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FROM OUTER SPACE BY PARACHUTE !

by

Valentina
Nikolayeva-Tereshkova

(USSR)

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[Highlights of an article by astronaut Valentina Nikolayeva-Tereshkova in response to readers of the periodical "Aviatsiya i Kosmonavtika, No.3 Moscow, 1967]

INTRODUCTION

Since this article is mostly designed to answer questions from laymen there are considerable digressions about the outer space, the reactions of living beings in its environment, how to deal with them, the training of astronauts and so forth. This is deliberately omitted in the present note.

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The flight in space is linked with enormous velocities and overloads. Man must not fear the high altitude and must orient himself in the environment at once and be able to make decisions. Who is better prepared for such conditions by a preceding way of life and work and in whom are the qualities required to that effect best developed? Obviously, this is the domain of flyers and parachutists!

The fighter-plane pilots, such as Yuriy Alekseyevich Gagarin, German Stepanovich Titov, Andriyan Grigor'yevich Nioklayev, Valeriy Fedorovich Bykovskiy and others did not become first astronauts casually. The same goes for American astronauts, who are flyers or flight engineers, having great experience in flying and experimental work. It seems to me that this situation will be maintained in the future.

Some people may ask: and how did Konstantin Petrovich Feoktistov and Boris Borisovich Yegorov fly in outer space? One of them is a scientist and the other — a physician. Here too, we should not forget that they underwent training alongside with the others; moreover, Feoktistov and Yegorov were only part of the crew, headed by the flyer and aviation engineer Vladimir Mikaylovich Komarov.

Man's capability to endure overloads, weightlessness during flight may be understood in different ways. In the end, even an insufficiently prepared man will return to Earth unharmed. But aboard spacecraft he will be nothing more than a nuisance, for his efficiency will be meager, if not zero at all.

He would find himself in an unenviable position had it become necessary to abandon ship during descent by the "catapulting" method, as was done by Titov, Nikolayev, Popovich, Bykovskiy and myself. It is true, however, that we have done it on our own initiative, since we could have landed aboard the spacecraft. Astronauts had the privilege of choosing either method: in the spacecraft or with the parachute.

And suppose the catapulting were necessary in emergency! How would an unprepared man feel about it? Bailing out of a spaceship is by far different from a jump from either a balloon or an AN-2.

Spaceships are equipped with a system allowing the removal of the crew from a zone of explosion or fire, having arisen as a result of breakdown, or some emergency at carrier-rocket blast-off, or during the ascending portion of the trajectory. In one case there takes place a separation with descent of the entire spaceship; in the other, the crew is catapulted and the descent is performed independently.

A favorable outcome is then linked with the timeliness of catapulting. The greatest time can be lost on decision-making and preparation. However, in the situations of emergence, all is to be resolved in a matter of seconds.

There exist at present all possible forms of catapulting. But if man failed to prepare himself morally and physically for that moment, he would not find it easy.

Assume that automation took care of everything, but the neuropsychic tension induced by the unexpected situation, the action of the impact overload at separation from the spaceship, the effect of deceleration in the air flow as the parachute opens, of landing or of splash down, may result to be beyond the endurance capability of such an astronaut.

A great future is promised for the rocket-plane, involving take-off, placing into orbit and then landing as an aircraft. The danger of landing outside the cosmodrome, the complexity of calculations for such crafts with the view of emerging into the preassigned area, may render the use of contemporary catapult installations extremely desirable. Having such a device, the pilot of the rocket-plane may catapult at start, during the ascent period, or prior to landing.

Here, for example, is how the catapulting of astronauts on one of the existing spaceships would take place.

The signal for catapulting may be given by either of the two astronauts; to that effect it is sufficient to pull a ring from the container installed between the feet. Guiding rails are located behind astronauts' chairs. The catapulting is triggered with the aid of flare cartridges. The interlocking system prevents cartridge wear until the hatches, through which the chairs with astronauts are jettisoned, open up with the aid of explosive bolts. After 0.2 seconds following the wearing out of cartridges, when the chairs with astronauts are outside the spaceship, the jet engines mounted in the chairs are switched on.

At time of catapulting the acceleration attains 24 g. The rocket engines reject the chairs with astronauts by 150 m on the side. After that the chairs are separated and the astronauts descend by parachutes.

At this point, I believe it to be quite clear that the knowledge of how to use a parachute is indispensable to the astronaut, for the parachute may also be the means of salvation, but sometimes, as was the case on our "Vostok" spaceships, a standard means of descent to the ground.

However, there is here yet another cause explaining the purpose of astronaut training for parachute handling. When instructing parachutists, sportsmen etc., numerous observations by specialists led to the conclusion that during jumps not only habits of separation from aircraft, free fall, body guidance in space develop in men, but also qualities of will power, endeavor, resolution and daring. And these qualities are more necessary to astronauts than to anyone else.

To jump for the first time with a parachute is not a simple matter, even from a parachute tower. More will power will be required to overcome the fear of altitude. There is a great deal to be said about the behavior and emotional state of those undergoing training.

I joined the group of astronauts after having completed 63 parachute jumps. During the training period and preparation for flight I performed 62 more jumps. The same can be said about my colleagues astronauts. Jumping together gave me the opportunity to watch their reactions and the progress from jump to jump in their habits of motion coordination in free fall and so forth.

A great deal more could be said about that, but I prefer to leave this matter to specialists — instructors and physicians, equipped with knowledge of parachute art, medicine and psychology. They would be able to trace the formation of needed habits and qualities from beginning to end. And this the more so since I am aware that they indulged in such investigations.

I should like to emphasize more particularly the coordination of motions in free fall, and to dwell upon the subject as to why such a requirement for astronauts exists.

When we were made aware of the fact that Aleksey Arkhipovich Leonov was being prepared for emergence into the outer space, none of us was surprised, for we knew beforehand that he not only had the qualities required for the fulfillment of such an assignment, but also the capability of impeccably managing his body during parachute jumps.

Obviously, there is unquestionably a difference between free fall in the atmosphere and in the medium the astronaut is confronted with outside the spacecraft, but, from my viewpoint, the habit of motion coordination is no less necessary to man in open space than to a parachutist. It must be acquired in near-the ground conditions.

Special devices exist for training to that effect. Utilized in laboratory are special aircrafts, where the temporary weightlessness is attained as a result of flight along a special curve. Americans, for example, began lately

to immerse their astronauts into water, imparting to them a zero buoyancy. However, in my opinion, a good parachutist has at the basis of his training, all the qualities required for emergence in outer space.

When after flight Aleksey Arkhipovich returned, and told us about his impressions, I tried to see myself in his place, attempting to mentally repeat his emergence: Here I am... in the capsule. The cover will be raised and I find myself alone in space, from which I am only separated by my space suit. An involuntary chill runs along my body. Do not rush, do it all as you did during training.....

Article signed by V. Nikolayeva-
Tereshkova, Flyer-Astronaut USSR
Hero of the Soviet Union

Contract No.NAS-5-12487
VOLT TECHNICAL CORPORATION
1145 19th St.NW
WASHINGTON D. C. 20036
Tel: 223-6700; 223-4930

Translated by ANDRE L. BRICHANT

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