



PRoViScout - Planetary Robotics Vision Scout

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D6.1.1 Morphology and Texture Simulation package & SW

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Work package 6 – Simulation & Testing

Lead contractor for this deliverable TRS

Dissemination level: Confidential, only for members of the consortium (including the Commission Services)

EXECUTIVE SUMMARY

The PRoViScout research project aims to develop a frame work for autonomous sample identification and sample selection through planetary robotic vision processing by bringing together the European space community and supported by NASA-JPL. Through the on-board autonomous processing of visual data products, science prioritisation and platform control of robotic missions, reductions in the operational cost and increases in return data can be realised. Through PRoViScout a unified and generic approach for future robotic missions in robot vision, on-board processing, and navigation and scientific goal detection will be developed. The project also aims to provide an increase in the public awareness and generate procedures for distributing mission data and information to the scientific community and general public. The culmination of the project will lead to the integration of all the individual components into a single operational system which will be demonstrated at several field demonstrations.

Simulation is an important step towards a smooth integration of the system. The Morphology and Texture simulator is a component of the simulation chain that allows to exercise, as much as possible the vision algorithms, but most importantly to close the loop of the control chain without the need of the targeted hardware.

The Morphology and Texture simulator models in 3D the elements of a robotized system and the morphology and the texture of the environment is which it evolves. It includes the rover, the surrounding terrain and the models of the vision sensors (cameras and stereo head). Images quality parameters associated to a camera are adjustable, e.g. noise, distortion, glare for testing in various conditions. Lighting sources associated to cameras but also celestial objects are modeled as well. Ambient conditions are therefore adjusted to the simulation needs by adapting direct sunlight intensity and direction, ambient light and surface reflexivity characteristics. On request of the rover controller simulator synthetic images are generated to support the simulation of vision processing tasks.

This report presents all the development process of the Morphology and Texture simulator from the requirements to the design, the software user manual and test results.

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