A Validation Frame Work Design Concept for Mutation based Evaluation of Integrated Performance of Avionics Systems of Unmanned Air Vehicles

International Journal of Computer Applications
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Volume 97 - Number 12
Year of Publication: 2014

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10.5120/17062-7469

Abstract

The Avionics of an Unmanned Air Vehicle comprises of a number of Flight-Critical and Mission-Critical systems and a pilot-vehicle interface with complex real-time performance capabilities. Verification of integrated dynamic performance of such systems in an Avionics Integration Rig is a challenging task in terms of achieving sufficient test adequacy and inclusion of optimization in test case design. As the complexity of the systems increases, generating effective test cases to improve test adequacy and an optimistic way of classification of test case combinations becomes a necessity. This paper proposes a Validation Framework Design for Integrated Evaluation of Avionics Systems in a Rig with the introduction of various classifications of mutant operator models required for Mutation Testing, to achieve both the above factors required for evaluation of an Integrated Avionics System with respect to its System Level Specifications and Functional Performance.

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Index Terms

Computer Science
Software Testing

Keywords

Unmanned Air Vehicle  Avionics Systems  Avionics Integration Rig  Ground Control Station Simulators

Mutant Operators

Line Replaceable Units

Test Case Generation

Mutation Testing

Test Adequacy

Mutation Analysis.