

CPT Ground Segment Requirements

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Abstract

The ground segment requirements of the Charged Particle Telescope (CPT) are discussed. The concept of ground segment is here considered to cover several fields of activity in addition to operational aspects.

The model philosophy of CPT is defined. The selected approach is based on a hybrid philosophy, where in addition to a ProtoFlight Model (PFM), also an Engineering Model is produced, and used in the design verification of the instrument. As a baseline, however, the PFM will be subjected to the full qualification programme, after which it will be flown.

The general requirements for Product Assurance (PA) are discussed. All relevant disciplines of PA are covered. The related management approach is also briefly considered. A Quality Control Board is assumed to play a major role in PA activities.

The design verification of CPT is proposed to cover electrical functional, electromagnetic compatibility, structural and mechanical, and thermal requirements. A verification programme is presented in a form of verification matrix defining the verification methods for all models involved.

The concept and tasks of the CPT Electrical Ground Support Equipment (EGSE) at various phases of the development programme are presented. At unit level, the EGSE includes a simulator emulating the assumed CPT-spacecraft interface as well as the EGSE interface to the system level facilities. This approach allows commanding and operation of CPT in an identical manner at all phases and levels.

CPT ground operations cover the delivery, integration and interface verification, spacecraft system level electrical performance verification and environmental tests, and launch site operations. The handling, servicing and test requirements of CPT are defined.

The ground segment requirements during flight assume a standard concept of the ground system elements. These facilities include a payload control centre and a mission exploitation centre. Based on these assumptions, the CPT requirements during commissioning, routine operations, and in emergencies are presented.