

ASTERIOS for Space Systems

ESA is supporting the development of micro-controllers based on ARM cores planned to be used in the different safety critical subsystems of a spacecraft as control of propulsion system, sensor bus, simple motor, mechanisms, power, thermal, antenna pointing, etc.

This will increase the number of safety critical Software to be embedded in a spacecraft. However, the development of safety critical Software imposes some constraints that increase their cost.

One way to reduce the cost of safety critical system would be to produce, at least partly, the Software directly from its specifications through a formally proven generator.

ASTERIOS from KRONO-SAFE-Safe is a solution that is able to guarantee the determinism of an application by construction on single and multi-core platforms. ASTERIOS is then providing strong safety evidence by calculation. In addition, ASTERIOS supports the validation of the temporal (dynamic and time) behaviour of an application by simulation.

This study consisted to port an existing space application Eagle Eye to run on top of ASTERIOS on an board based on an ARM System-On-Chip (quad 4 core i.MX6 from NXP) in order to evaluate its performance and the positive impact of the ASTERIOS development process with regards to the space standard ECSS-E-ST-40C qualification.