



PERGAMON

Available online at www.sciencedirect.com

 ScienceDirect

Acta Astronautica 63 (2008) 529–539

ACTA
ASTRONAUTICA

www.elsevier.com/locate/actaastro

Sputnik 50 years later: New evidence on its origins

Asif Siddiqi

Fordham University, New York, USA

Available online 7 March 2008

Abstract

Despite many revelations on the origins of *Sputnik* in the 1990s, there still remained some important unanswered questions. For example, we know that chief designer Sergey Korolev first wrote to the Soviet government in May 1954 asking for approval to develop a satellite. Yet, Soviet leaders responded with a decree *nearly 2 years* later in January 1956. What happened during this period? And why did the Soviet government finally approve Korolev's plan when it did?

New evidence now answers some key questions on the decision-making behind *Sputnik*. Documents declassified at two Russian state archives now show that two previously unknown dates almost exactly a year apart were critical to the approval of *Sputnik*: August 10, 1954, and August 8, 1955. On the former date, for the very first time, the Soviet government approved limited work on space exploration. On the second date, the government approved a dedicated satellite project. In this paper, I show that even in the pre-*Sputnik* years, the space plans of the Soviet Union were fundamentally tied to those of the United States, and vice versa. In essence, the new evidence shows that the "Space Race" between the two superpowers began long before the launch of *Sputnik*, and that a crucial player in the beginning of this race was a most unlikely player, the print media in both nations.

© 2008 Elsevier Ltd. All rights reserved.

1. Introduction

The rewriting of Soviet history that became possible after the collapse of the Soviet Union allowed historians to completely revise the origins of *Sputnik*. The "new" history began with the pioneering work of the famous "Tikhonravov Group" in the early 1950s. The team, headed by Mikhail Tikhonravov, conducted the first serious research in the Soviet Union on the possible design and missions of future artificial satellites. Armed with their research work, on May 27, 1954, legendary "chief designer" Sergey Korolev sent the first request to the Soviet government for a commitment to a satellite program. Subsequent elaboration of the satellite concept in 1954 and 1955 allowed Korolev, Tikhonravov, and their colleagues to develop a detailed

plan for the satellite. The Soviet government finally issued an official decree approving the satellite plan on January 30, 1956. The idea was to launch a relatively sophisticated scientific observatory during the International Geophysical Year (IGY) in 1957–1958. This was the seed of the current day Russian space program.

Later in 1956, Korolev and Tikhonravov decided to limit their ambitions. Afraid that the Americans would launch a satellite earlier than the Soviets, they decided to ask for approval to launch a much more modest-sized satellite, basically a sphere with a power source, a heat control system, two radio transmitters, and antennas. The Soviet government signed off on the more modest plan in February 15, 1957. As a result, the first *Sputnik* satellite was launched on October 4, 1957, opening the Space Age. The following year, the Soviets launched their originally intended large observatory as *Sputnik-3* [1].

E-mail address: siddiqi@fordham.edu.

This “new” story filled in many of missing details but there still remained important unanswered questions. Why, if Korolev wrote to the government in May 1954, did Soviet leaders respond with a decree *nearly 2 years* later in January 1956? What happened during this period? Why did the Soviet government finally approve Korolev’s plan when it did? For historians, the story of *Sputnik* still contained a number of crucial gaps.

New evidence now answers at least some of these questions on the decision-making behind *Sputnik*. Documents declassified at two Russian state archives—the Archive of the Russian Academy of Sciences (ARAN) and the Archive of the President of the Russian Federation (APRF)—now show that two previously unknown dates almost exactly a year apart were critical to the approval of *Sputnik*: August 10, 1954, and August 8, 1955. On the former date, for the very first time, the Soviet government approved limited work on space exploration. On the second date, the Soviet government effectively approved a dedicated satellite project. In this paper, I show that the Soviet government’s intervention in the process of space exploration (as opposed to missile development) occurred in two distinct stages: commitment to exploratory work (in 1954–1955) and commitment to a satellite project (1955–1956). I argue that even in the pre-*Sputnik* years, the space plans of the Soviet Union were fundamentally tied to those of the United States, and vice versa. In essence, the new evidence shows that the “Space Race” between the two superpowers began long before the launch of *Sputnik*, and that a crucial player in the beginning of this race was a most unlikely player, the print media in both nations.

2. Background

Soviet scientists did not begin concrete satellite studies until 1953 although these had been preceded by several efforts to explore the technical feasibility of launching an object into orbit. These early studies were carried out at the top-secret Scientific-Research Institute No. 4 (NII-4, pronounced “nee-4”) based in the Northeastern Moscow suburb of Bolshevo. NII-4 had been established in 1946 as an institutional forum to investigate “the development of methods of testing, acceptance, storage and combat application of missile weaponry” [2]. As is well known, the move to study spaceflight (as opposed to missiles) was taken at the personal initiative of a senior scientist at the institute, Mikhail Tikhonravov (1900–1974). By the late 1940s, he had already secured a place in the history of Soviet rocketry by designing the very first Soviet rocket to use liquid propellants, the famous “09” launched in 1933. After World War II,

Tikhonravov assembled a small group of young scientists to study the prospects of very long-range missiles. On March 15, 1950, at a plenary session of the NII-4 institute, he presented a paper based on these studies, where he suggested that using the current level of technology, it would be possible to cluster together a number of rockets to launch a small satellite into Earth orbit. These claims were viewed with much skepticism at the time, and Tikhonravov’s early research was stalled at least twice by bureaucratic interference since such work fell out of the institute’s official work mandate [3].

Within a couple of years, however, there was a consensus within the institute that a satellite could have potentially important *military* applications. On September 16, 1953, the NII-4 leadership approved a “scientific-research theme” entitled “Research into the Problems of Creating an Artificial Satellite of the Earth.” Code-named “Theme No. 72,” the R&D project was to begin the following January and was to last 2 years. Tikhonravov’s young protégé Igor’ Yatsunskiy (1916–1983) oversaw the project under his mentor’s guidance [4]. The group included the same young students—10 men and one woman—who earlier studied intercontinental ballistic missile (ICBM) design concepts. They explored a variety of engineering problems including placing a satellite in orbit, changes in a satellite’s orbit, returning to Earth, radio communications, and optical tracking of satellites from the ground. The group developed a preliminary model of a satellite they called “the simplest satellite” (*prosteishii sputnik*), which could serve as a technology-proving concept launched by the still-on-paper Soviet ICBM. Military applications were the central *raison d’être* for the 442-page report issued by the team by March 1955. In the report’s conclusion, Tikhonravov wrote:

The simplest satellite will have great scientific importance. Its military significance will be the possibility of testing the operation of a number of systems necessary for other more complex and heavier satellites carrying military payloads. Besides, it is likely that it will be possible to systematically photograph the enemy’s territory from the simplest satellite.

The team also researched the possibility of using a satellite to drop bombs to hit ground targets (“maximum deviation will be less than 15 km from the target”), manned military spaceships, and orbital stations [5].

Besides the “Tikhonravov Group,” another group of scientists at the USSR Academy of Sciences also began a similar exploratory study on satellites in 1953. This team was headed by Mstislav Keldysh (1911–1978), a brilliant applied mathematician who was on the rise

on the Soviet scientific community. Keldysh headed a division (the Department of Applied Mathematics) at the Academy's V.A. Steklov Mathematics Institute where he assembled a team of extremely talented young graduates ("Keldysh's Boys") who laid the mathematical groundwork for much of the early Soviet space program.

These early nascent satellite studies would have come to naught had it not been for the enormous advances in missile design made by Soviet engineers in the early 1950s. The heart of the Soviet missile industry was the Scientific-Research Institute No. 88 (NII-88) based in the Kaliningrad suburb of Moscow, right next to Bolshovo where Tikhonravov worked. At NII-88, under chief designer Sergey Korolev (1907–1966), a team of engineers developed progressively more sophisticated ballistic missiles, beginning with the R-1 (the Soviet copy of the German A4), the R-2, and then the R-5, and its nuclear-tipped version, the R-5M. The latter had a range of about 1200 km. The next step was the development of a missile capable of intercontinental distance. By 1953, Korolev's design bureau, in cooperation with a number of other R&D organizations, prioritized research on two different directions an intercontinental missile: ballistic and cruise. After a careful review of all possible options, on May 20, 1954, the Soviet government officially approved *three* intercontinental missile projects, one of which was an ICBM known as the R-7 or "article 8K71." Korolev's team was assigned as the prime contractor for the R-7, which involved hundreds of other subcontractors and factories spread across the Soviet Union. The two cruise missile projects, *Burya* and *Buran*, were directed jointly by Keldysh's NII-1 aviation research institute [6].

3. The August 1954 decision

The prospect of an ICBM opened up for the first time the realistic possibility of launching an object into orbit. Once it was evident that the Soviet government was moving to approve an ICBM program, Korolev mobilized his support base and began preparing a formal proposal. In the first 4 months of 1954, he consulted many influential people in the defense industry, military, and academic scientific community. Korolev arranged for disparate constituencies working on the satellite problem—such as the "Tikhonravov Group" and "Keldysh Boys"—to meet, discuss, and coordinate their work informally [7]. Two meetings at the Academy of Sciences, on March 16 and May 25, brought together important scientists curious about the scientific benefits of the satellite project. The former was attended

by Academician Petr Kapitsa (1894–1984), the world famous Soviet nuclear physicist and future Nobel Prize winner. The latter, a 3-h meeting, was held at the offices of Academy President Aleksandr Nesmeyanov (1899–1980), who signed off on a plan to ask the government to approve R&D work necessary to create a satellite [8].

Not everyone supported the effort. In his diaries, Tikhonravov noted that one of his superiors at his institute "didn't 'get' anything, and Korolev got the impression that he won't be offering any help, even though he had [been] promised [such help before]." He added, "I should have expected it" [9]. But Academy President Nesmeyanov's support proved to be critical. On May 27, 1954, not coincidentally just a week after the Soviet government approved full-scale work on the R-7 ICBM, Korolev dispatched a short letter to the top leaders of the Soviet military-industrial complex on the satellite issue. He attached a short (and preliminary) version of Tikhonravov's massive study on satellites and translations of a number of articles on space exploration from the American print media. In his cover letter, Korolev wrote:

I draw your attention to the memorandum of Comrade M.K. Tikhonravov, "On an Artificial Satellite of the Earth," and also to the forwarded [media] materials from the U.S.A. on work being carried out in this field. The current development of a new article [the R-7 ICBM] makes it possible for us to speak of the possibility of developing in the near future an artificial satellite... It seems to me that at the present time it would be timely and feasible to organize a scientific-research department [in NII-88] for performing the initial exploratory work on a satellite and more detailed work on the set of problems associated with this goal.

He ended the letter with a simple phrase: "I await your decision" [10].

Tikhonravov's attached report was a *tour de force* of foresight and elegance. He suggested beginning the Soviet space program with work on three simultaneous goals:

- launching a "simplest satellite" weighing about 3 ton orbiting to an altitude of 170×1100 km;
- developing the capability to launch a human on a suborbital flight; and
- recovery of capsule from Earth orbit.

Future goals would include a piloted orbital spaceship, a space station, and research on lunar flights [11].

For many years now, it was assumed that there was no response from the Soviet government to this dramatic request, i.e., that Korolev's letter essentially disappeared for 2 years amid the Byzantine bureaucracy of the Communist Party. However, recent evidence suggests that the letter actually had a significant effect, leading to the very *first* Soviet governmental intervention in the idea of spaceflight. Korolev's letter was not addressed to the top leadership of the Soviet government and the Communist Party but rather to the leading managers in the Soviet military–industrial complex who saw some value in Korolev's proposal. In August 1954, a number of these industrial leaders sent a formal appeal to the top echelons of the Soviet leadership on the satellite issue. We do not know the details of their proposal beyond the fact that they asked for approval “to work on scientific and technical questions related to spaceflight,” i.e., a moderated version of Korolev's idea to immediately begin work on a satellite [12]. Responding to their request, Georgiy Malenkov, the chairman of the Soviet Council of Ministers, signed an official decree on August 10, 1954, stipulating the following:

- approve R&D work on a satellite at OKB-1, NII-4, and the Academy of Sciences;
- create a commission in the Academy of Sciences for scientists to discuss potential scientific benefits [13];
- establish an award in honor of Russian patriarch Konstantin Tsiolkovskiy to be given to individuals who have made important contributions to astronautics [14].

While this was not a commitment to build a satellite but only to conduct preliminary work, the government's rationale to approve *any* work at all is unclear. It is possible that two factors played into this decision: Korolev's argument that research on satellite recovery would help in solving problems related to atmospheric reentry of nuclear warheads over foreign targets; and subtle threats by Korolev—based upon his file of American media pieces—that similar work was under way in the United States.

4. Objects D1, D2, and D3

In the most unexpected manner, the first two points in the decree cleared the way to the opening of the Space Age. As a result of the government decree, on August 19, 1954, the Academy of Sciences issued a decree (no. 3-1517) assigning Korolev's design bureau to develop some basic concepts for a potential satellite. By this time, Korolev's engineers had determined that it would

be possible to launch a 1.5 ton satellite into Earth orbit using the R-7. Korolev delegated this work to a group under Yevgeniy Ryazanov (1916–1975), which, basing much of their calculations on the work already carried out by the Tikhonravov and Keldysh teams, came up with three options for a satellite:

- a 1.5 ton non-recoverable and unoriented satellite launched on the R-7;
- a very small satellite launched on a modified version of the R-5M intermediate-range ballistic missile (known as the M5); and
- a very large satellite launched by a scaled-up R-7 with a launch mass of 700 ton (the original R-7 had a launch mass of about 270 ton).

Keldysh actively supported the second option even though it would require significant modification to the R-5 missile [15]. Engineers V.V. Molodtsov and V.I. Frumson substantiated the possibility of creating a small satellite although they eventually abandoned this option since it would have required decreasing the mass of the guidance system for the launch vehicle to 140 kg, an unrealistic option for the near future.

The third option was also not followed through since the R-7 itself had not been built and it was premature to talk of a scaled-up version. Early studies of such a booster, done by V.M. Udal'tsov under the leadership of Korolev's “first deputy” Vasiliy Mishin, laid the groundwork for the (in)famous N1 superbooster of the 1960s.

Eventually, for the short term, Korolev picked the first option—a 1.5 ton non-recoverable and unoriented satellite—development of which was carried out by Ryazanov's Group (which included L.M. Miloslavskiy, V.I. Frumson, and V.A. Nikolayev). Early reports from scientists, however, seemed to suggest that they would require a 5 ton satellite in order to fit a sufficiently complex set of scientific instruments. As a result, the group divided their work into three satellites, in effect, splitting the scientific equipment into three smaller satellites each weighing 1.5 ton. They were:

- Object D1 for scientific instrumentation.
- Object D2 for a biological specimen in a pressurized container.
- Object D3 for remaining instrumentation (probably a military satellite) [16].

5. The commission for interplanetary communications

Besides actual R&D work, the August 1954 decree also approved the creation of a commission within the

Astronomy Council of the Academy. The commission, which was formally established in December 1954, had a name that was typical in its Soviet-era bureaucratic speak: the (permanent) “Interdepartmental Commission for the Coordination and Monitoring of Scientific-Theoretical Work in the Field of Organization and Accomplishment of Interplanetary Developments of the Thematics of Research Problems and Analysis of the Possibilities of the Practical Realization of Interplanetary Communications.” For more than 50 years, the true purpose of this commission has been unknown in the West. Declassified records from the Academy’s archives now show its activities in 1955 included the following:

the clarification of first priority scientific research tasks [possible to solve] with the aid of an artificial earth satellite; analysis of the contemporary state of problem; [and] formulating the [most] promising problems to a number of scientific-research institutions in our country [13].

In other words, the most important goal for the interplanetary commission was to serve as a place for academy scientists to deliberate on the scientific and applied scientific problems associated with both the creation of a satellite and the goals it could solve. The commission, however, had another equally important task that was not officially enumerated. According to V.A. Yegorov, a scientist working at the time for Keldysh on satellite problems, the commission:

served the USSR as an official presentation to the community (Soviet and global) for the results of secret work on the creation of space technology [which was] carried out by the Academy of Sciences in cooperation with [secret scientific-research institutes, design bureaus] and factories. The members of the commission (and primarily its chairman and scientific secretary) visited foreign countries as representatives of Soviet space science, although they almost never participated in [secret] work [17].

Undoubtedly the driving force behind the creation of the commission was Mstislav Keldysh who made sure that key members on it included people who had little or no knowledge of the top-secret ICBM program but if necessary could be counted upon for their expertise. To chair the commission, Keldysh appointed academician Leonid Sedov, a colleague who knew nothing of the missile program, but was a respected aeronautics scholar specializing in hydrodynamics, gas dynamics, and mechanics [18].

Those on the “inside,” i.e., Korolev, Keldysh, and others, closely monitored and controlled the commission’s public pronouncements via the one member of the commission who *did* have close connection to the secret world of missile development, Mikhail Tikhonravov [19]. Keldysh also had one of his closest assistants, Gennadiy Skuridin, serve as an “associate” of the body. Korolev visited the commission’s offices once in late 1954—soon after its formation—to discuss its plan of publicity work [20]. One result of this collusion between the secret and public worlds was publicizing the commission’s work in the Soviet media.

6. A newspaper article, the CIA, and unintended consequences in the Cold War

A public announcement of the existence of the academy’s interplanetary commission, issued in the spring of 1955, had deep and unexpected consequences in the international arena. This single public announcement created an unlikely link between the Soviet media, the American media, the Eisenhower Administration, the CIA, and eventually the Soviet Politburo, and set off an unanticipated and international chain of events that sparked the beginning of the Space Age.

In February and March 1955, Korolev and Tikhonravov worked behind the scenes to orchestrate a detailed public announcement about the existence of the academy’s interplanetary commission [21]. The article, in dry and uninspiring prose, appeared on April 16, 1955, in the Moscow newspaper *Vechernyaya moskva* (Evening Moscow). Noting the creation of the commission, the anonymous author of the piece noted that the new body “would coordinate and direct all work concerned with solving the problem of mastering cosmic space.” In the article, Keldysh’s aide Karpenko was quoted as saying that “one of the immediate tasks of the Commission is to organize work concerned with building an automatic laboratory for scientific research in space,” a claim which was most certainly not true [22]. Western wire services immediately picked up the story and reported it prominently in the American press [23]. A *New York Times* article in July, for example, noted that “[i]ntense Soviet interest in achieving priority over all other nations in regard to all aspects of interplanetary flight has been evident for some years.” The *Times* went on to recount the various recent articles in the Soviet media on space exploration and then described the *Vechernyaya moskva* statement. “The United States and the Soviet Union now appear to be in a race for the glory of making the first step toward interplanetary flight,” the article concluded [24].

In his “Matter of Fact” column, one of the most widely syndicated columns in the United States, journalist Stewart Alsop noted that the “bland [Soviet] announcement ... caused much dismay at least among the more sensible men in the Pentagon.... [T]his kind of before-the-fact boasting by the Soviets must be taken very seriously indeed as the Pentagon has learned to its sorrow, conspicuously in the case of the atomic and hydrogen bombs” [25]. Alsop, a former OSS officer with strong ties to the American intelligence community, was not simply conjecturing; within the black world of the American security establishment, the relatively innocuous announcement had deep repercussions. A CIA National Intelligence Estimate prepared for President Dwight D. Eisenhower and issued later in 1955 singled out the Soviet interplanetary commission and cited the *Vechernyaya moskva* article as well as other recent Soviet writings as evidence “of a coordinated [Soviet] survey of the theoretical problems involved in establishing a space satellite” [26].

In May 1955, the US government’s National Security Council issued a top-secret policy document known as NSC 5520, which recommended that the Eisenhower Administration develop a small scientific satellite to be launched as part of the IGY, a broad-scale international program to study the Earth and its upper atmosphere set for 1957–1958, a predicted period of intense solar activity [27]. The decision, an important milestone in the birth of the American space program, had cascading consequences, eventually leading to several early space projects such as the civilian Vanguard program and early intelligence satellite projects. A number of historians have argued that the Eisenhower Administration’s decision had a hidden agenda known only to a handful of individuals at the time. The authors of NSC 5520 sought to establish the precedent of “freedom of space” by using a peaceful scientific satellite, i.e., the right to fly over other nations’ territories in space, thus clearing the way for intelligence reconnaissance satellites that could later spy on the Soviet Union with impunity [28]. NSC 5520 was, in fact, issued as a result of an earlier recommendation from the Technological Capabilities Panel (TCP), a high-level scientific body headed by MIT President James R. Killian, Jr., that was asked to study the issue of a surprise attack by the Soviet Union. Among its many influential recommendations, the TCP advocated that the United States immediately start developing a spy satellite [29].

Although establishing the precedent of “freedom of space” might have served as the main impetus for the American decision to launch a small scientific satellite, it was not the only one. Prestige—specifically

pre-empting the Soviet Union in launching the first satellite—also figured prominently. Here again, the *Vechernyaya moskva* article served as a catalyst. Days after its publication, Joseph Kaplan, chairman of the US National Committee on the IGY, wrote an urgent letter to Alan T. Waterman, the National Science Foundation’s director who was involved in the deliberations leading to NSC 5520, about the immediate need to approve a satellite project. To emphasize the urgency of his request, Kaplan attached a copy of the *Washington Post*’s report on the Soviet newspaper article [30]. NSC 5520, in fact, singled out *Vechernyaya moskva*’s announcement on the interplanetary commission as evidence of Soviet pursuit of a satellite project [31].

Historian Michael J. Neufeld suggests that assistant secretary of defense for research and development Donald A. Quarles, the principal architect behind NSC 5520, “seized...on the Soviet threat” to push through his hidden agenda to establish the “freedom of space” principle under cover of a civilian satellite [32]. He adds, “the Soviet factor played a critical role” in Eisenhower’s satellite decision of May 1955, a point explicitly underlined in NSC 5522; a follow-up report to NSC 5520 was issued in June 1955, in which the authors noted:

There is an increasing amount of evidence that the Soviet Union is placing more and more emphasis on the successful launching of the satellite. Press and radio statements since September 1954 have indicated a growing scientific effort directed toward the successful launching of the first satellite. Evidently the Soviet Union has concluded that their satellite program can contribute enough prestige of cold war value... to justify the diversion of the necessary skills... . The nation that first accomplishes this feat will gain incalculable prestige and recognition throughout the world [33].

On the same day that NSC 5522 was issued, the Department of Defense tasked Quarles with making the American scientific satellite a reality.

The “freedom of space” rationale gained particular urgency following President Dwight D. Eisenhower’s return from a Soviet–American summit in Geneva in July. At the meeting, Eisenhower had tried unsuccessfully to convince Soviet leaders Nikita Khrushchev and Nikolay Bulganin to agree to an “open skies” policy, i.e., a proposal to facilitate mutually supervised reconnaissance flights over each other’s territories [34]. After the Soviets refused the offer, Eisenhower met with Waterman and Quarles to convey his full support for an American satellite project for IGY. The satellite would fulfill both rationales: freedom of space and prestige by

beating the Soviet Union into space. Days later, on July 29, 1955, Eisenhower's press secretary, James C. Hagerty, for the first time publicly revealed that the United States would launch "small Earth-circling satellites" as part of its participation in the IGY [35].

The Eisenhower Administration's announcement set off a round of publicity over the possibility of an American satellite in the near future. Although the Soviet government never officially responded—it, after all, had no official plans to build or launch a satellite—the spaceflight activists working both in secret and in public in the Soviet Union continued to communicate their goals to the outside. Only 4 days after the Eisenhower announcement, academician Leonid Sedov, the erstwhile chairman of the Soviet interplanetary commission, announced at a meeting of the International Astronautical Federation in Denmark that "[i]n my opinion, it will be possible to launch an artificial Earth satellite within the next two years." He added that "[t]he realization of the Soviet project can be expected in the comparatively near future. I won't take it upon myself to name the date more precisely" [36]. Being only a public figurehead, Sedov knew nothing about Korolev's plans for his various Object D satellites. More than likely, Keldysh and others in Moscow, i.e., those actively proposing a Soviet satellite, had prepared Sedov's statement for public consumption [37].

The day after Sedov's press conference, the major Western press outlets ran front-page stories that considerably exaggerated his claims. Other Soviet scientists had made similarly vague statements in public before, but because Sedov's announcement immediately followed the Eisenhower statement, the Western media found a story too big to ignore. The *Washington Post* headlined its story "Russians Say They Intend to Beat U.S. In Launching First Unmanned Satellite," while the *Los Angeles Examiner* screamed, "We'll Launch 1st moon, and Bigger, Says Russ" [38]. Sedov later objected to the characterization of a satellite race between the two countries, but Western publications, at least for a few weeks, parroted the notion of international competition [39].

Public statements in the Soviet media on spaceflight, particularly the April 1955 article in *Vechernyaya moskva*, which announced the existence of the Soviet interplanetary commission, significantly accelerated American plans to pursue a satellite project. The Eisenhower Administration's stated purpose in its July 1955 announcement of US plans to launch a satellite during IGY was partly a response to the alarm about Soviet intentions. The American announcement then prompted the Soviet interplanetary commission's Sedov to

comment publicly on the possibility of a Soviet satellite. The American announcement and Sedov's garbled response to it—as well as the Western media's reportage of both—provided the final weapon, international competition, that Korolev, Tikhonravov, and others used to push through a satellite project.

7. The August 1955 decision

Korolev took advantage of this back-and-forth international conversation to push for a *concrete* commitment from the Soviet government; simply forming a public relations commission nor establishing a medal in honor of Tsiolkovskiy was sufficient. For his cause, he recruited two very powerful administrators in the Soviet military-industrial complex, Mikhail Khrunichev (1901–1961) and Vasily Ryabikov (1907–1974). Although the latter played as important a role in the birth of *Sputnik* as Korolev, Tikhonravov, and Keldysh, his name is almost absent from the many stories on the history of the world's first satellite. Ryabikov was originally a protégé of the famous armaments minister Dmitriy Ustinov (1908–1984), the powerful defense industrialist who would go on to reign over the Soviet space program for a quarter of a century. Although Ryabikov began his political career in 1939 working under Ustinov, after the war, in 1951, he was abruptly promoted to a highly sensitive and powerful position as the manager of the massive Moscow air defense project where he worked closely with the feared Soviet security services chief Lavrentiy Beriya. Ryabikov reached the apex of his career on April 14, 1955, when Nikita Khrushchev appointed him to head a supervisory body that would hitherto manage all long-range missile development (including, of course, the ICBM program) in the Soviet Union [40]. As head of this body, Ryabikov not only outranked Ustinov but became the man who reported *directly* to Khrushchev on all matters related to long-range and strategic missiles. In other words, if Korolev was ever to get his satellite off the ground on an ICBM, he would need Ryabikov's explicit permission.

Immediately after Hagerty's announcement on the launch of an American satellite, Korolev prepared a draft of a three-page letter which he circulated to Khrunichev and Ryabikov. The idea was to co-author a letter signed by all three and send it directly to Nikita Khrushchev and Nikolay Bulganin. The former was the head of the Communist Party and the latter the top official in the government, i.e., they were the two most powerful men in the country. The letter was crucial to Korolev's plans and was drafted very carefully.

Exploiting the publicity over the recent Eisenhower announcement, Korolev got right to the point in the first sentence, mentioning, “the appearance of announcements in the American press that in 1957–58, small artificial Earth satellites will be created... .” In repeatedly noting that “the problem of creating an artificial satellite of the Earth is being given special attention in the U.S.A.,” he elaborated at length on two projects of Wernher von Braun (whom he referred to as simply “Braun”)—one a 45 kg satellite and another a launch vehicle with a mass of 7000 ton (“25 times greater than the mass of the R-7”). Strikingly, Korolev mentioned neither Project Orbiter nor Vanguard which suggests that his information was garbled or that he was willfully distorting nascent American plans by bringing von Braun to the foreground rather than the relatively innocuous Vanguard. The letter was rather technical for a document intended for politicians—in it, Korolev described the mechanics of orbital flight, the kinds of scientific experiments possible with a satellite, as well as the basics of launch vehicle capabilities. In asking for a Soviet satellite, Korolev provided some raw data: the satellite would weigh 1.5–2 ton, it would orbit at an altitude of 200×700 km, it would cost 250 million rubles (in 1955 costs, without the expense for the launch vehicle), and it could be launched within 2–3 years, i.e., in 1957 or 1958, during IGY. He concluded the letter by noting that:

Considering that the creation of an artificial satellite of the Earth will open new prospects in the development of science and military technology, it is considered advisable in the nearest future to begin work on its creation. A list of necessary steps [for its implementation] can be submitted within one-and-a-half and two months [41].

The letter, signed by Khrunichev, Ryabikov, and Korolev had an immediate impact. On August 8, 1955, just 10 days after the Eisenhower Administration’s announcement, the agenda of an artificial Earth satellite was added to a regular meeting of the Soviet Politburo (or “Presidium” as it was called at the time). Although the content of the discussion or the attendees at this important meeting still remain unknown, we can speculate that the importance of the Earth satellite as well as its costs were discussed at the meeting; on the same day, on Korolev’s orders, Tikhonravov had quickly prepared a summary report entitled “Primary data on the scientific significance on the simplest satellite and projected expenses” that was probably used for the discussions at the Politburo [42]. The outcome of the Politburo meeting was unambiguous: a short memo entitled “On the

Creation of an artificial satellite of the Earth” was issued. Graded “top secret,” document noted simply:

To approve the idea for the creation of an artificial satellite of the Earth. To entrust Comrades Khrunichev and Ryabikov to go ahead in working to create an artificial satellite of the Earth and in a month-and-a-half’s time submit to [the Central Committee of the Communist Party of the Soviet Union] a draft for the necessary steps on this question and also to submit to [the Central Committee] the text of a communiqué for the press on work being carried out on the creation of an artificial satellite of the Earth [43].

The memo was signed into law on August 18, 1955.

There was a bustle of activity on the satellite in the waning months of 1955. As instructed by the Soviet government, Korolev scrambled to prepare a more formal proposal on a satellite that would include a detailed enumeration of the goals, costs, volume of work, contractors, and schedule for a Soviet satellite. Tikhonravov and Keldysh led this phase of the work, hammering out details at a series of meetings involving leading scientists, designers, and administrators. The paper record from this period suggests that there were still some who were not fully convinced of the propitiousness of spending money on a satellite; several times Korolev repeated his claim that a satellite would have more than simply scientific importance. In a document circulated to both designers and government officials, Korolev emphasized the political significance of a satellite by underlining the phrase three times with a pencil [44]. To Marshal Mitrofan Nedelin, the Deputy Minister of Defense in charge of operating and procuring all Soviet missiles, Korolev pointed out that the Americans would also launch during IGY and that “without doubt, it is impossible not to consider the significance of priority in... creating the first artificial satellite of the Earth” [45]. Finally, in a closed session celebrating the 125th anniversary of Moscow’s Bauman Higher Technical School in September 1955, Korolev spoke to a big (albeit restricted) audience about launching a satellite. Korolev ended his speech with several dramatic flourishes:

Our goal should be to have Soviet rockets fly higher and higher than done anywhere else. Our goal should be that a Soviet man accomplishes the first rocket flight... . Our goal should be that Earth’s first artificial satellite be Soviet, created by the Soviet people. Our goal should be that in the limitless expanse of the universe, the first flight be that of a Soviet rocket... [46].

In November 1955, Korolev, Keldysh, and Tikhonravov met several times with one of Ryabikov's deputies, Georgiy Pashkov, to iron out the details of a final document on the satellite. They lined up each of their rationales and received support from a wide circle of scientists [47]. After Ryabikov signed off on the plan, the drafters sent it to the Central Committee and the Council of Ministers requesting approval for a full program of research for the IGY using artificial satellites. The authors, who included Keldysh and Korolev, invoked defense, science, and prestige to make their case. Two months later, on January 30, 1956, the Council of Ministers issued a decree (no. 149-88ss) approving the launch of the Object D1 satellite in 1957 in time for IGY. Engineers would continue to explore the D2 and D3 options, especially in support of intelligence objectives. The military agreed to donate two test ICBMs for the satellite launches because they could be used to verify and test operational capabilities of the rocket. Apart from the Academy of Sciences, five industrial ministries would be involved in the project [48]. All future Soviet space projects, including the current day Russian space program, emerged as a result of this government decision.

8. Conclusions

The new evidence shows that the “Space Race” began much earlier than the launch of *Sputnik* on October 4, 1957, as early as 1954. The launch itself was the end result of a series of complex international discourses in which the media in both the Soviet Union and the United States played a critical role. When Sergey Korolev and Mikhail Tikhonravov first proposed a space program to the Soviet government in May 1954, they justified their request by sending along clippings from the US media on space travel. While Soviet leaders did not commit to any concrete project, 3 months later, they cautiously approved some modest steps for space research, including allowing Mstislav Keldysh, to form an Academy of Sciences commission to serve as a public face for Soviet interest in spaceflight. In April 1955, the three men, Korolev, Tikhonravov, and Keldysh, orchestrated a public announcement of the existence of this commission in a major Moscow newspaper. Almost immediately, the Western media picked up on this announcement (as well as other more general Soviet media treatments on space travel) and publicized it widely. Based on these alarming reports, leading officials within the American scientific and intelligence community believed that the Soviet Union had already committed to develop a satellite. These concerns played a major role in the decision

to approve an American civilian satellite project, a program which was then publicly announced in late July 1955 by the Eisenhower Administration. Once again, there was a round of publicity generated by the American announcement, in the press of both countries. Using this media attention, Korolev again approached the Soviet government; just 10 days after the Eisenhower Administration's announcement, on August 8, 1955, the Soviet Politburo fully committed to a modest satellite program. An official government decision on the issue was signed after 5 months (after all the details were hammered out) in January 1956.

This unusual and serendipitous chain of events underscores the importance of the media in the equation of competition in space. In the Soviet case, the media was always considered an official mouthpiece for the Soviet government. Yet, highly placed designers such as Korolev were able to manipulate the timing and content of certain media announcements skillfully to help their own cause. There is no evidence that Korolev and his colleagues orchestrated press communiqués on space travel to *deliberately* provoke the American side; yet, we must account for the fact that they were certainly aware that any and every Soviet pronouncement on space was being picked up and inflated in the West, since they had access to almost all major Western media treatments on space travel. On the American side, through the early 1950s, the media trumpeted up Soviet articles on spaceflight that were largely speculative in nature; after all, before mid-1955, the Soviets had decidedly not committed to any concrete work on a satellite project. In that sense, the secrecy of Soviet society and the openness of American culture put American scientists at a greater disadvantage. If the Soviets could at least roughly discern American intentions and schedules, the converse was invariably impossible. Yet, despite the broader circumstances of *Sputnik*, we cannot minimize the efforts of a few key individuals: *Sputnik*'s first place finish was as much a creation of the Cold War competition as it was of the genius of men like Korolev, Tikhonravov, and Keldysh, and Ryabikov, fortunately for the Soviets, made exactly the right decision at the right time.

References

- [1] For a detailed account of the actual events leading up to the launch of *Sputnik*, see A.A. Siddiqi, *Iskusstvennyy sputnik zemli: The launch of the World's first artificial satellite 50 years ago*, *Spaceflight* 49 (2007) 426–442.
- [2] Yu. Mozhorin, A. Yeremenko, *Ot pervykh ballisticheskikh do... Aviatziya i Kosmonavtika* 7 (1991) 40–41.

- [3] For details, see A.A. Siddiqi, *Sputnik and the Soviet Space Challenge*, University Press of Florida, Gainesville, 2003, pp. 84–86.
- [4] V. Baberdin, *Zdes' nachinal'sya voyenny kosmos*, *Krasnaya Zvezda* April 30 (1994) 4; I. Yatsunskiy, *O deyatel'nosti M.K. Tikhonravova v period s 1947 po 1953 gg. po obosnovaniyu vozmozhnosti sozdaniya sostavykh raket*, *Iz Istorii Aviatsii i Kosmonavтики* 42 (1980) 31–38.
- [5] M.K. Tikhonravov, et al., *Predvaritel'nyy otchet No. 571: Issledovaniya po voprosu sozdaniya iskusstvennogo sputnika zemli*, April 2, 1955, cover, table of contents, and conclusion in possession of the author. A censored version of the report was published later as M.K. Tikhonravov et al., *Osnovny teorii poleta i elementy proyektirovaniya ISZ*, Mashinostroyeniye, Moscow, 1967.
- [6] Hardware development for the cruise missiles was assigned to S.A. Lavochkin's OKB-301 (for the *Burya*) and V. M. Myasishchev's OKB-23 (for the *Buran*). Although the *Burya* was flight tested a number of times in 1957–1960, both programs were cancelled by 1960 and neither were deployed.
- [7] In his diaries, Tikhonravov noted at least a dozen meetings from January to March 1954 on the satellite proposal, most of them at Keldysh's office at the Academy of Sciences. See M.K. Tikhonravov, *Diary Notes, 1950–1966*, daily entries for January, February, and March 1954.
- [8] Tikhonravov *Diary*, daily entries for March 16 and May 25. For a summary of the meetings in early 1954, see B.V. Raushenbakh, ed., *Materialy po istorii kosmicheskogo korablya 'Vostok'* (Moscow: Nauka, 1991), pp. 208–10; Ya.K. Golovanov, *Korolev: fakty i mify*, Nauka, Moscow, 1994, pp. 518–20. Besides P.L. Kapitsa, scientists involved in these discussions included S.E. Khaykin (physics), I.A. Kibel' (geophysics), B.V. Kukarkin (astronomy), and S.N. Vernov (physics).
- [9] Tikhonravov *Diary*, daily entry for March 14, 1954. Tikhonravov was referring to G.A. Tyulin, deputy director of NII-4, whom Korolev met on March 13, 1954.
- [10] S.P. Korolev, *O vozmozhnosti razrabotki iskusstvennogo sputnika Zemli*, in: M.V. Keldysh (Ed.), *Tvorcheskoye nasledie Akademika Sergeya Pavlovicha Koroleva: izbrannyye trudy i dokumenty*, Nauka, Moscow, USSR, 1980, p. 343. Various reliable sources cite different dates (May 26 or May 27) and recipients (only D.F. Ustinov in most sources, while V.M. Ryabikov, G.N. Pashkov, and D.F. Ustinov in others) for this important letter.
- [11] M.K. Tikhonravov, *Dokladnaya zapiska ob iskusstvennom sputnike zemli*, in: *Materialy po istorii kosmicheskogo korablya 'Vostok'*, pp. 5–15.
- [12] Yu.P. Semenov (Ed.), *Raketno-kosmicheskaya korporatsiya 'Energiya', 1946–1996*, RKK Energiya, Korolev, 1996, p. 86. The proposal was signed by V.A. Malyshev, B.L. Vannikov, M.V. Khrunichev, and K.N. Rudnev.
- [13] *Otchet o deyatel'nosti komissii po mezhplanetnym soobscheniyam*, January 12, 1956, *Archive of the Russian Academy of Sciences (ARAN)*, f. 472, op. 1, d. 380, l. 22.
- [14] *Ob uchrezhdenii zolotoy medalii imeni K.E. Tsiolkovskogo*, September 24, 1954, *ARAN*, f. 2, op. 6, d. 176, ll. 151–152.
- [15] This was probably a proposal to quickly build a two-stage launch vehicle by using as the first stage an R-5M missile and as second stage, an R-11 missile. On August 9, 1957, OKB-1 completed a preliminary study of a satellite weighing 40–50 kgs which could be launched either by a modified R-5 or just the core of the R-7. See B.V. Raushenbakh, G.S. Vetrov, S.P. Korolev i ego delo: svet i teni v istorii kosmonavтики, Nauka, Moscow, 1998, p. 667.
- [16] V.V. Molodtsov, *Pervyye kosmicheskiye proyekty (k 40-letiyu zapuska 1 ISZ)*, *Zemlya i Vselennaya* 4 (1997).
- [17] V.A. Yegorov, *Iz vospominaniy o M.L. Lidove*, *Kosmicheskie issledovaniya* 39 (5) (2001) 451–453.
- [18] V.P. Lishevskiy (Ed.), *Ocherki o deyatelyakh Rossiyskoy nauki i tekhniki*, Nauka, Moscow, 1999, pp. 222–225; *Science and Technology Series*, Air Information Division, L.I. Sedov: *A Survey and Evaluation of His Works and Activity*, AID Report 61-136, September 25, 1961.
- [19] Tikhonravov *Diary*, daily entry for September 20, 1954.
- [20] For Keldysh's involvement, see Lishevskiy, *Ocherki o deyatelyakh Rossiyskoy nauki i tekhniki*, p. 224. For Korolev's visit, see *Testimony of G.A. Skuridin in: A.Yu. Ishlinskiy (Ed.), Akademik S.P. Korolev: ucheniy, inzhener, chelovek*, Nauka, Moscow, 1986, p. 453.
- [21] On February 1, 1955, Tikhonravov met with commission chairman L.I. Sedov, noting in his diary that "another report is needed [for the commission]." Later, on March 11, Tikhonravov called Korolev to discuss specifically the work of the commission. Tikhonravov *Diary*, daily entries for February 1 and March 11, 1955.
- [22] *Komissiya po mezhplanetnykh soobshcheniy*, *Vechernyaya Moskva*, April 16, 1955.
- [23] *Interplanetary commission created: Russians planning space laboratory for research beyond earth's gravity*, *Washington Post*, April 17, 1955.
- [24] H. Schwartz, *Russians already striving to set up space satellite*, *New York Times*, July 30, 1955.
- [25] S. Alsop, *Debate on the satellite*, *Washington Post*, May 25, 1955.
- [26] CIA, *National Intelligence Estimate Number 11-12-55, Soviet Guided Missile Capabilities and Probable Programs*, December 20, 1955, *NASA HQ Archives*, Box for CIA NIEs.
- [27] In October 1954, IGY scientists had proposed launching satellites as part of the program. See H.S. Jones, *The inception and development of the international geophysical year*, in: M. Nicolet (Ed.), *Annals of the International Geophysical Year, vol. I: The Histories of the International Polar Years and the Inception and Development of the International Geophysical Year*, Pergamon Press, London, 1959, pp. 392–393; W. Sullivan, *Assault on the Unknown*, McGraw-Hill, New York, 1961, pp. 28–30.
- [28] W. McDougall, *...the Heavens and the Earth: A Political History of the Space Age*, Basic Books, New York, 1985, pp. 119-121; R.C. Hall, *Origins of U.S. space policy: Eisenhower, open skies, and freedom of space*, in: J.M. Logsdon, et al. (Eds.), *Exploring the Unknown: Selected Documents in the History of the U.S. Civil. Space Program, vol. 1: Organizing for Exploration*, NASA, Washington, DC, 1995, pp. 213–229.
- [29] J.R. Killian Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology*, The MIT Press, Cambridge, MA, 1977, pp. 11–12, 70–82; D.A. Day, *Cover stories and hidden agendas: early American space and national security policy*, in: R.D. Launius, J.M. Logsdon, R.W. Smith (Eds.), *Reconsidering Sputnik:*

- Forty Years Since the Soviet Satellite, Harwood Academic, Amsterdam, 2000, pp. 161–195.
- [30] Kaplan to Waterman, May 6, 1955, reproduced in *Exploring the Unknown*, pp. 302–303. For the attachment see p. 308.
- [31] National Security Council NSC 5520, Draft statement of policy on U.S. scientific satellite program, in: *Exploring the Unknown*, May 20, 1955, p. 309.
- [32] M.J. Neufeld, Orbiter, Overflight, and the first satellite: new light on the Vanguard decision, in *Reconsidering Sputnik*, p. 239.
- [33] Comments on the Report to the President by the Technological Capabilities Panel of the Science Advisory Committee, June 8, 1955, White House Office, Office of the Special Assistant for National Security Affairs: Records, 1952–1961, NSC Policy Papers, Box 16, Folder NSC 5522 Technological Capabilities Panel, A55-A56, Dwight D. Eisenhower Library, Abilene, KS. Historian Dwayne Day notes that by late 1956, the NSC de-emphasized the need to be first in favor of other rationales such as establishing the “freedom of space” principle and the need to produce substantive scientific results. D. Day, Cover stories and hidden agendas, pp. 179–180.
- [34] W. Lafeber, *America, Russia and the Cold War, 1945–2000*, ninth ed., McGraw-Hill, Boston, 2002, pp. 186–187; S.N. Khrushchev, *Nikita Khrushchev and the Creation of a Superpower*, Penn State Press, University Park, PA, 2000, pp. 155–156.
- [35] Statement by James C. Hagerty, The White House, in: *Exploring the Unknown*, July 29, 1955, pp. 200–201.
- [36] *Mezhdunarodnoy astronavticheskoy federatsiy*, Pravda, August 5, 1955.
- [37] G.A. Skuridin, Keldysh’s secretary who worked in Sedov’s interplanetary commission (and also knew about Korolev’s work), implies as such. Testimony of G.A. Skuridin in: *Akademik S.P. Korolev*, p. 453; G.A. Skuridin, *S.P. Korolev i pervyy iskusstvennyy sputnik Zemli, Zemlya i Vseleennaya*, 5 (1982) 57–61.
- [38] Russians say they intend to beat U.S. in launching first unmanned satellite, *Washington Post*, August 3, 1955; We’ll launch 1st moon, and bigger, says Russ, *Los Angeles Examiner*, August 3, 1955; J. Hillary, Soviets planning early satellite, *New York Times*, August 3, 1955.
- [39] Manned space ships will reach moon by end of century, scientists predicts, *Washington Post*, August 4, 1955; L. Parrott, U.N. role is urged in satellite race, *New York Times*, August 4, 1955; Alsop, The real satellite story; H. Oberth, Why the race to the moon?, *Washington Post*, October 2, 1955.
- [40] This body was known as the Special committee of armaments for the Army and Navy. See A. Kruglov, *Shtab atomproma*, TsNIIatominform, Moscow, 1998, pp. 107, 117.
- [41] Khrunichev, Ryabikov, and Korolev to Khrushchev and Bulganin, August 1955, *Archive of the President of the Russian Federation (APRF)*, f. 3, op. 47, d. 272, ll. 41–43.
- [42] B.V. Raushenbakh, G.S. Vetrov, S.P. Korolev i ego delo, p. 662.
- [43] O sozdanii iskusstvennogo sputnika Zemli, August 18, 1955, *APRF*, f. 3, op. 47, d. 272, l. 40.
- [44] Cover letter to S.P. Korolev, *Predvaritel’nyye dannyye o prosteyshe sputnike*, in: *S.P. Korolev i ego delo*, September 3, 1953, p. 189.
- [45] Korolev to Nedelin, in: *S.P. Korolev i ego delo*, December 27, 1955, p. 204.
- [46] S. Korolev, K voprosu o primeneni raket dlya issledovaniya vysokikh sloyev atmosfery, in: *S.P. Korolev i ego delo*, pp. 190–200.
- [47] Tikhonravov Diary, daily entries for November 23, November 24, November 26, and December 29, 1955.
- [48] S.P. Korolev, Tezisy doklada o razrabotke eskiznogo proekta iskusstvennogo sputnika Zemli, in: *Tvorcheskiye naslediye*, September 25, 1956, pp. 362–368; V. Gubarev, Pod’em na sputnik, *Pravda*, October 3, 1982.