

Europlanet TNA Report

PROJECT LEADER

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Date of TNA visit:	18 to 21 April 2011
No. of days:	5
Host laboratory:	
Reimbursed	N/A

Project Title –

ESA Analogue Tests Rio Tinto

- 1) Study on the Comparison of Telepresence and Human-Assisted Planetary Surface Operations
- 2) Study of Monitoring Strategies for Human Safety, Performance and Operations During Exploration EVA Activities

Scientific Report Summary.

(plain text, no figures, maximum 250 words, to be included in database)

Analogue testing was performed in Rio Tinto to support two study activities:

- 1) Study on the Comparison of Telepresence and Human-Assisted Planetary Surface Operations. The purpose of this activity was to perform a study to compare telepresence and human-assisted surface operations through field-testing, to gain insight into how best to optimise human-robotic surface operations.**
- 2) Study of Monitoring Strategies for Human Safety, Performance and Operations During Exploration EVA Activities. The purpose of this study was to assess innovative health and performance monitoring concepts, to define the complementary developments and models that ESA should develop and/or consolidate to monitor human operations, health, performance and safety in preparation of, during, and after astronaut extravehicular / planetary surface activities.**

Tests were performed in Rio Tinto using the Long Term Medical Survey system as well as the Eurobot ground Prototype in combined operations with the ÖWF Aouda.X Space suit simulator. LTMS Science objectives were fully fulfilled, while Eurobot testing managed to fulfil about 40% of the defined tasks due to extreme weather conditions.

Full Scientific Report

Approx. 1 page

Analogue testing was performed in Rio Tinto using the Long Term Medical Survey system as well as the Eurobot ground Prototype in combined operations with the ÖWF Aouda.X Space suit simulator, to support two study activities:

1) Study on the Comparison of Telepresence and Human-Assisted Planetary Surface Operations.

The purpose of this activity was to perform a study to compare telepresence and human-assisted surface operations through field-testing, to gain insight into how best to optimise human-robotic surface operations. Specific testing was performed to evaluate the following:

- [Task ET-02] Demonstrate how Eurobot could be utilised to support the transportation of equipment from one location to another in cooperation with an EVA crew member
- [Task CR-02] Demonstrate how Eurobot could be utilised to support the transportation of an EVA crew member from one location to another
- [Task ID-03] Demonstrate how Eurobot could be utilised to support the deployment of scientific/operational instrumentation at a pre-defined location
- [Task SC-02] Demonstrate how Eurobot could be utilised to support the “scouting” of a particularly interesting location on a planetary surface, the primary objective being to locate and collect a specific rock sample
- [Task ID-01] Demonstrate how Eurobot may be utilised to perform instrument deployment on a planetary surface using a “haptic device’
- Additional Test: Demonstrate the capability of Eurobot to negotiate a “rough” terrain. This test was partially carried out in the “rock garden” area of the test site.
- Additional Test: A 160m traverse was performed via manual control (i.e. joystick commanding).

The Eurobot testing managed to fulfil about 40% of the defined tasks due to extreme weather conditions.

2) Study of Monitoring Strategies for Human Safety, Performance and Operations During Exploration EVA Activities.

The purpose of this study was to assess innovative health and performance monitoring concepts, to define the complementary developments and models that ESA should develop and/or consolidate to monitor human operations, health, performance and safety in preparation of, during, and after astronaut extravehicular / planetary surface activities.

- Demonstration of LTMS in an analogue field test
- Extend the LTMS validation to additional analogue environments
- Compare LTMS data with reference data (suit) and if possible other data
- Gain first-hand experience in multi-agency analogue campaign planning, execution and coordination
- Gain a better understanding of analogue simulation requirements
- Validate transmission and analysis of LTMS data and signals between remote site (Rio Tinto) and Mission Control in Innsbruck

LTMS Science objectives were fully fulfilled,

Please include:

- Publications arising/planned (include conference abstracts etc)

No specific conference attendance planned. Only internal publications and technical reports.

- Host approval The host is required to approve the report agreeing it is an accurate account of the research performed.