



**PRoViScout - Planetary Robotics Vision Scout**

FP7-SPACE-2009-1 Collaborative Project Grant Agreement no: 241523

Project Homepage: [www.proviscout.eu](http://www.proviscout.eu) starting: Apr 2010 duration: 30 months

**D2.4.1 Mission Requirements Document**

**Actual submission date:** 2010-06-30

**Work package 2 – Consolidation**

**Lead contractor for this deliverable** SSL

Dissemination level: Restricted to other programme participants (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. This document presents a spectrum of mission and target scenarios which could make use of the PRoViScout system and looks in particular at the commanding, vision processing chain, data handling and archiving of mission data aspects. Past, present and future missions have been analysed to understand their science and operational goals, processing methods in order to establish the mission requirements for the PRoViScout frame work. In deriving the mission requirements from the investigated missions and the PRoViScout objectives three base scenarios have been proposed; a single exploration rover, a single rover with an aerial vehicle and a multiple heterogeneous rover systems. Each has been analysed for their system configuration, environmental constraints, scenario test criteria and requirements. The PRoViScout system consists of a vision processing function chain (PROVISC), autonomous tasking, autonomous navigation, autonomous science representative sensor suite, an interface client (PROVIM), navigation, platform control. The scope and boundaries of the PRoViScout system have been derived to be:

<b>Out of Scope</b>	<b>PRoViScout Scope</b>
Dynamic Simulation of hardware and software components of a robot system	Normalisation process of the data (import/export)
Develop new 3D vision processing components	Mission planning, mission resourcemanagement and science classification with direct interaction to the mission control system
Address sampling once an interesting target has been selected	Provide tools needed for planning, resourcing and assessment but not provide actual interpretation of the results
Development of new breadboards or vision sensors	Processing the images automatically, on-board and at ground
Storage/archiving	Access to information is required (good search tools, metadata) □ □ image data & image
Aspects of orbital imagery other than for global context	
Address issues of off-line processing	

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This document does not represent the opinion of the European Community, and the European Community is not responsible for any use that might be made of its content. The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 241523 "PRoViScout".

