

SPEAKER



Dr. Myron Kayton, principal consulting engineer with Kayton Engineering Company, has nearly fifty years of experience designing avionic, navigation, communication, and computer-automation systems. As a consulting engineer for Kayton Engineering Company, he worked on several automotive electronic systems, process systems, upper-stage spacecraft, a satellite interceptor, commercial communication systems, numerous aircraft avionic systems, and a dozen land navigators. From 1968 to 1981 at TRW, Kayton served as chief engineer for Spacelab avionics, head of System Engineering for Space Shuttle avionics, and project engineer for the electronics of the Inertial Upper Stage and a nuclear power plant, among many assignments. From 1965 to 1968, Kayton served as deputy manager for Lunar Module Guidance and Control at NASA's Johnson Space Center. From 1960 to 1965, he was section head at Litton's Guidance and Control Division, where he designed and analyzed some of the earliest multi-sensor navigation systems.

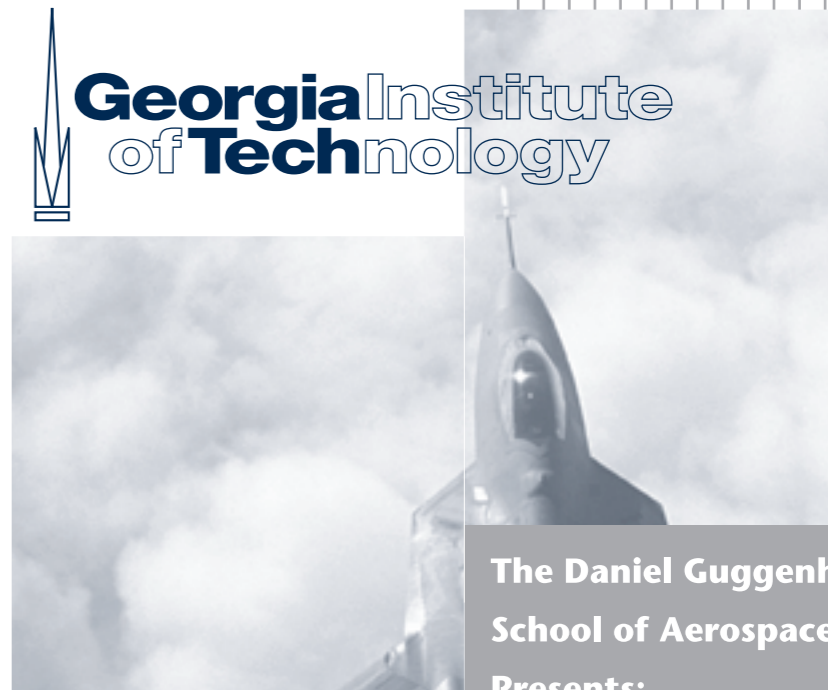
Kayton is a registered electrical and mechanical engineer. He is a life fellow of the Institute of Electrical and Electronic Engineers (IEEE), was an elected member of the corporate board of directors, and served two terms as president of its Aerospace and Electronic Systems Society. He was technical chairman of several conference sessions (concerning automobiles and fault-tolerant systems) and keynote speaker. He was an active member of standards committees for navigation sensors and computers for nuclear power plants, and taught simulation methods, multi-sensor navigation systems, and land navigation at UCLA, publishing more than eighty papers and articles.

As an IEEE distinguished lecturer, Kayton conducts technical seminars throughout the world. He is the author of the standard reference text Avionics Navigation Systems (first and second editions) and Navigation: Land, Sea, Air and Space. He is the recipient of several honors including IEEE's Millennium Medal and IEEE-AES's Carlton Award for the best technical paper of 1988.

Kayton received a doctorate in Instrumentation from M.I.T. in 1960, a master's degree from Harvard University with a concentration in electrical engineering, and a bachelor's degree in mechanical engineering from The Cooper Union. He is listed in Who's Who in Engineering, Who's Who in America, and American Men and Women of Science. He is an instrument-rated pilot and holds an FAA Project Raincheck certificate in Air Traffic Control. His interests include history, languages, and tennis.



The Daniel Guggenheim
School of Aerospace Engineering
270 Ferst Drive
Atlanta, Georgia 30332-0150



**The Daniel Guggenheim
School of Aerospace Engineering
Presents:
The Lockheed Martin Avionics
Integration Seminar Series**



**One Hundred Years of
Aircraft Electronics:
Progress in Avionic Systems
for Land, Air, and Space**

**Dr. Myron Kayton
Principal Consulting Engineer
Kayton Engineering Company**

INVITATION
**Friday, March 5, 2004
3:00 PM
Georgia Institute of Technology
Student Success Center, Clary Theater**

One Hundred Years of Aircraft Electronics: Progress in Avionic Systems for Land, Air, and Space

For decades, the only pieces of electrical equipment on typical aircraft were the engine's magnetos to fire the spark plugs. Cockpit instruments were vacuum operated from the engine's intake manifold, with the first spinning-wheel vacuum gyroscope appearing in 1914. Vacuum-tube electronics in radars and navigation sets were added during World War II. They were heavy, expensive, and unreliable and, consequently, purchased only for military-essential missions. Military rockets were unguided and had no avionics at all, except for the German V-1 cruise missile and V-2 ballistic missile, which had primitive analog guidance systems. In the 1960s, transistorized VHF omni-range (VOR) navigation and communications, instrument landing system (ILS) receivers, and transponders became affordable. Spacecraft avionics content was minimal and analog until the U.S. Gemini in 1967.

The integrated-circuit computer chip and memory chip created today's avionics. Complex autopilot functions, waypoint steering, and electronic displays became commonplace in the 1980s; self-test, stored digital charts and approach plates in the 1990s; and passenger services in the 2000s. Indeed, government rules prohibit aircraft from entering high-density airspace and preferred over-ocean airways without suitable avionics. Today, avionics are more expensive than automotive or consumer electronics because of 1) the need to conform to safety regulations that protect high-value vehicles and occupants and 2) low-production volume; an avionics manufacturer produces perhaps five hundred devices of a single type in a year, fewer than a cell-phone manufacturer produces in an hour. Spacecraft avionics are more expensive still because individually pedigreed parts and intensive testing are needed for vehicles where servicing is either impossible or immensely costly.

Since 1995, the field of avionics has been undergoing its most rapid period of growth since the digital revolution of the 1970s. The lecture will describe the characteristics of avionic systems for aircraft, automobiles, ships, and spacecraft. It will then focus on aircraft navigation, contrasting guidance with navigation and comparing absolute navigation with dead reckoning. Radio navigation aids, especially GPS, will be described with an emphasis on time measurement for one-way ranging. Dead reckoning will be discussed with an emphasis on inertial navigators. Predictions of future navigation technologies will conclude the talk. If time permits, animal navigation will be discussed.

Aerospace at Georgia Tech

The Daniel Guggenheim School of Aerospace Engineering was originally established as The Daniel Guggenheim School of Aeronautics on March 3, 1930 when the Georgia School of Technology (now, the Georgia Institute of Technology) received a \$300,000 grant from The Daniel Guggenheim Fund for the Promotion of Aeronautics, Inc. This was the last and third largest grant made to seven institutions across the United States for the establishment of centers for aeronautical research and instruction.

Since its inception, the School has played a leading role in the development of aerospace engineering education by stressing a multidisciplinary approach and emphasizing partnership with industry and government in educating students. The School enjoys a worldwide reputation, and the undergraduate and graduate programs rank among the top programs in widely recognized national surveys.

The School of Aerospace Engineering prepares students at the bachelor's, master's, and doctoral levels for a career in vehicle engineering, with primary emphasis on flight vehicles. The undergraduate program stresses the theoretical, experimental, and design aspects of aerospace engineering. The graduate program offers academic and research programs in aerodynamics and fluid mechanics, aeroelasticity and structural dynamics, flight mechanics and control, propulsion and combustion, structural mechanics and materials behavior, and system design and optimization.

Enrollment in the School currently includes 638 undergraduate and 284 graduate students. Studies are directed by 32 academic faculty members and 17 research faculty.

For additional information, contact Dr. Robert G. Loewy, William R. T. Oakes Professor and Chair, at:

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Lockheed Martin

Lockheed Martin is a highly diversified, \$24 billion advanced technology company and the strategic leader in the aerospace industry with major positions in information systems, software development, space, launch vehicles, aeronautics, electronics, environmental services, and energy programs. The Corporation is organized into four core business areas: Aeronautical Systems, Space Systems, Systems Integration, and Technology Services. Within these four businesses are nearly fifty major businesses with locations in most of the fifty states and around the world.

Lockheed Martin Avionics Integration Seminar Series

The Lockheed Martin Avionics Integration Seminar Series in the School of Aerospace Engineering at Georgia Tech was established through a gift from the Lockheed Martin Corporation. Planned as a means to facilitate technology transfer in the increasingly pervasive application of electronics, hydraulics, feedback control, and digital data processing to aircraft and spacecraft design, these lectures, inaugurated in March 2000, are intended to be of interest to students, faculty, and practicing engineers. The lectures are part of a larger program to enhance higher education in avionics integration at Georgia Tech sponsored by the Lockheed Martin Corporation.

Distinguished Lecturers

2000 - Dr. John E. Weaver

Avionics Product Manager, G27J
Lockheed Martin Aeronautics Co.

2003 - Dr. George L. Donohue

Professor, Systems Engineering and Operations Research
George Mason University

2004 - Dr. Myron Kayton

Principal Consulting Engineer
Kayton Engineering Company

Lecture & Reception

Friday, March 5, 2004

3:00 PM

Georgia Institute of Technology
Student Success Center, Clary Theater
Reception immediately following

RSVP

To RSVP for the lecture, please call 404.385.2382 or e-mail shoba.king@coe.gatech.edu.
Please RSVP by February 14.

Parking

Visitor parking is available in the Burge Visitor Lot located on North Avenue, across the street from the Student Success Center.

1. Student Success Center
2. Burge Parking Deck

Georgia Tech Campus map

