

An event-driven link-level simulator for validation of AFDX and Ethernet avionics networks

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RESUMEN

Aircraft are composed of many electronic systems: sensors, displays, navigation equipment and communication elements. These elements require a reliable interconnection, which is a major challenge for communication networks as high reliability and predictability requirements must be verified for safe operation. In addition, their verification via hardware deployments is limited because these are costly and make difficult to try different architectures and configurations, thus delaying the design and development in this area. Therefore, verification at early stages of the design process is of great importance that has to be supported via simulation. In this context, the present work presents an event-driven link level framework and simulator for the validation of avionics networks. The presented tool supports avionics protocols such as Avionics Full-Duplex Switched Ethernet (AFDX), which is a common protocol in avionics, as well as Ethernet, which is used with static routing in such scenarios. The simulator also uses realistic element models to provide accurate results. The proposed platform is evaluated in Clean Sky's Disruptive Cockpit for Large Passenger Aircraft architecture scenario. The speed of the verification is a key factor, so the computational cost is analyzed, proving that the execution time is linearly dependent on the number of messages sent.

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