IAF EARTH OBSERVATION SYMPOSIUM (B1)
International Cooperation in Earth Observation Missions (1)

Author: Mr. Pierric Ferrier
Centre National d'Etudes Spatiales (CNES), France

Mr. Philippe Crébassol
France
Dr. Gerard Dedieu
France
Dr. olivier hagolle
France
Mr. philippe GAMET
Centre National d'Etudes Spatiales (CNES), France
Mr. moti yakoov
Israel
Mr. Jacob HERSCOVITZ
RAFAEL, Israel
Mr. Jean-Louis Raynaud
CNES, France
Mr. Renaud binet
CNES, France
Mrs. Françoise De Lussy
CNES, France

VENUS: FIRST IMAGES AND FIRST ELECTRIC PROPULSION EXPERIMENT RESULTS FOR THIS FRENCH-ISRAELI MISSION.

Abstract

Venμs (Vegetation and Environment monitoring on a New Micro Satellite) is a demonstration satellite capable of providing frequent fly-by observations (2 days) at high resolution (5m), constant viewing angles, constant lighting conditions, in 12 spectral bands. It has been launched August 2, 2017 from French Guyana.

Thanks to these capabilities, an innovative ground processing allows the production of time composite images cloud-and-aerosol free.

Although Venμs is primarily designed for vegetation studies, scientific and applied applications are numerous in a wide range of subjects: • Monitoring and analysis of ecosystems functioning under the influence of environmental factors (climate, topography, soils etc.) and of human activities • Land-cover and land use mapping, change detection, including frequent updating and near real time classification, for instance for agriculture applications • Biodiversity and more generally environmental studies • Studies in the field of agriculture: crop types mapping, monitoring of crop growth conditions, agri-environmental policies, precision farming, assessment of policy impacts • Development and validation of natural and cultivated ecosystem functioning models: vegetation phenology, surface energy budget, biogeochemical fluxes and budget (CO2, H2O, N2O, CH4 ...), vegetation growth simulation, biomass and yield estimates, soil-vegetation-atmosphere exchanges ... • Modeling of snow cover, snow melt, glacier flow • Monitoring

of water turbidity and analysis of the driving factors (river flow and tides in estuaries for instance) • Water management issues, diffuse pollutions assessment

The Venμs mission has been carried out in the frame of a French-Israeli cooperation. It comprises two missions:

1. the Scientific mission (here above) which will last 2.5 years with the satellite at an altitude of 720 km 2. the Technological mission (demonstration of the advantages to use plasma engine thrusters vs hydrazine ones for station keeping, LEO to LEO transfer, and drag compensation at low altitude). This electric propulsion system will bring the satellite down to 410 km – once the 2.5 years are over - and will maintain this altitude during one year (autonomous close loop navigation). The scientific mission will go on, in parallel.

This paper recalls the mission profile and the cooperation implementation, presents the first results (images, and electric propulsion experiments) and lessons learned from cooperation at space agencies level. μ