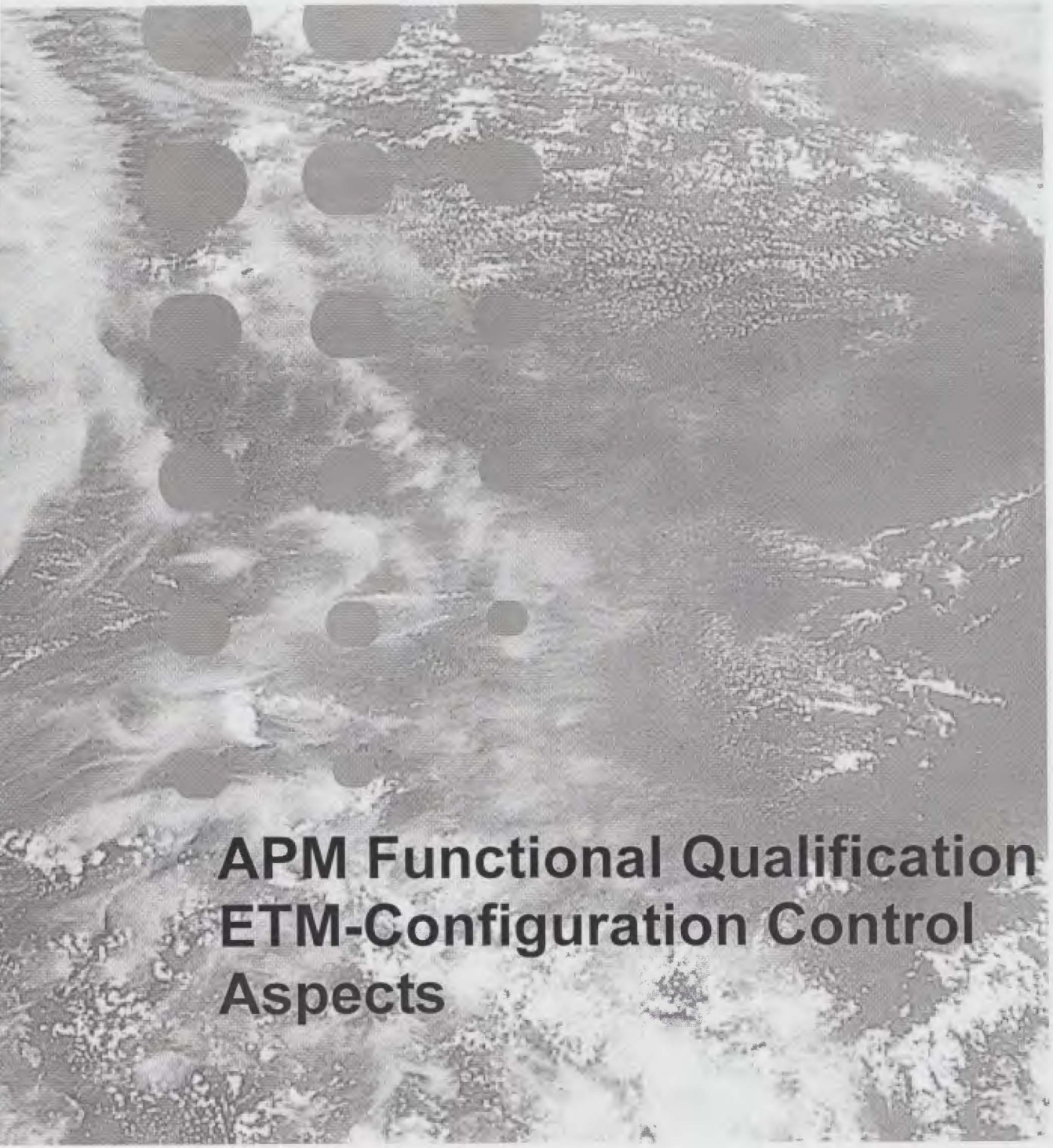


APM Functional Qualification on ETM-Configuration Control Aspects

astrium

COLUMBUS

General

- COLUMBUS approach is a compromise between
  - Classical approach: Full system qualification on EM
  - Protoflight: Complete qualification on FM (i.e. no system EM)
  - ETM Definition: see excerpts of Columbus D & D and AIV Plan

- Ground rules and principles (see following flow):
  - Design is approved at PDR's down to unit level
  - After PDR the design is changed only in controlled way
  - FM Design is approved at CDR's

2.4.2 Model Philosophy

2.4.2.1 System Level

As first step on Flight Configuration level an Electrical Test Model (ETM) configuration will be assembled consisting of functional EM units and the complete harness arranged in support structures. It will be used for functional qualification testing to the maximum content possible with this configuration.

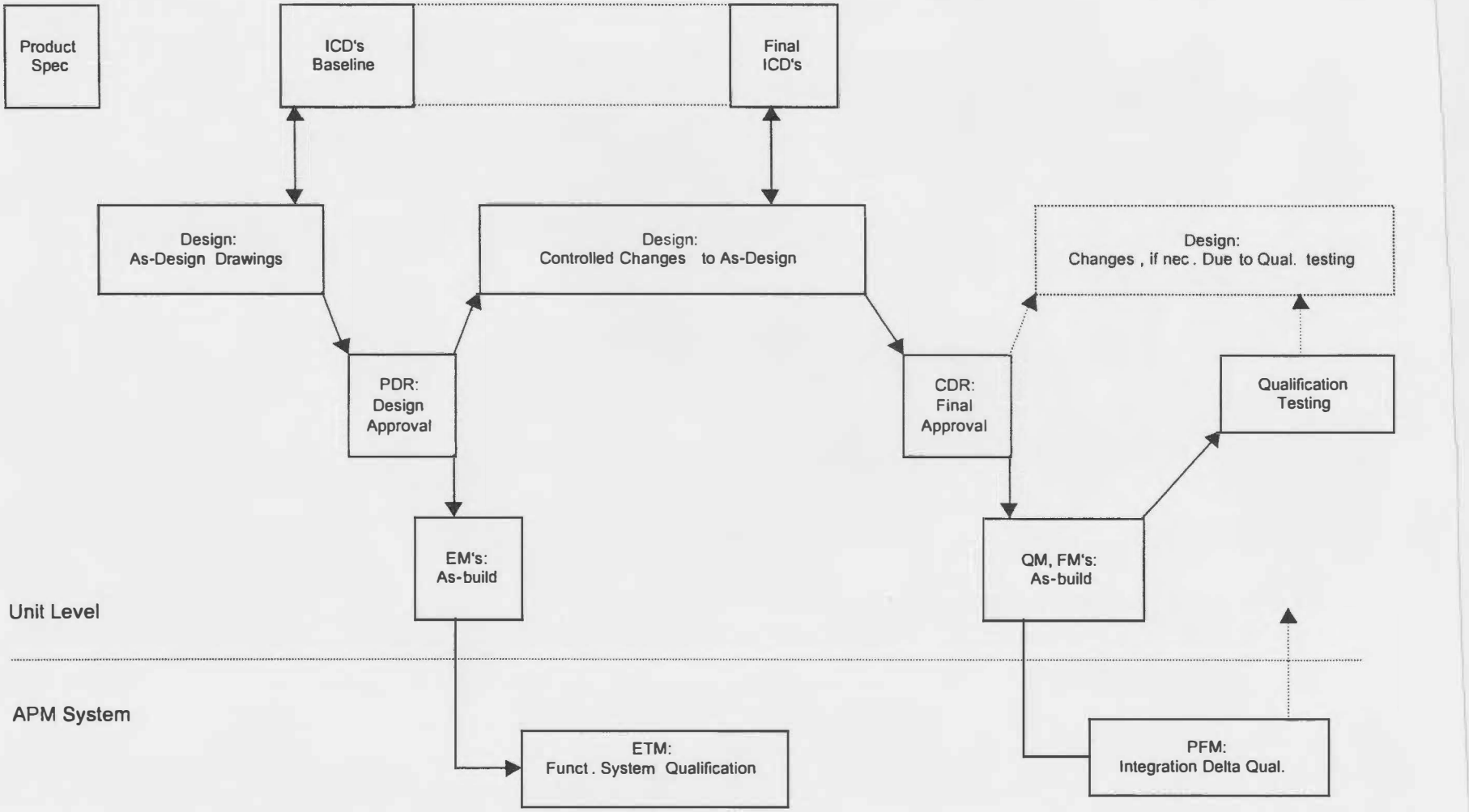
Because the structure is not there, radiated emission testing cannot be made but e.g. conducted susceptibility qualification testing is foreseen.

Also the onboard SW and the APM/EGSE interfaces can be fully exercised as missing onboard functional units will be simulated by the EGSE.

The EM units and software will be identical to the Flight Model in physical and functional design as necessasry for qualification objectives. Differences in detailed manufacturing processes and parts quality not influencing the objectives of the EM usage are considered acceptable. Redundancies will be included to such an extent as necessary for qualification testing.

Model	Definition	Purpose
BB/DM	o on unit-S/S level for electronic units and critical fluidic/ mechanical -thermal parts o non-flight HW	o to develop the design concept on S/S or unit level o to check eventual equipment modifications
EM Engineering Model	o full flight design, but limited flight standard (no high reliability components necessary). Identical to FM in form, fit and function o MIL grade EEE parts (extended temperature range) procured as a goal from the same production lot of QM/FM Hi-Rel parts as defined in RD(5), PAS spec.	o to qualify function/performance & internal/external interfaces as far as possible
QM Qualification Model	o all units - assy, SS (structure) o full flight design and flight standard	o environmental qualification on unit, assy, ORU, (S/S structure)
EQM Eng. Qualif. Model	o full flight design and EM standard o EEE parts stem from the same product line as FM Hi Rel parts	o environmental/functional qualification

Design and Qualification Logic



CIDL-ABCL-EM/FM Differences List Relations