Brazilian Spaceman Studies Air Conditioning and Refrigeration in Space

Contributed by Flávio Dieguez
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Three days after arriving at the International Space Station (ISS), the Brazilian astronaut, Marcos César Pontes, has already initiated six of the eight experiments he will conduct before returning to Earth on April 9.

"The timetable is being adhered to with great precision," said Marta de Carvalho Humann, assistant coordinator of experiments on the Centennial Mission, the way Brazilians refer to Pontes' participation in the ISS.

It's been 100 years since Brazilian aviator Alberto Santos Dumont flied his 14-Bis in Paris, winning a prize for conducting the first self-sustained flight ever over 25 meters, which was observed.

One of the experiments, using bean plants, is intended to verify how plants produce chlorophyll in space. The study, which was proposed by primary school students in São José dos Campos, in the interior of São Paulo state, also wants to investigate how bean sprouts germinate in near-zero gravity environments, such as on the ISS. The latter part of the experiment is still underway and will only be completed when Pontes' mission there is over.

Another partially concluded experiment involves protein clouds. A spray is formed containing various luminescent substances, such as those found in fireflies, to determine whether they mix together better in space than on the Earth. The quality of the mixture is established by means of photographs.

Two of the five stages of this experiment, which was assembled by Aristides Pavani, a scientist at the Renato Archer Research Center in the Campinas (São Paulo state) region, have already been completed.

Another experiment that is already underway is testing heat minitubes. The purpose of this study is to try to build a kind of miniature air conditioner for satellites. Tuesday, April 4, Pontes also began another experiment that also addresses the possibility of constructing mini-refrigerators for satellites.

The mini-refrigerators are called capillary evaporators. The experiment was devised by Edson Bazzo, a scientist at the Federal University of Santa Catarina. The apparatus envisioned by Bazzo attempts to imitate the flow of sap inside trees, except that it uses water circulating inside minuscule aluminum cylinders. This experiment is expected to take three days.

Two experiments are scheduled to be performed by Pontes at the end of his stay aboard the ISS. One of them will analyze how bacteria react to the intense radiation bombardment that exists in space. The author of this experiment is Heitor Evangelista da Silva, a scientist at the State University of Rio de Janeiro.

The other experiment that Pontes will perform during his last two days on the station is a test proposed by Alessandro La Neve, a scientist at the Industrial Engineering Faculty (FEI) University Center in São Paulo. La Neve wants to find out whether weightlessness affects the reactions of certain enzymes, which are substances found in living creatures.

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