Андрей Меньшутин

Последние тайны СССР
Проект Марс 88

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Много было в СССР полигонов: Плесецк и Сары-Шаган, Байконур и Капустин Яр, Семипалатинск и Новая Земля. Всех и не перечислишь. По большому счету: вся огромная страна под названием СССР была одним единым – ПОЛИГОНОМ. Полигон – это почти всегда создание, освоение и испытание чего-то нового, движение вперед. Посвящается: Всем прошедшим полигон… Двуязычное издание, текст на английском и русском языках.

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Андрей Меньшутин
Последние тайны СССР – Проект Марс 88

English

Much has been in the USSR polygons: Plesetsk and Sary-Shagan, Baikonur and Kapustin Yar Semipalatinsk and Novaya Zemlya. All and will not list. By and large – the whole vast country under the name of the Soviet Union was one single – Polygon.

Polygon – it is almost always developing and testing new things… to move forward.

To all those who were on the Polygon

Instead of preface…

There were a lot of secrets in the USSR, even the things which did not require any secrecy at first glance…

As the country collapsed, many of such secrets were revealed to those from whom they were concealed. The newest technologies, whose development took decades and tens of billions of dollars, and sometimes the most precious thing – human lives, were sometimes sold at a million or two, and sometimes given out practically for free.

Anyway, there were more secrets than one could sell, steal or learn for free. There were some mysteries which died along with the huge country.

One of them is the project “MS – 88”

There were just 9 people who knew about the real aim of this project in the whole of the USSR with the population of almost 280 million. General Secretary of CPSU Central Committee Andropov, minister of defense, general designer and… And of all the mighty General Secretaries, Andropov was the last one who knew about the project and, the main thing, understood its essence. Chernenko had other troubles – why should a gravely ill person be bothered about some deeply scientific things? Moreover, he died very quickly – maybe there was just no time to inform him.

The extremely talkative Gorbachev was not informed about it due to his excessive talkativeness. Moreover, the project was practically completed – it was just a matter of waiting for the results…

After that, there was nobody to inform – the minister of defense died, too. The general designer reported directly to him and preferred not to skip over the authority of his boss, even though he was deceased…

-1-

In the huge and mysterious taiga of Arkhangelsk, the most active and just as secret cosmodrome of the Soviet Union covered several thousand square kilometers. The nature itself protected such a large territory of the secret object.

Swamps, small rivers and lakes side by side with impassable wilderness. Nobody took care of the forest, and thousands of trees that had their day fell down and broke, creating natural barriers between new trees that our ancestors used about 700 years ago or maybe even earlier.

The taiga stretched on all sides beyond the horizon and really reminded of an endless green ocean. Just a few railroad lines bifurcated from the Northern track Moscow – Arkhangelsk and disappeared in this green silence.

The quiet was disturbed several times a week by powerful rolling boom of starting rockets. But practically nobody heard this sound except for the nearest military units and the launching crew. Small and sparse villages were located far away, and the northern taiga itself absorbed almost any sound better than any modern soundproofing…

The only thing the taiga could not absorb was light. In the absolute silence, a small dazzling spot would suddenly flash above the green horizon. First it seemed a kind of a toy balloon or a sparkle on a New Year tree that seemed to appear from nowhere in the wild taiga.

But the balloon was going higher and higher and growing brighter a brighter, like the metallic light of stars in the black space that suddenly drew much closer.

The northern sky is special, and nights are really white here in the middle of the summer. It is light like on a hot midday in June, but there is no sun in the sky. The star flying up seemed dazzling bright even against such a light background. Sometimes almost half of the sky started to shine due to particular weather conditions of the day or night of another launch, and it seemed that not one but dozens of rockets were starting off at the same time…

The star was going higher and higher and the sky gradually stopped shining, becoming a regular summer sky. And below it, the huge green sea remained just as thoughtful and silent.

Surely, things did not always look so beautiful; sometimes stars flew back to their native space practically imperceptible. For almost 20 years, the taiga cosmodrome was the most active in that, somewhat different, world. Almost 1 500 rocket launches – 40 % of all the world's space starts.

And all that happened far from the civilization, in the harsh conditions of the almost extreme North.

And preparation of a rocket for the start is nothing like the morning warm-up and cleaning the car of the snow before driving to work, even when you fling out at –20 °C without outdoor clothes and your car would not open, and even if it does after several attempts, it would not start…It's cold and nasty, you are short of time and you have to run for a spare battery or get assistance from those whose car started or try to push it… and how can you push a car that weighs 300 tons and is 50 meters long?

In winter there are no mosquitoes or even more disgusting gnat. And in the summer the wood is very beautiful and there are a lot of aspen mushrooms with red caps– but it's difficult to pick them because of those that are absent in winter…

And it's not everywhere that you can pick these mushrooms.

Looking in the black silent space that surrounded the spaceship, with bright white spots of an endless multitude of stars, it was for some reason these red mushroom caps which no one needed that Andrey recollected.

Andrey was an onboard engineer of the manned spaceship of M-88 project and at the same time – a USSR KGB officer. He was not included in the crew because the omnipotent Committee was looking for CIS or MI-6 spies even in the space or because he had to shoot down, for example,

the crew captain under certain circumstances. There was even no gun or any weapon on the spaceship at all.

It was just a personal wish of General Secretary… In the course of one of rare meetings with the project Coordinator he suddenly said: servicemen, scientists, doctors – all of them were in space, we sometimes even take foreigners there! And we have never included a single KGB officer in the crew!

The Coordinator was a bit surprised, but answered: Yuri Vladimirovich, that's an interesting thought, but it would be better if he had some other profession besides being an officer. The crew is almost complete – there is a place for an onboard engineer, and considering the peculiarities of the spaceship – we need a specialist on compact nuclear power systems. Do you have someone of this kind in the Committee?

In the Committee of that time there were specialists in practically any sphere, especially in promising trends, let alone those connected with the atom.

They found Andrey… He graduated from a minor institute in Moscow where best graduates were distributed to closed military laboratories, design offices and KGB…

In general, people were not sent to the Committee, the Committee kindly invited them to work. One could refuse with no bad consequences to follow. Why should a person be compelled if he does not want to? Compulsory labor is not always efficient.

The nuclear power facility of the spaceship was surprisingly efficient, and the main thing, it was compact. It took almost 25 years to create it. The question of reduction of nuclear facilities in size and weight appeared from the moment when the first atomic bombs appeared and was in many ways solved by the beginning of 80s. Even real nuclear briefcases appeared, but not those carried after different Heads and Presidents…

Many nuclear things, big and small, were created for military reasons, and there even was no desire to use all that stuff for the intended purposes.

People became a little cleverer, a little more polite and civilized, and understood that hitting themselves with nuclear clubs was not right or humane.

They decided to use something from this nuclear arsenal for peaceful purposes.

There was no sense in constructing large, labor-consuming and expensive nuclear power stations, considering the huge territory of the USSR and the peculiarities of its climate. There were hundreds of thousands of rivers, but the construction of hydro-electric power stations is not that cheap…

Then they remembered about compact or portable low power nuclear devices. A project was conceived to create small, reliable, and the main thing – one hundred times cheaper nuclear power stations. It was planned to build such a station in practically each of the remote regions…After all, the country occupied 1/6 of the land; but the project was suspended…

The question of portability, weight and, the main thing, the weight of fuel was the most acute in space industry. It was the trend with the highest priority for the Soviet Union. The majority of the most talented scientists worked for the space. Solar batteries were cumbersome and produced little electricity, the first compact nuclear power facilities were developed and used for the satellites – for the only purpose of providing energy to the devices…

The work on the nuclear propulsion engine for rockets was finished back in 1981. The trial runs were mainly carried out on the same launch site where military atomic shells and bombs were tested – near Semipalatinsk.

The project was successful and almost complete, but… it was closed. There were a lot of reasons for that, but the main thing was connected with the start of the rocket from earth cosmodromes: due to a great amount of radiation emitted, a new launch pad or desk would have to be built for each new launch.

And problems with protection of the rocket's living module seemed practically unresolvable back then…

The designer of MS 88 found a little different way to solve these problems.

The nuclear propulsion engine started as far from the Earth as possible, being the second or third stage engine of the spaceship. And it did not work directly, so its radiation background was just one and a half or two times higher than natural values.

Protection of the crew from such relatively low level of radiation was also simplified and was solved in three years. It took a couple more years for final breaking-in, fine tuning and trial. So in six years after closure of the first project, the second one was successfully completed. It is true that it had a lot of principal differences, but it was the same in essence.

The problem of energy and heat supply to the spaceship on the whole was successfully resolved. And the main thing, now there was an opportunity to use practically the whole volume and weight of the rocket for more important tasks…

Andrey was the KGB supervisor of this design office. First of all he was responsible for the project secrecy, and a little less for its successful final result.

The result was dimly shining behind the 50 cm partition of the energy compartment, transforming the energy of arms-grade plutonium into quite peaceful electrojet one, which pushed the spaceship closer and closer to Mars.

Andrey's shift always started with examination of the propulsion component monitoring unit and a visual check-up via a distance video camera. He did this even though he did not need to control or even provide maintenance for anything there.

The device was reliable and compact like a Kalashnikov gun, the famous AK-47.

The fuel could last for 5 years of continuous work, and recharging was available in case of need. There were only three propulsion engines, and now just one of them was working. Surely, all the three could be started at once, but it was to be done only when the spaceship started from the Mars surface on the way back…

Nuclear briefcases were so successful and compact that 8 of them were crammed in the rocket! Each of them weighed about 100 kg and had four massive handles… but it was not important in the space, and even the handles were not necessary.

Three of them were for the replacement of the main propulsion engines in case of need, and three were a little smaller and had to supply heat and energy to a small living module installed on Mars. One would be more than enough; the other two were just a reserve.

Andrey examined all these facilities every shift as well. All of them were located and secured in the space between the double rocket bodies. He had to check the fixtures as it would be bad if nuclear facilities, even though compact ones, hung loose behind the partition in zero-gravity…

Well, and the two remaining briefcases were the smallest and were to be used in the extreme variant as emergency sources of heat and electricity. All the variants of briefcases had additional modules and could produce practically any kind of energy needed for subsistence of the crew both during the flight and while on Mars.

These modules had the largest size and were much more complicated than the mobile nuclear facilities. And they took more time, efforts and money to develop than the briefcases themselves. An independent scientific and research institute worked on each module.

The rocket itself was the product of work of tens of institutes which did not know the ultimate goal or the reason why all that was done. Some of them suspected it was the newest tank, others thought it was a plane, while some others considered it to be a submarine! By the way, the design of the spaceship really reminded of the newest nuclear submarine…

It had a double body. However, unlike real submarines, both bodies were solid; it just did not have a protruding cabin, torpedo launchers or bird roosts. It was harder with the institutes which had been working with space projects for a long time and with fellows from Plesetsk cosmodrome itself…

Andrey flew to the cosmodrome before all the crew members and was responsible for secrecy of preparation of this rocket for launch.

In reality, it was not that difficult. The spaceship practically did not differ from an ordinary carrier rocket of the series “Molnia – M” from the outside…

The rockets of this type were launched from the military cosmodrome at least 10 times a year. However, it was almost 5 meters longer than a standard 8K78M, the diameter was almost the same – 10 meters, it weighed 25 tons less and contained a suspiciously small amount of fuel! There was an official version for the majority of people – it’s an almost standard rocket, with experimental, more economical engines.

In general, even this disguise was not necessary. Missile officers and civil specialists worked for a long time and saw the launches of hundreds of rockets of a dozen different types. Space romanticism and interest were replaced by usual everyday work in hard northern conditions. We have launched many things – this one will be no exception.

Andrey was distracted from earthly recollections and monitoring unit by a trunk into the adjoining section which opened almost noiselessly.

He did not even turn to see who opened it. It surely was not an extraterrestrial or any other humanoid loafing about in space. Even if it was an extraterrestrial, it would be called Sveta anyway…

Andrey turned around and took a look. Svetlana has almost flown half of his 15-meter service compartment. Different thoughts came to his head: what if Svetka had a summer dress on or a blouse with a short skirt? She would probably try to adjust a part of clothes that slipped up improperly high and instead of that would funnily tumble over with even more erotic consequences…

But she was wearing casual light overalls which suited her just as well as any other clothes. Sveta has already flown practically close to Andrey and looked at him smiling slightly and a little too attentively… as if she knew what he was thinking about.

In endless space, with its loneliness, cosmic wind and zero-gravity, all the feelings, sensations and thoughts were perceived somewhat differently…

And Svetka with her grayish blue eyes, short fair braids and dimples in her cheeks whom he has known for a long time, seemed familiar and absolutely different at the same time… in general, not like she was on Earth.

Sveta looked into Andrey’s eyes even more attentively and smiled without a shade of suspicion in her eyes. And how wrong she was! He took her hand carefully and kissed on the right dimple. Svetka laughed and said: A space maniac… so that’s the way you say hello now?

Andrey looked at the upper zip fastener of Svetka’s overalls and followed it to the place it began, on her very attractive waist: Hello, Svetik.

Hello, Andrey… Let’s go to look at the harvest, or you will surely do something to my overalls…

Andrey asked himself jokingly whether the whole crew except for him became paranormalists. He knew, of course, that his look at the zip was not left unnoticed, and that was the reason why he looked…

Sveta surely understood all that perfectly, so she smiled coquettishly and slunk like a fish towards the opened door, her favorite greenest compartment. Andrey swam after her in accordance with the instructions, closing the air-tight door to the service compartment after himself.

Svetik, just like she had to do in accordance with her position, but most probably – her calling, was already flying between three-meter shelves stuffed with hydroponic farm stuff. Everything that could be eaten grew here, and there were a lot of vegetables.

Fruit grew for a long time and did so very unwillingly.

The collection of seeds of different plants, practically from the whole world, started to be gathered in the USSR before the Second World War. However, sometimes politicians did not like plant breeders, so this science did not enjoy great support. But sooner or later even politicians understood that it would be hard to move ahead without breeding. And there are a lot of sciolists and just impostors everywhere, and breeding as a science is not to blame.

So you could find practically everything in the biological compartment, even something that probably did not grow on the Earth itself. A part of plants was selected just to produce more familiar oxygen that the one present in the self-contained system of crew life support. However, the majority of these were plain boring containers with all kinds of algae.

A few ordinary Russian birches were especially great, it's a pity they were small. There were 3 or 4 oaks and about five green conifers… So crew members rarely called this compartment a biological one.

Somebody called it a forest, somebody a winter garden, a jungle, or jokingly a vegetable garden. All crew members often gathered here and started to fool about – play hide-and-seek or shout: Hello! I am lost! Sergey, the crew commander, pretended to be a mushroom gatherer and looked for mushrooms, flying between the shelves… and he found them!

Surely, they did not grow on partitions or the conditional floor. These were ordinary mushrooms from the Earth that were very similar to pleurotus that earth dwellers grew in their kitchens and balconies. And you had to look for them because Svetka often took them to different shelves – mushrooms grew faster than anything else and were eaten just as quickly… You had to eat anything that grew, and mushrooms alone were not sufficient!

-2-

By the start of the MS 88 project, the ordinary “Molnia” had been traveling to space for almost thirty years.

It was called so because it main task was to put “Molnia” communication satellites into orbit.

The rocket turned out to be reliable and even lucky. It was used to launch automatic interplanetary stations to the Moon and Venus, and also Mars which was much farther.

“Luna – 9”, the first space vehicle that made a non-destructive landing on the surface of the Earth’s satellite, was also delivered there with the help of the “Molnia” carrier rocket, but with an “M” index meaning “modernized”.

8K78M delivered five automatic interplanetary stations to Venus alone. The carrier had an almost 100 % reliability ratio, that’s why it was taken as a basis for the project of a manned flight to Mars.

By the time the project was at its final stage, it just had the recognizable appearance left from the usual “Molnia-M”. Inside, the rocket was more similar to “Mir” space station, and only two stages were left of the standard four.

-3-

Time in space, like on earth, goes at different speeds. Sometimes a month flies past like several days, and sometimes one day lasts like eternity!

It is the TIME becomes a threat and a difficulty, just like everything around in the open space. “Solar wind” calms down or strengthens, sometimes it practically disappears… meteorites flash past far or very near, and the “bravest” of these burn in the magnetic field of the spaceship.

This two-hundred-meter magnetic field around MS 88 burned almost completely the dangerous impact of cosmic radiation that penetrated through anything, and besides – high-energy particles of such a set of cosmic radiations that were fortunately not even dreamed of on Earth.

And time does not burn, it is not near and not far – it is always close to you and there is no protection from it! At least, for the time being…

The first month of flight was the fastest and the easiest. While settling in on the spaceship, we got used to it working, not standing in the integration house or training center. And everyday experiments and research were carried out as usual during this period of adaptation on board, so time passed unnoticed.

Everyday duties in space were now performed in the automatic, somewhat background mode. Having come to terms with practically the whole spaceship, now the crew had much more time to pay to themselves in general and everyone separately.

The crew members got to know each other about two months before the flight. The coordinator had a good imagination and liked extraordinary methods and solutions of a great number of problems and tasks that constantly arise during many years of preparation for the start.

It was he who made a decision that the future “Martians” would be trained in quite different groups of cosmonauts. During standard and customary training in Zvezdny camp and other places, they never met and could not see each other, even at a glance.

It takes a long time to fly, so there will be time to get to know each other.

During six month of flight this desire increased or disappeared altogether. Sometimes they gathered together in one of compartments, discussing their cosmic affairs and duties, telling funny stories from the former life on Earth. Laughter and emotions filled the spaceship and there was an impression that the crew was much larger, that there were ten of them at least, not just four.

Mood changed and you felt like being alone for weeks. After a regular shift you went straight to bed, and it was like this for five days on end. When you got enough sleep for the whole month, you felt like devouring books. There were not many of them on board, of course, just about forty, but you could read them over and over again! In this case there was enough until Mars. No, there will be several left as you sometimes get bored with reading.

There were several personal computers, the very first models of them, and you could play “Tetris” or “Pacman”, but there was no desire to pass all 256 levels. Games usually finished on the fifth or sixth level at the most. Even though there is much more time in space than on Earth, there is just as less desire to waste it on these computer games.

And the best remedy against monotony and humdrum of the long flight is this same flight. There is always sufficient work on board a spaceship and you can never do it completely, but it must be done, and the more you work, the more changes the time: it almost disappears and becomes imperceptible.

When all that has been tried out and no longer helps, there is the last and probably the most important method – another person.

-4-

When Svetlana finished her usual duties in the biological compartment, she flew to look for Andrey – he has not been in sight for some time. Well, he is not in the central compartment, not in view of cameras in the corridors between compartments… can he be in the service compartment again, fiddling around with his beloved reactor?

Yes, he was exactly there. However, Andrey was sitting fastened at the working table and reading a thick book… but this was surely better than gloating the reactor.

Instead of saying hello, Svetka asked: Can you tell me how to get to the library?

Well… several million kilometers to Mars… and then it's not far to the Earth – there are libraries on every corner there. If you get lost, ask the first humanoid you meet and he is sure to show you something! – said Andrey, looking at Sveta over his book.

You yourself are a humanoid… And what's that about – "show you something"? Are you again with your erotic fantasies and platitudes?

No fantasies, no platitudes… how shall I know what he may show you? Maybe he will show you where you get off, – laughed Andrey.

All right there, local wanton. What are you reading there?

I suddenly remembered of Kipling and decided to read him over again.

Are you in your second childhood – decided to read "Mowgli" again? – Sveta started to laugh.

No, it's not about "Mowgli"… I read it probably when I was 6–7 years old. There was such a cartoon, too – probably the whole country remembers, I remembered the surname of Kipling… And I am ashamed to say that I thought he did not write anything else.

Later I found out that he was a military correspondent in Africa in the times of Anglo-Boer War, wrote articles, sketches and stories about India where he was born and lived, and once also wrote a lot of stories…

I read "Indian Stories", too, – Sveta put in. They are well written, but there were few of them, I found them in some collection along with other authors.

Just the same – I read them in a collection, Andrey continued:

"English Poetry in Russian Translations, 20th century", and you see, first there is an English variant, then a Russian translation, and there are even 2–3 variants of translation for the most interesting poems… The poems are stunning, but the main surprise is ahead… – So Kipling was a poet as well? – Yes, and a great one! I still remember some of his lines by heart:

Eyes of grey – a sodden quay,
Driving rain and falling tears,
As the steamer wears to sea
In a parting storm of cheers.
Eyes of black-a throbbing keel,
Milky foam to left and right;
Whispered converse near the wheel
In the brilliant tropic night.
Eyes of blue-the Simla Hills
Silvered with the moonlight hoar;
Pleading of the waltz that thrills,
Dies and echoes round Benmore.
Eyes of brown-a dusty plain
Split and parched with heat of June,
Flying hoof and tightened rein,

Hearts that beat the old, old tune.
Maidens of your charity,
Pity my most luckless state.
Four times Cupid's debtor I —
Bankrupt in quadruplicate.
Yet, despite this evil case,
And a maiden showed me grace,
Four-and-forty times would I
Sing the Lovers' Litany:
"Love like ours can never die!"

Yes, this poem is really great… There are few words and it is even short, but very succinct, said Sveta sadly.

He has a lot of poems, but he received the Nobel Prize in 1907 for stories… and he refused to get it! You know, during his whole life he refused all kinds of titles, – remembered Andrey, now distracted from poems, – even the most prestigious one in England: Poet Laureate.

Yes, people were much more modest before… Remember? It seems that Pushkin wrote: What is glory? – A patch on the poet's sackcloth, said Sveta thoughtfully.

All right, let's put aside the materialistic side. The saddest thing is that there are no more such poems, – added Andrey.

Besides the poems themselves, many authors in this collection have interesting and tragic lives, full of events… Many of them went to the First World War, some died, and some died later but from the wounds of war anyway, Andrey continued.

It's sad but it's life… You'd better recite something else, asked Sveta.

One of Kipling's best – "If". There are a lot of translations, but Lozinsky probably did best of all:

If you can keep your head when all about you
Are losing theirs and blaming it on you,
If you can trust yourself when all men doubt you,
But make allowance for their doubting too;
If you can wait and not be tired by waiting,
Or being lied about, don't deal in lies,
Or being hated don't give way to hating,
And yet don't look too good, nor talk too wise:
If you can dream-and not make dreams your master;
If you can think-and not make thoughts your aim,
If you can meet with Triumph and Disaster
And treat those two impostors just the same;
If you can bear to hear the truth you've spoken
Twisted by knaves to make a trap for fools,
Or watch the things you gave your life to, broken,
And stoop and build 'em up with worn-out tools:
If you can make one heap of all your winnings
And risk it on one turn of pitch-and-toss,
And lose, and start again at your beginnings
And never breathe a word about your loss;
If you can force your heart and nerve and sinew
To serve your turn long after they are gone,
And so hold on when there is nothing in you

Except the Will which says to them: 'Hold on!'
If you can talk with crowds and keep your virtue,
Or walk with Kings-nor lose the common touch,
If neither foes nor loving friends can hurt you,
If all men count with you, but none too much;
If you can fill the unforgiving minute
With sixty seconds' worth of distance run,
Yours is the Earth and everything that's in it,
And-which is more-you'll be a Man, my son!

It looks like a motto of the whole generation, said Sveta thoughtfully.

Andrey continued:

The world's a stage. The trifling entrabce fee
Is paid (by proxy) to the registrar.
The Orchestra is very loud and free
But plays not music in particular.
The do not printing programme, that I know.
The cast is large. There isn't any plot.
The acting of the piece is far below
The very worst of modernistic rot

This is Belloc, – Andrey finished reciting.

Yes, the style is quite different and it is more philosophical, – summarized Sveta.

You know, it’s sad… The beginning of 20th century was the golden age of poetry as an art, but now it’s gone… There is poetry and there are poets, but there is no art, and I am afraid there will not be, he said thoughtfully.

All right, Andrey, we have held a social event, even though between us, now let’s go and do something for the society, – said Sveta.

-5-

At the beginning of 70s USSR officially rejected a manned flight to Mars, concentrating on interplanetary automatic stations.…

There were surely many variants of a manned flight to Mars, but they were developed in a more optional way, as a long-term perspective.

The coordinator analyzed both national and western projects, taking something from them and adding something new.

So he decided to do without unnecessary fuss of preparation for the flight, the flight itself and the rest.

The plan was quite simple: secretly prepare an expedition to Mars, fly there, take as many samples as possible and return.

And then, having analyzed the information and the samples, announce unintentionally: we have recently returned from Mars and received very interesting results which we will soon reveal…

It seemed like a simple and ordinary affair, it was day-to-day work in terms of USSR – well, the Russians flew to Mars and came back… It's almost the same for us as for some people, especially in the West, to go to a restaurant or the nearest Disneyland.

The effect would surely be stunning. Even though Andropov was not very enthusiastic about the space, he imagined the possible effect and so agreed to this expensive expedition.

But the expedition turned out to cost much cheaper than the preliminary estimates.

The living modules were based on those nearly prepared for the Mir station, the only difference was a larger size, and the majority of equipment and devices was practically the same.

The rocket was the almost standard Molnia-M, with a new double body and just two stages instead of three to four used as usual.

A part of materials and technologies was taken from the well-known rocket CC 18 which terrified the Americans… They even invented such a name for it that I'd better refrain from saying it out loud.

Both bodies were composite ones, containing different materials, and the structure of the bodies was no less complicated than the whole of MS 88 taken together…

Almost half of the outer body of the spaceship consisted of different layers, each of which protected the crew from something special, and that's why it was created. All these layers had been used somewhere or were just being elaborated and finished.

That's why all the institutes that worked on the materials for MS 88 had associations with tanks, planes and submarines.

-6-

The farther was MS 88 going into space, the more often Andrey remembered the launch site. It was the last thing he saw on Earth, so he recollected it best of all; moreover, he worked and lived there for almost a year and a half…

More and more often he got the impression that the Launch site was alive. It had its own peculiar atmosphere. However, all the numerous objects, military units and launch sites were surrounded by the taiga, and when you drove several kilometers from them, and sometimes even one or two hundred meters, you found yourself absolutely on your own. Just taiga and silence surrounded you…

But you felt there was somebody else around you, and there were a lot of them – tens of thousands of servicemen and civil employees working on the launch site, and among the endless number of silent trees around you there was a feeling of an invisible presence of people united by one goal.

On many roads that connected almost 2 000 objects scattered all over the launch site, there was round-the-clock movement of cars and buses of all types and sizes, construction and military equipment… A car going past you made you feel that you are not alone, but when it drove away, loneliness surrounded you from all sides again.

The atmosphere of the launch site was absolutely unique and incommunicable. It can probably happen only on our numerous earthly cosmodromes. Each rocket and its multiple parts, components, devices, systems, materials were the results of work of hundreds of design offices and scientific and research institutes, thousands of enterprises and hundreds of thousands of people scattered all over the huge country.

And all that was delivered, brought and concentrated on the launch site. The launch site gave a final touch to all that, checked and tried it many times in accordance with numerous technologies and rules, until the final and probably the most important stage came – rocket launch, for which the Launch site was created.

But the launch site – it's not only hundreds of thousands of tons of concrete, steel, integration buildings, launch grounds and a long list of parts that make it up: these are just instruments. The main thing is people working there, so the launch site is really alive…

Considering the schedule of launches which was the most intense on Earth, the working environment in the many-thousand team of the launch site was quite tense… It probably reflected on the northern nature surrounding it, and it produced the atmosphere which was nothing like any other cosmodrome on Earth.

While they are flying, the launch site could have launched a good hundred of rockets with satellites and research craft to the Moon, Venus or Mars. Some rockets are still in the integration house, some are already on launch grounds, some are being delivered, and some are being assembled on plants. But sooner or later they will meet in the place from which they started – on the launch site.

The word "cosmodrome" was not very widely used then, rocket engineers had their own terms and designations, and other military units had theirs. But most of them called it all simply a launch site.

Probably some part of him, Andrey, as well as the whole crew, remained there, and they took some part of the atmosphere with them…

It was a place where you could meet representatives of practically any kind and service arms available in the USSR Armed Forces. It was probably just sailors and paratroopers that Andrey did not meet there… but probably they were there but just he did not encounter them? And access was given not everywhere on the launch site, but only to those related to direct duties.

And very often, based on the specific character of a regular program or project, officers wore shoulder straps and collar patches of the service arms they were not connected with in any way. Only

a few people knew what exactly they were doing at the launch site, and curiosity was not welcomed there.

It was Andrey's colleagues, KGB officers, who "loved" and probably just had to change their uniforms. These were the representatives of the Special Department of the launch site. There were a lot of units, so the staff was just as diverse in quantity: there were small units of communications men that contained several dozens of people and separate battalions, regiments and brigades which contained thousands of soldiers and officers.

Practically nobody wore the uniform of a KGB officer: if you are posted to rocket engineers, wear the same uniform, any uniform except for the real one.

Somehow Andrey liked visiting the airfield most of all. It was located a little aside from most other military units of the launch site and lived its own independent life, and a part of it was surely subjected to the launch site as a whole.

The checkpoint was located just near the wing, the staff office of the barracks, the club and the dining hall were lost among birch trees… There were surely a lot of evergreens in the taiga, a lot of mixed vegetation, and birch thickets were not that frequent. Maybe that was the reason why the wing seemed so homely and comfortable and people were attracted here?

The pilots were not the most secret part of the launch site, that's why there was no fence around the unit. The pilots themselves lived in the cosmodrome's main camp. The wing and its barracks accommodated soldiers from two assigned separate support battalions, as well as the soldiers included directly in the separate wing.

There was quite a comfortable club with a large audience hall and quite a big screen where movies were shown at weekends. In the other part of the club there was a good gym where soldiers from the regiment and battalions sometimes played volleyball.

The acquaintance with the life of taiga pilots happened all of a sudden. There was still some time before another board was to be met, so Andrey left the ordinary military offroader near the checkpoint and went out to walk among the birches. The road bifurcated to barracks and staff office of the regiment. On a small drill field there was a row of a dozen soldiers or officers – a usual work formation or instructions before the shift.

The soldiers of the air regiment were dressed probably best of all at the launch site. One could rarely see them in ordinary uniforms. In summer they wore summer technical clothes: a dark blue cap, a light and comfortable jacket with pockets and slacks of the same color, and the main thing – they wore light and comfortable low shoes on elastic and comfortable soles, almost like trainers, instead of tarpaulin boots with foot wraps as indispensable attributes.

In autumn they had to put on boots, cold-proof bib overalls, a demi-season jacket with a cold-proof hood that could be worn in a pocket on the back. All these clothes were almost black.

In winter, when the temperature often fell to minus 30–4 °C°, they wore felt boots and thick, warm and long overalls that reached the neck. As for outdoor clothing, they wore a very thick jacket of very warm material with a tied lining of good well-dressed sheepskin. There was also a huge collar of beaver lamb which rose above the head with a hat on it, which could be fastened if necessary.

Above all that you could also put on a thick and warm hood with dog fur, and when it was especially cold, there was a knitted helmet with holes for the eyes. Moreover, all that was put on over two sets of underwear – cold (summer) and warm (winter), and then there were semi-woolen peg-top trousers with a service coat, and then the rest.

This is not like knight's armor, but quite heavy; however, you will not be afraid of cold or wind. There were also thick and warm mittens of the same natural sheepskin with leather inserts on the palm; they were long and had lapels of different kinds – white, blue, even orange. Soldiers liked to put them in the pockets of the jacket or overalls, so that these bright lapels could be seen against the background of the rest – the jet blue uniform.

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