

Dominic Phelan (Editor)

Cold War Space Sleuths

The Untold Secrets of the Soviet Space Program

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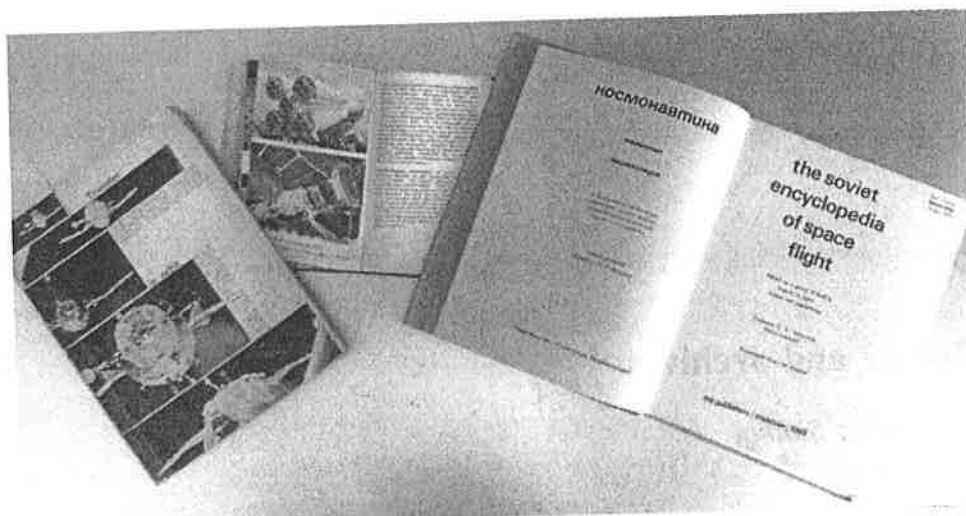
People and archives

By Asif A. Siddiqi

What I'd like to do here is to tell three stories that I hope are loosely connected. The first is a brief personal account of how I got interested in the history of the Soviet space programme, joining others in the West who were trying to uncover its secrets. When I began to study the Soviet space programme in the late 1970s, the names of its major architects were little known. In the second part of the essay, I explain how the names and identities of the most prominent designers behind the programme came to public attention. They include Sergei Korolev, Valentin Glushko, Mikhail Yangel, Vladimir Chelomey, and Vasily Mishin. Whilst I was not personally involved in this sleuthing – which occurred mostly in the 1960s and 1970s – the process of pulling back the curtains was very influential in my own work. Finally, in the concluding section, I build on the first two sections – the personal and the investigative aspects of sleuthing – and present some reflections on my journey into the *archives* in the post-Soviet period. I show how some of my work has helped to deepen our knowledge of the lives and works of men like Korolev, Glushko and Chelomey, and how my own voyage into the depths of the programme has come full circle: I have now met many veterans who worked with men like Korolev and Chelomey, giants whose very lives and works I was trying to uncover.

A PERSONAL JOURNEY

Like many others who were drawn to the study of the Soviet space programme, I was captivated at an early age. My first memory of a Soviet space “event” was in 1977 when I was aged eleven and living in Manchester, England. I have a distinct memory of cutting out a newspaper story on Soyuz 25, which had failed to dock with the new Salyut 6 space station. Later, I watched in wonder as British television showed grainy (but colour!) footage of cosmonauts Romanenko and Grechko inside Salyut 6. My family soon returned to Bangladesh for several years, but my interest only grew in leaps and bounds. To the alarm of my parents, I obsessively listened to



9.1: An introduction to Soviet spaceflight with *Transfer in Orbit* (left), the *Observer's Book of Manned Spaceflight* and the *Soviet Encyclopedia of Spaceflight*.

the English-language radio broadcasts of Radio Moscow. Inevitably, every single day there would be a news report on what the cosmonauts on Salyut 6 were up to. It was an exciting time for me and I was a fast learner. Fortunately, in Dhaka we lived very close to the Russian Cultural Centre, which had a superb library where I first perused through many English-language books on the Soviet space programme, including one of my all-time favourites, *Transfer in Orbit*, an illustrated book on the Soyuz 4 and 5 docking in January 1969 [1].

In 1978 my father bought me a copy of the *Soviet Encyclopedia of Spaceflight*, another English-language book edited by one "G. V. Petrovich" which I prized [2]. This lovely volume, originally published in mid-1969, was obviously intended for the foreign market. While the illustrations were of poor quality, this was compensated by the essay entries, especially on personalities from the history of Soviet cosmonautics. And this "Petrovich" fellow had also included a complete list of all Soviet launches from 1957 to 1969 – an absolute treasure for me as I pored over the various satellites, mysteriously all named "Kosmos".

Following Salyut missions

The late 1970s was a time of rebirth for the Soviet space programme: each long-stay mission to Salyut 6 set new endurance records; the station itself could receive two spaceships simultaneously, and to top it all off, there was a new cargo version of the Soyuz named Progress that could remotely dock with the station. At 3:00 p.m. every day I wrote copious notes from Radio Moscow about magnificent cosmonauts with enigmatic names such as Romanenko, Grechko, Kovalenok, Ivanchenkov, Lyakhov, Ryumin, Popov and so on.

But even at this early stage, I sensed that the official Soviet pronouncements told

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only part of the whole story. I had a treasured copy of *The Observer's Book of Manned Spaceflight* by Reginald Turnill, the very first space book I ever purchased in Manchester [3]. More than anything, this wonderful little book hinted at obfuscations and omissions in the received story of the Soviet space programme. For example, why weren't the names of cosmonauts given in advance? And who were the backup crews? My interests at that time gravitated less towards the hardware than the people behind this enigmatic adventure, and in particular the cosmonauts. I started to piece together possible backup crews for Soviet space missions, but the absence of Western literature in Bangladesh made this very difficult. All I had were Soviet journals such as *Ogonek*, *Soviet Life*, and such, some of which were actually published in Bengali.

My early attempts at 'space sleuthing'

In 1981 my parents bought me a copy of *Red Star in Orbit* by James E. Oberg [4]. It would be an understatement to say that my world view was transformed. I practically memorised the entire book, and re-read a hundred times the end section where Oberg listed still unanswered questions. Oberg's book also introduced as a real character to my worldview, the person of Sergei Korolev, who had been prominent but not unduly so in "Petrovich's" encyclopedia. Further acquisitions followed, most notably the Congressional Research Service's series of volumes under the general title *Soviet Space Programs* [5]. In leaps and bounds, I internalised the minutiae of the Soviet space programme, to the alarm of my family who must have thought I'd gone insane.

By 1982, I wrote a history of the Soviet space programme running to almost fifty pages (which I still have) based on various English-language sources. Only much later did I realise that my work was still far, far behind such Western luminaries as Geoffrey E. Perry (1927-2000), Charles S. Sheldon (1917-1981), James E. Oberg, Nicholas L. Johnson, and Phillip S. Clark. But this early attention to detail, repeating (albeit rather poorly) what others had done before, was immensely useful in laying a foundation. Once I permanently moved to the United States in 1985, aged eighteen, I was able to make use of a vast canon of English-language literature on the Soviet space programme and start to draw my own conclusions. As is no doubt evident from this volume, much of this ground-breaking work that I made use of was published in the pages of *Spaceflight* and the *Journal of the British Interplanetary Society*, two journals which were the gospel to me in the 1980s. Exposure to the research of the British contingent – especially Rex Hall (1946-2010), Phillip Clark, R. F. Gibbons, Gordon R. Hooper, and Neville Kidger (1953-2009) – was crucial in filling in the gaps.

Glasnost transforms everything

If the first transformative event in terms of my Soviet space "education" was my initial exposure to the Soviet space programme in the late 1970s, something equally transformative occurred in the late 1980s – *glasnost*. This period of "openness" let



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9.2: With veteran cosmonaut Vladimir Shatalov, one of the leading candidates for a Soviet moonlanding, at Star City in May 2006.

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loose the floodgates of information on the history and present of the Soviet space programme. It was hard to keep up with the deluge, particularly in the pages of not only *Spaceflight* and *JBIS* but also other short-lived publications such as *Zenit* and *Spaceflight News*. What grabbed most of my attention at the time (and probably for others too) were the revelations concerning the Soviet manned lunar programme. Soviet censors first allowed references to the programme in the summer of 1989.

Using some of the initial trickle, in 1991 I wrote and "self-published" a 100-page brochure called *The Soviet Piloted Lunar Programme*, and sent it to a few friends, but the information was coming at such a rate that it was obsolete after a few months. At this time, it was evident that I was learning about the Soviet lunar programme from English-language sources, particularly the work of such pioneering sleuths as Clark (a hero of mine) and Johnson, the latter of whom published *The Soviet Reach for the Moon* in 1994 [6]. But the more I read, the more curious I got. Perhaps I ought to go to the horse's mouth and track down the original Russian-language sources used by others? Using translated Russian sources, in 1994 I published my first articles on the history of the Soviet space programme. One was a two-parter on the organisation of their effort in *Spaceflight*, and the other was a lengthy scoop on the so-called Nedelin disaster in the U.S. magazine *Quest* [7].

Decision to study Russian

My decision in 1991 to use Russian sources instead of English-language ones led me down an unexpected path when I set out to write a comprehensive monograph on the history of the Soviet space programme based largely on Russian-language sources.

It was at this time that I made contact with another Russian space sleuth who had a profound impact on my future trajectory. In early 1993 I began communicating via e-mail with Dennis Newkirk, a young American writer who had recently published the *Almanac of Soviet Manned Space Flight* [8]. Dennis began to send me everything that he was collecting from writers all around the world, and soon we began to collaborate on a history of the Functional Cargo Block (FGB), a spacecraft that was intended to serve as a key element of the new International Space Station (ISS). Dennis and I dug quite deep, collecting an enormous amount of data and determined the intricate history of the FGB and its former role as part of the Transport-Supply Ship (TKS) of the Almaz programme. We also identified the Khrunichev factory as being part of a larger and convoluted network of design bureaus and factories which had been formerly linked to Vladimir Chelomey and Vladimir Myasishchev, two of the most prominent Soviet aerospace chief designers. We presented the results of our research at the annual meeting of the Society for the History of Technology (SHOT) in 1995 [9].

More than anything, Dennis encouraged me to keep working on my book about the history of the Soviet space programme. He put me in touch with Glen Swanson, editor of *Quest*, a fledgling new journal on the history of spaceflight that published many new revelations on the history of the Soviet space programme. Glen in turn helped me contact Roger Launius, the chief historian at NASA who serendipitously found some value in my notion to write a comprehensive history. Roger helped me to

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bring to fruition five years of dedicated work by having the NASA History Office publish in the year 2000 my *Challenge to Apollo: The Soviet Union and the Space Race, 1945-1974* [10]. Even after publication, I kept in touch with Dennis although owing to his full-time job and family obligations (he married and had a son) he was able to devote less and less time to sleuthing himself. Tragically, on 12 April 2012 Dennis passed away in Barrington, Illinois (a suburb of Chicago) from cancer. He was only 47 years old [11].

KHRUSHCHEV'S SECRECY

One of the biggest challenges in writing *Challenge to Apollo* was to offer a human side to the story of the Soviet space programme. This meant investigating in depth the lives of the principal players. I wanted to go beyond simply regurgitating information about Korolev and Glushko, and dig deeper. When my interest was first awakening in 1977, I had no idea who actually was "behind" it all. Korolev, Glushko and Yangel are now widely known, but until the late 1980s such names had little meaning for most of us. The books I owned (such as Turnill's) all seemed to communicate only a general impression, perhaps mentioning Korolev but only in the vaguest terms. Given the dearth of details about these men, my interest was piqued. And more recently, I have kept returning to a simple question: How did these names come to be known? Clearly they didn't suddenly appear into public view. What was the process? Who were the Westerners who found them out? This then is the subject of the next part of my essay.

Sergei Pavlovich Korolev (1907-1966) is rightly considered the founder of the Soviet space programme. Not surprisingly, there has been an enormous amount of scholarship devoted to his life and activities. As is well-known, during his lifetime the Soviet government went to extraordinary lengths to ensure that his identity (and indeed those of other prominent space designers) remained unknown. In a speech in 1958, Soviet Communist Party First Secretary Nikita Khrushchev famously said:

The Soviet atomic specialists or the experts who created the intercontinental rocket and the artificial earth satellites have no complaints about the socialist state. . . . The Soviet government rewards them; they are materially well taken care of and many of them have received Lenin Prizes and the Order of Hero of Socialist Labour. They 'suffer' a little only in one respect: for the time being they are anonymous to the outside world. They live under the title: 'Scholars and engineers working on atomic and rocket technology.' But who these people really are is now widely unknown. For those who created the rockets and artificial earth satellites we will raise an obelisk and inscribe their glorious names on it in gold so they will be known to future generations in the centuries to come. Yes, when the time comes photographs and the names of these glorious people will be published and they will become broadly known among the people. We value and respect these people highly and assure their security from enemy agents who might be sent to destroy these outstanding people, our

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valuable cadres. But now, in order to guarantee the security of the country and the lives of these scholars, engineers, technicians, and other specialists, we cannot make their names public or print their pictures. [12]

Since that time, it has become an oft-repeated truism in history books that during Korolev's lifetime there was no indication of the true identity of the so-called Chief Designer. Occasionally Westerners might hear about this enigmatic man, but until his death no one knew who he was. This is only partially true. While his identity was a closely guarded secret in the Soviet Union, his name was actually widely known in the West *before* his death. A number of Western analysts, by intelligent deductions, had managed to identify him as the "Chief Designer". In addition, these revelations appeared not only in obscure media but in major publications such as *Spaceflight*, the *New York Times*, and *Fortune* magazine.

The designer who came in from the cold

Korolev did not live an anonymous life. In fact, prior to his career in the rocket and space business, he was a fairly well-known designer of gliders in the 1930s [13]. By the time that he was in his early twenties, newspapers and magazines were already writing about him. He, in turn, authored a number of important articles on aviation. For example, the official military newspaper, *Krasnaya zvezda* (*Red Star*) published several pieces on the impressive performance characteristics of his SK-3 glider, also coincidentally named *Krasnaya zvezda* [14]. In 1931 his SK-4 was featured on the cover of the official journal of the Soviet Air Force, *Vestnik vozdushnogo flota* (*Journal of the Air Fleet*) as a "new Soviet long-range light-aircraft designed by S. Korolev" [15]. In other words, by the early 1930s Korolev's name was well-known amongst a fairly broad group of aviation enthusiasts in the Soviet Union. His first and only monograph, *Raketnyy polet v stratosfere* (*Rocket Flight into the Stratosphere*), published in late 1934, was not a book about space exploration but about high-speed rocket-powered aviation. The editor's introduction in the book stated confidently:

The author, pilot-engineer S. P. Korolev, in his work depicts the significance of the struggle to achieve great flight altitudes and underscores the capabilities of reactive flying vehicles as the most important means to achieve this goal. In the work, [the author] deals with experiments carried out with reactive flying vehicles; for the first time in our literature the design of modern reaction engines are shown and problems outlined which will allow the accomplishment of reactive flight of humans into the stratosphere. [16]

The book was positively reviewed in a number of different places, bringing his name to a wide audience [17].

As Korolev became deeply involved in military rocketry at the Reactive Scientific-Research Institute (RNII) in the 1930s, his public profile faded. There were few open details of his work on rockets at the time. Most of his research was focused on cruise missiles and rocket-powered gliders, both of which had military applications. The

last article under his own name published before the onset of World War II was issued in 1937 when he wrote a brief review of several recent books on stratospheric aviation [18]. His arrest and subsequent incarceration, beginning 1938, ensured that his name was entirely absent from any public discussion during the war [19]. Unless one was (in)famous, convicted prisoners were hardly mentioned in the Soviet press. Korolev simply disappeared, both in body and in mind, and his brief fame in the early 1930s became a forgotten footnote in the history of Soviet aviation.

As is well-known, Korolev was released from prison in 1944 and two years later was appointed one of several Chief Designers at a new rocket development institute (NII-88) located in the northeastern Moscow suburb of Kaliningrad. His position and work were top secret, and like almost all the other designers of weapons systems, he kept out of the public eye. In the decade between his appointment as Chief Designer and the launch of Sputnik his name *did* appear in official print, but only in a context that would not allow anyone to guess his "real" duties. In September 1957, just a few weeks prior to Sputnik, he delivered a prominent speech to commemorate the 100th birthday of the founding theorist of Soviet cosmonautics, Konstantin Tsiolkovsky. An abridged version was published on page 2 of *Pravda* as part of a special tribute to the late Tsiolkovsky. Korolev carefully, and perhaps intentionally, observed that "in the near future, for scientific purposes, the first trial launches of artificial satellites of the Earth will take place in the USSR and the USA". (Both nations had announced their intention to put up a satellite to mark the International Geophysical Year.) He signed simply as "S. Korolev, Corresponding Member of the USSR Academy of Sciences" [20]. In fact, this would be the very last article that Korolev published under his own name during his lifetime.

CIA sources wrong

What did Western observers know about Korolev during this period? One would expect that intelligence analysts at the Central Intelligence Agency would have had the best opportunity to uncover Korolev's identity. For certain, he would have been a high value target, given his prominence as the Chief Designer of the Soviet ICBM. Yet strangely enough, the declassified records of the CIA rarely mention his name, and when his name occurs it is never as a leading scientist or a chief designer. Most of the information on Soviet rocketry came from interviewing German specialists. Many of these men had known Korolev quite well, especially during the time that the Germans helped the Soviets to establish assembly and production of local versions of the V2 missile. By 1953 almost all of them had returned to the German Democratic Republic (East Germany) and subsequently the Federal Republic of Germany (West Germany). But anticipating that these specialists would eventually be deported, after late 1947 the Soviets had isolated them from mainstream rocket development [21].

Once these men were back in the West, the intelligence agencies sought them out and interviewed them for information on Soviet missiles. Some of this information actually leaked out in the 1950s. For example, the wife of Helmut Gröttrup, probably the most prominent German engineer who had worked with the Soviets, published a colourful memoir in German. Filled with inaccuracies and exaggera-

tions, the engineers' information at the end of the war showed that the classified list included 100 names, of which 70 were listed and what these listed only.

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tions, the memoir nevertheless provided a peek into the social history of German engineers kidnapped to work on Soviet rockets [22]. The CIA, which had better information, kept its data under wraps and most of this analysis was unknown until the end of the Cold War, when it declassified thousands of documents. These clearly show that the agency was interested in identifying important personalities. In a classified report issued in 1953, the agency included a list of personalities that included Boris Chertok, Lev Gaydukov and Yuri Pobedonostsev. Yet these names were listed in very general terms and it is evident that the CIA knew very little about what these men were actually doing at the time. "Korolov" (sic), for example, was listed only as "former deputy at Bleicherode" [23].

In another report on Soviet guided missile development that was issued in 1960 (presumably after more interviews with the returned Germans) the CIA once again listed several important leaders: Boris Chertok, Lev Gonor, Boris Konoplev, Vasily Mishin, Yuri Pobedonostsev, Konstantin Rudnev, Mikhail Ryazansky, Mikhail Tikhonravov, Georgi Tyulin and Leonid Voskresensky. Although this would seem to be a very good list of the top designers in the late 1950s, most of the information was dated to the late 1940s and the CIA had no information about what these men were up to in more recent years. About Korolev, the agency wrote: "[i]t was generally agreed that the most talented Soviet engineer-designer at NII-88 was a Colonel Sergei P. Korolev." As with the others, the CIA had no information from the late 1950s. In the 1960 report they noted that Korolev was a "chief designer as of 1951" but could not say what he was doing after that year [24]. And even more remarkably, there was no mention of Valentin Glushko, Chief Designer of the rocket engines that powered the first Soviet ICBM.

West fooled by 'front men'

Overall, while the CIA's understanding of the technological aspects of the Soviet space programme had some basis in reality, its view of the management was poor, especially in the early years. For example, as late as April 1961 the CIA claimed that the Soviet space programme was directed by something known as the "Inter-agency Commission for Interplanetary Communications under the Astronomy Council of the Academy of Sciences" [25]. Such a commission had actually been announced by the Soviet media as long ago as 1954 but it was mentioned less after Sputnik; only after the Cold War did it turn out that this supposed Commission was actually a "cover" institution set up by the Soviets to publicise their participation in the International Geophysical Year [26]. In the United States, the two best-known *public* personalities linked with Soviet spaceflight actually had little to do with either Sputnik or Vostok – Academicians Leonid Sedov and Anatoli Blagonravov were, respectively, prominent scientists in gas dynamics and machine science. Both men travelled abroad frequently and were quoted widely in Western European and American newspapers as scientific and technical leaders of the Soviet space effort. With very little to go on, journalists simply assumed that Sedov and Blagonravov worked at the highest levels. However, these men only had a peripheral relationship with the heart of the space programme. The renowned Soviet journalist Yaroslav

Golovanov later wrote that these “public” spokespersons “were so ensnared by what they had signed about not disclosing governmental secrets, that they uttered only banalities” [27].

Chief Designer’s secret identity

After Sputnik, Korolev’s name disappeared from public view. Nevertheless, he and Glushko wrote frequently in the official Soviet press as “Professor K. Sergeev” and “Professor G. V. Petrovich” respectively, simply by playing with their names: Sergei Pavlovich Korolev and Valentin Petrovich Glushko. French space sleuths Christian Lardier and Claude Wachtel pioneered the study of these pseudonyms and identified dozens of fake names used by real designers. The end of the Cold War confirmed many of their guesses, and Lardier was able to present a complete summary of this research in 1996 [28].

Korolev’s articles usually appeared in the official Soviet party newspaper *Pravda* every new year’s day – a very high honour accorded to influential Soviet dignitaries. His first article using his pseudonym was published in December 1957, only weeks after the spectacular successes of the first two Sputniks. Note that he had written an article under his *real* name just two months earlier to mark the 100th anniversary of Tsiolkovsky’s birth; he had returned to the “black world”. Although Korolev’s many pseudonymous articles were very general in nature, they typically anticipated new Soviet developments in space exploration the following year; in other words, they usually dealt with the vast possibilities of the future [29]. Glushko’s articles, on the other hand, were often historical in nature, and focused on the activities of the Gas Dynamics Laboratory (GDL) in the late 1920s and early 1930s where he served his apprenticeship. For example, on the occasion of the joint flight of Andrian Nikolayev on Vostok 3 and Pavel Popovich on Vostok 4 in August 1962, Glushko wrote a long two-part article in the newspaper *Komsomol’skaya pravda* as “G. Petrovich” on the early history of Soviet rocketry [30]. Glushko also wrote many articles for the official journal of the Academy of Sciences which would be closely scrutinised by Western analysts for information on Soviet space technology such as the early Sputniks or the Proton booster.

Korolev named in the West

Yet, even during this period, there were already rumours about Korolev and Glushko in the West. Korolev’s name (and his possible role in the Soviet space programme) first appeared in print in the Western press through leaks from Soviet defectors or from American journalists stationed in Moscow. In September 1961, a former Soviet citizen, Grigory Aleksandrovich Tokaty-Tokaev (1910-2003), gave a talk on Soviet spaceflight at the British Interplanetary Society (BIS) in London. Tokaty had been a representative of the Soviet Air Force in occupied Germany after the war in 1945. Although he didn’t have much contact with the Nordhausen Institute responsible for recovering German rocket technology, he picked up a particularly unique assignment. In 1947, Stalin assigned him to lead a small team to

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kidnap the Austrian aeronautics pioneer Eugen Sänger and bring him back to the Soviet Union. The idea was to have Sänger work in a Soviet design bureau (OKB-3 under Gherman Moisev) and help the Soviets to develop the so-called antipodal bomber for intercontinental flight [31]. While on his mission in occupied Germany in late 1948, Tokaty defected to Britain where he lived for the rest of his life [32].

Tokaty had had little direct contact with the Soviet missile programme, and later grossly exaggerated his role in the postwar missile effort by claiming that he was the "chief rocket scientist" of the Soviet Union, when in fact there was no such position. Some of his information was also clearly wrong or exaggerated [33]. Yet Tokaty did know several key facts about the Soviet missile programme which were unknown to the general public. He was the first person in the West to openly suggest that Sergei Korolev was involved with the Sputniks and Vostok. In his 1961 lecture to the BIS, Tokaty said Korolev was "one of the chief designers of rockets for carrying Sputniks and Vostok capsules". He also mentioned Valentin Glushko, but was unsure of his exact role in the successes of Sputnik and Vostok. The text of Tokaty's speech was published in several different places but few people paid attention [34].

Reports on Korolev and Glushko's true identities continued to emerge from time to time in the early 1960s. For example, in November 1963, during the wedding of cosmonauts Andrian Nikolayev and Valentina Tereshkova, Western correspondents were invited to the reception – and learned through informal conversation that two important scientists from the Soviet space programme were in attendance, "S. P. Korolev" and "V. P. Glushko". Shortly thereafter, Theodore Shabad (1922-1987), an enterprising journalist for the *New York Times*, published a story identifying Korolev and Glushko as "likely two figures in the Soviet space programme". He was not sure which one of the pair was the "Chief Designer of Rocket-Space Systems" and which was the "Chief Designer of Rocket Engines", but it appeared that they were of equal importance. Shabad incorrectly claimed that Glushko had worked with Soviet rocket engineer Fridrikh Tsander in the 1930s [35].

Conclusive identification

Around this time, quite independently, the Aerospace Information Division (AID) at the Library of Congress came to the same conclusion concerning Korolev's identity. Where the *New York Times* had felt unsure of their guess, AID was the very *first* Western organisation to confidently pinpoint the identity of the mysterious "Chief Designer". And it bears repeating that they identified Korolev long before the CIA. The Library of Congress based its research on a detailed analysis of all of the open Russian-language literature on rocketry between 1934 and 1964 [36].

The strategy they used to identify Korolev was rather interesting. In 1962, the publisher "Sovetskaya rossiya" issued a book by the title *Nashi kosmicheskiye puti* (*Our Paths in Space*) containing various essays and documents from the early years of the Soviet space programme. It matched the usual archetype of early Soviet space publications, with pages and pages of press releases, descriptive passages, laudatory poems in honour of the socialist cause, and few if any details of actual space flights. But a careful reading of the articles showed that one must be creative in seeking the

secrets of the Soviet space programme. One of the articles in the book, 'Vse li my znayem o tsiolkovsom?' ('Do we know everything about Tsiolkovsky?') was by Mikhail Saulovich Arlazorov (1920-1980), a biographer of Konstantin Tsiolkovsky. In recounting some events from Tsiolkovsky's later years, Arlazorov mentioned that the late scientist had been invited to something called the All-Union Conference on the Use of Reactive Vehicles for the Study of the Upper Layers of the Atmosphere, held in Moscow in 1935. Tsiolkovsky had apparently declined the invitation due to health reasons; he actually died later that year. Arlazorov noted that "among [the list of those] who presented papers at the conference is the name of the chief designer of the Vostok spaceship". This was a key piece of the puzzle for the investigators at the Library of Congress, because the names of all the presenters of this conference had been published openly in the 1930s. So the researchers could start working through this list. But they needed more information to narrow down the search.

They found this in the essay when Arlazorov described a letter that Tsiolkovsky had received from the semi-governmental GIRD rocketry group. This organisation, the Group for the Study of Reactive Propulsion, was one of the first Soviet rocket research groups; by the early 1960s publications in the Soviet media had begun to discuss the work of GIRD. In his essay, Arlazorov described several artefacts from GIRD's work – letters, testimonials, memoirs, etc. One letter he quoted was rather interesting. He noted "[h]ere is a letter from the leaders of the Moscow GIRD", and then he provided a quote from the letter, presumably written by someone in GIRD: "Many qualified engineers are working with us, but the best of them is..." At this point Arlazorov censored the letter, saying that "here follows the name of the chief designer of the Vostok spaceship..." Obviously, Arlazorov was not allowed to print this name. He provided another clue:

The future chief designer mailed a book to Kaluga [where Tsiolkovsky lived] but without his return address. "I do not know how to thank him for his kindness," wrote Tsiolkovskiy, "Thank him for me, if possible, or send me his address." [37]

Based on this information, the Library of Congress concluded that: (1) the Chief Designer had read his paper at the All-Union Conference in 1935; (2) he was the best engineer working at GIRD; and (3) he had sent his recent book to Tsiolkovsky in Kaluga. The last piece of information proved particularly useful. The Library of Congress found that only two major monographs were published in 1934-1935 by Soviet authors on the topic of rocket technology: M. K. Tikhonravov's *Raketnaya tekhnika (Rocket Technology)* and S. P. Korolev's *Raketnyy polet v stratosfere (Rocket Flight in the Stratosphere)*. So one of them was quite likely the mysterious Chief Designer. But from Tsiolkovsky's letter it was clear that Tsiolkovsky did not know the author of the book personally, as implied by Tsiolkovsky's comment that he did not know the author's address. Yet, the Library of Congress also knew (from newspaper accounts from the 1930s) that Tsiolkovsky had actually met Tikhonravov and corresponded with him. Hence, by a process of elimination, they concluded that the Chief Designer *must* be this person "S. P. Korolev", who, it transpired, was also on the list of those presenting papers at the 1935 conference. They used several other

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9.3: In Moscow recently with the Chief Designer's daughter, Natalya Koroleva.

published sources to corroborate this claim without inconsistencies. So in the end it was a Soviet book, passed by the censor, that gave the US its best clues to the actual identity of the mysterious Chief Designer – Sergei Korolev had been identified.

Published internally in May 1964, the Library of Congress study was available to the general public but was not widely distributed. It opened the door for much more widespread identification of Korolev. In November 1965, Theodore Shabad of the *New York Times* again openly identified Korolev and Glushko as the two leading chief designers [38]. It is not known if these major press reports were communicated back to Korolev himself. But just eight days before Korolev's death in January 1966, *Fortune* magazine, one of the most influential magazines in the United States, ran a story that identified him as the mysterious Soviet Chief Designer of Rocket-Space Systems [39]. Authored by journalist William Shelton, who would later write one of the first comprehensive books on the Soviet space programme, the article reinforced Korolev's role in the Soviet space programme [40].

So what do all these news items about Korolev cumulatively tell us? The most significant issue here is that *undoubtedly*, if he had not unexpectedly died during a medical procedure, his identity would have been widely known all over the world. There would have been more speculative articles and perhaps even questions posed directly to Soviet authorities about Korolev. And it is not unreasonable to argue that given all these sleuthing revelations, the Soviets themselves would have declassified

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his identity and he would have taken on an iconic public role similar to other giants of the Soviet weapons industry such as Andrey Tupolev and Igor Kurchatov. Alas, this was not to be. His death saved the authorities from having to confront this possibility. And a myth of sorts has been cultivated suggesting that the official Soviet announcement of Korolev's death in January 1966 was the defining moment in the West's recognition of his identity. But the evidence shows that Korolev was already a known name – not particularly famous – but known just the same. The veil had already been lifted by the time of his death.

In death and memory

When Sergei Pavlovich Korolev passed away on 14 January 1966, news of his death was reported widely in the Western press. Yet reports at the time still lacked certain essential pieces of information, and many Western newspapers did not immediately perceive the importance of his accomplishments. For example, the *New York Times* reported news of his passing on page 82 of the Sunday news edition, noting that he was a “leading Soviet space scientist” [41]. On being informed, James E. Webb, the NASA administrator, considered sending a message of condolence to Moscow but after discussions with several senior officials he decided not to do so [42].

But within days, the scope of Korolev's contributions became evident. In a major editorial in the *New York Times*, the editors noted that “death has finally declassified the role and identity of Academician Sergei P. Korolev, the man who provided the scientific and technical leadership of the Soviet rocket programme”. They went on, “Korolev's rockets were powerful enough to send men into orbit and to put cameras into position to photograph the back side of the Moon. But they were too weak to break the chains of secrecy that denied him, while he lived, the world applause he deserved” [43].

In the first years after Korolev's death, Westerners discovered more about his life but almost all of it dated to *before* World War II and was based on the brief obituary published at the time of his death. The few pieces of information on his life after the war were connected with the dates of various awards and honours. To add insult to injury, even as late as 1968, some Western newspapers still said that Academician Leonid Sedov was the “father of Sputnik” [44].

Defector provides new details

A number of books on the history of the Soviet space programme were published in the United States and Britain in the late 1960s and early 1970s. In these books, the authors began to piece together a chronology of Korolev's life, although a lot of the information was still based on rumour and hearsay. Perhaps the most controversial aspect of Korolev's life was his incarceration as a prisoner of the Stalinist gulag system between 1938 and 1944. Details of his incarceration are now well-known but in the 1970s there was much that was uncertain. Analysts had only bits and pieces of information as evidence. For example, less than five months after Korolev's death, a Hungarian publication made the sensational claim that he had been in prison from

1940 to 1953, i.e. “Washington Post Prison” [45].

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1940 to 1953, i.e., until Stalin's death. Days later this news made the pages of the *Washington Post* with the headline "Top Soviet Space Designer Worked in a Stalin Prison" [45].

Further details emerged in the late 1960s and early 1970s from a former Soviet journalist named "Leonid Vladimirov" who had defected to Great Britain in 1966. Like Korolev, Vladimirov, whose real name was Leonid Vladimirovich Finkelshtein (1924-), had spent time in the gulag; he was arrested while a student at the Moscow Aviation Institute in 1947 and spent six years in prison. Later, he became a staff writer for the popular science journal *Znaniye-sila* (*Knowledge is Power*) and met journalists who had access to the "inside" world of the Soviet space programme. After his defection "Vladimirov" wrote about Korolev's life (including his time in prison) in a number of publications. Finkelshtein's book *The Russian Space Bluff*, published in 1971, caused quite a sensation in the West [46]. There was much back-and-forth in the pages of the British magazine *Spaceflight* between those who found the book as credible and those who found it full of dubious claims. Hindsight and posterity have not been kind to *The Russian Space Bluff*. While it is true that it has some valuable insights (such as the now-accepted fact that the Voskhod was by-and-large a Vostok crammed with three cosmonauts), the book was also misleading in many ways and frequently full of inaccuracies; for example he called Soviet rocket designer Mikhail Yangel a German! Nevertheless, the book was very influential in the English-speaking world, and inspired others to undertake historical research on Korolev's years in the *sharaga* (often also called, *sharashka*) prison system.

Another book from the early 1970s that was smuggled out of the Soviet Union, claimed to be a memoir of "G. Ozerov" who had spent time in the *sharaga* prisons with Korolev. It was Ozerov's book that gave us one of the most famous alleged quotes from Korolev: "We will all vanish without a trace" [47]. Later, at the tail end of *glasnost*, it turned out that "Ozerov" was actually Leonid L'vovich Kerber (1903-1993), a deputy to famed Soviet aviation designer Andrey Tupolev who had indeed spent time in the camps with Korolev [48].

First Western 'biography'

With these and other works, the genie was out of the bottle. Western historians were able to combine snippets of information from many different sources – including the books of Mark Gallay, Roy Medvedev, and Aleksandr Solzhenitsyn, with rumours from other sources – to attempt to reconstruct Korolev's activities during the 1930s and 1940s [49].

The most important historical work in this regard was American journalist James Oberg's classic article 'Korolev and Khrushchev and Sputnik' in the British journal *Spaceflight* in 1978 [50]. Besides details on Korolev's incarceration, Oberg's article contained the first account of Korolev's activities in the postwar years – particularly his involvement in the development of the R-7. There were a few inconsistencies in the biography. For example, Oberg speculated that Korolev might have been arrested a second time in the late 1940s; he was not. In addition, although Oberg gave details of the infamous Nedelin disaster in 1960, he claimed that this took place

during the launch of a Mars automatic interplanetary station as opposed to the attempted launch of an ICBM – later found to be Yangel's R-16 missile. Oberg used as a source for this the alleged memoirs of one Oleg Vladimirovich Penkovsky (1919-1963), a Soviet military intelligence officer who informed on the USSR to British and American authorities in the early 1960s and was later caught and executed by the Soviets [51]. Penkovsky provided tantalising details about the disaster, including the fact that the city of Dnepropetrovsk in Ukraine was in mourning afterwards; we now know, of course, that the R-16 ICBM was produced by the Yuzhnoye design bureau based in Dnepropetrovsk.

Despite some shortcomings, Oberg's article was the first substantive biography of Korolev published probably *anywhere* in the world; i.e., even including the Soviet Union. Oberg argued that Korolev was a pawn of politics, particularly of the whims of Nikita Khrushchev, and was forced to perform many space missions against his will. Oberg later expanded these observations into *Red Star in Orbit*, published in 1981. As I said above, the significance of this book cannot be overstated because it drew a large popular audience into the study of Soviet space history. There had, of course, been good books published in the West on the history of the Soviet space programme in the 1960s and 1970s. These included the works of Firmin J. Krieger (1909-), Albert Parry [née Paretzky] (1901-1992), Alfred J. Zaehring (1925-2012), Martin Caidin (1927-1997), William R. Shelton, Michael Stoiko (1919-2010), Nicholas Daniloff (1934-), Piet Smolders (1940-), Peter N. James and Nicholas L. Johnson. But what distinguished Oberg's work was a certain flamboyance coupled with assiduous and exacting research. He was also not afraid to tell a good story – although not at the expense of the facts. One of Oberg's most striking conclusions was about Korolev's role in the Soviet space programme. He noted that "Korolev's premature death... may have been the most important contributing factor which prevented [a] cosmonaut lunar flight from occurring" [51]. In Oberg's imagination, the failure of the mythical lunar programme and the super booster programme was inextricably tied to Korolev's life and death.

REVEALING GLUSHKO

Whilst Korolev was clearly the central figure in the Western visualisation of the Soviet space programme, gradually, imperceptibly, through the 1970s and into the 1980s, it became apparent that there were others of equal importance whose names were unknown. Undoubtedly the most prominent among the others was Valentin Petrovich Glushko (1908-1989). Through the late 1960s, Glushko continued to publish under his assumed name of "Professor G. V. Petrovich" and he even edited the first major encyclopedia of spaceflight in 1968 [52]. For reasons that still remain unknown, in 1971, just prior to the first Salyut station missions, the Soviet censors decided to declassify his name in a dramatic manner. They not only identified him as the Chief Designer of Rocket Engines but also confirmed that "Professor G. V. Petrovich" had been a pseudonym that Glushko had used for many years. Soviet official sources naturally declined to explain why Glushko had needed a pseudonym

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for so long [53]. The first open interview with Glushko was published in the Moscow communist youth daily *Moskovskiy kosmomolets* in October 1972. In the interview he spoke at length about the future of chemical, nuclear, and electrical rocket propulsion [54].

Throughout the 1970s Glushko published many articles and was often interviewed by the Soviet media. In 1977 his early work was summarised in a 504-page volume *Put' v raketnoy tekhniki* (*The Path in Rocket Technology*), and this began the process of embellishing Glushko's contributions to the space programme at the expense of those of Korolev. As he took the helm of Korolev's old organisation (now known as NPO Energiya), Glushko began to position his contributions as equal to if not greater than those of Korolev. For example, as one of his first acts after taking over in 1974, he instructed the curators of Energiya's then highly restricted "display hall" to remove all traces of Korolev's handiwork (including the famous R-7 rocket that placed Sputnik into space) and to replace them with his own rocket engines. During the late 1970s and 1980s, Glushko sought to rewrite the official historical narrative in subtle ways that were not immediately noticed by Westerners; for example, book chapters on his own research preceded those on Korolev's research [55].

When did we first learn of the conflict between Korolev and Glushko? One would expect that this would have been revealed during the time of *glasnost* but, in fact, in the mid-1970s there were clues to the rift between the two giants of the Soviet space programme. In the smuggled memoirs of Nikita Khrushchev (published in English in 1974), the former Soviet leader noted cryptically that: "The principal designer of the [R-7] booster was Korolev's friend and collaborator, whose name I forget. The best booster in the world won't make a broomstick fly. So while Korolev designed the rocket, his colleague [designed] the engine. They made an excellent team. Unfortunately, they split up later. I was very upset and did everything to patch up their friendship, but all my efforts were in vain [56]."

When the unedited portion of this passage was finally published in 1990, we found some added details: "...differences of opinion started to pull [Korolev and Glushko] apart and the two of them couldn't stand to work together. I even invited them to my dacha with their wives. I wanted them to make peace with each other, so that they could devote more of their knowledge to the good of the country, rather than dissipate their energy on fights over details. It seemed to me that they were both talented, each in his own field. But nothing came of our meeting. Later Korolev broke all ties with Glushko [57]."

Officially revealing Glushko's identity in 1971, while he was still alive and very much active, was unprecedented. It was a striking example of the enormous power which the rocket engine designer wielded, a level of influence matched by few of his contemporaries. The identities of only a very small group of designers in the Soviet defence industry were revealed during their lifetimes. The usual custom was for death to "reveal" a designer's identity and work [58]. This is how we *officially* learned the names of Mikhail Yangel and Vladimir Chelomey.

Korolev's successor?

The way the names of these two men came to light was hostage to a fundamental misunderstanding among Western sleuths, with analysts assuming that there was a single and massive research and development organisation that had been headed by Korolev. A natural assumption was that after his death another Chief Designer took over. The most likely contender for a "successor" was Mikhail Kuzmich Yangel (1911-1971), the Soviet rocket designer who proved to have been responsible for several generations of strategic ICBMs, space launch vehicles, and automated military and scientific satellites. In June 1966, just five months after Korolev's death, the *New York Times* ran a short piece on Yangel by Theodore Shabad – the same journalist who had correctly identified Korolev a few years earlier. He wrote, "A 54-year-old Ukrainian engineer, who has recently been advanced to high position in the Kremlin hierarchy, has been tentatively identified as the new scientific head of the Soviet Union's secrecy-shrouded space programme. The promotion of the Siberian-born scientist, Mikhail K. Yangel, to a public position is believed to reflect a high-level political decision to give a few leading space technicians, usually cloaked in anonymity until their death, general recognition during their lifetime while still avoiding open identification of their work [59]."

Shabad's work was based on his investigation of the published lists of names of people who had been "promoted" to Candidate Membership of the ruling Central Committee of the Communist Party. Such an honour was typically reserved for the most influential citizens of Soviet civil society. While it was a rank that was largely honorific ("full" members of the Central Committee were more likely to have true power in the Party hierarchy), by scrutinising such lists – in addition to the order of signatures on obituaries of famous Soviet individuals, published lists of members of the rubber stamp Supreme Soviet, the faces of people who showed up at parades in Red Square, the signatures on articles in *Pravda*, etc. – Western observers were able to determine the intricacies of whose fortunes rose or fell in the halls of power. This was actually a fairly well-established field in the West known as "Kremlinology".

In his article, Shabad also identified Valentin Glushko, Nikolay Pilyugin, and Grigoriy Kisun'ko as potentially important missile designers [60]. There was little further information on Yangel until his death in 1971 when his identity was officially revealed, albeit in rather vague terms. His obituary simply acknowledged that he was "an outstanding scholar and designer in the field of rocket and space technology". Western media outlets continued to tout him as Korolev's *successor* rather than the head of an entirely different organisation [61].

A leading missile-man

The name of Vladimir Nikolayevich Chelomey (1914-1984) had been mentioned by the spy Oleg Penkovsky in *The Penkovsky Papers* (1965) and also by the defector Finkelshtein in his 1971 book *The Russian Space Bluff* (although again with many inaccuracies), but a more substantive identification that Chelomey was a major chief designer in the Soviet space programme came from Nicholas Daniloff in his book

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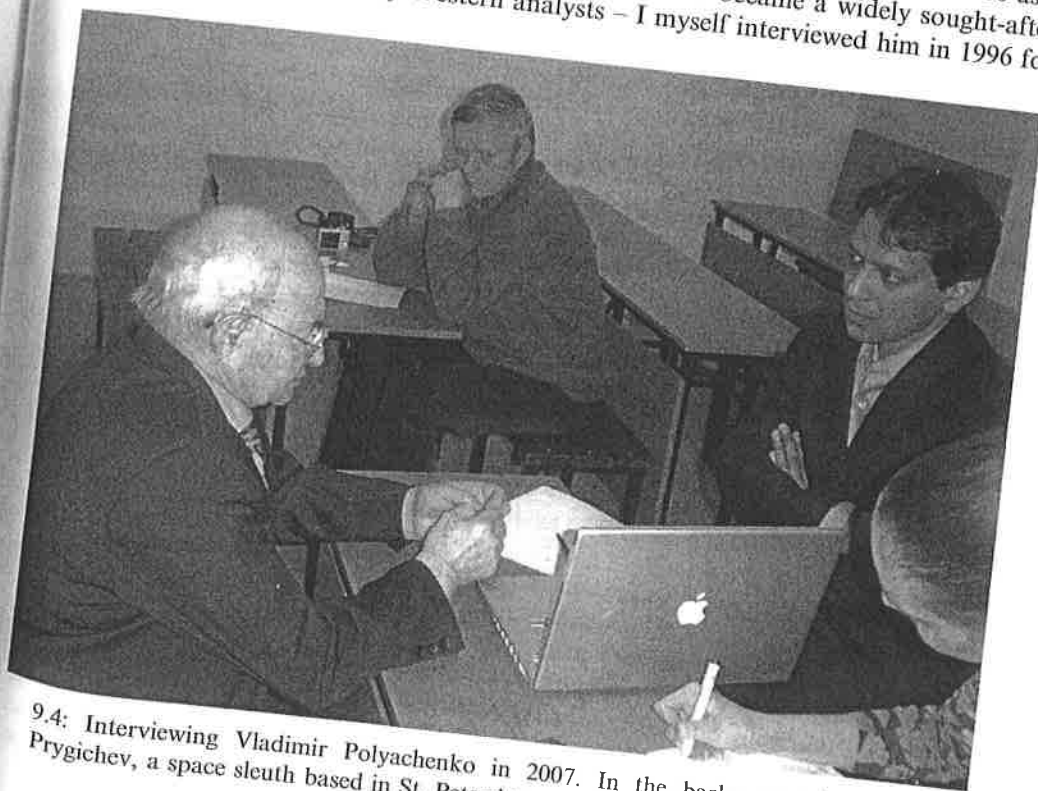


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The Kremlin and the Cosmos in 1972 [62]. As with Yangel, Chelomey's promotion within the Communist Party hierarchy in 1974 prompted Theodore Shabad to claim that Chelomey was "the new head of Russia's secrecy-shrouded space programme... [a] job that was previously held by Mikhail K. Yangel [63]."

Bits and pieces of information about Chelomey continued to trickle out through the 1970s and early 1980s, but it was not until his death in December 1984 that we got the first concrete details about his life; his obituary said he was an "outstanding designer of Soviet rocket technology and flying vehicles" [64]. Soon after, in 1985, articles began to appear linking Chelomey with the Proton launch vehicle. Over the next few years a Soviet journalist named Valeriy Yevgen'yevich Rodikov published several articles which revealed details of Chelomey's colourful and rich career as a designer of cruise missiles, ICBMs, space launch vehicles, manned spacecraft, and military satellites [65]. Most of this information quickly trickled out to the West and appeared in *Spaceflight* magazine or various French publications, but the true extent of Chelomey's massive contributions to the Soviet space programme was not known in the West until the 1990s helped partly by the writings of Sergey Khrushchev, the son of the Soviet leader, who emigrated to the United States.

The younger Khrushchev had worked for Chelomey between 1958 and 1968 as a guidance systems engineer. In the 1990s Khrushchev became a widely sought-after interview subject for many Western analysts - I myself interviewed him in 1996 for



9.4: Interviewing Vladimir Polyachenko in 2007. In the background is Timofey Prygichev, a space sleuth based in St. Petersburg.

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my first book. He later invited me to fact-check his English-language memoirs (and was kind enough to thank me in the acknowledgments) which were finally published in 2000 [66]. I also developed a friendship with Vladimir Abramovich Polyachenko (1929-), who Chelomey had appointed “lead designer” for several key programmes, including the IS anti-satellite project and the Almaz space station. I helped Vladimir to publish a portion of his recollections about the competition between Korolev and Chelomey in *Spaceflight* magazine in 2011 [67]. My hope is that working together with Vladimir I will eventually be able to publish a more comprehensive history of the Almaz space station programme [68].

Unlike journalists or analysts who worked only with public information, Western intelligence agencies appear to have had a very good sense of the entire design bureau system by the late 1970s. A lengthy National Intelligence Estimate (NIE) issued by the CIA in 1980 on ‘Soviet Military Capabilities and Intentions in Space’ correctly showed a chart of Soviet design bureaus involved in the space programme; including those of Valentin Glushko, Mikhail Reshetnev, Vladimir Utkin, Sergey Kryukov, and Vladimir Chelomey [69]. These were some of the principal chief designers at the time, and it is a testament to the CIA’s access to (probably) human intelligence information that this information – all correct – was known to them.

Back from obscurity

Perhaps the most enigmatic trajectory of a Soviet chief designer was that of Vasily Pavlovich Mishin (1917-2001) who succeeded Korolev at the OKB-1 design bureau. Mishin was hardly known in the West until his revelations in 1989 about the manned lunar landing programme. Yet even Mishin’s name was linked to the Soviet space programme in the early 1970s while he was still a Chief Designer.

Like several other designers, Mishin wrote or edited many arcane mathematical textbooks under his own name in the 1960s, 1970s and 1980s. These were available at such places as the Library of Congress in Washington, D.C., but few suspected the author of having anything to do with the Soviet space programme [70]. On the other hand, when writing on space topics he used the pseudonym “M. Vasil’yev”. During his tenure as Chief Designer, he also edited at least two important books on the Soviet space programme under this pseudonym – *Steps to the Stars* (1972) and *Salyut In Orbit* (1973) – both of which were later translated by NASA into English in the run up to the Apollo-Soyuz Test Project [71]. He also wrote major articles (also under his pseudonym) for newspapers such as *Pravda*, *Izvestia*, and *Krasnaya zvezda* [72].

French sleuths played an important role, and in 1972 journalist Pierre Dumas was able to link Mishin’s name with the Soviet space programme in connection with an article on Soviet plans for future manned Mars expeditions [73]. Based on this article and some other unconnected clues, several months later a Ukrainian émigré for the first time argued that Mishin was the mysterious Chief Designer of the Soviet space programme. But as he published this in an obscure émigré journal based in the United States, few paid any attention [74]. In 1974 French analyst Claude Wachtel listed an “M. P. Vassiliev” in Volume 11 of the French *Cosmos Encyclopedia*. Then

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in 1977 Christian Lardier explicitly identified "V. P. Michine" in a French popular science book [75]. A Soviet defector who worked at the old Korolev design bureau added some tantalising details in a quasi-memoir that he published in the United States in 1982. The author, a "Victor Yevsikov", correctly claimed that Vasily Mishin had succeeded Korolev as Chief Designer, and described the loss of prestige that came with Korolev's death [76]. Despite these prominent claims, most Western analysts remained unaware of Mishin until well into the 1980s.

French analyst Claude Wachtel was the first in the West to emphatically claim that Vasily Mishin was the successor to Korolev. In a landmark article published in 1985 based on a paper he presented at the annual Soviet Forum of the British Interplanetary Society in London in 1983, Wachtel actually published a photograph of Mishin [77]. Remarkably, by the time that Wachtel's article was published, Mishin's position and importance in the Soviet space programme had still not been acknowledged *within* the Soviet Union. In fact, when Glushko took over from Mishin at NPO Energiya in 1974, he had made sure that Mishin's name was white-washed out of history. During his years of "banishment" as a professor at the Moscow Aviation Institute, Mishin quietly worked on a number of important historical projects, including collecting the works of rocketry pioneer Fridrikh Tsander and editing a classic volume of Korolev's works that was published in 1980 and revealed an astounding number of secrets about the Soviet space programme. Discerning owners of *The Creative Legacy of Sergei Pavlovich Korolev* will see that Mishin's name was one of the many listed as part of the editorial council for the book [78]. He also co-wrote the main introduction to the book, although he was only identified as an "Academician". The Soviet media only began to fully acknowledge Mishin's role in the Soviet space programme in 1987, in connection with the twentieth anniversary of Sputnik [79]. The door was pushed wide open with the famous interview Mishin gave to the newspaper *Pravda* in 1989 on the failed Soviet manned lunar programme [80]. Within a few months his name was on the lips of all space sleuths. And then in late 1990 he published a tour de force history of the Soviet manned lunar project in which he provided a slew of previously unknown details on the project [81].

The Mishin diaries

During his time as Korolev's deputy (and later as his successor) Mishin kept daily office notes about his activities. In the chaos after the collapse of the Soviet Union, Mishin offered these 32 notebooks to be sold at a Sotheby's auction in late 1993. The Perot Foundation (named after the American businessman and entrepreneur H. Ross Perot) bought them, allegedly for \$190,000 [82]. Copies of the diaries, albeit of poor quality, have found their way to at least a couple of different archives in the United States and I was able to make use of some of them for my book *Challenge to Apollo*. Along with fellow Soviet space sleuth Peter Gorin, I was invited to work on a portion of these copies to explore the option of releasing them to the public.

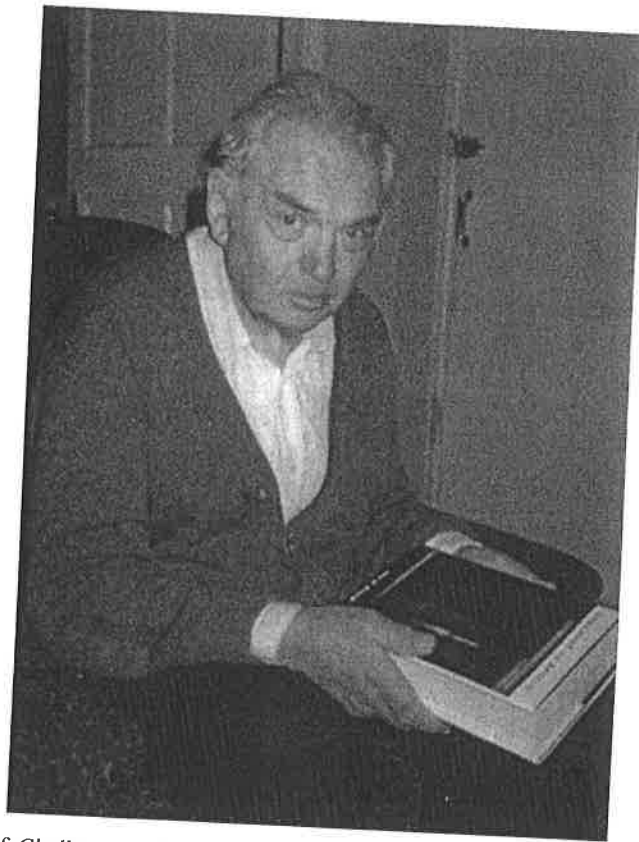
I had made contact with Peter in 1993 or so, as a result of our common interest in uncovering the secrets of the Soviet space programme. Peter, a Russian citizen, had



9.5: Posing with a once-secret Soviet lunar lander at Mishin's Moscow Aviation Institute.

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9.6: A copy of *Challenge to Apollo* was presented to Mishin shortly before his death by his former MAI student Dmitry Payson.

emigrated to the United States with his family in 1990. He was a political scientist by training with the equivalent of a doctorate from a prominent Moscow university. His knowledge of the inner details of the Soviet space programme was encyclopedic. In the 1990s, he published some ground-breaking articles on the history of the Soviet photo-reconnaissance programme, in particular about the Zenit and Yantar series of satellites, and he worked for a long time on the history of the Soviet manned lunar programme [83]. In the early 2000s, Peter and I began to work on Mishin's diaries, but he found it difficult to devote his full attention due to health-related problems and struggles involving his naturalisation process in the United States. Sadly he suddenly passed away on 16 January 2009 in Norfolk, Virginia, 56 years of age [84].

Peter's untimely death, together with various logistical challenges, have impeded work on the Mishin diaries project. One hopes that one day these priceless notebooks will see the light. Although I was never fortunate enough to meet Mishin, through an intermediary I was able to send a copy of my *Challenge to Apollo* to him. One of my most prized possessions is a picture of Mishin holding a copy of the book,

taken only a few months before his death on 10 October 2001. In January 2012, with NASA's Chief Historian Bill Barry, I was given a private tour of Mishin's former MAI office and it was humbling to be in the same room where the leading architect of the Soviet manned lunar programme had worked [85].

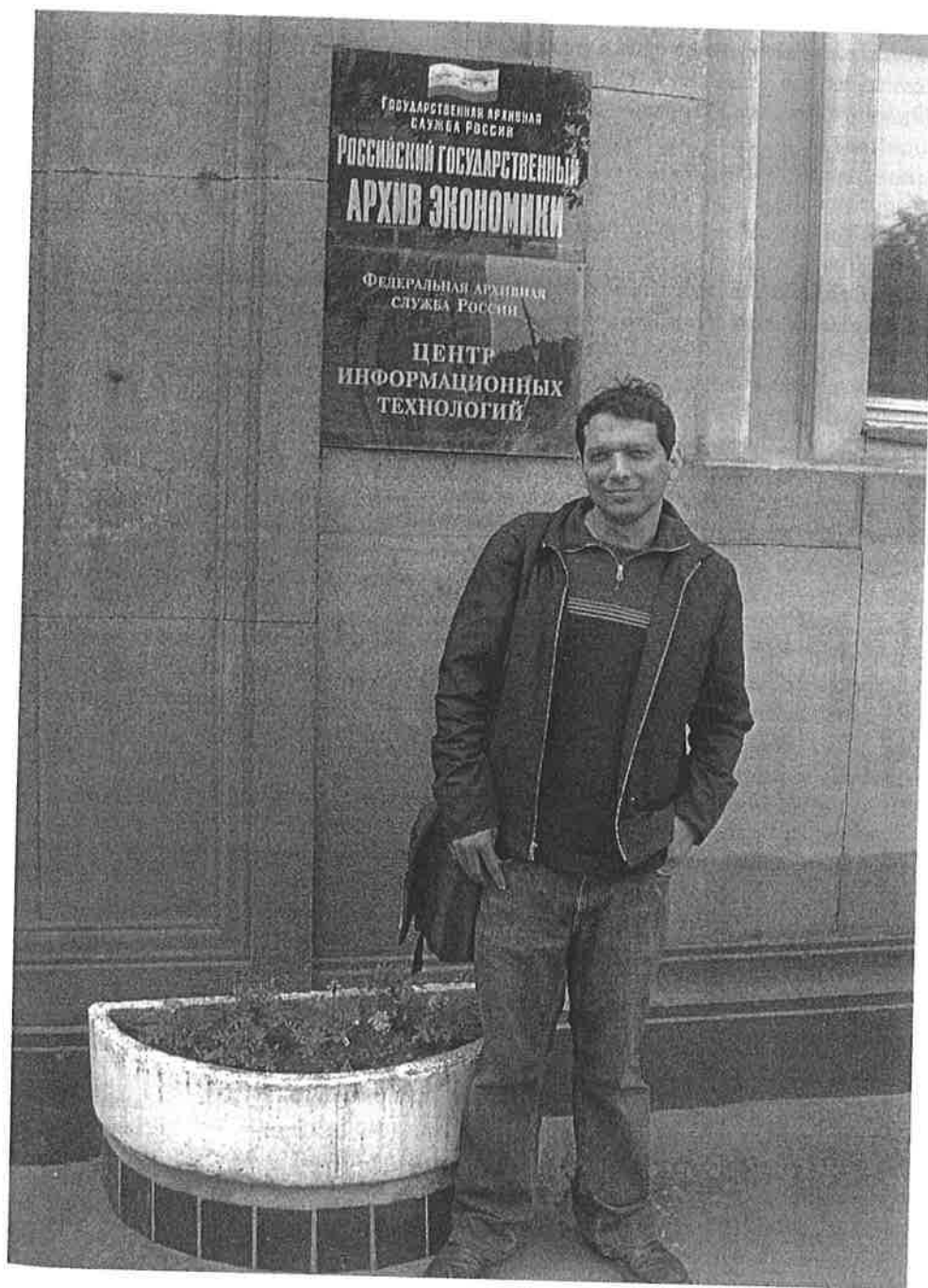
INTO THE ARCHIVES

When revelations about each of the prominent Soviet designers appeared in the late 1980s and early 1990s, Western sleuths were employing a combination of sources to reconstruct the hidden stories of the Soviet space programme: articles in the Russian media; official Soviet-Russian books and press releases (often containing revealing photographs); analyses of orbital behaviour; rumour and speculation; personal and uncensored interviews with designers and cosmonauts; and declassified intelligence documents from the CIA. But by about the year 2000, one further source of analysis became available to Westerners: the actual archival documents. I was fortunate to be amongst the first Westerners to work with space-related archival material held in the Russian archives. This has played a crucial role in my more recent work, including highlighting further and deeper secrets about the men who were the architects of the Soviet space programme.

The very first missile/space publications based on archival documents were works on the German contribution to the Soviet missile industry in the late 1940s. German historians Matthias Uhl and Christoph Mick published stellar works based on a deep mining of such sources, most of them at the Russian State Archive of the Economy (RGAE) in Moscow [86]. Starting in 2002 I worked for many months at RGAE and other archives, including the State Archive of the Russian Federation (GARF), the Russian State Military Archive (RGVA), and the Archive of the Russian Academy of Sciences (ARAN). This work served as the foundation for my recent book, *The Red Rockets' Glare: Spaceflight and the Soviet Imagination, 1857-1957*. Published by Cambridge University Press in 2010, the book is the very first analysis of the early history of the Soviet missile and space programme based almost entirely on archival sources.

I am often asked what it was like to work in these archives, and about the kind of documents that are available. The actual experience of archival research in Moscow bears only a passing resemblance to similar work in the Western world. Yes, there are rudimentary finding aids. Yes, there are reading rooms. But there are also substantial differences. For a start, there are many more security restrictions. One also has to deal with a Byzantine bureaucracy. Finally, the degree of access one gets to certain files is often a function of personal relationships or the whims of archivists. Despite these idiosyncrasies, the prize at the end of the process can be incredibly fulfilling. Below, I provide some brief examples of the kind of documents I collected on the work of Korolev, Glushko, Yangel, Chelomey and Mishin.

One of the most prized finds in my archival work was by accident. For some time, I had been obsessed with the Soviet manned lunar programme. One key aspect that remained clouded in my mind was the Soviet decision to go to the Moon: how, why,



9.7: At the entrance to the Russian State Archive of the Economy in 2006.

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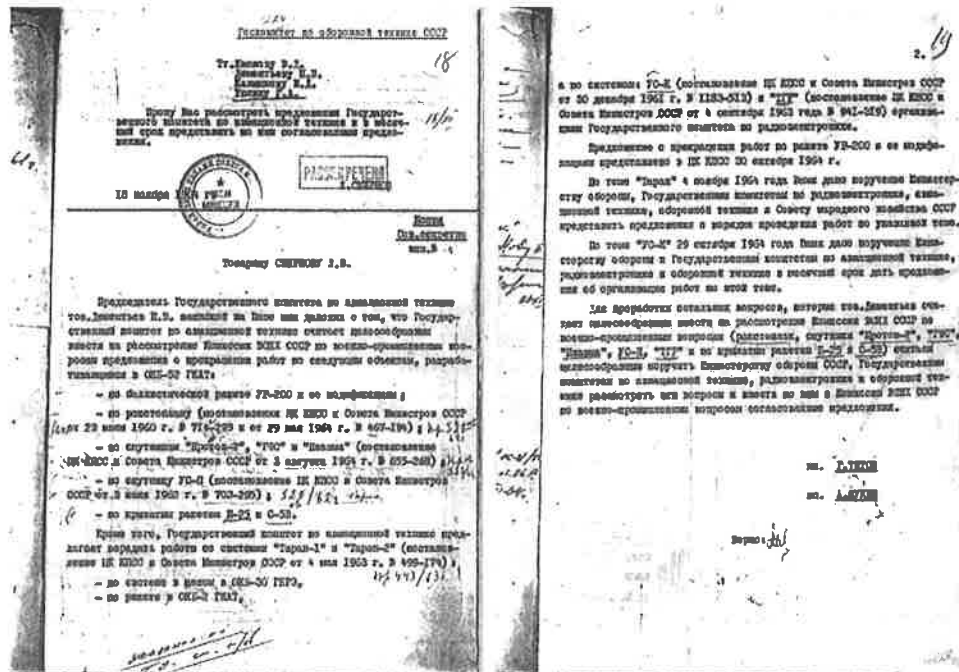
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and when did the Soviets decide to compete with Apollo? What precisely prompted them to mount a challenge to Apollo? And what role did the five men listed above play in this decision? Inspired by a classic work of American space history, John M. Logsdon's magisterial *The Decision to Go to the Moon* analysing John F. Kennedy's famous commitment made in May 1961 to land a man on the Moon before the decade was out, I wrote about the Soviet side in a two-part article in *Spaceflight* in 1998 [87]. But without actual documents in my hand, I still felt uncertain about my conclusions.

In 2002 I stumbled upon what I thought of as the 'holy grail'. While working at RGAE, I had continually butted heads with archivists about the absence of certain papers concerning the Soviet defence industry (which oversaw the space programme). It had taken me a while to figure out that such papers were actually not stored in the main RGAE building on *ulitsa Bol'shaya Pirogovskaya* near the Frunzenskaya metro station in Moscow. I slowly realised that there was a *odtel spetsfondov* ("Department of Special Funds") at an entirely different location which was unlisted in any archive finding aid. I would need special permission to go there, so I spoke personally with the deputy director of the archive, who was sympathetic but suspicious. Finding my way to the rather unremarkable building near the Kaluzhskaya metro station that held this "Special Fund", I found a treasure trove of



9.8: This two-page document was prepared after the 'fall' of Nikita Khrushchev and proposes the cancellation of several Chelomey projects.

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My sleuthing

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documents. Here, in 2003, I stumbled, quite accidentally, upon what was clearly a draft version of the *actual* decree from 1964 that committed the Soviet Union to a manned landing on the Moon. I published my analysis of this document in a lengthy article in *Spaceflight* in 2004 [88].

Among the many revelations from this decree were details of programmes that were part of the effort that fell by the wayside later (such as Chelomey's Oriented Lunar Satellite), several abandoned scientific satellite (Protsion, Plazma, GFS, etc.), and the projected cost of a manned lunar landing (2.1 billion rubles). As part of this research I also identified the precise date on which Korolev met with Khrushchev to discuss the terms of the decision to go to the Moon (17 July 1964). Finally, the fact that both Korolev and Chelomey signed the document suggests that there was a level of détente between the two competitors. I am proud to say that I pre-empted Russian scholars by a few years – the same decree finally appeared in print in a Russian book in 2008 [89].

My sleuthing comes full-circle

Around the time that I published this decree, I had become well-acquainted with two persons who had been close to Korolev: his daughter Natalya Sergeyevna Koroleva (1935-) and one of his leading deputies, Boris Yevseyevich Chertok (1912-2011). I had gotten to know the latter while helping him to translate and edit his memoirs for an English-speaking audience [90]. Chertok in turn introduced me to Koroleva, who has been a very generous and kind host to me on each of my trips to Moscow. As I got to know them better, I had to 'turn off' my sleuthing mode and resist the urge to ask them questions at every opportunity about some arcane topic or other. But it was heartening and fulfilling to see their generosity and openness to Western researchers. In Koroleva's home there is a small "museum" dedicated to her father. The artefacts include Korolev's various awards, letters, models, and possessions. On a bookshelf, among various prized Russian books that Korolev himself owned, she has a copy of the late Rex Hall and David Shayler's *The Rocket Men* and James Harford's *Korolev* [91]. She considers them important contributions to understanding her father's life. I was also grateful to see that in the introduction that Chertok wrote to Koroleva's 3-volume work *Otets (Father)*, he mentioned my book *Challenge to Apollo* as one of the most important Western works on Korolev and the Soviet space programme [92]. Since this was before I actually came to know Chertok personally, I felt particularly honoured. In an odd way, Western sleuthing had come full-circle, with the Russians themselves now mentioning our work as standards. This is enormously gratifying.

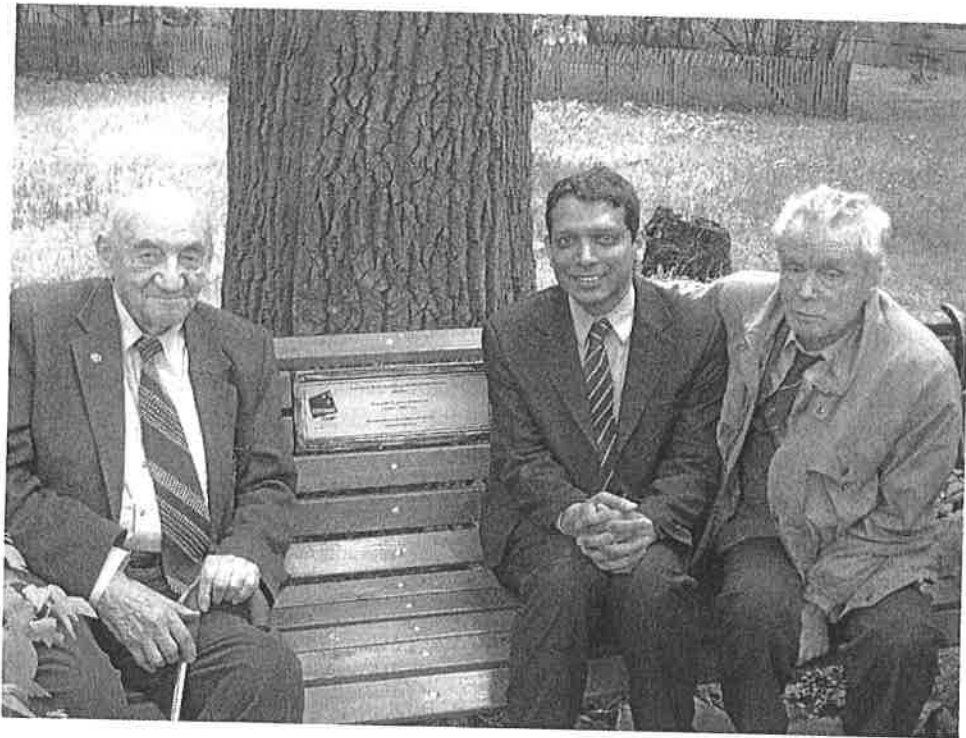
In the Moscow archives I was also able to find many other key documents about the work of the leading chief designers, examples of which include: the interrogation records of Glushko in early 1938 before his arrest and incarceration; documents from 1945 proposing that Glushko and *not* Korolev should be assigned "Chief Designer" of the Soviet ballistic missile programme; letters from Korolev to his (second) wife describing Glushko's ill-behaviour towards him; the annual reports of the Chelomey design bureau from the early 1960s which provide many unknown

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9.9: Sitting with Boris Chertok and Vladimir Syromyatnikov, the designer of the Soviet docking system, on "Korolev's bench" in May 2006.

details about the two Polet satellites; letters detailing the "collapse" of the Chelomey empire after the fall of Nikita Khrushchev in 1964 when several of his projects, including the UR-200, GFS, and Plazma were cancelled; and documents showing how Chelomey justified the UR-700 project as a competitor to Mishin's N-I.

The archives contain many documents on the strategies the Soviets employed to maintain secrecy, which I used as the basis for a recently published essay 'Cosmic Contradictions: Popular Enthusiasm and Secrecy in the Soviet Space Programme' [93]. Some of these documents point to the use of bland designations for spacecraft.

Soviet attempt to confuse?

One of the most tantalising finds was a set of documents detailing how the Soviets sought to *confuse* Western space sleuths. By the mid-1960s, Western intelligence analysts (as well as others such as Geoff Perry and Charles Sheldon) had begun to realise that the 'Kosmos' series of satellites were largely military in nature. There were also numerous failures hidden under that catchall cover name. In an effort to further confuse Westerners, in 1965 Soviet space policy-makers proposed adding a new class 'Zarya' (Dawn) satellites which would, like Kosmos, include military, non-military, precursor test flights, and failed missions [94]. Satellites were to be split



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9.10: Pictured at the Moscow office of *Novosti kosmonavtiki* in January 2012 are: (L-R) Igor Afanasyev, Igor Lissov, Igor Marinin, Asif Siddiqi and NASA's Chief Historian Bill Barry.

randomly between the Kosmos and Zarya designations. The plan was shelved but it is not clear why; perhaps a hapless bureaucrat pointed out that having the Kosmos and Zarya designations would not only confuse foreigners, it would probably also confuse the Soviets, so perhaps it would be wise to stick with the single Kosmos designation!

To end the section on archival research on the Soviet space programme, it is only appropriate to also acknowledge the work of native Russians in ferreting out original sources. The monthly journal *Novosti kosmonavtiki* (*News of Cosmonautics*) has been at the forefront in uncovering formerly secret information for more than two decades. Its noteworthy sleuths have included Igor Afanasyev, Vladimir Agapov, Konstantin Lantratov, Igor Lissov, Igor Marinin, Sergey Shamsutdinov, and the late Maxim Tarasenko (1962-1999). I would also include two professional historians. The first was Georgiy Stepanovich Vetrov (1918-1997) who was responsible for decades of historical research in the archives of NPO (later RKK) Energiya; it was because of his diligent work that we are fortunate to have available the 716-page volume of



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declassified documents about Korolev's work published in 1998 as *S. P. Korolev i ego delo (S. P. Korolev and His Affairs)* [95]. Vetrov, a former engineer under Korolev, worked on a number of other similar volumes, most of which unfortunately remain unpublished; his untimely death having stalled this valuable historical work. In the mid-1990s, I was fortunate to have corresponded with Vetrov via the late Maxim Tarasenko, the young author of the first Russian-language book on the history of Soviet military programmes [96]. On the military side, another leading figure has been military historian Vladimir Ivanovich Ivkin (1958-) who has helped to declassify hundreds of documents on the origins of the Soviet ICBM programmes. Since 1993 he has served as a historian at the Russian Strategic Rocket Forces. Perhaps the most important of Ivkin's works was the nearly 1,200-page-long volume of declassified documents on the Soviet missile programme published in 2010 under the title *Zadacha osoboy gosudarstvennoy vazhnosti (A Goal of Special State Importance)* [97].

CONCLUSIONS

In this chapter I have provided an account of how prominent Soviet space designers' names became public knowledge in both the Soviet Union and the West. In all four cases – Sergei Korolev, Valentin Glushko, Mikhail Yangel and Vasily Mishin – they were identified in some fashion by Western analysts prior to their deaths. I think the most striking revelation here is about Korolev: a number of Western journalists and analysts had conclusively identified him during his lifetime as the enigmatic “Chief Designer” of the Soviet space programme. But it is still common for journalists and historians to write that Korolev's identity was unknown to the general public during his lifetime. True, his name was a state secret and few in the Soviet Union had heard of him. But the evidence used here shows that in the West, diligent researchers had already ferreted out the truth.

Historians need to dispense with the myth that Korolev was a complete unknown during his life. Undoubtedly, had Korolev lived past January 1966 his real job would have become common knowledge, and space books written in the late 1960s might have started with a biography of him. One wonders what Korolev would have thought of that. On the other hand, it is also clear that the Soviet government took great pains to hide the names of their leading space scientists and engineers. Although Korolev's name might have been known in the West, Westerners knew few details of his life or his actual accomplishments. As with the lives of other important designers – such as Glushko, Chelomey or Mishin – it took the intrepid work of Western sleuths (such as Dennis Newkirk and Peter Gorin) to uncover the true details of their amazing lives. The next step, I believe, will be for sleuths to get direct access to archival documents and peel off yet another layer of secrets from the amazing history of the Soviet space programme.

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