



## 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

### D4.1.3 Navigation & Mapping Component

Actual submission date: 2011-06-30

Work package 4 – Provisc & On-Board System

Lead contractor for this deliverable GMV

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

### EXECUTIVE SUMMARY

The base for on-board navigation is a local DEM which is used by path planning in terms of traversability, possible hazards, locomotion costs, reliability and information content. Terrain modelling can be performed by a laser scanner, laser illuminated cameras, radio-frequency (RF) imagers or stereovision cameras which appear the best compromise for reliability and accuracy on one side and mass, power consumption and space qualification readiness on the other. Within PRoViScout a 3D-TOF camera is used for this purpose. DEM resolution should be much better than a wheel rover size to allow terrain crossing analysis. The current solution implemented in the **Eurobot Ground Prototype** follows the long-range navigation strategy. This navigation approach will be adapted to the PRoViScout solution, supported by the 3D Vision toolchain, is presented in the ProViScout deliverable.

### Table of Contents

|  |    |
|--|----|
| ISSUE RECORD.....  | 2  |
| 1. EXECUTIVE SUMMARY.....  | 3  |
| 2. INTRODUCTION.....   | 5  |
| 2.1 Purpose and scope.....   | 5  |
| 2.2 Definitions, Acronyms, Abbreviations.....                          | 5  |
| 2.2.1 Definitions.....   | 5  |
| 2.2.2 Acronyms.....  | 5  |
| 2.3 Document Structure.....  | 6  |
| 2.4 References.....  | 6  |
| 2.5 Applicable Documents.....  | 6  |
| 3. Navigation and Mapping component.....                               | 8  |
| 3.1 Background on long-range rovers navigation.....                    | 8  |
| 3.2 Coordinate system convention.....                                  | 9  |
| 3.3 Rover dimensions.....  | 10 |
| 3.4 Navigation component.....  | 12 |
| 3.4.1 Corba interface.....   | 12 |
| 3.4.2 Component installation.....                                      | 14 |
| 3.4.3 Navigation Component configuration.....                          | 17 |
| 3.4.4 Testing.....   | 17 |
| 3.5 Mapping component.....   | 18 |
| 3.6 DEM Generation from Multiple View Stereo Scene Reconstruction..... | 18 |
| 4. ANNEX A. Corba Interface (navigation component).....                | 20 |
| 4.1 Absolute Navigate.....   | 20 |
| 4.2 Determine Requirements.....  | 20 |
| 4.3 Follow Path.....   | 20 |
| 4.4 Get Status.....  | 21 |
| 4.5 Init.....  | 21 |
| 4.6 Relative Move.....   | 21 |
| 4.7 Stop.....  | 21 |

Copyright: All texts, graphics and images are protected by copyright and may not be used without prior express approval.

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".

