THE GENERIC COMPACT AUTOMATIC TEST EQUIPMENT (GCATE) BASED ON SERIAL COMMUNICATION FOR FIGHTER AIRCRAFTS

ANUBHAV GARG1 & RABINDRA KUMAR SINGH2
1Hindustan Aeronautics Limited Korwa, Amethi, Uttar Pradesh, India
2Knit, Sultanpur, Uttar Pradesh, India

ABSTRACT

Different Test Equipment (TE) required for the testing of serial communication based avionics systems for different aircrafts are usually supplied by the corresponding manufacturer. So procurement and maintenance of different TEs for the different avionics systems is not effective in terms of cost and operation. Additionally, the cost and time overheads that arise to carry out any changes in the Test equipment, with evolving hardware and software requirements of a particular avionics system like a black box over the years and has to be considered. Hence, it is necessary to have a Generic & Compact type of ATE to address various testing needs of Avionics system and also assurance for the future evolution of an avionics system like a black box. As in today’s scenario increase in usage of digital systems and standardization of data buses in avionics, the need for Generic Compact Automatic Test Equipment (GCATE) to test a variety of systems and subsystems arises. These GCATEs are built to support various testing needs of avionics systems and may require functioning during the entire lifecycle of aircraft project, which is minimum 25 years. To cater for hardware modification, obsolescence management and design upgradations of both GCATE and avionics system for such a long time span; the need for robust and maintainable Application software which is hosted within GCATE arises. A software engineering team may spend months of effort building software to an obsolete specification or design upgradations. It has mainly the following features:

• Open system architecture method resulting in significant cost and time saving
• Creative design capable of meeting the testing requirement of various avionics systems Reconfigurable design concept and modular design approach to make it compactable for other platform
• Modular, Reusable and Non editable software
• Automatic test methodology and non editable report generation
• In-house developed compact and cost effective solution

This paper describes mainly the functional capabilities features, system-level design of GCATE. It also presents the innovative aspects, cost effectiveness and financial impact of the solution. Finally, it highlights the key lessons learned during the development, testing and certification process.

KEYWORDS:
Line Replaceable Unit (LRU), Test Rig, Avionics System, Test Equipment, Cost Effectiveness, Innovation & Generic Compact Automatic Test Equipment

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