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# A HIGH PERFORMANCE ON-BOARD COMPUTER AND SOFTWARE DEVELOPMENT PLATFORM

## Abstract

As missions of small satellites are coming to be complex, high performance and high reliability are required for the on–board computers. To meet these requirements, high reliability, high complexity and high productivity are coming to be requested for not only for the hardware but also software. Generally speaking, recursive operation and verification are efficient ways to increase software reliability and productivity. Since the missions are highly specialized for individual spacecraft, software for the on-orbit computer was developed for the individual mission. Even though whole sequences may be specialized for the each mission, we can find common units if we divide them into basic functional units. Efficient verification process is also important to increase reliability of the software. Especially for software of spacecraft, the verification using hardware model of on-orbit computer is important to specify errors caused by implementation and delicate hardware dependent performance such as timing. But it is rather difficult to simulate whole on-orbit environment using whole spacecraft hardware model. Therefore we propose to develop software development and verification framework to enhance recursive use of software for the on-orbit computers. On the framework, the software can be constructed by software blocks based on the GUI software development kit without special knowledge on the hardware. The same software development kit dynamically links with hardware in the loop simulator that perform space environment simulation and automatically generate sensor read out caused by actuator command in the given situation. In this paper, the outline of software development and verification framework to enhance recursive

use of software for the on-orbit computers.