



Introduction to Avionics Systems

By R.P.G. Collinson

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Introduction to Avionic Systems, Third Edition explains the basic principles and underlying theory of the core avionic systems in modern civil and military aircraft, comprising the pilot's head-up and head-down displays, data entry and control systems, fly by wire flight control systems, inertial sensor and air data systems, navigation systems, autopilots and flight management systems. The implementation and integration of these systems with current (2010) technology is explained together with the methods adopted to meet the very high safety and integrity requirements. The systems are analysed from the physical laws governing their behaviour, so that the system design and response can be understood and the performance examined. Worked examples are given to show how the theory can be applied and an engineering "feel" gained from a simplified model. Physical explanations are also set out and the text is structured so that readers can "fast forward" through the maths, if they so wish. Introduction to Avionic Systems, Third Edition meets the needs of graduates, or equivalent, entering the aerospace industries who have been educated in a wide range of disciplines, for example, electronic engineering, computing science, mathematics, physics, mechanical and aeronautical engineering. It also meets the needs of engineers at all levels working in particular areas of avionics who require an understanding of other avionic systems. Technology is continually advancing and this new third edition has been revised and updated and the presentation improved, where appropriate, The systems coverage has also been increased and a new section on helicopter flight control added.

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Editorial Review

Review

From the reviews of the third edition:

“This book ... ‘aims to explain the basic principles of the key avionic systems in modern aircraft.’ ... this book earns a place on the shelf to be dipped into as required this book also provides the historical background of how things came to be the way they are and these sections will be useful to those entering the aerosystems and avionic world” (John Campbell, Aerospace, April, 2014)

About the Author

Following service in the Royal Navy, I studied electrical engineering at London University, graduating with a First Class Honours Degree in Electrical Engineering. I joined Elliott Brothers (London) Ltd. in 1953 and was continually employed by the company, which later became part of GEC Avionics Ltd., Rochester, Kent, UK, ,retiring in late 1991. I progressed to the position of Chief Systems Engineer in 1960, my main activities up to that time being the design and development of inertial navigation (IN) systems where I was the Project Leader for the IN system for the Blue Steel missile;, the first British IN system. I was appointed Manager of the newly formed Flight Automation Research Laboratory in 1962, responsible for the development of new systems and technology which could be exploited by the product divisions of the Company. I was Manager of the Research Laboratory for a total of 21 years, with a break from 1966 to 1971 when I was Manager of Flight Instruments Division and then Manager of Inertial Navigation Division. During this period, I held over-all responsibility for the development and production of the first Air data Computers to be exported to the USA for the Lockheed C-5A and the development of the Navigation/ Weapon Aiming System for the Jaguar strike aircraft. The Laboratory has been responsible for many innovative systems and techniques which have subsequently been used in the development of avionic equipment for many current European and United States aircraft, Examples of the Laboratory’s achievements are digital Fly- by-Wire flight control systems, strap-down attitude/ heading reference systems, helmet mounted sights, binocular helmet mounted displays, holographic combiners for HUDs, colour moving map displays, Mil Std 1553 B data transmission chip sets. I was awarded the Silver Medal of the Royal Aeronautical Society in 1989 for my contribution to the research and development of advanced avionic equipment. Since retiring, I have given numerous talks on avionic and aviation topics to both lay and technical audiences and given specialist lectures at two universities.

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Michael Alvarado:

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