Flight Software Affects on Ground Systems
- JAXA’s Approach -

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JAXA’s Approach

- JAXA is developing a new approach to develop flight software.
- In the past, each piece of flight software was designed independently, and its descriptions were always given informally without any standard or guideline.
- Because of the above situation, the spacecraft operations teams had a hard time understanding the operational rules of each spacecraft and onboard instrument.
- In order to solve this problem, JAXA adopted a model-based approach.
- In this approach, the behavior of each piece of flight software is described based on a Functional Model of Spacecraft (FMS), and the descriptions are stored in a standard database.
- We are also developing a tool that partially generates a code from the contents of the database.
Model-Based Development of Flight Software

The FMS specifies a set of rules to describe the behavior of flight software as functional objects.

The behavior of each piece of flight software is described as a set of functional objects in a standard way.

The description of the functional objects are stored in a standard database as an XML document.

Flight software is developed either manually or automatically from the description of functional objects.

The monitor and control software monitors and controls any piece of flight software based on the description of the functional objects stored in the SIB.

Ground Monitor and Control Software

Spacecraft Information Base (SIB)

Behavior of Flight Software

Functional Model of Spacecraft (FMS)