

SPACE SYSTEMS SYMPOSIUM (D1)  
Lessons Learned in Space Systems (5)

Author: Prof. Geilson Loureiro  
Instituto Nacional de Pesquisas Espaciais (INPE), Brazil, geilson@lit.inpe.br

LESSONS LEARNED IN 12 YEARS OF SPACE SYSTEMS CONCURRENT ENGINEERING

**Abstract**

A space systems concurrent engineering approach was presented at IAC1998, in Melbourne, Australia. The approach was used, from there on, on satellites and its subsystems architecting phase at INPE, in Brazil. This paper presents how the approach evolved towards pragmatism, systemization and automation in the last 12 years, justifies the evolution and derives lessons learned from the evolution process. The systems concurrent engineering approach was based on a so called total view framework and on a so called concurrent structured analysis method. The approach consists of analyzing stakeholders, requirements, functional concept and implementation architecture, simultaneously, for product, its life cycle processes and their performing organizations at every layer of the systems breakdown structure. Evolution includes: the realization of stakeholder analysis, functional analysis and physical architecture analysis, separately, for each system life cycle process; a new hazard, risk and exception analysis approach; a systematic treatment for states and modes; integrated product and organization modeling using a computer tool. The paper provides a list of lessons learned from the application of the initial and of the evolved approach.