

15th SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)  
Small Satellite Operations (3)

Author: Dr. Gregory Pradels  
Centre National d'Etudes Spatiales (CNES), France, gregory.pradels@cnes.fr

CNES SOLUTION FOR A REUSABLE PAYLOAD GROUND SEGMENT

**Abstract**

The Myriade series of the French Space Agency, CNES, has been developed for laboratories proposing pertinent scientific space experiences. It consists of a small platform with independent and configurable functional chains and able to onboard a scientific payload of 80kg/60w. It is designed to orbit at low altitude (600 - 1000km) for a 2-years duration at least. CNES manages the development of the platform and the corresponding ground operation center, while the laboratory manages the development of the payload and the scientific ground operation center. The launch is managed by the agency. Three scientific missions have been elaborated by CNES with this concept: DEMETER (June 2004), PARASOL (December 2004) and PICARD (June 2010). Other industrial or military missions have been also developed with this concept. The platform and satellite ground segment are now very mature. The main difficulties undergone by the coming projects are the development of the payload and the delivery of a launcher. CNES's Myriade satellites are in fact not designed for recurrent missions; each payload is very specific and requires long term studies or adaptations to the initial concept. All the laboratory efforts are then focused on the development of the payload, leaving apart the development of the ground segment. In order to ease the workload, CNES developed a reusable set of tools that helps to elaborate, realise and validate the payload ground segment. This paper aims at presenting this set and demonstrating the absolute necessity, even for a small scientific mission, to fix the operational concept at the very beginning of the realisation phase of the mission. The operational concept of the three first CNES's Myriade missions are presented in order to make an overview of the solutions elaborated during the past seven years. The main difficulties undergone by the development teams as well as the operational teams are discussed. The new CNES solution is afterwards presented. It consists of several reusable and modern software tools but also of reusable set of documents elaborated thanks to the lessons learned from the previous missions. These means will be used for the coming Myriade missions that are TARANIS and MICROSCOPE and proposed for others scientific missions as MSL, SVOM or MERLIN. Each new mission will improve these sets, either by financing new software options or by modifying the documentation.