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Front Cover: This out-of-the-window view shows the Autonomous Extravehicular Activity Robotic Camera Sprint (AERCam Sprint) hovering over Columbia's cargo bay during the second EVA of mission STS-87. The AERCam Sprint is a prototype free-flying television camera that could be used for remote inspections of the exterior of the International Space Station. See p.185.

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The Decision To Go To The Moon

*The View From the Soviet Union
Part I*

BY ASIF A. SIDDIQI
Philadelphia, USA



President John F. Kennedy delivering his historic message to a joint session of the Congress on 25 May 1961 when he declared, "I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to Earth".
NASA

Introduction

On 25 May 1961, US President John F. Kennedy announced during a joint session of the United States Congress the goal of landing an American astronaut on the surface of the Moon before the end of the decade [1]. Perhaps the most important public policy statement in the history of the US space programme, it was a clear and focused response to the continuing successes of the Soviet space programme and was aimed at asserting the pre-eminence of the United States in the exploration of the cosmos. Believing the country to be in 'a race for the Moon' with the Soviets, the industrial, technical, and managerial expertise of the United States was galvanised to achieve this singular goal. A little over eight years following Kennedy's pronouncement and almost six years after his death, on 20 July 1969, astronaut Neil A. Armstrong became the first human being to set foot on the Moon, thus fulfilling the national objective laid down in 1961.

In the public's eye, by 1969, Soviet pre-eminence in human space flight had receded to the background. Although it was the Soviet space programme which had served as the primary motivation for Kennedy's 1961 challenge, by the end of the decade, the United States had an unsurpassed lead in the 'space race.' Given the extreme secrecy associated with the Soviet effort in space, there was little consensus on why the Soviets had failed, or if indeed they had even tried to beat Apollo. The most common viewpoint, that the Soviets were never in a race to the Moon, eventually became engrained in the mythology of space history. As early as October 1969, *The New York Times* in a page one

article reported that:

...according to some observers in Washington and some American scientists, the Russians may never have had a high-priority goal and timetable for a lunar landing in the same sense as the Apollo project's commitment to land men on the moon in this decade. [2]

It was a full twenty years after Neil Armstrong's historic step that the Soviet Union, then in the midst of tumultuous changes that expanded the parameters of historical discussion, would admit that they had indeed raced with Apollo, that it was a significant commitment, and that they had lost [3]. Subsequent disclosures revealed that although the existence of the effort was hidden for a quarter of a century, the Soviet lunar programme was clearly the central component and prime motivator of their piloted space programme in the 1960s. It would, in fact, be completely impossible to assess Soviet space policy during the height of the Cold War without addressing their piloted lunar effort. It is an incontrovertible fact that President Kennedy's speech in 1961 irrevocably changed the course of the US civilian space programme. In much the same way, the Soviet decision to go the Moon, taken in 1964, also had a profound impact on the nature of their efforts to explore space. From a policy standpoint, both were watershed events in the history of human space exploration. Newly published material has finally allowed the first early scholarly attempts at understanding the decision on the Soviet side.

Soviet Space Policy

There is a tendency in the Western discourse on the Soviet space programme to make repeated allusions to "the Soviets" even when speaking of specific events in time. It was always the generic "Soviets" who made a particular decision, or the "Soviets" who launched a satellite, while in the United States, one could comfortably write about NASA or the Department of Defense. In the face of pervasive secrecy, the inner workings of the programme were as unknown as the secrets of the cosmos itself. It was as if there was a monolithic structure lo-

cated in some far away place, an almost mythological quantity, which ran a programme of gargantuan proportions.

This is, of course, an erroneous assumption. As has become increasingly clear, decision-making and policy formulation in the Soviet space programme was not driven by a single entity or individual, although it is true that one man, Sergey Pavlovich Korolev, the founding engineer of the Soviet space programme, played a remarkably significant role. There were essentially five institutional components which determined Soviet space policy during the Cold War, the

Communist Party, the defense industry, the military, the Design Bureaus, and the scientific community. Each had their own agenda for space policy, and more often than not, there was little unanimity among the major players [4].

The Communist Party of the Soviet Union, the primary creator of Soviet space policy, administered the space programme through a department in its Central Committee. A single individual, usually a Secretary of the Committee had final *de facto* say over long-range space policy, often with the consent of the First Secretary of the Committee, Nikita S. Khrushchev in



Valentin Glushko.

the early 1960s. Unlike later leaders of the USSR, Khrushchev appears to have had remarkably close relationships with the major engineering leaders of the space programme such as Korolev, Mikhail K. Yangel, and Vladimir N. Chelomey, prompted in part by his keen interest in the development of nuclear-tipped intercontinental ballistic missiles as the central tenet of Soviet military doctrine. His interest in space exploration as a means to further Soviet prestige all over the world is unarguable, but old myths notwithstanding, there is no recent evidence to suggest that Khrushchev recklessly ordered one-off space missions simply to usurp or pre-empt concurrent US missions.

Of the remaining four players, the military, represented by the Strategic Missile Forces played a prominent role in hindering piloted space exploration. Unlike in the United States, the Soviet space programme was an off-shoot of their ballistic missile effort, thus effectively making the space programme an arm of the defense industry. Thus, the Missile Forces acted as clients for all space objects, as well as serving as the primary financiers of the space programme. Their concern in the early 1960s was not space exploration but rather the quick creation of an effective intercontinental missile force. In this climate an expensive lunar landing programme was considered completely outlandish, making it difficult for the engineering leaders such as Korolev or Chelomey to advance serious scientific proposals.

The major space design entities, called 'Design Bureaus,' were also diverted into space from their primary goal of developing long-range ballistic missiles. The most prominent of these Design Bureaus, the OKB-1 headed by Korolev, had created the early Sputnik, Luna, and Vostok spacecraft and by the early 1960s was involved in the creation of automated reconnaissance satellites for the military. While most of Korolev's time may have been taken up with orders from the Ministry of Defense, clearly his primary interest was in space exploration. Weaned on

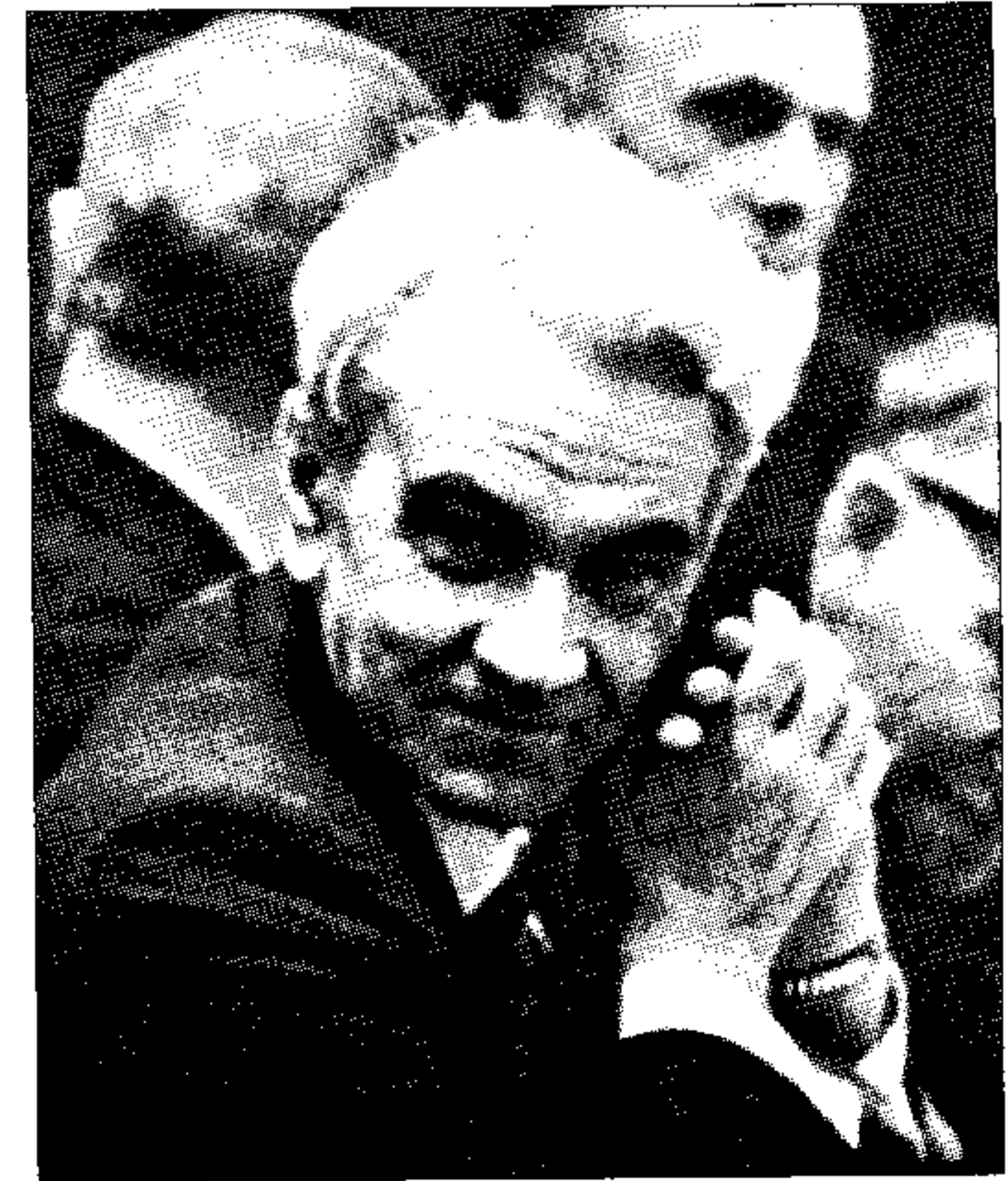


Vladimir Chelomey.

the ideas of the early 20th century theoretician Tsiolkovskiy, Korolev's vision of the Soviet space programme was one which expanded progressively from Earth orbit to the Moon and eventually to the inner planets [5]. This vision, however, had to deal with more earthly concerns. By the time of Gagarin's flight in 1961, Korolev's monopoly and influence in the space arena was being challenged by two other 'Chief Designers': Chelomey and Yangel. The former's rise to power began in the 1950s, aided by a sympathetic Khrushchev, and by time of Kennedy's speech, he was certainly as influential and powerful as Korolev [6]. Apart from Khrushchev's visible support, Chelomey was also better positioned strategically by continually gearing all his proposed space projects to military goals, thus eliciting strong interest from a normally disinterested defense sector. It was much harder for Korolev to justify piloted missions to Mars on military grounds.

Early Discussions on the Future

The early Soviet space successes such as Sputnik, Luna, and Vostok were all the result of isolated governmental actions prompted to a large extent by Korolev's own persuasive abilities. As opposed to NASA's early agenda on space exploration, in the Soviet Union, there was no coordinated plan or singular vision of the future of the space programme. A number of repeated and urgent letters from Korolev and Academician Mstislav V. Keldysh (representing the scientific community) in the post-Sputnik period requesting the formulation of a macro-level space policy remained unanswered [7]. This state of affairs changed dramatically with a joint decree of the Council of Ministers and the Central Committee on 23 June 1960 entitled "On the Creation of Powerful Rocket-Carriers, Satellites, Space Ships and the Mastery of Cosmic Space in 1960-67" [8]. Among a plethora of programmes and R&D projects, the decree called for the



Mstislav Keldysh.

creation of a new generation of powerful launch vehicles with Korolev's OKB-1 serving as the prime contractor. These launchers, the N-1 and the N-2, would serve the increased needs of the Soviet space programme through the end of the decade. Missions for the N-1 and N-2 boosters were divided into three broad categories: for defense; for global communications and meteorology; and for lunar and interplanetary travel.

Korolev had made sure that a number of salient details were inserted into the document. These included development of an Earth orbital spaceship for crews of 2-3 people, automatic lunar satellites, and automatic lunar landers which could return to the Earth. Also listed were research on carrying out piloted expeditions to the Moon to investigate its terrain, selection of sites for establishing lunar settlements, and after the construction of such a base, the creation of a transport system for the Earth-Moon-Earth route. At the same time a spaceship would be developed for crews of 2-3 people to carry out orbital missions to Mars and Venus allowing among other things the selection of locations for future research bases on the surfaces. After these bases were established, regular interplanetary flight of crews would begin. A separate paragraph was also dedicated to launching automatic spaceships to the outer planets, in particular Jupiter [9].

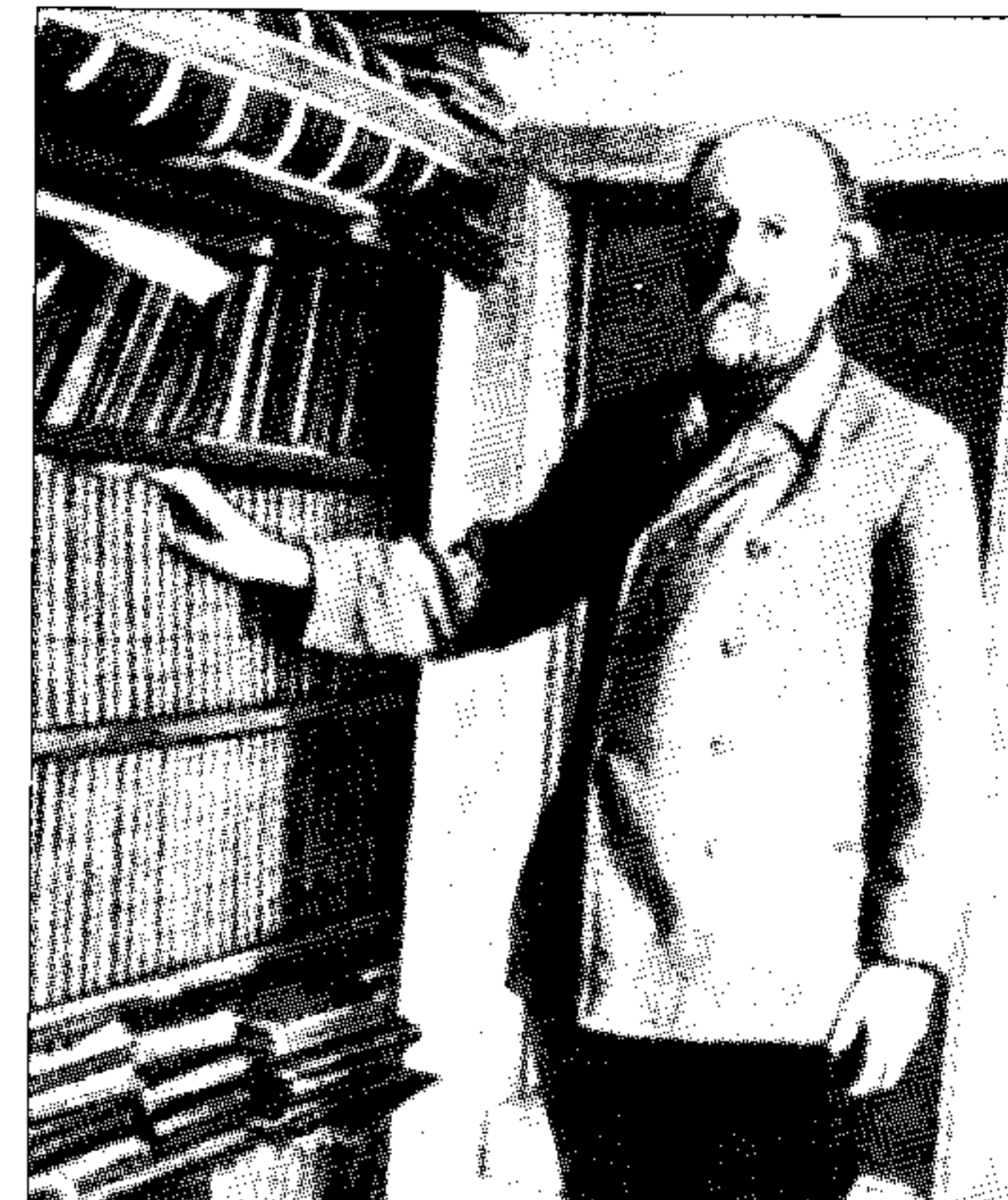
Most of the plans in the wildly ambitious decree never saw the light of day. Within less than a year, a second resolution on 13 May 1961 modified much of the earlier goals and redirected many of the programmes to military applications. If there had been any real interest in piloted interplanetary exploration, it remained a low priority behind a dazzling number of military projects approved for implementation by Chelomey. Just 12 days later after the second decree, Kennedy made his historic announcement at Congress setting the Moon as the next and greatest prize in the symbolic competition between the two su-



Mikhail Yangel.



Sergey Korolev.



Konstantin Tsiolkovsky.

perpowers. From the Soviet perspective this challenge was not perceived as such. From the beginning of the space era, the Soviets had been in the position to make the challenges, with the spectacular launches of a plethora of Sputniks, Lunas, and Vostoks. Given the rigorous secrecy which pervaded their space efforts, it would have been unusual for them to announce these projects in advance. Every challenge was manifested in hardware, in launches, in accomplishments. The speeches came afterwards. The United States of course, also responded with hardware, but all of them, Vanguard, Explorer, Mercury, paled in the eyes of the public to Soviet accomplishments. Thus for the Soviet Union, on 25 May 1961, the dimensions of the space race changed little. Kennedy's speech was in fact not even widely reported in the Soviet media, and few in the space programme took notice [10]. There were no major reassessments of Soviet goals and plans for space exploration. It was after all, only a speech, and in the mind of the Soviet citizen, speeches were better left to celebrate victories, not plans for victories. What was a momentous occasion in US space policy, thus passed without a response in the Soviet Union. The Soviets never guessed that regardless of Kennedy's own commitment to space exploration, the wheels of a mammoth and well-oiled machine had been set into motion.

Diversions in Early 1960s

Each of the five arbitrators of the Soviet space programme had pressing concerns in the period 1960-63, none of which involved a response to the Apollo decision. The Design Bureaus, led by the OKB-1, had a conception of the future which integrated Mars and Venus as the most visible objective. Korolev's vision was a step-by-step plan in many ways directly out of the notebooks of Tsiolkovskiy: it included the establishment of permanent orbital stations in Earth orbit crewed by cosmonauts, leading to progressively

more complicated lunar and interplanetary journeys culminating in a Mars landing. The Moon, so coveted by the US space programme following Kennedy's speech, was never an end to Soviet scientists, but merely a stopping point on the way to Mars and Venus. This important distinction is crucial to explaining the apparent inactivity on the part of the USSR in the post-Kennedy years. Although there were a number of projects for achieving piloted circumlunar flight by the mid-1960s, there was not a single proposal for a lunar landing in the 1961-63 period in any of the Design Bureaus.

In the OKB-1 itself, two ongoing efforts began in 1959-60, which foresaw piloted flight to Mars. The first would use a 20-25 ton spacecraft to allow the "rapid realisation of the programme with the resources at hand" of a circum-Martian flight [11]. The other envisioned the design of a larger 75 ton spacecraft for landing Soviet cosmonauts on Mars. It was in fact, the payload requirements for these interplanetary spacecraft which served as determinants of the capabilities of the N-1-class boosters [12]. The research on these spacecraft appears to have engaged resources at Korolev's Design Bureau in 1960-63 at the same time as NASA began to consolidate its own resources, handing out a number of important contracts in support of the Saturn C-5 lunar rocket and Apollo spacecraft.

The Central Committee of the Communist Party, in the persons of Khrushchev and Frol R. Kozlov, had no serious cause to feel threatened by the murmurs of activity from NASA. By the end of 1963, the Soviet Union continued to maintain its undisputed lead in space exploration, springing one 'first in space' after another at a continually shocked American audience. The Central Committee's primary concern, as with the military, was achieving strategic parity. In a bid for common resources, the space programme had spare chance of being a priority over the development of newer long-range ballistic missiles. Contrary

to conventional wisdom, the space programme was not a central component or instrument of Soviet state policy. At best, it was an added bonus, a perk that allowed the Party and the military to add to its résumé in extolling the virtues of a socialist state. The unprecedented successes of Gagarin, Tereshkova and others was a useful but not indispensable tool in helping to destroy the standard image of the Soviet Union as a nation of obsolete tractors and factories. And while Kennedy may have made Apollo an instrument of American state policy, there was little to be worried about. Given the track record of the US space programme up to the early 1960s, there was no reason to believe that the United States would actually put a human on the Moon before the end of the decade.

Redirection at the OKB-1

In the earliest existing document indicating that Korolev was moving his thinking to a lunar landing, dating from 27 July 1963, he wrote: "The accomplishment of an expedition of humans to the surface of the Moon should be considered the primary goal in the programme of study and familiarisation of the Moon" [13]. The leading designer of the N-1 rocket OKB-1 Deputy Chief Designer Sergey S. Kryukov recalled later that this reassessment of goals had taken place due to "reports on American work on Saturn and the start of flight work of this complex" [14]. By this time, NASA had conducted the first four ('Block I') Saturn I launches as part of the "first step to perfecting the Saturn V vehicle for lunar missions" [15]. Although fired with only a live first stage, the launches, all successful, was hard evidence of NASA's commitment to the lunar landing goal.

Korolev had evidently briefly discussed a possible lunar landing programme with Khrushchev in July 1961 and February 1962 at two different high-level meetings. The evidence suggests that these were merely informational briefings, focused more on the

N-1 rocket itself than any specific mission. The first concrete action by the Chief Designer came at exactly the same time as "the reassessment" was taking place at the OKB-1 to a Moon landing mission. During a meeting in early June 1963, Korolev for the first time detailed his lunar landing proposal to Khrushchev. The meeting's main agenda had been to address the increasing acrimony between Korolev and the principal rocket engine designer in the USSR, Chief Designer Valentin P. Glushko, a battle that had almost stopped the N-1 programme in its tracks. Having disagreed on certain design elements of the N-1, Korolev and Glushko, after thirty years of cooperative efforts simply refused to work with each other. Although Khrushchev's personal mediation on the issue did little to improve personal relations between the two Chief Designers, Korolev took the opportunity to directly raise the issue of competing with Apollo.

Using a number of beautifully illustrated drawings of his N-1 rocket and proposed lunar spacecraft, Korolev painstakingly explained the requirements and mission profile of a Soviet lunar landing project. He emphasized that there was a good chance that the USSR would be able to beat the United States, given the requisite financial and industrial support. Khrushchev was guardedly enthusiastic about the plan, but asked the Chief Designer about the projected cost of such an undertaking. Korolev estimated that it would cost 10-12 billion roubles, the official cost of the rouble at the time being roughly the same as the dollar. The expense of the undertaking clearly surprised Khrushchev. By the end of the meeting, while he did not commit to any programme, he did ask Korolev to prepare a formal proposal which would be considered by the Presidium (later the Politburo) of the Central Committee [16].

Cost was a particularly important factor in space policy planning at the time, particularly due to an agricultural crisis peaking around 1963 which prompted the USSR to increasingly rely on imported grain from abroad. Despite phenomenal industrial growth in the late 1950s, the poor record of the agricultural sector may have served as a catalyst for more conservative levels of funding in areas not essential for national defense [17]. The enormous amounts of money pouring into the development of nuclear weapons and ballistic missiles was clearly taking its toll, and attempts to downsize conventional weapons systems to compensate did not alleviate the crisis [18]. These food shortages and rising prices across the USSR may have given pause to Khrushchev

when considering a highly expensive space extravaganza whose political utility was dubious at best.

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Part 2 of this two-part article will appear in a forthcoming issue.