



# News Review

## Women in Cosmos

Space Journey: Two women might land on the moon in 2024 from NASA. Now a research mission should find out how the cosmic radiation acts on female body.

Helga and Zohar have suitable tickets. The NASA sends them to the moon with their first rocket of their new programme Artemis. In November 2020 it should go to Cape Canaveral for the twins on the launch pad.

For the time being they are on preparation for the flight in laboratory in Cologne, Germany. Helga and Zohar are phantoms, they are not alive. In spite of that they have the organs, skin and connective tissues. Only all are synthetic materials with them. They are true details of imitation of female body with breast, uterus and side by side with that all other organ as also one spinal cord.

In the early phase of Artemis a key role comes to both the phantoms. These on the 42 days fixed first mission, these will be led round the moon and back to earth from Cape Canaveral. In course of Artemis 1 the capsule will depart from the earth as every other manmade spaceship previously. In course of this journey Helga and Zohar will gather experience of the cosmic radiation with which human being first must not gather the same. This experiment is called Mare: Matroshka AstroRad Radiation Experiment.

The conditions for Mare are unique in the history of space journey. Helga and Zohar fly with not as original hardware: These are dumb witnesses; when the first rocket of new Type SLS (Space Launch System) the first Orion Capsule locks in the moon's orbit. It means the measurement results cannot be realistic. When for the first time in 2024 since 1972 one landing

journey in the direction of the moon opens, two real women can be on the board presented this by the NASA Chief Jim Bridenstine in an interview. Immediately the interest for radiation research was awakened. Now researcher of Israel Space Journey Agent ISA and the German Centre for Air & Space Journey (DLR) may investigate with the Mare experiment how the radiation in cosmos works upon the female body and how it gets shielded/screened.

For the measurement it is important that Helga and Zohar are identical – till in the last detail. “We have verified in the computer tomography. Both are twins” confirms Thomas Berger, the Laser Scientist at the German Centre for Air & Space Travel (DLR). The phantoms are set out during the whole mission for the same radiation. They fly directly next to each other. Helga and Zohar are in 25 cm strong layers built up. Between two layers there is an occasionally passive sensor which in one scanner of 3 cm x 3cm per measuring place four thermoluminescent dosimeter (TLD) well built up on statistical ground – in total it is 11520. The dosimeter cumulates the ionized radiation during the flight and store the energy in crystal grid. After the return to the earth these can in a photomultiplier read out. These are warmed up and then emit the radiation energy in the form of photons. The quantities of given up photons in correspond to radiation dose.

Additionally Helga and Zohar also still provide time dissolved measuring technique. Both the phantoms are with eight (8) instruments which store a measurement in every five minutes. Even at any time one sticks to uterus, belly, spinal cord and to any hole of lung. Every three are brought to the skin. The expenses out of other ground are high. For the USA milliards are at the game with

Artemis 1. The safety requirements are enormous. "We might certainly fly with but we are not closed to board net" says DLR researcher Berger. Whole batteries must be rigidly suffice for specification of US Navy which later catches the capsule from the ocean. With that the battery capacity sufficed also when the start is deferred, the measuring equipment is activated first on an acceleration sensor with rocket start.

The combination of both measuring methods render it possible for the researchers, very precisely design where how much radiation comes in. That is decisive cancer risk in definite parts of the body and organs is clearly higher than other parts. The feminine breast and uterus for example are more susceptible than thumb, finger and knee. On the basis of this the NASA names also differing radiation limits for men and women. As for example women could accumulate up to 45 years of her age in total 2,50 sievert before she may no more fly. The limit for a man of the same age is 3,25 sievert clearly higher.

On the morning of February 2019 in Cologne the 45 Kg heavy Helga carried already flight dresses, a customary overall fireproof and blue. She lies on a table with six belts buckled in a shell of equally fireproof synthetic material. Zohar on the contrary stands erect and carries a black vest whose composition is a big secret. Only Berger knows this. The vest weighs 26 kg, consists of polyethylene and was contributed by an Israeli firm Stemrad.

Dress like this could decide on so that the coming astronauts are not sick with cancer. The time for radiation, research, breakthrough finally the NASA and its partner organizations under this the Esa and the Japanese Agent Jaxa, for the coming both the decades formulate ambitious

goals. They want human being on a space station in moon's orbit can be researched and in 2030s send a crew to Mars. On such a manner long missions the right dresses could keep the body at a distance from a part of ceramic background radiation.

Certainly there is also radiation against which something coarser requires outside, solar storms throw centrifuges of deadly flood of protons and helium nuclei solar system. Only the earth's magnetic field protects the mankind on the surface of the earth. Human being got into cosmos in such a storm is threatened with radiation disease with fatal consequence. According to Federal office for radiation protection with high doses within seconds. Cramps and loss of consciousness with cardiovascular shock come in such cases.

Spaceship for long time missions therefore had to be equipped with radiation protective chambers, in which the crew can keep into hiding. These shelters rotating to galaxy were as per present stand of technique surrounded by water. It had two decisive advantages. It is in each capsule automatically provided and shielded from protons. Much time may not remain with the astronauts in case of sun storm. 15 minutes are to be worth realistic early warning time. The Apollo astronauts did not have water wash tank however much luck. The earth met a sun storm in August 1972 exactly between Apollo missions of 16 and 17.

**Anil Kumar Ghosh**

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