

Prototype SpaceWire RMAP Boot Software for Secondary Processor

Satellite instruments and other on-board equipment that include an on-board computer implement a flight initialisation sequence that is performed by a particular software item, usually called Boot Software. Typically, the Boot Software is stored in a dedicated read-only memory that belongs to the instrument or equipment. After initializing and testing the processor module, it copies the Application Software from non-volatile memory (typically EEPROM) to RAM and starts it. In the recent missions (e.g., Solar Orbiter, Metop SG), SpaceWire is increasingly used as command/control link between the platform on-board computer and the instruments. Therefore, the idea of performing (at least partly) the instrument initialisation sequence by making use of the RMAP over SpaceWire emerged. Among the expected gains, there were a simpler Boot Software within the instrument itself, and less non-volatile memory needed on instrument side since the application software could be directly loaded through RMAP under control of the platform. On the other hand, to some extent responsibility and required resources would be shifted to the platform side.

This activity made a detailed analysis of the system impact (advantages and drawbacks) of using the RMAP protocol over SpaceWire in the implementation of the initialisation sequence in the context of secondary processors (i.e, instruments or other equipment). This also led to the implementation of a proof-of-concept prototype.