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Subslug: [Interview of Major General of Aviation Aleksey Arkhipovich
 Leonov, USSR Pilot-Cosmonaut, Twice-Honored HSU, by Major
 I. Kuznetsov under rubric ``Our Interview Guest``: ``The
 Flight That Did Not Occur``; uncaptioned photograph of
 Major General of Aviation Leonov included]

FULL TEXT OF ARTICLE:

1. [Interview of Major General of Aviation Aleksey Arkhipovich Leonov, USSR Pilot-Cosmonaut, Twice-Honored HSU, by Major I. Kuznetsov under rubric ``Our Interview Guest``: ``The Flight That Did Not Occur``; uncaptioned photograph of Major General of Aviation Leonov included]
2. [Text] Major General of Aviation A. Leonov, USSR Pilot-Cosmonaut, Twice-Honored HSU, tells about the Soviet lunar program and contemporary problems of cosmonautics.
3. [Kuznetsov] Aleksey Arkhipovich, the journal's readers are interested in ``gaps`` in the history of Soviet cosmonautics. One of them is our manned lunar program, in which you had occasion to participate. Share your recollections.
4. [Leonov] The Soviet manned lunar program envisaged two stages: the first was a flyby of the Moon and the second was a manned landing on the Moon, and its technical director was Hero of Socialist Labor Vasiliy Pavlovich Mishin.
5. The first stage in the mid-1960's--that was when Center specialists joined in fulfilling it--was viewed realistically: the Proton booster rocket already was flying and the Soyuz craft, named L-1 in the lunar version, was being materialized in metal. The second was problematical, but we believed that it would be carried out. Back before the decision was made on realizing the lunar program, Sergey Pavlovich Korolev told us about the powerful N-1 booster and L-3

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craft which his collective was working to create. At that time we thought that the lunar program was designed for many years. We argued about projects for creating lunar settlements and flights to planets of the solar system. All this was so, but life showed that our dreams outstripped real events.

6. The booster intended for accomplishing the lunar flyby program had been made and had given a good account of itself, but the first launch of the Zond--that was the name of the L-1 craft in the automatic version--was unsuccessful. Why? A booster module (the D unit) was placed on the Proton to reach parabolic velocity, but the switching of commands was confused in it and it decelerated instead of accelerating. The craft had to be liquidated. This was the first alarm signal. The next launch went normally, but later there again was a booster malfunction. After functioning for several seconds, it fell not far from the launch site. It turned out that a rubber plug had fallen into the manifold ahead of the turbopump assembly. Having gotten stuck in the line, it cut off the fuel feed. Subsequently serious troubles leading to flight disruptions were repeated every other time.

7. It was learned in 1968 that we would not perform this mission before the Americans. One reason was the absence of proper financing and an incorrect distribution of assets.

8. [Kuznetsov] You said that main efforts were aimed at realizing the L-1 program. How did the cosmonauts prepare for it?

9. [Leonov] A total of some 20 persons prepared for the lunar program. The first crews consisting of Leonov and Makarov and of Bykovskiy and Rukavishnikov were made up from them. Believing in the feasibility of the set goals, the entire group began work actively, since each one thought that with a successful flyby of the Moon he automatically would go over to the next stage for the L-3. Therefore training also proceeded with promise. We mastered many simulators, including a dynamic simulator created on the basis of a helicopter, and went through test pilot school at the Flying Research Institute. Realizing that the lunar landing was the most difficult element, we learned the ability to choose a site in a short time, land the craft with limited fuel reserves, and instantaneously evaluate vertical velocity.

10. The landing approach on the return from the Moon was to have been from the direction of the Antarctic. We even flew in Somalia in order to have a good knowledge of constellations near the Southern Cross. The craft had a star-tracker and sextant for autonomous navigation, and the cosmonauts devoted much time to studying these instruments. In the final account everyone learned to work with full

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understanding of the dynamics of a lunar flyby.

11. To practice a landing on Earth at parabolic velocity, specialists developed a precise, detailed methodology with two entries. We had to learn to choose the angle of entry after the last correction using the star-tracker and sextant. It depended on the magnitude and direction of the deceleration pulse. It was possible to "bury" oneself in the atmosphere with a large angle and to "slip through" it with a small angle. The optimum version was an entry with a "pop-up": enter, exit the atmosphere after extinguishing great speed, and reenter, already knowing the angle of incidence at which the craft had to be held in order to get to the calculated landing point. The "manual pulse input" instrument highlighted the number of pulses after passage of the first sector. From them we figured the distance to the calculated landing point, then converted distance into angle of incidence. All these operations were rehearsed on the "Volchok" dynamic simulator. As a result we learned to make a "landing" with an accuracy to on kilometer. After taking tests on craft design and flight program, the cosmonauts were ready to fly around the Moon.

12. The flight would be difficult even from a purely everyday aspect, since the L-1 did not have an orbital module as did the Soyuz, and two persons had to be in the descent module for a week. We followed the last unmanned flight with hope, but when the frontal shield was fired off, the command also was sent to fire the parachute system. The craft was flattened after falling to Earth. It was curious that part of the film which it delivered was preserved. This allowed us to be first to obtain beautiful, exceptionally precise photographs of Earth from the direction of the Moon.

13. The Americans flew around the Moon in Apollo 8 in December 1968 and our leaders shivered: "Do we have to do this now?" General Designer Mishin nevertheless got to conduct one more test flight in an automatic version, and again a failure: a disturbance of the flight configuration led to depressurization of the body. We will add to this that all three launches of the N-1 booster rocket during flight-design tests were unsuccessful. After soberly assessing the situation, the government shut down the program connected with a manned lunar landing.

14. [Kuznetsov] Aleksey Arkhipovich, did our plan differ from the American plan?

15. [Leonov] Our lunar lander was similar to the American one, and the flight schemes, as Kondratyuk had foreseen them, did not differ at all. The craft had to enter a base circumlunar orbit, and a capsule would separate from it which would make a soft landing on the

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Moon. True, in contrast to the American one, the capsule was to hold one person, but actions on the Moon and the return to Earth coincided fully.

16. I will remind you that the Soviet Union was performing parallel research of the Moon with automatic satellites. They gave us interesting data, even more complete than the Americans had at that time, but there also was one other distinction.

17. The accident on Apollo 13 connected with the explosion of a fuel cell demonstrated the very flexible thinking of U.S. leaders. By telling about everything honestly, they were able to unite the entire nation in those days. Literally all America followed this flight, suffered it, and suggested and thought how to save the crew. But our out-of-the-ordinary situations always were concealed in an attempt to prove the superiority of Soviet equipment. As a matter of fact, there were enormously more of them than the Americans had, but the people were not told about this. Therefore many got the impression that mastery of space was a rather simple matter and that upkeep of cosmonauts was costing the state dearly and was economically inexpedient.

18. [Kuznetsov] How did you follow the progress of the Americans' fulfillment of the Apollo program?

19. [Leonov] The entire world observed man's first landing on the Moon except for the Soviet Union and China. But with the exception of a maximum of a hundred persons who viewed the reports in one of the organizations, no one among Soviet citizens saw the launch of the craft and its landing on the Moon or the crew's actions. History appraised the merits of our ideologues Ponomarev and Suslov and the course along which they led the country. But the Americans have no false morality. In 1965 they gratefully received all our information on extravehicular activity and coordinated their program. While at first it was planned only to stick a hand out of the craft, subsequently they repeated my spacewalk and also used a handheld motor which permitted the astronaut somehow to control his body in space. Returning to the U.S. lunar program, I will say that there are no "gaps" in it for me. Moreover, I recorded the flights of Apollo 10 through 17 on video cassette.

20. [Kuznetsov] Did you see extraterrestrials on your films? UFO specialists assert that the first people on the Moon saw them and that extraterrestrials allegedly observed the astronauts. Is this true?

21. [Leonov] People fond of any sensations wrested a phrase from the astronauts' conversation and are building their fantasies on this.

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Clear communications were established with the Houston Flight Control Center after the Moon landing. The picture was being transmitted "there" and "back." On emerging from the craft, Neil Armstrong stepped to the ground very cautiously, then became bolder; his steps became more confident and he began to jump. I looked at these frames. James [sic] Aldrin said to him: "Look out, they're watching us." "They" in the sense of "Earth." He further advised not to violate instructions and to be more cautious. And in fact, after this Armstrong began to take normal steps. I told the ufologists this more than once: "Why are you speculating? This is in fact not so."

22. [Kuznetsov] We created the Buran space shuttle, it went through the first tests, but now some such as Academician Sagdeyev are saying that it is not necessary. What is your opinion?

23. [Leonov] We have the Mir program. If we wish to seriously receive dividends, it is necessary to return to Earth materials of the studies that have been conducted. The Soyuz craft can return a quantity of cargo that is small in volume and a maximum of 100-120 kg in weight. We plan to return tons. This can be done only by the Buran. In this connection it is impossible to agree with Academician Sagdeyev's opinion that the Buran in general has nothing to do in orbit. We need it as a component part of the Mir program's transportation system. Sagdeyev is wrong here.

24. And further, previously he was silent, but now he objects. It would be more ethical for his part to give an account for his subject matter: Why did the Phoboses, which he launched and into which great assets were placed, fail without having reached the target?

25. [Kuznetsov] Here we probably should touch on questions of improving the profitability of space?

26. [Leonov] Being an embodiment of foremost scientific-technical thinking, cosmonautics is really capable of enormously greater economic return. Having spent \$25 billion on the lunar program, the Americans subsequently received a profit twice that by introducing new technologies and developments. Our situation is somewhat different, but through whose fault? Cosmonautics?

27. Back in the 1930's Academician Kapitsa posed a question before the Economic Council of the Council of People's Commissars: "What incentives for creative innovations are built into the Soviet system?" And he answered himself: "I see none." The situation has not changed since then. What projects didn't the economists substantiate to please the politicians? "Emancipation of peasants," "destruction of unpromising villages," "transfer of northern rivers" and others of sad memory. And to this day the economic

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mechanism has not been developed for stimulating enterprises' introduction of new kinds of products and technologies which, for example, now lie unclaimed in excess in the space sector. Hence the conversations about low profitability of space. But this is not the fault, but the misfortune of cosmonautics.

28. I remember how we were asked to monitor agricultural lands from space. In a 24-hour period we gave out a pile of data, but it differed from that which the State Committee for Statistics gives out by 25-30 percent, and they turned down our services. But we learned that many fields either were smaller than according to the data of the Agro-Industrial Committee, or they were not being used, or they were not taken into account at all. Results of mismanagement also are easily seen from space: trampled-down pastures, ruined rivers and reservoirs, and the polluted atmosphere of cities. We can tell, for example, about all the outrages which the Ministry of Land Reclamation and Water Resources committed on Soviet land. Much is being said now about Aral and Balkhash, but the fact is that cosmonauts were first to sound the alarm 15 years ago. I myself went to Pelshe, chairman of the Party Control Commission of the CPSU Central Committee, and told him what was being done on the Baykal-Amur Railroad and Sea of Aral. While they made certain other decisions on the Baykal-Amur Railroad at that time, they did not for Aral.

29. It seems our information is little needed by anyone. I personally believe that reproaches on this matter should be addressed to the economists above all, and the press must properly arrange the emphasis here. Rigid communications, both direct and feedback, is needed and then there also will be an economic effect.

30. [Kuznetsov] And the last question, which journal readers often ask: Do you believe that our contemporaries will be eyewitnesses to fulfillment of a Soviet lunar program?

31. [Leonov] Such a program is not envisaged before the year 2000. But beyond that, we will see.

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