

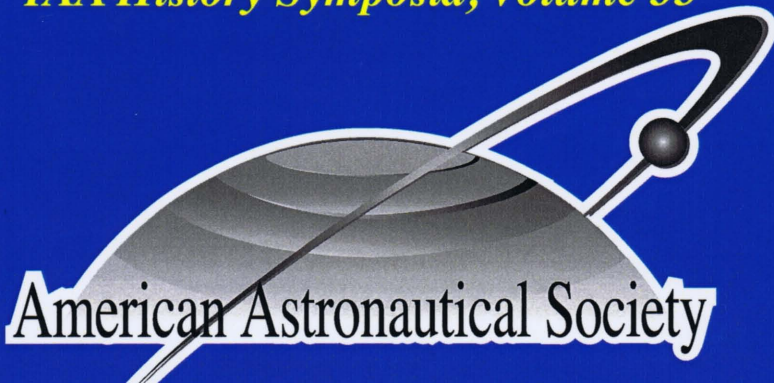
# History of Rocketry and Astronautics

Tal Inbar, Editor



**AAS History Series, Volume 47**

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**American Astronautical Society**



# **History of Rocketry and Astronautics**

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**International Academy of Astronautics Symposia**

### **Front Cover Illustration:**

Alexei A. Leonov (born 1934), retired Soviet/Russian cosmonaut. On 18 March 1965, he became the first human to conduct an extravehicular activity (EVA), exiting the capsule during the Voskhod 2 mission for a 12-minute spacewalk. See Chapter 3 in this volume for more details. This photo, “First EVA SS,” holds original signatures by some members of the Zvezda Berkut space suit project team. Source: JSC RD&PE Zvezda; archive A. I. Skoog.

# **History of Rocketry and Astronautics**

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**Tal Inbar, Volume Editor**

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## Chapter 3

# Fiftieth Anniversary of the First Space Walk by Soviet Cosmonaut Alexei Leonov<sup>\*</sup>

Olga Zhdanovich<sup>†</sup>

### Abstract

This chapter describes the first spacewalk performed by Soviet cosmonaut Alexei Leonov during his mission that was launched on 18 March 1965 in the Voskhod-2 spacecraft together with cosmonaut Pavel Belyaev. The text gives a detailed description of the Voskhod-2 mission based on the documents written by Sergey Korolev, the USSR Chief Designer, and the diary of General Nikolai Kamanin who was Head of Cosmonaut Training Centre, and reminiscences of Alexey Leonov, the first space walker. The first spacewalk had a number of very dramatic off-nominal situations that could lead to the death of cosmonauts and the loss of the mission, but likely enough it turned into a success.

### I. Sergei P. Korolev: Spacecraft Voskhod-2

After a successful flight of three seats, Voskhod OKB-1 had priority number one—to make the first spacewalk ahead of the US Gemini program. This section provides a brief overview of the Voskhod-2 program as summarized by Sergei P. Korolev.

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<sup>\*</sup> Presented at the Forty-Ninth History Symposium of the International Academy of Astronautics, 12–16 October, 2015, Jerusalem, Israel. Paper IAC-15-E4.2.1.

<sup>†</sup> ESA/Adjilon, The Netherlands.

## Designation of Spacecraft Voskhod-2

The two-seat, spacecraft-satellite Voskhod-2 is developed for an experiment with the first exit of a human from a spacecraft directly into the outer space. The experimental research and development are performed for a testing of the design of supporting elements for extravehicular activities (EVA), testing of EVA spacesuits, and experimental data generation for design of systems that provide movements and activities outside a spacecraft-satellite. Research and development mentioned above are of great importance for the design of future systems that provide life support of a human in outer space, performance of assembly activities, and landing of mission on the Moon and other planets [1].

## Main Features of Spacecraft Voskhod-2

The spacecraft Voskhod-2 is developed on the base of spacecraft Voskhod. The crew compositions are as follows: spacecraft commander and second pilot-cosmonaut. At one of the orbits, the second pilot-cosmonaut is making an exit from the spacecraft into outer space. The exit made by the second pilot-cosmonaut and entrance back is performed through an airlock. During the spaceflight inside the spaceship and EVA of the second pilot-cosmonaut, cosmonauts are dressed in spacesuits. The general design concept is shown in Figure 3-1.

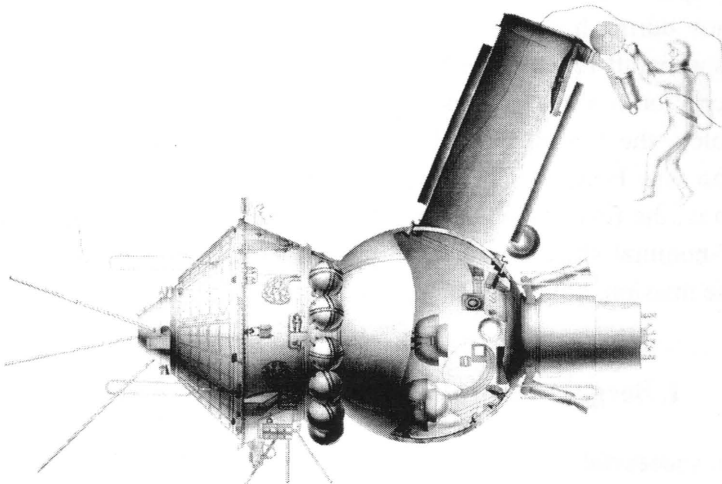


Figure 3-1: Voskhod 2 spacecraft. [1].

An inflatable airlock is installed at the cover of hatch number 3 of the landing module. A hatch manhole with sealing is installed at the cover of the hatch number 3 for the entrance of the cosmonaut into the airlock and return into the spacecraft. A cover of a hatch manhole is opened inside the spacecraft. For an EVA of a cosmonaut, an airlock has a cover with a hatch manhole that is opened



inside an airlock. Covers of the hatch of a landing module and of an airlock are operated by electrical drives and are controlled remotely. In case of a failure of electrical drivers, the manual opening and closure of covers is foreseen.

The following are installed on the landing module:

- Two shock-absorbing chairs with interface to spacesuits. Chairs are installed at lowest part in a way that allow comfort during entering of a crew at launch pad and EVA operations. Chairs are installed during installation of a parachute system.
- Onboard system of spacesuits ventilation.
- Autonomous system of oxygen (rucksack) for a cosmonaut making an EVA.
- Oxygen-ventilation device for cosmonauts during landing.
- Automatic system of porting, ventilation of spacesuits, inflation of spacecraft, and an air lock.
- Special valve for bypassing of pressure between landing module and airlock before opening of hatch manhole of a landing module. A valve is controlled remotely. A possibility of manual closure of a valve is foreseen, in case of malfunction of electrical drivers.
- Console of control of an air locking.

Additional tanks for onboard system of ventilation of spacesuits and system of inflation of landing module are installed at the instrument compartment. Other equipment and hardware are similar to the equipment of spacecraft Voskhod. The landing scheme of spacecraft Voskhod-2 is the same as the landing scheme of a spacecraft Voskhod thus the “soft” landing of cosmonauts inside the landing module is provided. Rescue of a crew during accidents during launch is performed in the same way as at the spacecraft Voskhod with additional ejection of an airlock [1].

### Main Characteristics of Spacecraft Voskhod-2 [1]

Number of crew members	Two
Weight of a spacecraft at orbit	5,685 kg
Duration of a spaceflight	One day
Exit (spacewalk) into outer space	At the end of the first orbit and beginning of a second orbit
Maximum distance from a spacecraft with a strap	5 meters
Duration of a stay of a cosmonaut outside spacecraft	10–15 minutes
Diameter of a hatch manhole	650 mm

Table 3–1

## **Flight Program and EVA Procedures**

The Voskhod-2 spacecraft was making spaceflight with perigee 180 km and apogee 400 km. The program includes the spaceflight during one day and the spacewalk of a cosmonaut during the first orbit and beginning of a second orbit. With the arrival of the spacecraft into the space orbit, the preparation to the spacewalk starts. The following consequence of operations shall be performed:

1. Control panel of airlock starts turning of an airlock into the operation mode, when airlock is installed into operation mode.
2. Second pilot-cosmonaut taking off seat belts and with the help of commander is mounting rucksack with autonomous system for oxygen supply, performing check-up of rucksack and spacesuit.
3. Bypassing of oxygen from landing module into airlock with the bypass valve, checkup of a sealing of an airlock, and after alignment of pressure in landing module and airlock, cover of hatch manhole of spacecraft is opened.
4. Second pilot-cosmonaut connects to the airlock oxygen system and safety cord and moves into airlock.
5. After secondary checkup of rucksack and space suit hatch of landing module is closing, the system of pressure relief is switched on.
6. Commander orients the spacecraft in such a way that airlock is under sunlight, during start of a trajectory of an orbit above territory of the Soviet Union the hatch manhole of an airlock is opening and second pilot cosmonaut starts the EVA by switching on rucksack with oxygen and disconnecting from the hose of oxygen tank of an airlock. The spacewalk is performed with the special strap that allows a cosmonaut to be a distance of 5 meters from a spacecraft.

During the spacewalk, the cosmonaut is performing visual observations, making photos of a spacecraft and Earth. Results of observations cosmonauts is reporting by telephone to spacecraft commander and by radio channel to the ground.

During return of cosmonaut, all operations are done in backward sequence as follows:

1. Cosmonaut enters the airlock, cover of a hatch is closing, inflation of airlock is done from autonomous tank, cosmonaut connects to the hose of oxygen tank, takes off the rucksack, and leaves rucksack in the airlock.
2. After alignment of pressure in the airlock and landing module, the hatch manhole is opened, cosmonaut moves into the landing capsule, sits down in the chair, disconnects hose and strap, and moves into nominal system of ventilation.
3. Cover of the hatch manhole of landing module is closing, inflation of landing module raises the pressure to nominal pressure. The experiment is then finished.

Control of air locking is performed by commander of a spacecraft with remote control, installed in the landing module. In case of necessity, all procedures of air locking can be performed by the second pilot-cosmonaut with remote control in the airlock. After completion of the EVA, the airlock disconnects from the spacecraft. Final part of the flight of the spacecraft is done without airlock with the program similar to Voskhod. At the end of 24 hours on the seventeenth orbit, the retrorocket engine is switched on and the spacecraft is landed in the given geographic region. Data acquisition of telemetry information from the systems supporting air locking is performed by the ground station, while flight above the territory of the Soviet Union and by marine ships in the Pacific Ocean [1].

## II. Training of the Crews

In July 1964, Pavel Belyaev, Alexey Leonov, Evgeniy Hrunov, and Viktor Gorbatko started training for the program "Exit (spacewalk)." Belyaev and Gorbatko were trained as commanders and Leonov and Hrunov were trained for EVA, but training did not stay long [2]. Very soon it became clear that spaceflight for this program would not occur in 1964 and all four cosmonauts were granted annual leave holidays. The training restarted on 15 August and Georgiy Shonin and Dmitrii Zaikin joined the group. Viktor Gorbatko recalled at that time that the mock-up of the spacecraft for EVA did not exist. Trainings were done directly in the flight model. The flight model was under construction and cosmonauts were making their trainings and at the same time were testing the spacecraft. "I remember that even oxygen was provided inside the spacecraft through external hose. Once something happened with the hose and oxygen stopped to come into the spacecraft. So when I was taken out I was so wet that water went out from helmet." [2]

In December 1964, the cosmonauts had very heavy trainings at the parabolic flights at Tu-104. During a few minutes of weightlessness, cosmonauts were trained for the whole process of a spacewalk starting from airlock and coming back, utilization of strap, etc. On 22 December during heavy parabolic flight training, an electrocardiogram showed that Viktor Gorbatko had a severe problem with his heart. As a result, he stopped training and on 25 December he went through thorough medical examinations at TsVNIAG where the reason of his heart problem was discovered. His sick tonsils were the cause of the heart problem. He was replaced by Dmitriy Zaikin on 3 January 1965. On 14 January, crews passed theoretical exams and after 4 February they started their training in the low-pressure chamber. On 8 March and 5 March 1965, Pavel Belyaev and Alexey Leonov went on 37 km of altitude (that was the limit at that time that the

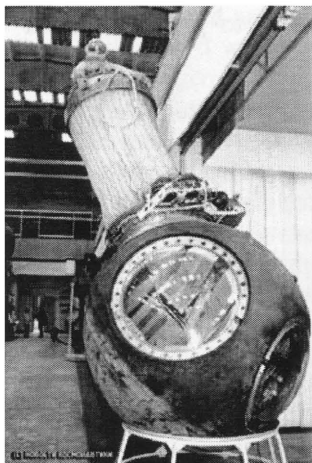
low-pressure chamber could do). On 9 February and 5 March 1965, a second crew was taken to the same altitude. On 9 February 1965, the State Commission selected the crews for the “Space Walk” program. These crews were approved later by Smirnov who was Deputy Chairman of the Soviet of Ministers of the USSR. On 3 March 1965, final trainings were performed by the main crew. So the crew trainings for this flight were over.

On 9 March 1965, crews arrived to cosmodrome Baikonur. On the same day, there was a meeting of the Air Force and Technical Management devoted to the composition of crews. During this meeting, General Kamanin ranked cosmonauts by their level of preparedness for the flight as Alexey Leonov, Evgeniy Hrunov, Pavel Belyaev, and Dmitrii Zaikin. There were doubts about Belyaev, because during the trainings in the low-pressure chamber, he nearly suffocated but quickly found a malfunction of the equipment and quickly repaired the equipment. Nevertheless, Kamanin did not recommend changing the composition of the main crew. Leonov and Belyaev were trained together and performed very well as the crew. Hrunov was able to be backup of both positions as the commander and the second pilot, and he was better prepared than Zaikin. As a result of a discussion, the decision was made not to change composition of the crews. But the decision was made during preparation to launch to dress into the space suits only three of four cosmonauts.

On 11 March 1965, the main crew had training inside the spacecraft. On 13 March 1965, the last final lessons were performed with the crew. Sergey Korolev told them that possibly he was for the last time present at the launch pad: “Vostoks and Voshods are cost a lot for me.” The launch of Voskhod-2 was the last one for Sergey Korolev, in ten months he passed away. On 16 March 1965, the State Commission decided to put Voskhod-2 on the launch pad and to make launch on 18 March 1965. In the evening the State Commission approved the main crew commander under Colonel Pavel Belyaev with space walker Major Alexey Leonov, backup crew commander Dmitrii Zaikin, and space walker Evgenii Hrunov [2].

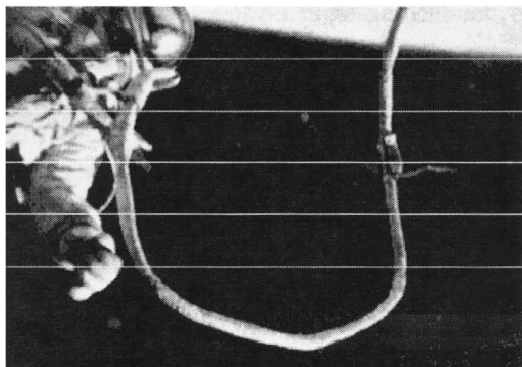
### **III. Voskhod-2 Mission and the EVA**

On 18 March 1965, the spacecraft Voskhod-2 with cosmonauts Pavel Belyaev and Alexey Leonov was launched. Figure 3–2 shows the Voskhod-2 spacecraft with airlock at the RSC Energia museum. At the start of the second orbit, after 1 hour, 35 minutes in space, Alexey Leonov left the spacecraft and Pavel Belyaev announced: “Attention! The human went into outer space! The human went into outer space!” (Figure 3–3)



**Figure 3-2 (left):** Spacecraft Voskhod-2 with airlock at Energia Museum. (Novosti Kosmonavtiki). **Figure 3-3 (right):** The first spacewalk performed by Alexsey Leonov. (Videocosmos).

A picture of Alexey Leonov in outer space was shown by all the TV stations (Figure 3-4). Leonov was in space during his EVA a total of 23 minutes, 41 seconds and out of airlock in outer space for 12 minutes, 9 seconds. He managed to leave the spacecraft for a distance of 5.35 meters secured by a safety strap. During EVA, his spacesuit was connected to the spacecraft through a safety strap with an electrical cable (Figure 3-5).



**Figure 3-4 (left):** Leonov during his EVA. (Videocosmos). **Figure 3-5 (right):** Safety strap securing Leonov to the spacecraft. (Videocosmos).

The only thing that Leonov was not able to do was to photograph the spacecraft from outside. He recalled:

“I had miniaturized spy camera Ajax that can film through a button. I received this from personal permission of chairman of the KGB. This camera was installed at my spacesuit and can be operated remotely with little cable. Because of spacesuit deformation I was not able to get to this cable. But I did film 3 minutes by camera S-97 and there were 2 cameras installed on spacecraft that were filming me but they did not have high resolution.” [2]

## **Dramatic Moments of Voskhod-2 Mission**

During this Voskhod-2 mission, there were in total seven off-nominal situations from which three to four may be lethal for Alexey Leonov and Pavel Belyaev.

From reminiscences of Alexey Leonov [2]:

“When the spacecraft ‘Voskhod’ was created for the very first spacewalk then a many technical solutions should be found for this specific mission. One was connected to the cover of the hatch that should be opened fully inside the spacecraft. To allow doing this either size of the cosmonaut seat shall be shortened or size of the hatch should be decreased. Size of cosmonaut seat was not possible to reduce because reduced seat would not fit my shoulders. Instead I agreed to decrease size of the hatch. That is why the distance left between my shoulders in the spacesuit and a cover of the hatch was only 20 mm. On the ground the tests were performed in the low pressure chamber with vacuum at the 60 km altitude. I was in the cosmonaut seat and only imitated the work. Such imitational training lasted only 1 hour and there was no any deformation of the spacesuit.

One hour was enough to be sure that space suit is protecting me. The altitude of 60 km seemed to be enough because lethal end result might happen at depressurization at both in orbit and 60 km altitude.

The reality during EVA was different. Pressure in space suit was near 500 mm but outside  $760 \times 10^{-9}$  mm. Such conditions were impossible to model at the ground. In the space vacuum the spacesuit inflated like a balloon (stiffening ribs did not help as well as thick material of spacesuit did not stop the inflation), I was foreseeing this but could not imagine that it would be so much. Being at airlock before EVA I tightened all belts up to the limit, but the spacesuit swelled so much that my hands went out of gloves when I touched handrails and foot went out of boots. In such a state I was not able to squeeze back inside the airlock. The situation was critical but to report to the ground there was no time at all. How much time it would take my report to ground, plus their discussion to find a solution and who would take the responsibility? Only Pasha Belyaev saw what was going on but he was not able to help. Then by violation of all procedures, without communication with ground I change the pressure to 0.27 atm. in the spacesuit. This was the second mode of operation of spacesuit. However, in case to this time ni-

trogen would not be washed out from my blood already, my blood would boil and... I would be dead. I estimated that I was already one hour under pure oxygen and boiling of my blood should not occur. So it was. After I switched on the second mode of spacesuit, the spacesuit deflated. I was so nervous, I put film camera into airlock and again violating the nominal procedure went back to the airlock by head first not by feet. I squeezed myself inside the airlock keeping hands on the rails. Then I closed external cover and started to turn upside down because I need to enter the spacecraft by feet first and that was because the cover of the hatch was opened inside the spacecraft and was occupying 30 percent of the volume. Internal diameter of airlock was 1 meter but the length of spacesuit in shoulders was 68 cm. During this turn there was the biggest g load and I was at the risk of thermal shock. My blood pressure was at 190. I managed to turn upside down and entered nominally the spacecraft. Then because of thermal shock still violating the procedure because I did not close after myself internal cover, I opened the helmet. I tried to dry eyes by the glove but was not able to dry the eyes because I have so much wet that it looks like someone was pouring water on my head. At that time I have only 60 liters of oxygen for breath and ventilation.

But the most horrible happened when I returned back to the spacecraft—the pressure of oxygen started to grow up to 460 mm and was continuously growing. The norm was 160 mm. But with 460 mm it was too dangerous. Bondarenko was burned to death inside the pressure chamber during training. First what we did with Pavel we did not move at all. We did understand that in general we are not able to do anything, except what we did we took away moisture, decreased temperature up to 10–12°C but pressure was still growing. Any little spark and everything will turn into molecular state. And we stayed 7 hours in such a state but then we felt asleep, most likely from stress. Later we realized that by cable from my spacesuit I touched switch of inflation... What happened? Because spacecraft was for a long time stabilized against Sun then one side of spacecraft was cooled down –140° C and other side of a spacecraft was warmed to +150°C. This difference of temperatures cause deformation. Sensors of closure of hatch worked perfectly but hatch was not sealed a space was left. System of oxygen regeneration started to pressurize, and oxygen started to grow but we were not able to consume it. Total pressure was up to 920 mm. These few tonnes of pressure closed the hatch and growth of pressure stopped. Then pressure started to drop down.”

From the Diary of Nikolai Kamanin [3]:

“19 March 1965

Today I have the most restless day in our spaceflight mission as well as all others who are present today at the polygon.\* I left KP and went to house of cosmonauts at 3 am of local time and at 7 am I was already awaked by warning telephone call. When I arrived to KP, Korolev was already there

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\* Cosmodrome Baikonur was known as polygon during the Soviet space program era.

and he told me that during last orbit (13th orbit) the pressure in the anti-g bladder tanks was fallen down abruptly (from 75 to 25 atm.). Further decrease of pressure can lead to the complete depressurization of spacecraft followed by forced landing. After thorough analysis of data received we concluded that we did not need to worry a lot: the crew has oxygen and air up to 17th orbit and this is the orbit where the nominal landing is planned. The Chief Designer Voronin firmly confirmed that the pressure is not able to fall down lower than 500 millimeters of mercury, and oxygen is enough for 3 hours of flight. When during 14th of orbit we had communication session with the crew Belyaev reported that pressure decrease in tanks stopped at the 25 atm. parameters of compartment were at normal level, and cosmonauts were in good health, well-being. We confirmed to the crew our decision to land the spacecraft due to automatic cycle on 17th orbit.

First command of automatic landing cycle was nominal, followed by the long awaiting of data from landing but landing did not start at all: the automatic orientation did not switch on and descent engine did not switch on and as a result the spacecraft stayed at orbit. The decision was made to have manual landing on 18th or 22nd orbit (it was the very first attempt in the Soviet space history to land manually the spacecraft). The second round of landing waiting has started. This time we received much quicker data about the passing the commands from the ship Ïliechevsk followed by absence of any information. First data about landing was received from Odessa then from Saransk. Voskhod-2 was landed at 12:06 not far from Stshuchino village (25 km to the southwest of Bereznikov to north of Perm) but we get information about landing of the spacecraft only after 4 hours after landing has occurred. The spacecraft was radio located by Krug but the precision of bearing was around 60–70 km, for VHF spaceplanes were not bearing with VHF because the main group of our airplanes was 600–800 km from Perm.”

## IV. Landing

From the Diary of Nikolai Kamanin [3] Continues:

“19 of March

More than 4 hours we did not have any data about condition of health of the crew.”

Leonov Recalled the Following [2]:

“We were flying over Moscow with inclination in 65°. We were obliged to land during this specific orbit and we picked up by ourselves the region for landing in 150 km from Solikamsk with the course angle 270°. We picked this region because there was only forest (taiga). Not any cities, settlements and lines of energy power, nothing. We can land at Moscow, Kharkov or Kazan but that was too risky. After our mission there were rumors that we landed where we landed because of malfunction of balancing system—this



is not true. We picked landing region by ourselves because it was safe for the population on the ground and possible malfunction of engine also helped us to land in the inhabited region of the Soviet Union. The only problem was to land at the territory of China. At that time international relations between China and the USSR were far from being positive. As a result with the speed 28,000 km/hour we landed in 80 km from the point we calculated. At that time in 1965 there was no backup places for landing. No one was waiting for us... ”

From the Diary of Nikolai Kamanin [3]:

“But Alma-Ata did receive by telegraph ‘VN VN VN (vseo normalno (all intact)’ This was signal from the crew—everything is OK. It was the pleasure to know about peleng and signals VN but we would like to have more detailed information about health and well-being of cosmonauts, finally we received report from helicopters crew: ‘In between two villages Sorokovaya and Stshuchino in the forest we see red parachute and 2 cosmonauts. Cosmonauts are sitting and eating. The spacecraft landed in deep forest, far from villages. Everywhere is deep snow.’

It will be soon 10 pm on Moscow time, no one has reached cosmonauts. 2 hours ago in 5 km the helicopter landed from which group of people headed to cosmonauts; 2 cars with soldiers from anti-air defense units are trying to reach cosmonauts. Temperature in the landing site at minus 5. Helicopter threw down flight uniform and they do have huge parachute and the spacecraft nearby. They will not be frozen to death but will remember this night for quite a long time.”

Not to be frozen to death on the second day cosmonauts took the spacesuits off and cut the thermal insulation material from the spacecraft interior. Alexei Leonov and Pavel Belyaev covered themselves with 9 layers of thermal insulation foil plus parachutes and in this way they were able to wait for the rescue team and stayed alive [2].

From the Diary of Nikolai Kamanin [3]:

“20 March

Belyaev and Leonov spent night in the forest. Early in the morning the helicopter was flying over them and the report of the commander of the helicopter was the following: ‘I see 2 men near spacecraft, one is chopping the wood, and another one is putting the wood into fire. Both are dressed in the pilot flight outfit.’ 2 crew members from helicopter who were trying to go to cosmonauts during the night returned back to the helicopter. Group of soldiers from the anti-air defense unit also are too far from Voskhod 2 landing.

At 7:30 am Colonel Sibiryakov landed from helicopter Mi-4 in 1.5 km from cosmonauts together with Doctor Tumanov and technician. At 8:30 they headed towards cosmonauts on skies. At this region helicopters brought already few people and that one’s started to prepare landing site for other hel-

icopters to evacuate the crew. Group of Sibiryakov in 3 hours made 1.5 kilometers and in 11:35 reached the cosmonauts. An Il-14 aircraft established VHF communications with cosmonauts and supported it until evening. By request of Belyaev and Leonov the winter men's underwear and boots were thrown to them. In the evening in the landing site of spacecraft Voskhod-2 there were 22 men from rescue team. The doctor reported: 'cosmonauts are in good health, no injuries, no chilblains.'"



**Figure 3–6:** Rescue team greets Leonov. (Videocosmos).

#### Leonov Remembered [2]:

“When the rescue team came to us they brought to us warm clothes and brandy. We gave them our spirits and life became much better and more fun. The rescue team warmed water on the fire and we were able to wash ourselves. The wooden little house was built in two hours where we spent next night; we had even beds in this little house.”

#### From the Diary of Nikolai Kamanin [3]

“There was a possibility to evacuate cosmonauts by helicopter who would stay at the distance 5–6 meters from the ground and would bring cosmonauts to Perm. And in 3–4 hours cosmonauts would be delivered to the Baikonur. But Marshal Rudenko ordered to bring cosmonauts back by cars and when he realized that that would not be possible ordered to bring them back by helicopter that would land on the prepared spot in advance. These unthoughtful orders of the marshal stopped all the efforts of the rescue team of Sibiryakov, Kutasin, Kurtakov, and other members to bring back the crew during today.

Finally in 70–80 km from the regional centre cosmonauts Belyaev and Leonov will spend another night in the forest. For the cosmonauts the second

night in the forest would not be a problem but for the cosmonaut rescue service this is no good at all. It is difficult to explain to our nation and world community why after such a successful flight two days cosmonauts were kept in the forest. I tried to convince Marshal Rudenko about safety and necessity of taking cosmonauts with the help of stairs onboard the helicopter and I was supported by Korolev but Rudenko managed to convince Smirnov and Brezhnev that such intake of cosmonauts was dangerous and ordered to start to chop forest and prepare a place for landing of helicopters. I totally disagree with such approach but formally speaking marshal was right and he received the support at most highest possible level.”



**Figure 3-7:** Belyaev and Leonov heading to the helicopter landing spot by skies on 21 March 1965. (Videocosmos).

The helicopter landing spot was prepared on 21 March and Belyaev and Leonov went there by skies from the landing spot of Voskhod-2 (Figure 3-7).

“21 March

At 17:30 cosmonauts were delivered to cosmodrome Baikonur.

In the evening Korolev was talking with Brezhnev.<sup>†</sup> Moscow will greet cosmonauts on 23 March.”

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<sup>†</sup> Brezhnev was General Secretary of the USSR Communist Party, leader of the Soviet Union.



**Figure 3–9:** Greetings of Voskhod-2 crew at Baikonur on 21 March 1965. (Videocosmos).

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