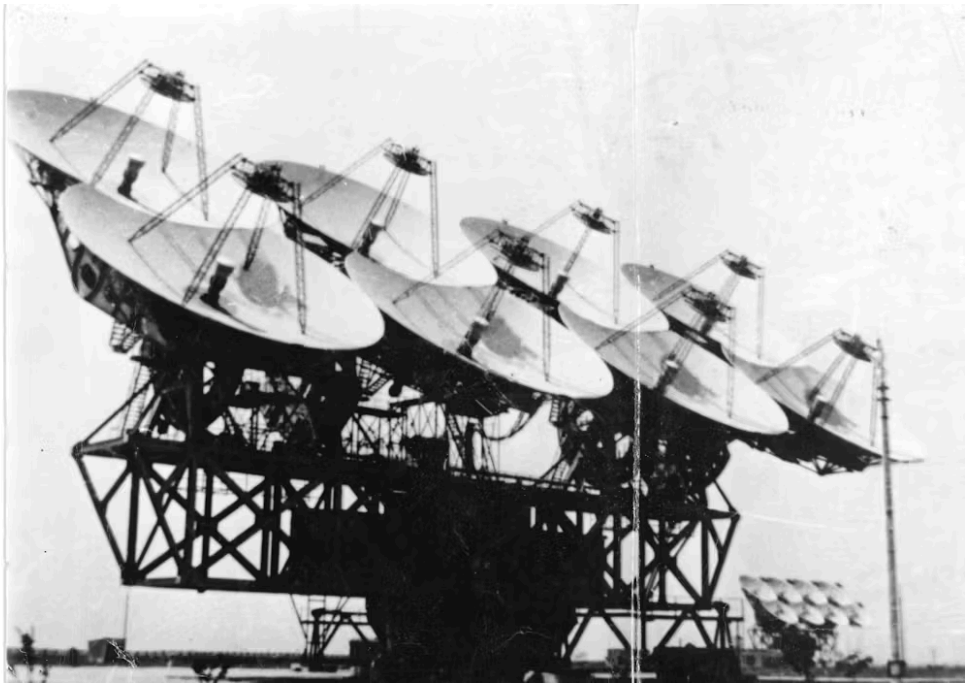
SETI's 'Noah's Ark' – a space historian explores how the advent of radio astronomy led to the USSR's search for extraterrestrial life

Gabriela Radulescu, Guggenheim Postdoctoral Fellow, Smithsonian Institution

Published: November 4, 2025 8:15am EDT



The planetary radar, built in 1960 in Crimea, from which the Morse signal 'MIR, Lenin, USSR' was sent in November 1962.

National Radio Astronomy Observatory Archive

As humans began to explore outer space in the latter half of the 20th century, radio waves proved a powerful tool. Scientists could send out radio waves to communicate with satellites, rockets and other spacecraft, and use radio telescopes to take in radio waves emitted by objects throughout the universe.

However, sometimes radio telescopes would pick up the artificial radio signals from telecommunications. This interference threatened sensitive astronomy observations, causing inaccurate data and even damaging equipment. While this interference frustrated scientists, it also sparked an idea.

During the Cold War, a new field emerged at the intersection of radio astronomy and radio communications. It put forward the idea that astronomers could search for radio communications from possibly existing extraterrestrial civilizations. Astronomy usually dealt with observing the universe's natural phenomena. But this new field made the detection of technologically, or artificially produced radio waves, the object of a natural science.

This field has continued today and is now called the search for extraterrestrial intelligence, or SETI. SETI encompasses all that scientists do to search for intelligent life beyond Earth. It includes one of the original uses of radio telescopes: to study signals from across the galaxy in hopes of detecting intelligent messages.

When the idea behind SETI was first proposed and pursued in the 1960s, only two countries, the U.S. and the USSR, had the technical capability for it. As the only space powers at the time, they were the key actors affected by radio frequency interference.

As a historian of science, I've worked to make sense of what happened throughout the history of Soviet SETI during the space race by analyzing a range of primary sources. SETI captured the scientific imagination of many prominent Soviet astronomers in the 1960s and early 1970s.

Astronomers have not yet confirmed any detection of radio signals – or any other kinds of signs – from extraterrestrial civilizations. But many scientists are still searching, even as their bold ideas run into obstacles. Some evidence suggests humans might be the only intelligent life in the universe.

Soviet SETI: The golden age of radio astronomy

SETI is intertwined with the profound changes brought by radio astronomy. Up until the second part of the 20th century, scientists could see astronomical objects and phenomena only in optical or visible light. Optical light is the same kind of light that the human eye is sensitive to.

After World War II, scientists figured out that they could peacefully use radar antennas, developed for use in that war, to detect radio signals coming from objects out in the universe. Deciphering these signals allowed researchers to study astronomical objects in the universe. They learned, for example, about the most abundant element: hydrogen.

In the former Soviet Union, the prominent radio astronomy pioneer Iosif Samuilovich Shklovsky played a key role in detecting radio signals from hydrogen.

Scientists knew that every chemical element would absorb certain wavelengths of light and reflect others, and the light signals that an object absorbed or reflected could tell astronomers what element it was. Most hydrogen could not be observed directly in optical light, so astronomers didn't spot it out in space until they started looking beyond the visible light spectrum.

Shklovsky figured out how to detect hydrogen with radio waves, which helped astronomers map the distribution and motion of hydrogen gas in and between galaxies.

Historians generally consider the year 1960 the start of the golden age of radio astronomy. After the detection of hydrogen, astronomers discovered previously unknown types of stars, such as pulsars and quasars. These phenomena offered scientists new insights into the nature of astrophysical phenomena and fundamental physics.

The Priroda issue in which Shklovsky's article 'Is Communication with Intelligent Beings of Other Planets Possible?' was published.

Priroda/RAS

Shklovsky later grew fascinated with the possibility of using radio waves to contact other intelligent beings in the universe. In 1960, he published an article on this topic in one of the country's most prestigious scientific journals.

Shklovsky's article soon expanded into a widely popular book called "Universe, Life, Intelligence," published in 1962. That same year, the USSR's Academy of Sciences sent its first radio message in the direction of Venus from a radar in Crimea.

The experiment involved bouncing radio signals off the surface of Venus to transmit the following words using Morse code: Lenin, USSR and mir, which in Russian means both world and peace. Even though statistically increasing radio interference risk, this message was mainly symbolic. The Soviet Union wanted to depict its technological might and wasn't expecting to communicate with extraterrestrials. Soviet SETI was thus not yet a real pursuit.

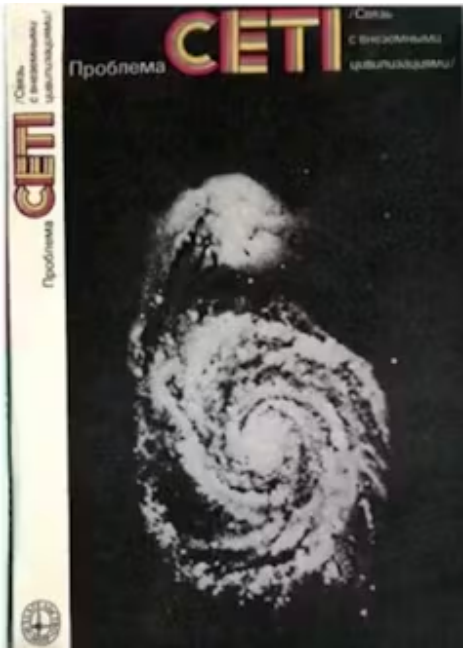
Iosif S. Shklovsky at a SETI conference in Soviet Russia in 1975.

NRAO/AUI/NSF

Starting an organized search

Shklovsky and the majority of other radio astronomers pursuing the search for extraterrestrial intelligence were all located in central Russia at the time. The USSR Academy of Sciences was also located there. But this group needed more formal measures to move their search from a few initiatives into a coordinated effort.

Due to concerns over unwanted public attention, the scientists organized a conference far from Moscow, at the Byurakan Astrophysical Observatory in the Soviet Republic of Armenia, in 1964. At this conference, researchers formed a group specifically dedicated to studying artificial radio signals from space. With this group, SETI became a top-down, state-led activity.



A 1971 Conference Proceedings volume focused on SETI (CETI in Cyrillic) and was published in Russian.

With this validation, scientists could now theoretically look for artificial signals, potentially from an alien origin. However, any discussions about artificial radio signals were subject to strict government surveillance, given the fact that military satellites depended on them, too.

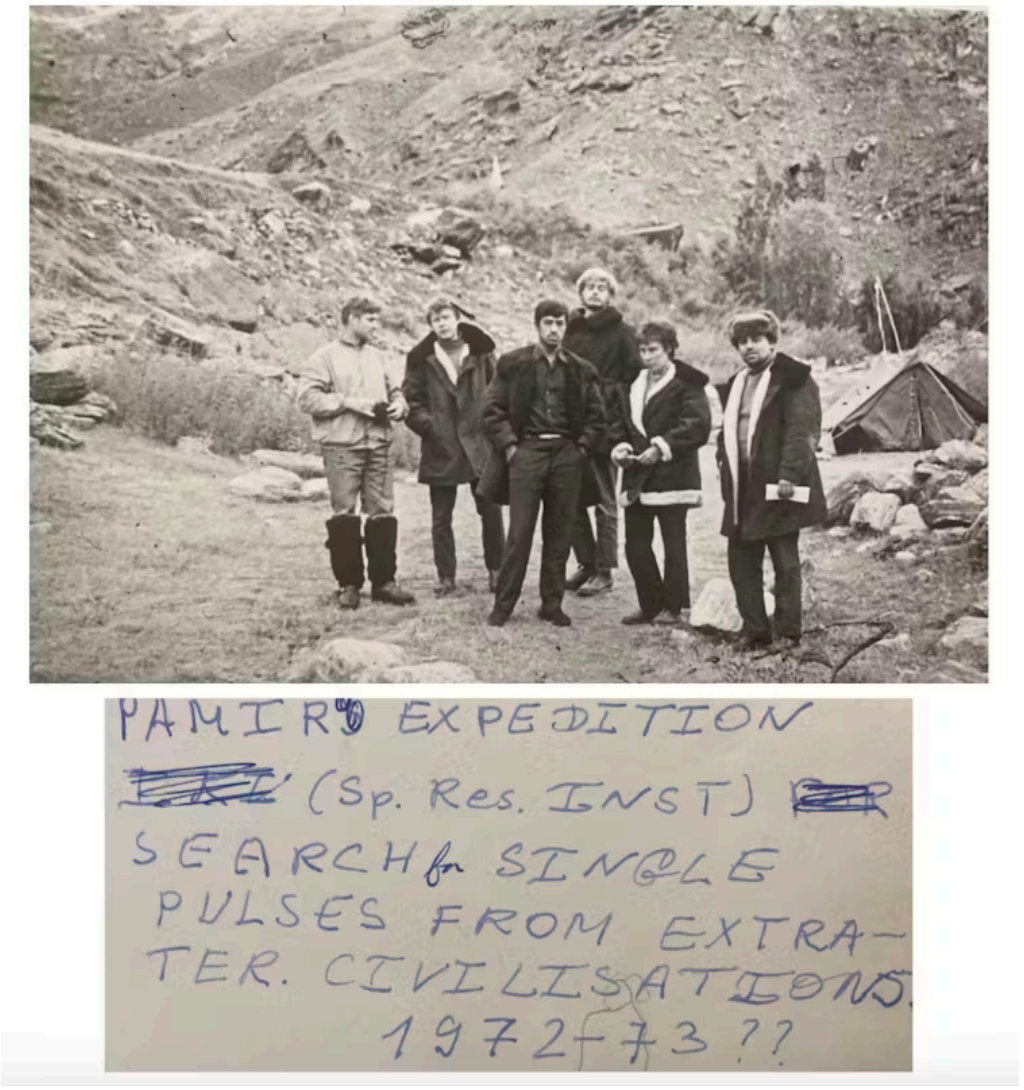
Soviet scientists faced several obstacles. For example, their own government's secrecy made coordination difficult. The Cold War also set limits on developing SETI internationally. However, they had a green light to search and study peculiar signals they suspected had artificial origin.

International collaboration

Efforts to collaborate internationally on artificial signals culminated in 1971 with a symposium, again at Byurakan. There, about 50 scientists – the majority from the U.S. and the USSR, but also some from Czechoslovakia, Hungary, the U.K. and Canada – agreed to disagree on how to best conduct SETI.

Some in attendance compared this gathering to Noah's Ark, because an almost equal number of prominent scientists from East and West of the Iron Curtain managed to meet that year. And the gathering took place in Armenia at the foot of Mount Ararat, located in neighboring Turkey. This mountain is where archaeologists believe Noah's Ark may have beached.

After almost a week of discussion at Byurakan, the two geopolitical blocks designated an official SETI group. That group still exists today, and it still connects researchers all around the world who conduct SETI research. Given the secrecy around radio signals in space, this international SETI group marked a momentous diplomatic achievement at the height of the Cold War.



Postcard with Soviet scientists conducting SETI experiments in the Pamir region of Tajikistan, with a note on the back to their U.S. correspondent.

NRAO/AUI/NSF

SETI started in the Soviet Union with a few strong Moscow-based initiatives. It continued through group events in Armenia – from the first state-level Soviet conference to the international one.

SETI is the first and only domain of astronomy to study artificial radio signals themselves. It indirectly addressed radio frequency interference during a time when these frequencies were highly unregulated.

Stakeholder countries eventually addressed their radio frequency interference issues with international agreements on radio frequency usage and allocation. An international committee approved a feasible and comprehensive radio frequency allocation plan for the first time in the 1970s. This plan has been revised and renewed ever since. Today, space scientists and astronomers use an internationally agreed upon plan to minimize this interference.

Remarkably, SETI began even before this allocation plan. SETI continues its rich legacy today by continuing to search for signals – and along the way discovering new astrophysical objects and phenomena.

Gabriela Radulescu has received funding from the Smithsonian National Air and Space Museum as a Guggenheim Postdoctoral Fellow (2024-2025), from the American Institute of Physics for a Grant-in-Aid, as well as from the Elsa-Neumann Scholarship and the Technical University of Berlin Coordinating Office for Women's Advancement and Gender Equality for her doctoral research.