Interview Romain Charles

WHO ARE WE INTERVIEWING? (job, studies…)

Romain Charles was an automotive quality engineer until 2009. Lifelong passionate about space, he decided to answer the call of the Mars 500. The project Mars 500 is a Russian experimental program simulating the conditions encountered by a crew on Earth during a round-trip mission to the planet Mars. The objective is to analyze the physiological and psychological repercussions of a journey of more than 520 days in a restricted space cut off from the outside world. This experiment was conducted between 2010 and 2011 and Romain Charles was a member of the crew.

Now, he is supporting European astronauts. He has to facilitate the daily life of the astronauts so they can focus on their mission. He takes care about the communication between the astronauts and their family, about the food bonus, about their return on Earth, about their personal objects...

How much food have you planned for your 1.5 year trip?

According to Mr. Charles, several tons of food were planned in total for the entire expedition. This quantity was separated in two, since the "Mars base" in which Romain Charles was embarked, was supplied by "docking with a Martian vehicle" at mid-mission.

What kind of food was it?

For the first 8 months, the food ingested by the members of the expedition was part of a study to study sodium absorption. During this period, the food was mainly frozen food, unlike what is found in space, as well as freeze-dried and canned food. The following 8 months, the meals were more free, no longer being in the scope of this study. They then looked more like meals for astronauts, with freeze-dried and canned food being in the majority at that time. The only exception to this diet was the 2 weeks mimicking the "excursion to Mars" where part of the crew was allowed to eat "space food", which according to Romain Charles was much better tasting.
A particularity of the food program implemented during the first 8 months is the importance given to the arrangement of the meals so that a routine is not created. Thus, although the food programmes were very strict, the first period of the trip was less monotonous than the second, where each day of the week was scheduled the same meal as the previous week.

Were you taking any food supplements during your March 500 experience?

Spending a year and a half away from the sun and without fresh food is not a normal physiological situation for the organism which can then develop deficiencies. During their

Mars 500 experiment, the crew was therefore supplemented daily with vitamins. Romain Charles tells us that throughout the experiment, other supplements were added in order to study their impact on the astronauts' health: probiotics, omega 3 capsules (or omnipresent in the Russian food distributed during the last 8 months of the expedition) etc...

What mechanisms are used to process space food?
Three processes are used to treat food intended to go into space: irradiation, autoclaving and freeze-drying.

What impact has the confinement you experienced had, both physiologically and psychologically?

Romain Charles highlighted the lack of physiological impact of containment on the participants. In fact, in space, astronauts' immune systems deteriorate in ways that were not seen here, and the immune systems of the members of the Mars 500 project are sometimes even improved compared to their basic immune systems. Psychologically, too, the impacts were less severe. However, Romain Charles confided to us, "The more the project progressed, the calmer everything seemed, as if everyone was working in slow motion.

Since March 500 to the present day, has the nutrition plan evolved?

To this answer, Mr. Charles confirms "Yes, from an external point of view". It is, first of all, more and more important to reduce the salt in these dishes. Then, over the years we can observe a difference in the way food is sent. Formerly transported mainly in canned food, food is increasingly being transported in bags in order to limit waste as much as possible, as waste treatment is a major problem in space. On the other hand, the relationship to food has also changed. With the lengthening of missions (from 2 weeks to sometimes 6 months) the expected characteristics of food have changed. From a purely functional diet, we have moved to a pleasurable diet, implying diversity in the meals and "bonus food" dishes sometimes provided. This is important for the psychological support of the astronauts throughout their mission. And astronauts must be in good psychological conditions to carry out and be effective in their missions.

Do astronauts experience a change in taste?
Some astronauts experience a loss of taste, but this is not the case for everyone. Studies are currently being conducted to explain the physiological phenomenon that causes such loss of taste.

What does the job of European astronaut support engineer involve?

According to Romain Charles "the job of astronaut support engineer consists mainly in facilitating the daily life of astronauts so that they can focus on their mission". This includes a wide variety of tasks such as communicating with the family when the astronaut is in space, orchestrating the implementation of "bonus food", ensuring that the astronauts' personal items are delivered without fail in their cabins. In this type of job, the relationship of trust between the engineer and the astronauts is absolutely essential. This implies for the

engineer to be extremely interactive with the astronaut and his family. An astronaut has a dedicated support engineer. A support engineer will be able to follow 2 to 3 astronauts at different levels of their missions: training, flight, return (up to 6 months after the return).

Aside on the notion of "bonus food": A "bonus food" is a meal chosen by the astronaut that is not necessary in the strict criteria of nutritionists in terms of nutritional intake. Chosen by the astronaut, it aims to please the astronaut. The "bonus food" comes in several forms:
Commercial products (must correspond to certain constraints, in particular concerning the shelf life at room temperature)
Gold products already developed by the CNES
Dishes specially prepared by a chef according to the astronaut's tastes.
It's up to the astronaut support engineer to put all these people in touch and to make sure that the production of the dish corresponds to the constraints imposed to be able to go into space.

Mr. Charles will soon be working for the CNES spaceship project, so we asked him:

Will the projects that emerge from the spaceship project have applications on Earth?

The spaceship project will push this double objective of developing projects for space that can then be applied on earth.