical metrology and radar imaging. In 1968 Dr. Champagne joined GCO, Inc., also in Ann Arbor, to develop experimental techniques aimed at the application of holographic interferometry to nondestructive testing. In 1971, he joined the Willow Run Laboratories, University of Michigan, where he worked on imaging radars. His assignments included a determination of the imaging properties of the Apollo XVII lunar sounder radar and the spotlight radar.

In 1973, Dr. Champagne rejoined the Electronic Technology Division of the Avionics Laboratory, Wright-Patterson Air Force Base. He was involved with the analysis and translation of operational requirements to device performance specifications. Areas of analyses included microwave and laser-based systems, radiometers, thermal imaging systems, focal plane arrays, digital processing and superconductor based device performance.

Dr. Champagne was assigned as Principal Scientist of the Electronic Technology Laboratory in October 1983. He was promoted to Chief Scientist and assumed those duties in May 1990.

Dr. Champagne holds four patents. He is a member of the Optical Society of America, Tau Beta Pi, Eta Kappa Nu and Sigma Xi. He is listed in the First Edition of the Marquis, International Who's Who in Optical Science and Engineering. He was an adjunct assistant professor of electrical engineering at the University of Dayton, Dayton, Ohio.

(Current as of October 1990)

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Dr. Donald G. Bodnar
Chief Scientist
Sensors Directorate
July 1997 – December 1998

Dr. Donald G. Bodnar, then a member of the research faculty at the Georgia Institute of Technology, served as Chief Scientist of the Sensors Directorate of the Air Force Research Laboratory and earlier, Chief Scientist of Rome Laboratory as an Individual Program Augmentee (IPA).

His responsibilities as Sensors Directorate Chief Scientist included leading the transition of 900 people, organized in seven divisions, and at three different geographical locations from an air-to-air avionics to a space sensor organization.

At Rome Laboratory, Dr. Bodnar was responsible for establishing the direction of the scientific content of programs in command, control, communi-

cation and intelligence (C3I) technology.

He was Laboratory Director at Georgia Tech where he was responsible for hiring, salaries, space, contract development, and capital equipment. As Division Chief there, he was responsible for developing and managing new large contracts as well as creating and running large multi-company proposal teams to win these contracts.

Dr. Bodnar is an internationally known expert in the field of antenna design and analysis, especially scanning reflector antennas and in the polarization characterization of antennas using both theoretical and experimental methods. He has performed near-field and far-field antenna and RCS measurements using compact, near-field and far-field measurement techniques.

Dr. Bodnar is a Fellow of the IEEE, a past President and a past Vice President of the IEEE Antennas and Propagation Society, past Chairman of the IEEE Antenna Standards Committee, and is the author or co-author of over 100 publications.

Dr. Bodnar holds a Doctorate Degree and a Bachelor of Science Degree in Electrical Engineering from the Georgia Institute of Technology and a Master of Science Degree in Electrical Engineering from the Massachusetts Institute of Technology. He has taught graduate and undergraduate courses at the Georgia Institute of Technology in antennas, electromagnetic theory, materials, and computer programming. He has also taught several short courses including Antenna Engineering, Principles of Modern Radar, Phased Array Antennas, Polarimetric Radar, Principals and Applications of Millimeter Wave Radar, and Scanning Antenna Design.

Composed from biographical text provided by Dr. Bodnar. Sensors Directorate archives

Dr. Horst R. Wittman
Chief Scientist
Sensors Directorate
January 1999 – March 2000 (Acting)

Retired August 2001

Dr. Horst R. Wittmann was Associate Director of the Sensors Directorate, Air Force Research Laboratory. He was co-responsible for executing a $150 million science and technology program in a broad spectrum of disciplines supporting advanced sensor technology. He also served as advisor to various Department of Defense research activities and is Department of Defense representative to NATO, Research and Technology Board, Science and Electronics Technology Panel. He served a dual role as acting Chief Scientist during the search for a permanent appointee.

His previous assignments were Director of Electromagnetics and Reliability at Rome Laboratory, Hanscom Air Force Base, Massachusetts, and

Director of Physics and Electronics at the Air Force Office of Scientific Research.

Before joining the Air Force in 1984, Dr. Wittmann was Associate Director of the Electronics Division, U.S. Army Research Office. During this time, he also held the position of adjunct associate professor in the Electrical Engineering Department of North Carolina State University. Dr. Wittmann has authored more than 20 research publications and holds one U.S. patent.

Dr. Wittmann is a naturalized citizen from Austria, where he received his graduate education. His field of scientific specialization is solid state physics.

EDUCATION:

1959 Bachelor of Science degree in Physics, University of Erlangen, Germany
1964 Doctor of Philosophy degree in Physics, University of Graz, Austria
1993 Air Force Certified Acquisition Professional, Level III

CAREER CHRONOLOGY:

1. 1964 - 1966, space systems engineer, Bolkow GmbH, Munich, Germany
2. 1966 - 1970, group leader, Physics Laboratory, United States Army, (USA) MICOM, Hunstville, Ala.
3. 1970 -1984, Associate Director, Electronics Division, USA Research Office, Durham, N.C.
4. 1984 - 1996, Director of Physics and Electronics, USAF Office of Scientific Research, Washington, D.C.
5. 1996 - 1997, Director, Electromagnetics and Reliability Directorate, Rome Laboratory, Hanscom AFB, Mass.
6. 1997 - August 2001, Associate Director, Sensors, Air Force Research Laboratory, Wright-Patterson AFB, Ohio

MAJOR AWARDS AND HONORS:

1977 Fulbright Hays Fellowship
1977 Secretary of the Army Fellowship
1993 Fellow, Institute of Electrical and Electronic Engineers
1996 Fellow, American Association for the Advancement of Science

CURRENT PROFESSIONAL MEMBERSHIPS / AFFILIATIONS:

Institute of Electrical and Electronics Engineers (IEEE)
American Physical Society (APS)
American Association for the Advancement of Science (AAAS)
NATO, Research and Technology Board, Panel on Sensors and Electronics Technology, U.S. representative.

Dr. William M. Brown
Chief Scientist
Sensors Directorate
March 2000 — January 2005

Retired January 31, 2005.

Dr. William M. Brown was Chief Scientist, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio. The directorate develops the new technologies that U.S. warfighters need to find and precisely engage the enemy and eliminate its ability to hide or threaten our forces. In collaboration with other AFRL directorates and Defense Department organizations, the directorate develops sensors for air and space reconnaissance, surveillance, precision engagement and electronic warfare systems. He was a member of the scientific and professional cadre of senior executives.

Dr. Brown had 50 years of experience in research, teaching and man-

agement, and administration. Apart from his 24 years as Director and President of the Willow Run Laboratories and the Environmental Research Institute of Michigan in Ann Arbor, most of his work had been in universities, complemented by work in industry and government-related organizations and programs. His research and teaching experience was extensive in sensor systems analysis, random processes and information theory. At ERIM, and in most other work, he had been active in federally funded research and development programs.

Dr. Brown had served on various technical committees, including the Defense Department's Defense Science Board Studies and the Project Michigan Summer Study. He was Chairman of the Board for the International Symposium on Remote Sensing of Environment, and continued work as a consultant to government and industry. He was a registered professional engineer in Michigan.

EDUCATION

1952 Bachelor of Science Degree in Electrical Engineering, West Virginia University, Morgantown
1957 Doctor of Philosophy Degree in Engineering, The Johns Hopkins University, Baltimore, Md.

CAREER CHRONOLOGY

1. 1950 - 1952, assistant instructor, physics department, West Virginia University, Morgantown
2. 1954 - 1957, project supervisor, Countermeasures Group, Radiation Laboratory, The John Hopkins University, Baltimore, Md.
3. 1957 - 1958, technical staff member, Institute for Defense Analyses, the Pentagon, Washington, D.C., and associate professorial lecturer, George Washington University
4. 1958 - 1963, assistant professor, later, associate professor, Electrical and Computer Engineering Department, University of Michigan (1960 - 1963, Head, Radar and Optics Laboratory, University of Michigan)
5. 1963 - 1973, professor, Electrical and Computer Engineering Department, University of Michigan (1963 - 1968, Head, Radar and Optics Laboratory, University of Michigan) (1968 - 1968, visiting professor, Imperial College, University of London) (1970 - 1973, Director, Willow Run Laboratories)
6. 1972 - present, chairman, International Symposium on Remote Sensing of Environment Inc. (1972 - 1973, President and founder, Environmental Research Institute of Michigan)
7. 1973 - 1994, President and Founder, Environmental Research Institute of Michigan (1993 - 1994, Chairman, Michigan Development Corp.)
8. 1994 - present, Chairman, Michigan Development Corp.
9. 1994-1999, Electrical and Computer Engineering Chair, US Air Force Institute of Technology.

9. 2000 - January 2005, Chief Scientist, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson AFB, Ohio

AWARDS AND HONORS

First in College Prize, West Virginia University
Centennial Medal of Exceptional Service, Institute of Electrical and Electronics Engineers
Meritorious Civilian Service Award, U.S. Air Force
1991 Michigan High-Technology Entrepreneur of the Year
Trimillennium Medal, IEEE
Pioneer Award, IEEE

OTHER ACHIEVEMENTS

Former member, Army Science Board, Air Force Scientific Advisory Board and Institute for Defense Analyses Radar Target Designation Summer Studies
Former chairman, Air Force Space Division Advisory Group
Former special adviser, Aeronautical Systems Division, Wright-Patterson Air Force Base, Ohio
Former course chairman, Engineering Summer Conferences, Intensive Course on Random Processes, University of Michigan
Former consultant, Institute for Defense Analyses
Former associate editor and editor-in-chief, Transactions on Aerospace and Electronic Systems, IEEE
1972 - 2005, adjunct professor, University of Michigan

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS

Honorary fraternities (4)
Fellow, IEEE
Electrical and Computer Engineering Academy, West Virginia University
National Academy of Engineering

Dr. Brown passed away 23 February 2008 in Ann Arbor, Michigan.

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Dr. Michael C. Wicks
Chief Scientist
Sensors Directorate
January 2005 — June 2005 (Acting)

Dr. Michael C. Wicks, a member of the scientific and professional cadre of senior executives, is the Senior Scientist for Sensor Signal Processing, Sensors Directorate, Air Force Research Laboratory, Rome, N.Y. He specializes in the science and technology needed for superior U.S. air and space systems for reconnaissance, surveillance, precision engagement and electronic warfare. Dr. Wicks' work involves developing and exploring concepts in signal processing algorithms for detection, discrimination, track processing, identification and the control of distributed sensor systems. He is scientific and technical adviser specializing in radio frequency sensors, radar systems concepts and signal processing research as it applies to advanced ground, air and space systems.

Dr. Wicks began his career with the Air Force in 1981 when he joined the laboratory. He advanced to senior engineer by 1990, principal engineer by 1998 and assumed his current position in 2002. His technical expertise encompasses space-time adaptive processing, advanced algorithm development and ultra-wideband radar, including antennas. Additionally, his expertise includes polarimetric sensor signal processing, S-band inverse synthetic aperture radar imaging, knowledge-base applications to radar signal processing, concealed weapon detection, ground-penetrating radar, bistatic radar, and radar systems engineering. Dr. Wicks holds 14 U.S. patents, and he has authored or co-authored two books, several book chapters, and more than 300 journal, conference and technical papers.

EDUCATION

1979 Associate of Science Degree in Engineering Science, Mohawk Valley Community College, Utica, N.Y.
1981 Bachelor of Science Degree in Electrical Engineering, Rensselaer Polytechnic Institute, Troy, N.Y.
1985 Master of Science Degree in Electrical Engineering, Syracuse University, N.Y.
1995 Doctor of Philosophy in Electrical Engineering, Syracuse University, N.Y.
2000 Master of Arts Degree in Public Administration, Syracuse University, N.Y.

CAREER CHRONOLOGY

1. 1981 - 2002, Electronic Engineer and Program Manager, Sensors Directorate, Rome Research Site, Air Force Research Laboratory, Rome, N.Y.
2. 2002 - present, Senior Scientist for Sensor Signal Processing, Sensors Directorate, Rome Research Site, AFRL, Rome, N.Y. (2005, acting Chief Scientist, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio)

AWARDS AND HONORS

Fellow, Institute of Electrical and Electronics Engineers for "Contributions to Adaptive Airborne Signal Processing"
Co-recipient of the Brian Hendrickson Memorial Award, Sensors Directorate, AFRL
Engineer of the Year, Mohawk Valley Engineers Executive Council
1998 Best Patent of the Year Award, Sensors Directorate, AFRL
1998 Fred Nathanson Memorial Award for the Young Engineer of the Year, IEEE
1999 Fellow, AFRL
2001 Alumni of the Year, Mohawk Valley Community College
2006 Waveform Diversity Person of the Year Award, 2nd International

Conference on Waveform Diversity and Design
2009 Warren D. White Award for Excellence in Radar Engineering, IEEE

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS
IEEE
IET Radar, Sonar and Navigation
Association of Old Crows

(Current as of May 2009)

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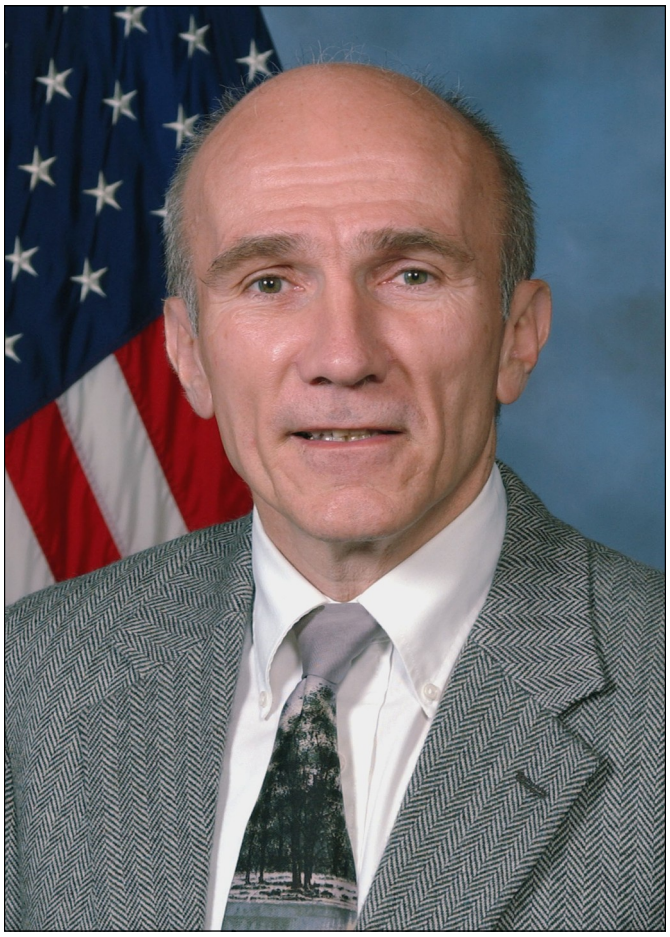

Dr. Paul F. McManamon
Chief Scientist

Avionics Directorate	Sensors Directorate
December 1994 – July 1997 (Acting)	June 2005 – May 2008

Retired May 2, 2008.

Dr. Paul F. McManamon, a member of the scientific and technical cadre of senior executives, was Chief Scientist, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio. The Sensors Directorate consisted of approximately 1,100 people responsible for developing new sensor technology for the Air Force. Dr. McManamon was also responsible for the directorate's technical portfolio. Dr. McManamon served more than two years as acting Chief Scientist for Avionics. He was the technical lead for more than 500 scientists and engineers, and he was responsible for the technical content of all electro-optical and microwave sensors development, electron device development, automatic target recognition as

well as avionics systems, concepts and simulation.

Prior to June 2005, he was the Sensor Directorate's Senior Scientist for Infrared Sensors, developing multi-discriminate electro-optical sensors, including multifunction laser radar technology, novel electro-optical counter-measure systems and optical phased-array beam steering technology.

Dr. McManamon is widely recognized in the electro-optical community and was elected as the 2004 secretary for SPIE, the International Society for Optical Engineering. In addition, he served on the executive board for the Military Sensing Symposia.

EDUCATION

1968 Bachelor of Science Degree in Physics, magna cum laude, John Carroll University, Cleveland, Ohio
1973 Master of Science Degree in Physics, the Ohio State University, Columbus, Ohio
1977 Doctor of Philosophy in Physics, the Ohio State University, Columbus, Ohio

CAREER CHRONOLOGY

1. May 1968 - September 1972, electronic warfare physicist and electronics engineer, Aeronautical Systems Division, Wright-Patterson AFB, Ohio
2. September 1972 - June 1973, student, Ohio State University
3. June 1973 - May 1976, electronics engineer in electro-optical countermeasure systems, Wright-Patterson AFB, Ohio
4. May 1976 - May 1977, laser development engineer, Avionics Laboratory, Wright-Patterson AFB, Ohio
5. May 1977 - March 1979, electronics engineer in avionics systems, Avionics Laboratory, Wright-Patterson AFB, Ohio
6. March 1979 - November 1987, Group Leader, Thermal Imaging and Passive Sensors Group, Wright-Patterson AFB, Ohio
7. November 1987 - April 1993, technical expert in electro-optical sensors, Wright-Patterson AFB, Ohio
8. April 1993 - November 1994, Branch Chief, Electro-Optical Sensors Branch, Avionics Directorate, Wright-Patterson AFB, Ohio
9. December 1994 - July 1997, acting Chief Scientist, Avionics Directorate, Wright Laboratory, Wright-Patterson AFB, Ohio
10. July 1997 - March 2000, principal engineer in electro-optical sensors, Wright-Patterson AFB, Ohio
11. March 2000 - June 2005, Senior Scientist for Infrared Sensors, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson AFB, Ohio
12. June 2005 - May 2008, Chief Scientist, Sensors Directorate, AFRL, Wright -Patterson AFB, Ohio

This award is presented annually for the most outstanding paper reporting original work in any of the IEEE journals or publications.
1998 - A Roadmap for a 21st Century Aerospace Force, Air Force Scientific Advisory Board summer study
2001 - Sensors for Difficult Targets, Air Force Scientific Advisory Board summer study
2006 - Meritorious Senior Professional Presidential Rank Award

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS
Board of directors and executive committe, SPIE
Fellow, SPIE
Fellow, Air Force Research Laboratory
Fellow and executive board, Military Sensing Symposia
Senior member, Institute of Electrical and Electronics Engineers, Inc.
Association of Old Crows
Optical Society of America
The Technical Cooperation Program Sensor Panel

(Current as of November 2006)

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Dr. Brian M. Kent
Chief Scientist
Sensors Directorate
May 2008 – Present

AWARDS AND HONORS
1998 - W.R.G. Baker Award, Institute of Electrical and Electronics Engineers.

Dr. Brian M. Kent, a member of the scientific and professional cadre of senior executives, is Chief Scientist, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio. He serves as the directorate's principal scientific and technical adviser and primary authority for the technical content of the science and technology portfolio. He evaluates the total laboratory technical research program to determine its adequacy and efficiency in meeting national, Department of Defense, Air Force, Air Force Materiel Command and AFRL objectives in core technical competency areas. He identifies research gaps and analyzes advancements in a broad variety of

scientific fields to advise on their impact on laboratory programs and objectives. He recommends new initiatives and adjustments to current programs required to meet current and future Air Force needs. As such, he is an internationally recognized scientific expert, and provides authoritarian counsel and advice to AFRL management and the professional staff as well as to other government organizations. He also collaborates on numerous interdisciplinary research problems that encompass multiple AFRL directorates, customers from other DOD components, as well as the manned space program managed by NASA.

Dr. Kent joined the Air Force Avionics Laboratory in 1976 as cooperative engineering student through Michigan State University. He began his career performing research in avionics, digital flight displays and radar signature measurements. Through a career broadening engineering assignment with the Directorate of Engineering, Aeronautical Systems Division, he modeled a number of foreign threat missile systems and performed offensive and defensive electronic combat systems assessments. He received a National Science Foundation Fellowship in 1979, working at both the Air Force Wright Aeronautical Laboratories and the Ohio State University Electroscience Laboratory until the completion of his doctorate. Dr. Kent spent two years in the Passive Observables Branch of the Avionics Laboratory, later transferring to the AFWAL Signature Technology Office. From 1985 to 1992, Dr. Kent was involved with classified research efforts, managed through the Air Force Wright Laboratory, now the AFRL. During his tenure with AFRL and its predecessor organizations, Dr. Kent held a variety of positions. He has made pioneering and lasting contributions to the areas of signature measurement technology, and successfully established international standards for performing radar signature testing.

Dr. Kent has authored and co-authored more than 85 archival articles and technical reports and has written key sections of classified textbooks and design manuals. He has delivered more than 200 lectures, and developed a special DOD Low Observables Short Course that has been taught to more than 2,000 scientists and engineers since its inception in 1989. Dr. Kent has provided technical advice and counsel to a wide range of federal agencies, including the Department of Transportation, the Department of Justice and NASA's Space Shuttle Program. He is also an international technical adviser for the DOD and has provided basic research guidance to leading academic institutions.

EDUCATION

1980 Bachelor of Science Degree in Electrical Engineering, highest honors, Michigan State University, East Lansing, MI

1981 Master of Science Degree in Electrical Engineering, the Ohio State University, Columbus, OH

1984 Doctor of Philosophy Degree in Electrical Engineering, the Ohio State University, Columbus, OH

CAREER CHRONOLOGY

1. 1976 - 1977, electrical engineering aide, Avionics Laboratory, Wright-Patterson AFB, Ohio
2. 1977 - 1978, electrical engineering aide, Passive Observables Branch, Electronic Warfare Division, Avionics Laboratory, Wright-Patterson AFB, Ohio
3. 1978 - 1980, senior electrical engineering aide, Directorate of Engineering, Aeronautical Systems Division, Wright-Patterson AFB, Ohio
4. 1980 - 1985, research engineer, Passive Observables Branch, Electronic Warfare Division, Avionics Laboratory, Air Force Wright Aeronautical Laboratories, Wright-Patterson AFB, Ohio
5. 1985 - 1989, low observable research engineer, Signature Technology Office, AFWAL, Wright-Patterson AFB, Ohio
6. 1989 - 1990, senior low observable research engineer and Program Manager, Signature Technology Office, Wright Research and Development Center, Wright-Patterson AFB, Ohio
7. 1990 - 1991, senior low observable research engineer and Program Manager, Signature Technology Office, Air Force Wright Laboratory, Wright-Patterson AFB, Ohio
8. 1991 - 1994, Principal Research Fellow and Program Manager, Signature Technology Office, Air Force Wright Laboratory, Wright-Patterson AFB, Ohio
9. 1994 - 1999, Principal Research Fellow and Program Manager, Signature Technology Office, Sensors Directorate, Air Force Research Laboratory, Wright -Patterson AFB, Ohio
10. 1999 - 2000, Division Chief, Measurements and Prediction Division, Signature Technology Office, Sensors Directorate, AFRL, Wright-Patterson AFB, Ohio
11. 2000 - 2003, Principal Research Fellow and Program Manager, Signature Technology Office, Sensors Directorate, AFRL, Wright-Patterson AFB, Ohio (2003, Lead Signature Consultant, Columbia Accident Investigation Board, Air Force Materiel Command and AFRL Defense Columbia Investigation Support Office, Wright-Patterson AFB, Ohio)
12. 2004 - 2005, Principal Research Fellow, Signature Technology Office, AFRL, Wright-Patterson AFB, Ohio
13. 2005 - 2008, Senior Scientist for Low Observable and Electromagnetics, Sensors Directorate, AFRL, Wright-Patterson AFB, Ohio
14. 2008 - present, Chief Scientist, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio.

AWARDS AND HONORS

Fellow, AFRL
Samuel Burka Award (two-time winner), Avionics Laboratory
Best Paper Award, National Conference of Standards Laboratory

Signature Technology Management Excellence Award, AFRL
Signature Technology Director's Award, AFRL
William F. Bahret Signature Technology Technical Achievement Award, AFRL
Director's Award, Sensors Directorate, AFRL
Letter of Commendation, B-2 Systems Program Office, Aeronautical Systems Division
Columbia Accident Investigation Board Staff Recognition Award
Letter of Commendation, NASA
External Customer Support Award, Sensors Directorate, AFRL
John D. Ryder Distinguished Alumni Award, Michigan State University
Best Dissertation in Electrical Engineering, the Ohio State University

OTHER ACHIEVEMENTS
Subject matter expert lead, Radar Technology, NASA-Johnson Space Center
Invited guest lecturer, Air War College, Royal Air Force Cranwell, England
Guest lecturer, Georgia Tech Research Institute
Adjunct professor, Department of Electrical and Computer Engineering, Michigan State University
Thesis adviser, Air Force Institute of Technology
Federal Liaison, Engineering Dean's Advisory Committee, Michigan State University

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS
Fellow, Institute of Electrical and Electronic Engineers
Fellow, Antenna Measurement Techniques Association
Former Technical Coordinator, Vice President and President, Antenna Measurement Techniques Association
Associate Editor, Editorial board, IEEE Antenna and Wireless Propagation Letters
Former Associate Editor, "AMTA Corner," IEEE Antenna and Propagation Magazine
Former President, Range Commanders Council Signature Measurements and Standards Group
Eta Kappa Nu, Tau Beta Pi and Phi Kappa Phi Honorary Societies

(Current as of August 2008)

Chief Engineers

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Mr. Floyd Paul Johnson
Chief Engineer
Sensors Directorate
October 2003 – February 2010

RETIRED May 2010

Mr. Floyd Paul Johnson was Chief Engineer, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio. The directorate specialized in developing the science and technology necessary for superior U.S. air and space systems in the areas of intelligence, surveillance, reconnaissance, precision engagement and electronic warfare. The directorate's primary areas of technology investment included radio frequency sensors and countermeasures; electro-optical sensors and countermeasures; automatic target recognition and sensor fusion. The Directorate had an annual budget of more than $500 million, and approximately 1,350 scientists, engineers and support personnel at three different geographic locations.

Mr. Johnson, as Chief Engineer, was architect and senior inaugural team member in developing the Sensors Directorate and Air Force Research Laboratory layered sensing concept. He was the "joint advocacy" liaison between National System for Geospatial-Intelligence (NSG) and AFRL's layered sensing initiative. Earlier he was the architect for the sensor craft initiative that seeked to develop a sensors-focused air vehicle.

EDUCATION

1971 Bachelor of Science Degree in Electrical Engineering, University of Cincinnati, Cincinnati, Ohio
1972 Radar Systems
1972 Principles of Modern Radar
1974 Perception of Displayed Information
1975 Pictorial Pattern Recognition
1977 Analysis of Variance
1978 Defense Image Interpretation School
1983 Wright Action Management
1986 Executive Development Seminar
1987 Managing the Eighties
1989 White House Workshop
1991/92 In Search of Excellence I &2
1992 New Directions in National Policy Making
1993 Advanced Management Challenges and Approaches
1995 AFMC Metrics Course
1995 ASC Leadership Course

CAREER CHRONOLOGY

1. January 1972 – March 1981, project engineer/program manager, Radar Technology Group, Avionics Laboratory, Air Force Wright Laboratories, Wright -Patterson AFB, Ohio.
2. March 1981 – April 1987, Group Leader, Radar Technology Group, Avionics Laboratory, Wright Laboratory, Wright-Patterson AFB, Ohio.
3. April 1987 – February 1990, Branch Chief, Target Recognition Technology Branch, Avionics Laboratory, Wright Research and Development Center, Wright-Patterson AFB, Ohio.
4. February 1990 – April 1994, Branch Chief, Applications Branch, Avionics Directorate, Wright Laboratory, Wright-Patterson AFB, Ohio.
5. April 1994 – December 1995, Branch Chief, Radar Branch, Avionics Directorate, Wright Laboratory, Wright-Patterson AFB, Ohio.
6. December 1995 – January 1997, Technical Director, RF Division, Avionics Directorate, Wright Laboratory, Wright-Patterson AFB, Ohio.
7. 1996, Special Assignment, Directorate for Science and Technology, Air Force Materiel Command, AFMC/ST.
8. March 1996 – March 1999, President, Diversified, Inc.
9. February 1997 – October 1997, C4I Business Development Manager, Envi-

ronmental Research Institute of Michigan (ERIM), Ann Arbor, MI.
10. June 1997 – February 1998, General Manager, Feather Lite Innovations, Inc., Springboro, OH
11. February 1998 – July 1998, Support Engineering and Business Strategist, Georgia Tech Research Institute, Atlanta, GA.
12. July 1998 – July 1999, Advanced Sensors Technology Liaison, Reconnaissance Systems Program Office, Aeronautical Systems Center, Air Force Systems Command, Wright-Patterson AFB, Ohio, IPA Georgia Tech Research Institute, Atlanta, GA.
13. July 1999 – December 1999, Deputy Intelligence, Surveillance, and Reconnaissance Thrust Lead , Application Division, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson AFB, Ohio, IPA Georgia Tech Research Institute, Atlanta, GA.
14. December 1999 – October 2003, Chief Architect and Advocate, SensorCraft Program, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson AFB, Ohio, IPA Georgia Tech Research Institute, Atlanta, GA.
15. October 2003 – February 2010 – Chief Engineer, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson AFB, Ohio.

Publications

Coherent Monopulse Radar Ground Target Tracking, 20th Radar Symposium, F. P. Johnson, H. J. Geller

The Effects of Polyfrequency Radar Image Quality on Vehicle Recognizability, 23rd Radar Symposium, F. P. Johnson, G. L. La Monica

A Scan Mode Synthetic Aperture Radar System, 25th Radar Symposium, F. P. Johnson, W. D. Becher, J. L. Auterman

An Overview of Major Air Force Radar Developments. F. P. Johnson, K. McCoin, J. Pasek, G. L. McFarland, internal AF document, 1982

History of Air Force Radar Development, F. P. Johnson, internal AF document for General Officer Staff, 1985

Covert, In-Weather Recce/Strike Avionics, F. P. Johnson, internal AF document prepared for Project Forecast II, 1986

Radar & ECCM, A Reconnaissance Perspective (Keynote Address), Radar and Electronic Protection Conference, F. P. Johnson, Nov 1998

SensorCraft – "Little Brother is Watching, too", Air Force Materiel Command Leading Edge, Feb 2000, F. P. Johnson

SensorCraft (Keynote Paper), Tri-Service Radar Symposium, F. P. Johnson, Jun 2000

SensorCraft - "Tomorrow's Eyes and Ears of the Warfighter", Technology Horizons, March 2001, F. P. Johnson

Layered Sensing; Its Definition, Atributes, and Guiding Principles for AFRL Strategic Technology Development, Mr Floyd Johnson, Dr Mike Bryant, Dr Brian Kent, Mr Michael Nowak, Dr Steve Rogers, May 2008

AWARDS AND HONORS

1979 Project Engineer of the Year Award, Avionics Laboratory, Air Force Wright Laboratories, Wright-Patterson AFB, Ohio.
1979 Director's Award, Avionics Laboratory, Air Force Wright Laboratories, Wright-Patterson AFB, Ohio.
1986 Outstanding Support and Contributions Award, Project Forecast II, Air Force Systems Command.
1987 Meritorious Civilian Service Award.
1992 Peter R. Murray Manager of the Year Award , Avionics Directorate, Air Force Research Laboratory, Wright-Patterson AFB, Ohio.
1997 Outstanding Civilian Career Service Award
2000 Applications Division, Sensors Directorate Quarterly Award for Leadership.
2001 RF Division, Sensors Directorate Quarterly Award for Leadership.
2001 Sensors Directorate Leadership Award.
2006 Samuel M. Burka Memorial Award, Gotcha Radar Team

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS

USAF International representative to TTCP-Subgroup K for many years
Eta Kappa Nu national electrical and computer engineering honor society.

PROFESSIONAL CERTIFICATIONS

Private Pilot's License
Instrument Pilot's License
Certified as Service Oriented Architecture (SOA) Professional
Certified as Service Oriented Architecture (SOA) Consultant
Certified Acquisition Professional: Systems Planning, Research, Development and Engineering, Level III

Dr. Robert A. Clemens
Chief Engineer
Sensors Directorate
February 2010 – Present

Dr. Robert Clemens is Chief Engineer of the Sensors Directorate, Air Force Research Laboratory (AFRL), Wright-Patterson Air Force Base, Ohio. The directorate specializes in developing the science and technology necessary for superior U.S. air and space systems in the areas of intelligence, surveillance, reconnaissance, precision engagement and electronic warfare. The directorate's primary areas of technology investment include radio frequency sensors and countermeasures; electro-optical sensors and countermeasures; automatic target recognition and sensor fusion. Previously he served as technical lead for an advanced development program within AFRL charged with enhancing survivability of current generation aircraft as well as laying the foundation for survivable next generation aircraft.

Dr. Clemens spent 15 years with the Aeronautical Systems Center (ASC)

at Wright-Patterson Air Force Base beginning in 1989. He worked as a Low Observables Engineer for numerous aircraft development efforts including the F-117, B-2, and F-35 programs. His work in ASC culminated as the Chief of Observables Integration for the F-22 program, directing the design of the aircraft system through successful developmental test and leading to production approval. Dr. Clemens moved to the Sensors Directorate in 2001 to serve as deputy program manager and to lead the development and implementation of aperture technology for advanced avionics applications. His work was significant in establishing baseline performance assessments and developing defensible roadmaps for future aircraft programs like the Next Generation Long Range Strike Aircraft. From 2006 to 2008 he served as an exchange scientist with the Defence Science and Technology Laboratory, Farnborough, United Kingdom researching radar scattering algorithms, signal processing of synthetic aperture radar data to improve target recognition, and validation of infrared signature prediction software.

EDUCATION
1986 Bachelor of Science Electrical Engineering, The Ohio State University, Columbus, OH
1994 Master of Science Electrical Engineering, University of Dayton, Dayton, OH
2003 Doctor of Philosophy Electrical Engineering, University of Dayton, Dayton, OH
2009 Air War College via Correspondence

CAREER CHRONOLOGY
1. February 1987 - February 1989, Low Observable Engineer, Defensive Avionics Branch, Engineering Directorate, Aeronautical Systems Division, Wright-Patterson AFB, OH
2. February 1989 – December 1991, F-117A Lead Low Observable Engineer, F-117 System Program Office, Aeronautical Systems Division, Wright-Patterson AFB, OH
3. January 1992 – August 1992, B-2 Advanced Edge Lead Engineer, B-2 System Program Office, Aeronautical Systems Center, Wright-Patterson AFB, OH
4. August 1992 – September 1995, Low Observable Engineer, Defensive Avionics Branch, Engineering Directorate, Aeronautical Systems Center, Wright-Patterson AFB, OH
5. October 1995 – August 2001, Chief, F-22 Observables Integration, F-22 System Program Office, Aeronautical Systems Center, Wright-Patterson AFB, OH
6. September 2001 – September 2003, Deputy Program Manager, Signature Technology Office, Air Force Research Laboratory, Wright-Patterson AFB, OH
7. September 2003 – June 2006, Apertures Technology Thrust Leader, Signature Technology Office, Air Force Research Laboratory, Wright-Patterson AFB, OH

8. June 2006 – June 2008, Principal Research Scientist, Defence Science and Technology Laboratory, Farnborough, United Kingdom
9. July 2008 – February 2010, Technology Lead, Systems Technology Office, Air Force Research Laboratory, Wright-Patterson AFB, OH
10. February 2010 – present, Chief Engineer, Sensors Directorate, Air Force Research Laboratory, Wright-Patterson AFB, OH

AWARDS AND HONORS
AFRL/SN Team of the Year Award, 2005
AFRL/SNS Program Management Excellence Award, 2004
Special Act Award, 2004
AFRL/SN Veiled Award of the Year, 2003
AFRL/SNS Director's Award 2003
ASC/EN Dr. Chester Jones Memorial Award, 2001
PEO Quarterly Team Award, 1998
F-22 Top Gun Award, 1997, 2000
F-22 IPT of the Quarter, 1996
ENA Division Junior Engineer, 1998
Performance Awards (12)
Special Act Awards (7)
Time Off Awards (14)
Notable Achievement Awards (2)

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS
Member, Institute of Electrical and Electronics Engineers since 1988
Member, National Defense Industrial Association since 2003

PROFESSIONAL CERTIFICATIONS
Systems Planning, Research, Development and Engineering, Level III

(Current as of May 2010)