The Avionics Handbook

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Edited by

CARY R. SPITZER

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Preface

Avionics is the cornerstone of modern aircraft. More and more, vital functions on both military and civil aircraft involve electronic devices. After the cost of the airframe and the engines, avionics is the most expensive item on the aircraft, but well worth every cent of the price.

Many technologies emerged in the last decade that will be utilized in the new millennium. After proof of soundness in design through ground application, advanced microprocessors are finding their way onto aircraft to provide new capabilities that were unheard of a decade ago. The Global Positioning System has enabled satellite-based precise navigation and landing, and communication satellites are now capable of supporting aviation services. Thus, the aviation world is changing to satellite-based communications, navigation, and surveillance for air traffic management. Both the aircraft operator and the air traffic services provider are realizing significant benefits.

Familiar technologies in this book include data buses, one type of which has been in use for over 20 years, head mounted displays, and fly-by-wire flight controls. New bus and display concepts are emerging that may displace these veteran devices. An example is a retinal scanning display.

Other emerging technologies include speech interaction with the aircraft and synthetic vision. Speech interaction may soon enter commercial service on business aircraft as another way to perform some noncritical functions. Synthetic vision offers enormous potential for both military and civil aircraft for operations under reduced visibility conditions or in cases where it is difficult to install sufficient windows in an aircraft.

This book offers a comprehensive view of avionics, from the technology and elements of a system to examples of modern systems flying on the latest military and civil aircraft. The chapters have been written with the reader in mind by working practitioners in the field. This book was prepared for the working engineer and his or her boss and others who need the latest information on some aspect of avionics. It will not make one an expert in avionics, but it will provide the knowledge needed to approach a problem.

Biography

Cary R. Spitzer is a graduate of Virginia Tech and George Washington University. After service in the Air Force, he joined NASA Langley Research Center.

During the last half of his tenure at NASA he focused on avionics. He was the NASA manager of a joint NASA/Honeywell program that made the first satellite-guided automatic landing of a passenger transport aircraft in November 1990. In recognition of this accomplishment, he was nominated jointly by ARINC, ALPA, AOPA, ATA, NBAA, and RTCA for the 1991 Collier Trophy "for his pioneering work in proving the concept of GPS aided precision approaches." He led a project to define the experimental and operational requirements for a transport aircraft suitable for conducting flight experiments and to acquire such an aircraft. Today, that aircraft is the NASA Langley B-757 ARIES flight research platform.

Mr. Spitzer was the NASA representative to the Airlines Electronic Engineering Committee. In 1988 he received the Airlines Avionics Institute Chairman's Special Volare Award. He is only the second federal government employee so honored in over 30 years.

He has been active in the RTCA, including serving as chairman of the Airport Surface Operations Subgroup of Task Force 1 on Global Navigation Satellite System Transition and Implementation Strategy, and as Technical Program Chairman of the 1992 Technical Symposium. He was a member of the Technical Management Committee.

In 1993 Mr. Spitzer founded *A*vioni*C*on, an international avionics consulting firm that specializes in strategic planning, business development, technology analysis, and in-house training.

Mr. Spitzer is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) and an Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA). He received the AIAA 1994 Digital Avionics Award and an IEEE Centennial Medal and Millennium Medal. He is a Past President of the IEEE Aerospace and Electronic Systems Society. Since 1979, he has played a major role in the highly successful Digital Avionics Systems Conferences, including serving as General Chairman.

Mr. Spitzer presents one-week shortcourses on digital avionics systems and on satellite-based communication, navigation, and surveillance for air traffic management at the UCLA Extension Division. He has also lectured for the International Air Transport Association.

He is the author of *Digital Avionics Systems,* the first book in the field, published by McGraw-Hill and Editor-in-Chief of *The Avionics Handbook,* published by CRC Press.

He and his wife, Laura, have a son, Danny.

His hobbies are working on old Ford products and kite flying.

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