SPACE SYSTEMS SYMPOSIUM (D1)
Space Systems Architectures (4)

Author: Mr. Josef Ettl
German Aerospace Center (DLR), Germany, josef.ettl@dlr.de

Dr. WALDEMAR LEITE FILHO
CTA-IAE, Brazil, waldemarwclf@iae.cta.br
Dr. Domingos Carrijo
Institute of Aeronautics and Space (IAE), Brazil, domingosdsc@iae.cta.br
Dr. Hilton Pietrobom
DCTA/IAE, Brazil, hiltonhcp@iae.cta.br
Dr. Fausto Ramos
DCTA-IAE, Brazil, faustofor@iae.cta.br
Mr. Adolfo Silva
DCTA/IAE, Brazil, adolfoags@iae.cta.br
Mr. Henrique Daitx
DCTA/IAE, Brazil, henrique.daitx@gmail.com

CONTROL SYSTEMS AND STRATEGIES ONBOARD OF VLM-1

Abstract

The VLM-1 rocket will be launched for the first time from the launch site in Alcântara (North east of Brazil, Maranhão State) 2016. The VLM-1 can be used for 2 different applications. The first one is to carry the SHEFEX III re-entry flight vehicle and impose it to a final speed of about 26 Mach, the second application is to lift microsatellites into equatorial low earth orbits. The VLM-1 is a three stage rocket system, consisting of 2 S-50 and one S44 motors. The first 2 stages have a flexible nozzle while the upper stage has to be controlled by a cold gas system. To follow the nominal trajectory and to stabilize the flight behavior of the rocket system several control loops have to be installed. The aim of this paper is to describe a total overview about the control complex, their targets, strategies and principle functionalities. Furthermore, the redundant guidance and navigation system used on board is described, including its accuracy and reliability. Additionally, algorithms are introduced to minimize drifts of the navigation data online. Simulation results are shown in order to confirm that the requirements will be reached.