

EARTH OBSERVATION SYMPOSIUM (B1)  
Future Earth Observation Systems (2)

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VENUS - AN INNOVATIVE SATELLITE FOR THE STUDY AND MODELLING OF LAND SURFACE  
PROCESSES -

**Abstract**

Venus 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 the range of 12 spectral bands.

Thanks to these capabilities, innovative ground processing will allow the production of time composite images cloud-and-aerosol free. Although Venus 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
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Development and validation of natural and cultivated ecosystem functioning models: vegetation phenology, surface energy budget, biogeochemical fluxes and budget (CO<sub>2</sub>, H<sub>2</sub>O, N<sub>2</sub>O, CH<sub>4</sub> ...), vegetation growth simulation, biomass and yield estimates, soil-vegetation-atmosphere exchanges ...

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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)

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Water management issues, diffuse pollutions assessment

*Venus* is built in the frame of a French-Israeli cooperation and carries two missions: the Scientific mission (here above) and a 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).

*Venus* is a micro satellite of less than 300 Kg and is due to fly in 2016. The Scientific mission will last 2.5 years with the satellite at 720 km. Then the Technological mission (operating the electrical propulsion) after having maintained the orbit at 720, will bring the satellite down to 410 km and will keep this altitude during one year. The scientific mission will then be resumed at this new altitude, with an improved resolution.

This paper presents all the aspects of the mission: both missions' goals, ground image processing, satellite and payload descriptions, and finally the cooperation implementation.