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CHECKLIST OF USING COTS DEVICES FOR DISTRIBUTED ONBOARD SYSTEM DESIGN

Abstract

As compute-intensive applications such as artificial intelligence (AI) and precise image processing, are applied onboard to save limited uplink and downlink bandwidths and to react swiftly, multiple commercial off-the-shelf (COTS) products which form a distributed system, are developed to offer high computing performance for these satellite applications. The disruptive technology of distributed onboard system using COTS products is beyond the boundary of traditional satellite technology experience and management experience. New scientific methodologies must be explored and adopted for the challenges introduced by the disruptive technology. Therefore, it is of significance to summarize the challenges, methodologies and lessons learned as checklist for the distributed COTS onboard computer (OBC) system, which can act as a framework to analyze and select COTS devices and design the architecture for distributed reliable high-performance onboard platform software. The benefits of this checklist are that any entities, which would like to participate in design and developing this kind of emerging field, can use this checklist as a reference design model for their COTS OBCs without omitting important considerations and features which are necessary for missions using COTS for distributed OBCs successfully, thus they can have at the early phase a comprehensive overview and a broad perspective of concepts and techniques required for distributed OBCs using COTS, and optimize their project workflow accordingly.

This paper states clearly the importance of the standardization of distributed onboard system reconfiguration. The best practices of project management and software engineering summarized in this paper are also vital for the success of distributed COTS OBCs projects.