



PRoViScout - Planetary Robotics Vision Scout

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

Project Homepage: www.proviscout.eu starting: Apr 2010 duration: 30 months

D4.5.1 PROVISC Prototype

Actual submission date: 2011-11-30

Work package 4 – Provisc & On-Board System

Lead contractor for this deliverable SSL

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

EXECUTIVE SUMMARY

This document outlines the core interfaces and relationships between the main on-board components for ProViScout – known collectively as PROVISC. This consists of several applications that work together to provide the required functionality onboard. A key operating principle for PRoViScout was to minimise effort spent on integration in order to maximise algorithm development.

To support this approach SciSys provided the planning and execution software components to allow autonomous execution of mission timelines. In order to communicate, monitor and control the other components a CORBA based software architecture was designed. The native interface for each component was “wrapped” by each module provider in a CORBA implementation based on IDL interface definitions. The software framework for PRoViScout is therefore quite distributed in terms of provision i.e. rather than provide a single software framework for developers to integrate with, each provider supplied the full implementation of their own component. This allowed reasonable development independence and minimised the spend on framework development.

The various components have been tested in a series of physical co-located workshops and some remote trials where necessary. This was enabled by the CORBA based communication infrastructure. Trials included:

1. Primary Testing event - June 2011 held and organised by SciSys
2. Feb 2012 held at SciSys
3. June 2012 held at AU
4. Remote testing late July 2012
5. Physical testing Aberystwyth August 2012.
6. Physical testing Tenerife September 2012.

For the later trials the system had to accommodate a reconfiguration given the unavailability of the key sensor for the Tenerife trials. The AUPE II PanCam has been used in its place however some changes have been required to support the science assessment and navigation.

Table of Contents

1. DOCUMENT CONTROL	2
2. ISSUE RECORD	2
3. EXECUTIVE SUMMARY	3
4. INTRODUCTION	6
4.1 Purpose and Scope.....	6
4.2 Definitions, Acronyms, Abbreviations	6
4.2.1 Acronyms	6
4.3 References	6
4.3.1 Reference Documents	6
5. INTERNAL DESCRIPTION	6

5.1	SW Overview	6
5.2	Algorithms & Data Flow	8
	• Executive	8
	• Science Assessment	8
5.3	Sequence Diagrams	9
	• Executive	9
	• Initial Plan Upload	9
	• Image Acquisition and Analysis	10
	• Navigate	10
	• Science Assessment	11
	• Analyse Image for Science	11
6.	EMBEDDING INTO PROVISCOUT ENVIRONMENT	11
6.1	Overview	11
6.2	CORBA Interfaces From Proviscout components	13
	• Executive	13
	• IExecutive Planning	13
	• IExecutiveStatusProvider	14
	• IPlanningUpdateListener	14
	• ISAERRetrieval	15
	• IExecutive	15
	• Science Assessment	15
	• IScienceAssessment	15
6.3	Decision System - mmops	16
6.3.1	Description	16
6.3.2	Interface - IMMOPS	16
6.3.3	Required Components	17
6.4	Science Assessment	17
6.4.1	Description	17
6.4.2	Interface - IScienceAssessment	17
6.4.3	Required Components	18
6.5	Navigation	18
6.5.1	Description	18
6.5.2	Interface - INavigation	18
6.5.3	Required Components	19
6.6	Vision Processing	19
6.6.1	Description	19
6.6.2	Interface - IVisionProcessing	19
6.6.3	Interface - IGlobalMapListener	21
6.7	Rover Platform	21
6.7.1	Description	21
6.7.2	Interface - IPlatform	22
6.7.3	Interface - I3DTOF	22
6.7.4	IWALI	23
6.8	Testing	24
6.9	System Status	28
	• AUPE-2	28
	• iWAC	29
	• 3D-TOF	29
	• iRover & Rover HW	30
	• iVision	30
	• iNav	31
	• iScience	32

- Executive 33
- Decision Module..... 33
- 7. FURTHER WORK.....34**
- 7.1 Improvement potential 34
- 7.2 exploitation outside proviscout 34
- 8. APPENDIX: EXAMPLES OF TEST PROTOCOLS35**
- DAY 1.....35**
- DAY 2.....36**
- DAY 3.....38**
- DAY 4.....38**

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".

