

Life On Mars? No, but it's the next best thing

The unearthly landscape of the Rio Tinto in southern Spain makes it ideal for a Red Planet mission test run. Dale Fuchs reports

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There are other sites in Spain that have an other-worldly feel. Consider those Darth Vader lookalikes atop Gaudi's La Pedrera in Barcelona, or the lava-made moonscapes in Tenerife.

Even some Marbella mansions might qualify for extraterrestrial status.

But a red-tinted river basin in Huelva tops the alien lovers' list. It's called the Rio Tinto, or Red River, and this stretch of rosy rocks and soil in southern Andalusia appears so extra-terrestrial that it resembles a Spanish outpost of Mars. Tourists joke about its Martian credentials as they photograph the rust-coloured water and craters, carved by centuries of mining.

But scientists take the Rio Tinto seriously. For them, this hostile turf tinged by oxidised iron is a convenient substitute for the Red Planet. In fact, it boasts so many Martian properties that two space agencies even conducted a "mission" there last month, including a simulated Mars walk.

"It looks like a very alien environment," says Philippe Schoonejans, head of the Robotics Project Office at the European Space Agency (ESA) and one of the mission leaders. "It's on the list of top 10 weird-looking landscapes, for people who are interested in things like that."

Blending into the sci-fi scenery, ESA tested its €1.5 million (€1.3m) "Eurobot" Mars Rover, a two-armed robot with stereo vision mounted on a human-sized rover. It is designed to perform tasks that are "too dangerous, too difficult, or simply too boring", as Mr Schoonejans put it, for a future Mars explorer.

The Austrian Space Forum also tested its latest equipment: a spacesuit simulator dubbed Aouda X, funded by the Europlanet network. The 45-kilogram suit with built-in computers, ventilators and sensors allows scientists to measure, among other things, the human body's response to harsh conditions on Mars.

"This is a dress rehearsal for the biggest journey our civilisation has ever taken," announced Gernot Groemer, executive officer of the Polaris Research Program in Innsbruck, at the start of the mission, which was cut short by heavy rain (unusual weather for both Mars and southern Spain).

Despite the storms, the team of 30 scientists managed to perform a week of trials that mimicked an astronaut's activities after a hypothetical Mars landing. It is one of many simulations underway to help man eventually reach our Solar System's fifth rock.

ESA, for instance, is now conducting a 500-day flight simulation in Moscow, known as Mars 500, to measure how five astronauts respond to the psychological stress of a long Martian journey confined to a tiny spacecraft. "It's five people sitting 500 days basically in a Coca-Cola can," Mr Schoonejans said. The crew is "flying" home now.

The Rio Tinto basin is also one of about 20 strange sites around the world ♦ from the Arizona desert to the volcanic Krafla region of Iceland ♦ where scientists can test their equipment on unearthly landscapes.

The Rio Tinto area looks like the red planet because it contains a high concentration of the minerals that are abundant on there, such as iron, sulphur and copper.

"Iron is what gives the Red Planet its colour ♦ a lot of the surface of Mars basically rusted away," Mr Groemer said.

The rich ore has attracted miners since pre-Roman times. In the 19th-century, large British mining companies began extracting copper, silver, sulphur and gold from the Rio Tinto on a large scale, leaving an unearthly crater in their wake ♦ as well as a village with well-trimmed gardens built for British employees. The mines have closed, and the only trace of human activity is the turn-of-the-century tourist train that chugs by the old rail lines, and a museum, housed in the employee hospital, that recalls "5,000 years of mining history".

The river itself is extremely acidic, with a PH of 0.7 compared to the neutral 7 of ordinary water. It springs from the ground and is isolated from other water sources by a geological fault.

Signs warn not to drink the water. "You don't even want to wash your hands in it," Mr Groemer said.

But a special form of bacteria has managed to thrive there. Last year, laboratory tests by scientists in Madrid showed that the bacteria could survive in extreme conditions similar to those found in the Martian subsoil, fuelling hopes of life-seekers.

"This probably is the only place on Earth ♦ at least with the mineral conditions and low PH ♦ that could serve as

a model system for what Mars was like 3.5 billion years ago before it lost its magnetic field and its water," Mr Groemer said. "If life ever spawned, it encountered the same conditions as we see on Rio Tinto now. So anything that we learn from life in the Rio Tinto might be a clue to what to look for on Mars." So while alien aficionados searched for little green men in far-off places, the Eurobot explored the red soil of Huelva, photographing terrain, drilling for samples and coordinating other tasks with its astronaut partner. It navigated a difficult area known as the rock garden, which Mr Groemer described as "a miniature Grand Canyon".

The "Mission Control" centre in Innsbruck monitored the teamwork between man and machine — an objective of the trials. It also studied the possible contamination of samples by particles from Earth, which complicates the search for traces of life on Mars.

"We're looking for such diminutive traces — cell wall fragments, biologically precipitated minerals, DNA fragments — that if we find something, we really want to make sure it's indigenous and not a hitch-hiker from Earth," Mr Groemer said.

The hardest job belonged to the spacesuit testers, who lumbered in their hi-tech cages, which supposedly double as a spacecraft and computer, for as long as eight and a half hours. The suits measured the men's heart rate, served them water, fed them soft granola and accepted their bodily waste. At a voice command, it even offered a soft-tissue to scratch itchy noses. "That's a big relief," said Mr Groemer. "Your hands are just centimetres away, but in the suit you can't rub your nose."

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