



MOONWALK is an exciting step further into the future of human space exploration, where humankind pairs with technology to transcend known boundaries.

PRESS RELEASE

MOONWALK - Spring Simulations

Rio Tinto / Marseilles - April / May 2016



Announcement of Rio Tinto / Marseilles Spring Simulations 2016

MOONWALK will conduct Earth-Analogue simulations to test new hardware and various spacewalk scenarios at the **Subsea Marseilles Lunar Analogue site** in France and **Rio Tinto Mars Analogue site** in Spain in preparation for future human and robotic mission to Moon and to Mars. Project MOONWALK, is a 3-year cooperative Research & Development project funded by the European Commission under the *Space* theme of the 7th Framework Programme and aims to compare the performance of different compositions of **astronaut-robot teams** over multiple tasks and operational scenarios, in two **Analogue environments**.

First evers!

new for the first time in the European Union... the MOONWALK simulations at Marseilles and Rio Tinto will exhibit the;

- **First-time demonstration of collaboration between an astronaut and a gesture controlled rover, YEMO**
 - **First European demonstration of the new, specially designed, underwater EVA space simulation suit, Gandolfi 2, for exploration of Lunar and Martian terrain**
 - **First EVA simulation suit, Gandolfi 2 - suitable for testing in two environments, both on ground and immersed in water**
 - **First use of an advanced EVA (Extravehicular Activity) information system in a water immersion partial gravity simulation**
 - **First integration of a self-deployable simulation habitat into an analogue test (SHEE- Self-deployable habitat for extreme environments, www.shee.eu)**
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Simulation Period 2016

Rio Tinto, Spain: 15-30 April 2016
Subsea Marseilles, France: 28 May-12 June 2016

Register for press and public visit

Rio Tinto, Spain

PRESS

Press Conference – morning, Friday, 22. April - 11.00hrs

All members of the press are invited for ***open interviews and access to project and project site*** throughout the day on Friday 22. and in the morning of Wednesday 27. April.

PUBLIC

Sunday 24. April, project MOONWALK will be opened to the public and will host an outreach activity in the morning.

Travel details upon registration. Please register under 'Participate' at the project website.

Tips for travel and accommodation can be found here; http://www.spain.info/en/reportajes/riotinto_marte_en_la_tierra.html

Subsea Marseilles, France

PRESS

Press Conference

All members of the press are invited for ***open interviews and access to project and project site***. Specific dates will be announced on the project's website under 'participate.'

PUBLIC

Project MOONWALK will be opened to the public and will host an outreach activity. Specific dates will be announced on the project's website under 'participate.'

Travel details upon registration. Please register under 'Participate' at the project website. The exact date and location of Subsea Marseilles analogue tests will be determined closer to the date of the analogue due to regional wind patterns. Dates are subject to change for both analogue test sites due to organisational or meteorological reasons.

International Analogue Mission Control Centre, Brussels

PRESS

All members of the press are invited as observers to the ***International Analogue Mission Control Centre in Brussels, Belgium*** during the extent of the simulations.

Travel details upon registration. Please register under 'Participate' at the project website.

Children Competition

**Design a new flag for the Moon /
first sentence to be spoken on Mars**

Win a trip to the International Analogue Mission Control Centre, Brussels

PARTICIPATE

Who will be at the simulations

Members of the MOONWALK consortium, comprised of 7 partners from six EU member states will participate at the simulations:

DFKI - Robotics Innovation Centre (Project Coordinator), Germany
COMEX (Technical Coordinator), France
AIRBUS Group, Great Britain
LIQUIFER Systems Group (LSG), Austria
Space Applications Services, Belgium
NTNU - Centre for Interdisciplinary Research in Space, Norway
INTA - Instituto Nacional de Técnica Aeroespacial, Spain

Guest researchers

were invited to submit proposals to be conducted parallel to the tests conducted in Marseilles and Rio Tinto in Spring 2016. Winning proposals include;

ADAPA 360 - 360-Degree VR Video Camera System for Space Suit and Helmet

Team: Ali Zareiee, ADAPA, Norway

Cave Explorer - Assessment of performance for the wearable electro-optical diagnostic health assistant system

Team: Human Spaceflight Department, OHB System AG; Medical Engineering Department, IMES University of Applied Sciences Würzburg-Schweinfurt

Lunar Lander Pivot Beam Support System

(Astronaut and Rover Construct a Tool Shed Together)

Team: Aedel Aerospace Unipessoal, Portugal

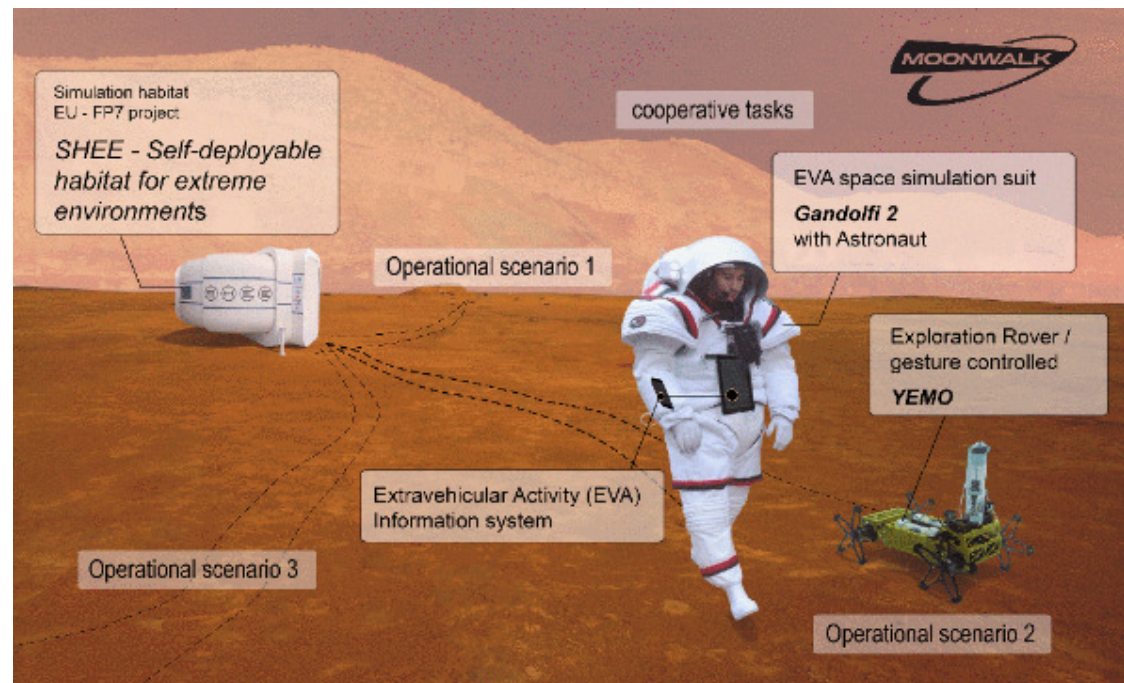
SCALE: Shared Cognitive Architecture for Long-term Exploration

Team: Leslie DeChurch (Georgia Tech), Noshir Contractor (Northwestern), Jeff Johnson (U. of Florida); United States (NASA Behavioral Health & Performance)

In addition, some members of the MOONWALK Scientific Advisory Board (SAB) will be present at the MOONWALK analogues. Members of the MOONWALK SAB include; Ingmar Skoog (Institute of Space Physics in Kiruna, Umea University, Sweden); Oleg Saprykin (TSNIIMASH – ЦНИИМАШ, Head of Human Space Flight Department, Central Research Institute for Machine Building, Russia); Ulrich Kübler (Astrium Space Transportation, Germany); Hans Amundsen (EPX AP, Earth and Planetary Exploration Services, Norway); Scott Howe (JPL, Mission Systems Concepts section, NASA's Jet Propulsion Laboratory, USA); and M. Annadurai (Indian Space Research Organisation ISRO, India).

Description of Rio Tinto analogue test site

The Rio Tinto analogue test site is situated in the Huelva district of southern Spain near the city of Seville. The site is part of a large opencast metal mining district that has been exploited at least since Roman times and probably earlier for iron, copper, and other metals. Iron sulphide has interacted with ground water to produce a very acidic environment with pH 0 – 3 and a mineral assemblage including jarosite, Fe-sulphates and oxides as found on Mars. Particularly interesting is the presence of microbes living in the extremely acidic and metal rich waters at Rio Tinto. For these reasons the site has been chosen by the MOONWALK project to simulate a Mars field exploration.



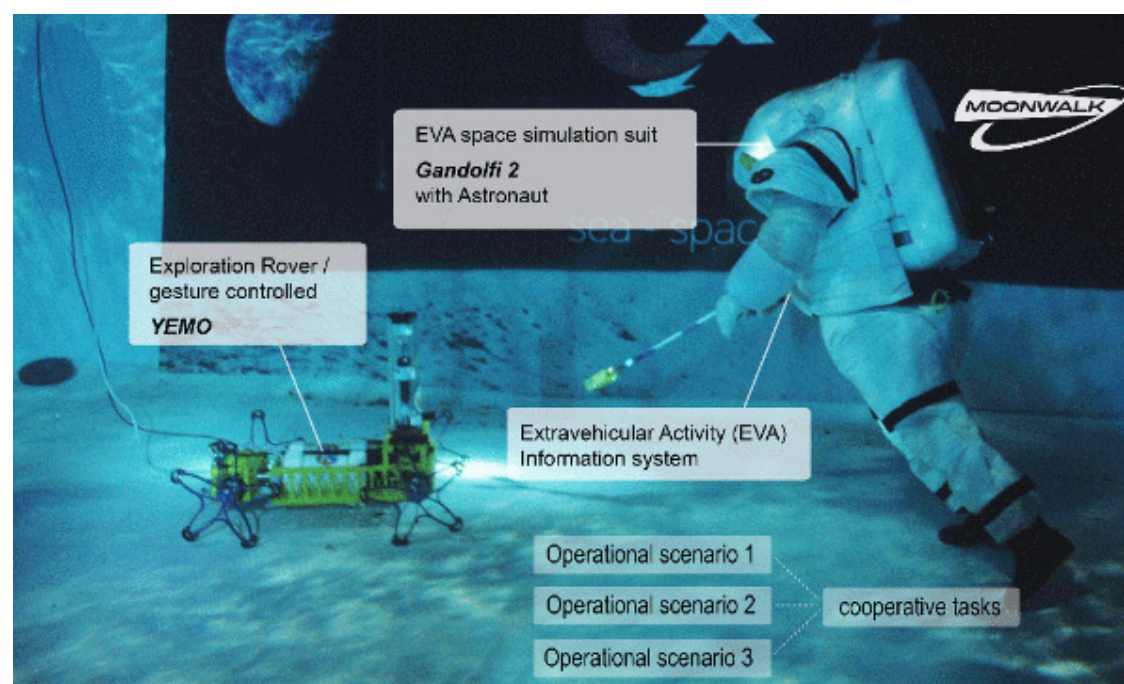
Diagrammatic scheme of the simulation tests at Rio Tinto

Description of Marseilles analogue test site

The Marseilles analogue test site is located near the city of Marseilles on the southern coast of France and can be reached onshore or by ship in less than one hour.

The underwater site has been chosen due to their natural qualities that are similar to some morphologies found on the Moon and at the same time offer the possibility to test and train human and robotic operations in simulated reduced gravity.

Wind conditions are an extreme factor in determining the exact site of the Marseilles analogue test site(s). Determination of the exact day and location of analogue tests within the simulation period (28 May-12 June 2016) will be determined closer towards the time of the actual event and will be based on real-time weather forecasting and identification of the directionality of the prevailing winds. Seven potential sites are identified and reserved during the testing period, each rich with particular geological features and depending on its orientation, having natural protection (vs.) exposure to (the) prevailing winds (on any given day). Seafloor depths for potential test sites range from -3m to -15m.



Diagrammatic scheme of the simulation tests at subsea Marseilles

Description of the International Analogue Mission Control Centre

The International Analogue Mission Control Centre is located in Zaventem, right next to Brussels, Belgium. The state of the art Control Centre has been designed to interact with the advanced spacesuit computer prototype and EVA information system designed for MOONWALK. A team composed by experienced flight controllers of the International Space Station, and experts in planetary science will

perform real-time operations and support the mission from a centralized location in the heart of Europe.

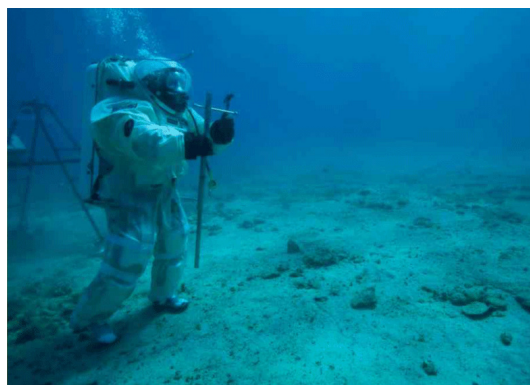
General programme of simulations Rio Tinto/ subsea Marseilles

- Arrival, set up of all equipment at the 'Landing Site' including all logistical items
- Safety procedures and instructions for on-site researchers and astronauts are communicated (for Marseilles: Safety procedures and instructions for divers)
- General testing of all MOONWALK equipment/ systems/ procedures/ including YEMO Robot, Gandolfi 2 Suit, Astronauts, Payload, Scenarios, Outreach, Biomonitoring systems and Science Instruments (Raman spectrometer), Communications, Control Center (Brussels), Mission Coordinator and Logistics; *only Rio Tinto: Science Team and Simulation habitat SHEE**
- Operational scenarios conducted by both astronaut and scout rover are carried out in actual Rio Tinto sites (a trench, crater, cave and rocky outcrop) and in actual subsea Marseilles sites
- Mapping of the 'Landing Site' by MOONWALK scout rover YEMO; autonomous measuring capabilities in marking sites, imaging, presence of any obstacle that may impede the mobility of the astronaut or rover, or inhibit communications; *only Rio Tinto: environmental parameters (temperature, wind speed, humidity), consistency of soil, topographic map*
- Time slots throughout the research period are reserved for meetings with the press and/or public

*For further EU exposure, the habitat, SHEE (Self-deployable Habitat for Extreme Environments) will be incorporated into the simulation campaign of MOONWALK at Rio Tinto. The habitat, completed in 2015 through an EU-FP 7 grant, will provide shelter and suitport ingress/egress for the simulation astronauts.

Registration

To visit one of the analogue sites or the International Mission Control Centre, please register under 'Participate' at the project website.



Consortium

[German Centre for Artificial Intelligence](#) (DFKI)

Bremen, Germany

[COMEX](#)

Marseilles, France

[Airbus Group](#)

Newport, UK

[LIQUIFER Systems Group](#)

Vienna, Austria

[Space Applications Services](#)

Zaventem, Belgium

[NTNU Centre for Interdisciplinary Research in Space](#)

Trondheim, Norway
[Instituto Nacional de Técnica Aeroespacial](#)
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