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A Philosophical Insight of Soviet Space Conquest

Point de vue philosophique sur la conquête spatiale soviétique

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OUTLINE

Introduction: philosophy is the blind spot of the Soviet space conquest history

The Russian cosmism or why should we go to space?

The Soviet engineers sacrifice to promote peace against the regime's will

TEXT

Introduction: philosophy is the blind spot of the Soviet space conquest history

“You lighted the flame, we won't let it extinguish, we will do everything to make the great dream of humanity come true.”

Hermann Oberth to Konstantin Tsiolkovsky¹

¹ Because no philosophical insight of the Soviet space conquest has been proposed so far, we face bewilderment to comment current development of space engineering. If you ask any institution the question “Why should we go to space?”, nobody will be able to give you a decent answer. Or maybe this one: once access to space exists, there is an economic market to run and a military advantage to take over your opponent². But do we seriously believe that space engineering pioneers made access to space possible for such purposes? Did the

huge worldwide space fad after the first artificial satellite launch, first man in space and first man on the Moon stem from economical or military perspectives? This is not serious. But let's say the institutions are not supposed to answer the question "Why should we go to space?" If the engineers do not know why they do their job, it is their personal problem. However, we may expect historians of science or specialists of soviet studies to give us a glimpse of the answer, at least from the historical perspective. Why did the pioneers want us to go to space? But once again, we can be bewildered as they don't give any answer, because they are stuck to the political point of view, or the means of power, which made the space conquest possible. Either Soviet science historians limit their work to the history of power, or they elude the philosophical, deep aspirations of the public and of those people who made space conquest technically possible. The popular historian of soviet science Asif Siddiqi tells us that the space fad comes from imagination or science-fiction³. However, France had first class science-fiction writers, such as Jules Verne and Camille Flammarion, who wrote about space conquest. It doesn't mean French engineers looked for technical solutions to concretely go to space. But Konstantin Tsiolkovsky did it in 1903, founding astronautics with an article called *The Exploration of World Space by Means of Reaction Devices*⁴. As professed in the article, Tsiolkovsky developed reactive propulsion specifically to save a crew inside the rocket, as a cannon ball projection imagined by Jules Verne was not only doomed to be insufficient to reach high enough velocity, but would kill the crew due to unbearable acceleration. Yet Tsiolkovsky and all famous Soviet engineers (let's mention F. Zander, S. Korolev, M. Tikhonvarov, V. Glouchko, but also Y. Gagarin among cosmonauts) tell us why to carry a crew.

- 2 After having defused the problematic of mankind's need to go to space, arguing about imagination of the public and engineers and slandering about "Tsiolkovsky's occultism" or "Vernadsky's infection of the Academy of science"⁵, Siddiqi makes the public and the engineers' discourse comply with the very specific narrative of the Soviet regime. His colleague Slava Gerovitch is fascinated by the political ambition to create a new soviet man. At some point, he finds a paradox between extreme automation of space rocket guiding, implying minimal role of the crew almost "merging with the machine", and the

idealized cosmonaut in outer space. Yet the extreme automation of space rocket guiding finds its justification in mere technical reasons: how to design of a new means of transportation through a new medium, cosmic space. When you take the plane to go anywhere, aren't you relieved to know that your plane is as fully automatized as possible to avoid any human mistake, the pilot taking care of the plane only in case of emergency? In the end, even Slava Guerovitch has to admit that the American propaganda of bringing more attention to the astronaut is in fact not relevant. Indeed, the American engineers, as any engineer around the world, were more keen on flight security than political discourses, and ended up with the same level of automation as their Soviet colleagues⁶. The Soviet space conquest cannot be reduced to the representations given by Soviet propaganda, or it may only generate false paradoxes. To understand in depth Soviet space conquest, we cannot avoid the main question: "Why should we go to space?" We should keep in mind that the idea was not only to carry a few astronauts to the low Earth orbit, to look at the Earth and to come back. But the idea was also to transport many people, the very ordinary people, and to bring human presence to some world further away. We will discuss this in the next section.

- 3 Specialists of Soviet studies may have tried to understand the pioneers from a crude scientific or engineering point of view, without any political interferences. Alexei Kojevnikov reads Tsiolkovsky's and his follower's A. Chizhevsky scientific articles and claims that "catastrophism" is Tsiolkovsky's leitmotiv for space exploration⁷. But it is much more complicated. Everyone knows that a rather insignificant meteorite from the cosmos can eradicate human civilization. But one can still argue that such an event is highly unlikely. Before writing his article founding astronautics, Tsiolkovsky was a specialist in thermodynamics. He discovered the thermodynamics of non-equilibrium and the spontaneous disruption of symmetry in large scale gaseous systems, in which gravitation cannot be anymore neglected⁸, contrary to Maxwell and Thompson's assumptions. About one century later, the chemistry Nobel prize Ilya Prigogine warns about possible gravific effect on a gas, leading to the idea that the second law of thermodynamics could not be as general as we thought⁹. Relying on his scientific discovery, Tsiolkovsky makes at least two fundamental conclusions:

The universe is not doomed to thermal death, it has processes to condensate again and forever the dispelled energy¹⁰. Therefore the universe should better be described by eternal cycles. His follower Alexander Chizhevsky paid specific attention to the 11-year-cycles of the Sun and their consequences on Earth life. According to solar activity, the life of human beings could be deeply affected. But many other cosmic cycles can also have their significance¹¹.

2. Mankind is not doomed to suffer from the cosmic cycles. It has to use its skills and its power of reason to overcome blind nature, and eventually make nature conscious. This is already what Tsiolkovsky's former teacher, Nikolai Fedorov¹², taught him in Moscow during his three years of study there. Then Tsiolkovsky's father called him back. Back home, Tsiolkovsky switched from thermodynamics to astronautics.

The Russian cosmism or why should we go to space?

- 4 One should find the following fact interesting: Russian philosophy of space conquest was born at the same time as Russian intellectuals looked for cultural independence from prevailing French culture. It happened right after the Russian imperial army managed to break the Napoleonic invasion of 1812. Philosophical circles started to rise in Moscow in the 1820's, as Prince Vladimir Odoyevsky founded the first of them¹³. On the one hand, German romantic philosophy fascinated the young Russian philosophers, on the other hand the Lumières philosophy, the reduction of the world understanding to pure rationality and the overwhelming industrialism in Western Europe disgusted them. In Odoyevsky's thought, Malthusianism and free competition praised by Adam Smith's economics encompassed the worst of the new Western culture¹⁴. But after having strongly criticized the new rational European culture, as opposed to their beloved pre-revolutionary French writers (at the top of them Pascal, but also Montaigne, Fénelon, Bossuet and many others), Russian intellectuals had to propose a positive philosophy solving social problems, such as overpopulation or poverty among the workers, with dignity, whereas Western philosophy gave up to the blind laws of nature. Odoyevsky's short novel *The Year 4338* anticipates how Russia solved in the far future all its problems. A major concept of Russian philosophy is born:

the “regulation of nature”. We are neither talking about exploitation of nature nor non-interventionism (motivated by respect towards wild nature), but namely about regulation. Extremist non-interventionism would quickly kill all humans after a single Russian winter. Russians definitely have to protect themselves from nature with a shelter, and the contrast between a warm home and the look on frozen Russian landscape from the window fascinates Odoyevsky. However, the coal extraction highly needed for the industry must not end in the ill-treatment of even a small proportion of the population. The dark face minors are clearly reduced to slavery and the extraction area gets highly polluted, while the industrial goods production not only satisfies basic needs, but also bourgeois taste. Therefore, to solve both problems of social and nature exploitation, and of blind nature mitigation, Odoyevsky’s futuristic Russia managed to divert the warm streams from the equators to Russia, as well as the cold streams from Russia to the equators. As a result, both frozen Russia and hot infertile lands change their climate into a mild one best fitted for human inhabiting. According to the short story, only Russia, soon imitated by China, managed to do so in the far future because Western countries had been struck dumb by the strongest blind force of nature: lust for profit and institutional justice as social fundamentals, eventually justified by mercantile spirit and Lumières philosophy. In the end, Russia gathers its forces to go to space to save the whole humanity, including corrupted Western countries, from a gigantic meteorite rushing to the Earth.

- 5 We must understand from Odoyevsky’s short story written in 1837 that imagination by itself is absolutely not the key to understand Russian and later Soviet engineers’ fascination for space. Of course, till the technology is ready, literature anticipates, but for the sake of highly concrete economical and philosophical issues, and not mere fantasy. For a century, Odoyevsky’s short novel was been followed for a century by many other novels imagining Russian space conquest not only to save the Earth but also to colonize new worlds to defeat Malthus’ theory. Famous Alexander Bogdanov’s novel *The Red Star* (1908) stages a Russian man – Russia being the only trustworthy country as France has been explicitly discarded – observing the highly moral Martian society fighting against malthusianism while looking for another planet other than Earth. In his following novel

Engineer Menni (1912), Bogdanov explains us how the Martian society managed to become moral starting from its feudal age.

- 6 The fight against blind forces of nature, both physical and psychological, gets philosophically systematized by Nikolai Fedorov's "common cause"¹⁵. Being a Fedorov's follower, Konstantin Tsiolkovsky developed both technological and philosophical response to malthusianism, till the suppression of suffering in the world (with strong Buddhist inclination¹⁶). Like Fedorov, Tsiolkovsky does not believe in definite death of man¹⁷. Science should focus on this problematic. As Odoyevsky praises alchemist science against new science exploiting nature, Tsiolkovsky's science also intends purification for both mankind and nature (from blind forces).

The Soviet engineers sacrifice to promote peace against the regime's will

- 7 We can hardly say Soviet rocket engineers have read the cosmist philosophy, apart from maybe Friedrich Zander, a pioneer of rocketry and spaceflight who exchanged many letters with Tsiolkovsky. Zander started to work on rocketry from the very beginning of his engineering studies in Riga, where he graduated in 1914. With other enthusiasts of space conquest, in 1924 he founded the Society for Studies of Interplanetary Travel, and published the same year his own rocket design in *Flight to Other Planets*. After several years of unemployment spent on active research in rocketry, Zander began work at the Central Bureau of Aviation in 1926. Thanks to paramilitary funding, Zander could come back to rocketry founding in 1931 the GIRD (*Gruppa Izucheniya Reaktivnogo Dvizheniya* or in English *Group for the Study of Reactive Motion*). He soon recruited Serguei Korolev, the latter shifting from plane to rocket design. Engineers earned very low wages at the GIRD, affectionately renamed "Group of Engineer working for Nothing" (*Gruppa Inzhenerov Rabotayushchikh Darom*). In the GIRD workshops, everybody was working to carry a crew to Mars. "Forward to Mars!" Zander explicitly shouted to his teammates to hearten them¹⁸. The Moon was not their main interest. Their main interest was colonizing a new planet. As the GIRD lacked money to conduct ex-

periments, but still needed nothing less than silver for soldering, all GIRD's members gathered forks, spoons, samovars and all objects they owned in silver to melt them¹⁹. Zander was always reluctant to come back home, and GIRD members could only threaten to stop working to force him to take rest. As Zander's health weakened, Korolev paid him a train ticket to the South of Russia to rest in the sanatorium of Kislovodsk. Unfortunately, Zander died in Kislovodsk after he caught typhoid on the way there. Korolev cried after Zander's death, and wondered whether the GIRD could survive such a tragedy. It did survive, and few months later Korolev launched the first liquid-fueled Soviet rocket Zander finished designing. History would not have remembered Zander, had Korolev not looked for the place where Zander was buried in Kislovodsk, and made a funerary stele erected there. This could happen only after Korolev's deportation in 1938 to the gulag in the far east, followed by his deportation to a *sharashka* (scientific institute hiring prisoners), and after he has been freed at the end of the Second World War to make him study German rockets V-2.

- 8 Zander's admiration for Tsiolkovsky was boundless. He edited the second volume of the first edition of Tsiolkovski's scientific works, unfortunately released a year after his death (1934). If there were any need, Zander reminds in the foreword of this edition that Tsiolkovsky's work has nothing to matter with Cyrano de Bergerac's or Verne's imaginative books. Tsiolkovsky is the common idol of Soviet rocketry pioneers. Korolev will emphasize Tsiolkovsky's legacy at the unique public talk about rockets he gave on September 25, 1955, to the students of his former university, the Moscow State Technical University (Bauman) celebrating its 125th anniversary. Here is the conclusion of his vibrant talk:

Our goal should be to have Soviet rockets fly higher and earlier than before this is done elsewhere! Our goal should be to have a Soviet citizen be the first to fly on a rocket! Our goal should be to create a new type of super-speed transport for passengers and cargo, the creation of rocket ships! Our goal should be that the first artificial satellite of the Earth be Soviet, created by the Soviet people! And our goal should be to have Soviet rockets and rocket ships be the first to fly to the limitless expanse of the universe!²⁰

- 9 It was before his existence was completely concealed from public life. From this short excerpt we understand that Korolev did not comply with the political will to reduce his work to military applications only, without the least interest in what the Soviet goal “should be”. Tsiolkovsky’s legacy will be permanently recalled after every Soviet achievement in space. Until today, Tsiolkovski’s portrait is still exposed in the Russian module of the International Space Station.
- 10 Let’s now compel Gerovitch’s assertion about Korolev reducing his cosmonauts to “little eagles” automates inside the rocket. Freedom within space rocket engineering is not boasting about being a super-man flying in the cosmos, but to ensure at any cost – and the minimal cost is automation – the crew life. Soviet cosmonauts have never been reduced to automates. As Korolev says, a pilot must be able to design the machine he flies in. Korolev did fly in the gliders he designed. Cosmonauts must do likewise. Even after he became famous worldwide, Gagarin did not turn towards politics. He could have easily bid his time as a powerful official of the Communist Party, as he was strongly encouraged to. But Gagarin preferred to become a student again. He considered he needed to know how a rocket is made. Gagarin still had to eminently suffer from the political role the Party wanted him to play. And Gagarin did not flee from his duty. He would have become an engineer, had his life not been so short.
- 11 The passion for cosmos (the Russian word *kosmos* should not be understood straightly as space) drove the famous names of Soviet space conquest. In accordance with the deep anti-militaristic attitude of the Russian cosmists and of Tsiolkovsky, Soviet rocket engineers highlighted their desire to separate military purposes from a possible international scientific collaboration aiming only to go to space. Yves Gauthier, quoting from Korolev’s biographer Iaroslav Golovanov, reminds us of Korolev’s attempts to convince Soviet bureaucrats to separate the military and non-military activities in 1959 and to promote international cooperation²¹. Eventually, Korolev gave in to his colleagues’ military applications after Gagarin’s flight²². It is very painful to notice that lengthy North American books on the topic omit to mention the pacific attitude of Soviet engineers. Their patriotism and their fear that the Soviet Union could be overwhelmed by the United-States should not hide their sense of responsibility and their commitment to involve all nations pacifically in space conquest.

The emblematic case of Andrei Sakharov, both having provided his nation with the atomic bomb and then denouncing Soviet military-industrial complex should give us a hint about the depth and the complexity of Soviet engineers' psychology. On the other hand, political leaders' psychology is much rougher and not sufficient at all to understand the Soviet space conquest. Besides, considering that Korolev was tortured and sent to the gulag and to a *sharashka* for six years, who can believe Korolev could have been a supporter of the Soviet regime? Siddiqi argues that Korolev took the lead of Soviet rocket engineering again after the Second World War thanks to his "ambition". Yet Korolev was known by the public only after his death; still, he never gave up his mission to take humanity to cosmos. The ambition of many would have soon crumbled away in such conditions.

- 12 The history of Russian cosmism and of Soviet rocket engineers has something to teach us; we should not miss it. It is the history of men and women who hoped to unite the whole world thanks to what they believed to be the oldest dream of humanity.

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NOTES

1 In a letter quoted by A. L. Chizhevsky in *Na beregu Vselennoj* (L'Aube de la conquête du cosmos for the French edition, p. 165), 1959-1961 (first edition in USSR in 1974).

2 See G. Penent, "Why go to Space? Justifications, Motivations and Contributions to the Contemporary Debate on Space Power" in *Nacelles* (issue n°2), Thematic Section: À la recherche de l'Espace, updated on 25/05/2017, URL: <http://revues.univ-tlse2.fr/pum/nacelles/index.php?id=278>.

3 See Asif A. Siddiqi, *The red rocket's glare – Spaceflight and the soviet imagination*, 1857-1957, Cambridge University Press (2010).

4 K. E. Tsiolkovsky, *Issledovanie mirovyh prostranstv reaktivnymi priborami*, Nauchnyj obzor, 1903.

5 As for example, see p. 80 of mentioned Siddiqi's book. Yet you must know that Vladimir Vernadsky is the founder of geochemistry and ecology with his book *La Biosphère* (first edition in french in 1926). But in opposition to modern ecology, Vernadsky extends the Earth system to the whole cosmos and considers that ecology should serve mankind and not nature itself. Man is part of that nature to be protected.

- 6 S. Gerovitch, "New Soviet Man" Inside Machine: Human Engineering, Spacecraft Design, and the Construction of Communism, *Chicago Journals*, p. 154-157 – History of science society, 2007.
- 7 A. Kojevnikov, *The Cultural Spaces of the Soviet Cosmos in Into the Cosmos – space exploration and Soviet culture*, edited by James T. Andrews and Asif. A. Siddiqi, University of Pittsburg Press, 2011.
- 8 K. E. Tsiolkovsky, *Prodolzhitel'nost' lucheispushkaniya Solnca* (*The continuous emission of Solar light*), 1897
- 9 I. Prigogine and I. Stengers, *La Nouvelle Alliance*, p. 279, Folio Essais, 1986.
- 10 K. E. Tsiolkovsky, *Vtoroe nachalo termodinamiki* (*The second law of thermodynamics*), 1905. Vernadsky postulates the same in *La Biosphère* (1926), that is why he is usually classified as a "biocosmist", even though he does not call straightly for space conquest.
- 11 A. L. Tchizhevsky, *Fizicheskie faktory istoricheskogo processa* (*Physical factors of the historical process*), Kaluga, 1924.
- 12 As Fedorov says in an article written in 1892: "Nature created the mechanism, but also the mechanic" (p. 360 in *Sochineniya, Mysl'* editors, 1982). As for Tsiolkovsky, he already considers that the whole universe follows the will of a higher conscience. See K. E. Tsiolkovsky, *Volia Vselennoy* (*The Will of the Universe*), 1928.
- 13 A. Koyré, *La Philosophie et le Problème national en Russie au début du XIX^e siècle*, éd. Honoré Champion, 1929.
- 14 "The Malthusian ideas, based on the coarse materialism of Adam Smith, on a simple arithmetical mistake in calculation, have poured into society from the heights of Parliament chairs like molten lead, burning its noblest elements and cooling down inside lower lower levels. Perhaps there is one consolation in this phenomenon: Malthus is the last absurdity in mankind; one cannot go any further in that direction." V. Odoyevsky, *The Russian Nights* (1844).
- 15 For a thorough study of Odoyevski and Fedorov's philosophical fight against malthusianism and, on a wider range, how they define the place of man in the cosmos, see my book: R. Biérent, *L'Impératif cosmique*, vol. 1: *L'avant-garde russe du XIX^e siècle*, éd. Publishroom Factory, 2019.
- 16 In his article *Nirvana* (1914), Tsiolkovsky considers our sensitive life as a dream concealing our real life. Sensation mitigation shall drive us to our real

life.

17 Among many articles of Tsiolkovski dealing with this topic, see *Nauchnaja etika (Scientific ethics)*, 1927.

18 After Gagarin's flight, the crowd spontaneously demonstrated in Moscow, without any party officials. The motto was: "And now, Mars!". See Y. Gauthier, *Gagarine ou le Rêve russe de l'espace*, Ginkgo éditeurs, 2015, p. 243.

19 From the memories of the former GIRD's member L. K. Korneev.

20 Translation to English: A. A. Siddiqi in *op. cit.*, p. 290.

21 Korolev's proposal was to create an "International scientific centre for cosmic space exploration". The proposal was rejected by Khrushchev. Cf. Y. Gauthier, *op. cit.*, p. 95.

22 For further details, *ibid.*, p. 315.

ABSTRACTS

English

The question "Why to go to space?" is essential to understand why Soviet pioneers pushed their government to invest in space conquest, and not only in military applications of rocketry. If we neglect to find the pioneers' answer, either we rely on the Soviet propaganda or we believe that pioneers were mere fantasists. Yet, since the 19th

century Russian philosophy urges humanity to go to space. In 1903, Konstantin Tsiolkovsky published his calculations proving theoretically that a rocket can be launched to cosmic space thanks to jet propulsion. Laying on this basis, Soviet pioneers started the practical development of space rockets from the 1920s, and launched their first liquid-propellant rocket on 1934. Being deported and freed after the war to study the German military rocket V-2, Soviet space rocket engineers were forced to work for military purposes. Only after the huge enthusiasm worldwide that followed the first artificial satellite launch, a political discourse about space conquest arose. But the political discourse never complied with the Russian pioneering ideal: space conquest should be a common cause uniting in peace the whole humanity.

Français

Il est essentiel de répondre à la question « Pourquoi aller dans l'espace ? » pour comprendre pourquoi les pionniers soviétiques ont poussé leur gouvernement à investir dans la conquête spatiale, et non seulement dans les applications militaires des fusées. Si nous ne répondons pas à cette question, nous sommes contraints soit de nous en remettre à la propagande

soviétique, soit de tenir les pionniers pour des fantaisistes. Pourtant, la philosophie russe du XIX^e siècle pressait déjà l'humanité à s'élancer dans les espaces cosmiques. En 1903, Konstantin Tsiolkovski prouve théoriquement la faisabilité de l'envoi d'une fusée dans l'espace cosmique à l'aide de la propulsion par réaction. À partir de ces résultats, les pionniers soviétiques en démarrent la réalisation pratique dès les années 1920, aboutissant à leur première fusée à ergols liquides lancée en 1934.

Déportés et libérés après-guerre pour étudier les missiles nazis V-2, les constructeurs de fusées furent forcés de servir des enjeux militaires. C'est seulement après l'immense enthousiasme populaire mondial suscité par le lancement de Spoutnik qu'apparut un discours politique sur la conquête spatiale. Mais le discours politique ne fut jamais en accord avec l'idéal des pionniers russes : la conquête de l'espace doit être une cause commune rassemblant fraternellement toute l'humanité.

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Mots-clés

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