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**Headline:** State Commission Chairman Kiyenko on Economic Impact of Satellite Programs

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**Subslug:** [Interview with Yuriy Pavlovich Kiyenko, deputy chairman of the USSR Council of Ministers' Main Administration of Geodesy and Cartography and chairman of the State Commission for Launches and Use of Cosmos-series, Resurs-type Satellites, by SELSKAYA ZHIZN correspondent V. Shcherban, under the rubric "Today is the Space Program Day": "The Satellites Are Launched at Dawn..."; first two paragraphs are source introduction]

**FULL TEXT OF ARTICLE:**

1. [Interview with Yuriy Pavlovich Kiyenko, deputy chairman of the USSR Council of Ministers' Main Administration of Geodesy and Cartography and chairman of the State Commission for Launches and Use of Cosmos-series, Resurs-type Satellites, by SELSKAYA ZHIZN correspondent V. Shcherban, under the rubric "Today is the Space Program Day": "The Satellites Are Launched at Dawn..."; first two paragraphs are source introduction]

2. [Text] For 16 years, there was an impenetrable shroud of secrecy surrounding him. All this time, his work was reported in the press dryly: "... the next satellite in the series was launched." And if they ever showed him on television, it was only from the back, and that just a glimpse. The chairman of the State Commission for Spacecraft Launches has always been a big secret. On the eve of the Space Program Day, we met with him. Just before the interview, he again called someone at the "top" and asked, "Then it's OK?..."--and, after hanging up the receiver, he said, "Well then, let's begin..."

3. Our interviewee is Yuriy Pavlovich Kiyenko, deputy chairman of the USSR Council of Ministers' Main Administration for Geodesy and Cartography and chairman of the State Commission for Launches and Use of Cosmos-series and Resurs-type Satellites. He is over 50 years of

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age. A hale man of few words. During the year, he spends many a day roaming the cosmodromes. The satellites he has launched have never fallen back to earth or exploded, and they have sent billions of pieces of information from orbit. He has written more than 100 scientific articles and is an Honored Scientist and Engineer.

4. [Shcherban] Yuriy Pavlovich, every now and then there are reports in the newspapers about the satellite launches. And behind all of them stands a mysterious figure--you. What kind of work does the state commission chairman do?

5. [Kiyenko] It is somewhat odd that I am of interest to you. I am neither a cosmonaut nor a general designer. I am a civilian. The state commission chairman coordinates and supervises the operations associated with the testing and use of space equipment. An enormous number of people participate in those operations. The information needed for making a decision about launching a space vehicle and for supporting the work during the flight converges at the chairman's desk. Accordingly, he alone bears all the responsibility for how a launch will go and for the safety of the people...

6. [Shcherban] It is only recently that we have begun to learn the truth about the launches of manned spacecraft. Along with the successes in that area, there have also been failures: people have died, and crews have returned from orbit with nothing... But there has never been any such information about the launches of the robot satellites. There has been total silence on that score.

7. [Kiyenko] It's no secret that work with space equipment is dangerous. Very complicated situations come up. But I have never been involved in a single instance in which someone has died or has received a serious injury. So if you are expecting ''sizzling'' facts, then, I'm afraid I'll disappoint you. Space robot systems--unlike a human, who has one head, one heart, and two hands--all have one, two or even three back-up systems. That is why the space robots are more reliable. Man is needed in space for testing new equipment and for conducting unique experiments. When all the bugs have been worked out, then the automated equipment successfully replaces man. Although, even I have had some emergency situations come up. I have had to postpone launches when I didn't receive absolute assurance that systems would work efficiently or when flight programs needed to be adjusted. Once, we discovered one person missing among the evacuated participants in a launch. The launch had to be put on hold. We organized a search party for the missing person. He had been sleeping quite comfortably in a safe area the whole time.

8. [Shcherban] What's the result of delaying a launch for a minute?

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9. [Kiyenko] In such an extremely complicated matter, the slightest interruption leads to an unbalancing of the system. Which means that there is a lesser degree of probability that we can produce the needed results. A whole set of research operations must be performed to determine the launch time. The entire collective really gets 'thrown off' whenever there is any kind of delay during a launch.

10. [Shcherban] Every time spacecraft are launched, the specialists assert that it will facilitate the development of the national economy. What kind of return have your spacecraft given to the national economy?

11. [Kiyenko] It is difficult to state precise sums in rubles, since the application of space technology is multifaceted. Well, for example, to make a map or to study the ecological situation in a given region, an airplane can be used, or a satellite. The space-derived information will be 3-4 times cheaper than that derived by airplane. But how many millions is the recent discovery from orbit of the causes of the Aral Sea catastrophe worth? These days, the Ministry of Land Reclamation and Water Resources and the agricultural industry are rightly being named as the primary culprits in the drying up of the Aral. But it turns out that they are not the only ones at fault. In the middle reaches of the Amu-Darya and Syr-Darya rivers, the earth's crust is sinking. And at the mouths of those rivers, it is rising.

12. The difference in elevation between the mouth and the middle reaches changes by 10-15 millimeters a year. Nature is building a dam naturally at a rate of 1.5 meters a century! Underground aquifers have enormous reserves of fresh and slightly mineralized water. If the Aral Sea today has 450 cubic kilometers of water, the underground geological lenses beneath the middle reaches of the rivers have accumulated something on the order of 20,000 cubic kilometers. This will help solve the region's ecological problem! It will mean billions of rubles saved!

13. And what about satellite prospecting for oil, gas and coal? Drilling just one dry well means millions of rubles down the drain. And what about controlling desertification? It was established from orbit that, in Kalmykia, 40,000-45,000 hectares of land per year are becoming unusable because the land is being covered with sand, and the reason for that--overgrazing by cattle. And what about the number of underground water deposits that have been found? Satellites have identified hundreds of thousands of hectares of eroded soil. If it weren't for them and the measures taken thanks to them, you and I would have no bread at all...

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14. [Shcherban] I would love to share your optimism. But here among the people far from space a somewhat different opinion has formed regarding its development. It's no accident that demands have been voiced at the Congress of People's Deputies for a reduction in the allocations for space... There was no sausage or butter in the pre-space era, and there's still none. Even though more and more satellites are being launched. Might it not make sense to reconfigure them and to concentrate on solving the problems of today? I believe that people would vote for that with both hands.

15. [Kiyenko] Well, first of all, the launches of space vehicles are not increasing. Just the opposite. And that's not because we are becoming convinced of the flights' ineffectiveness. The reduction is happening because they are becoming more effective and are lasting longer...

16. Let's imagine for a just moment that we abandoned the use of satellites and that we plunked down those millions for the purchase of meat. We would reduce substantially the effectiveness of the operations for investigating the country's natural economic potential. At present, space-derived information forms the basis of operations involving the search for raw materials and the study and inventory of the country's forests. That information is important for the study of agricultural resources and seismic hazards, and for the analysis of the engineering and geological conditions in areas that have nuclear electric power plants... I could continue the list ad infinitum. We would lose much, much more than we would gain if we abandoned the space programs.

17. It's another matter that the data from space-derived information is underused. And that use, basically, only for the development of industry. Agriculture is receiving only a miserly portion of the space pie. And yet, information that is of value to agriculture is being passed on regularly to the agricultural industry. For example, a comprehensive study of natural resources was recently conducted in the Central Asian republics. In arid places, we found lands with good forage resources, and we mapped them out.

18. [Shcherban] Mapped them out? No matter how many kolkhoz and sovkhos representatives I questioned at the local level about how they are using the materials of space surveys, they just shrugged their shoulders: they hadn't heard a thing about it. Most of them don't even know what it is.

19. [Kiyenko] Well, I don't know whom you talked to there... Is it really necessary to get the space-survey results to the farm managers? It's the land-use surveyors in the oblasts and the republics who should be familiar with them. But you are right in

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saying that the farm managers are not very interested in the space information. Moreover, there is a certain pessimism in their attitude toward it. Why? The main reason lies in the ineffectiveness of the existing mechanism for introducing what is new. The system operates in such a fashion that people are not interested in what is new, because, after its introduction, they receive a smaller wage.

20. The space program must be viewed as a locomotive which is pulling behind itself a long train of basic and applied sciences. If all the achievements we have brought back from space were introduced today, then there is no doubt that an enormous economic impact would be felt in many sectors of the national economy.

21. [Shcherban] Each new launch of a spacecraft, it is asserted, produces wounds in the ozone layer which do not heal for a long time. And if you consider the fact that we are launching hundreds of space facilities, then that very layer reminds me personally of a sieve. Does the chairman of the state commission have his deputy for ecology close at hand? And, in general, is any one determining the effect of the space launches on the environment?

22. [Kiyenko] The rockets which we use to place the Cosmos and Resurs satellites into orbit are ecologically clean. And they do no harm to the ozone layer. They discharge a smaller amount of combustion products than do the automobiles of an average-sized city. And, in general, it one can't that a rocket punches a hole in the ozone layer. No one has ever even recorded such phenomena above the cosmodromes. And, with regards to the deputy... During launches of space vehicles for the study of natural resources, I have close at hand specialists from the Priroda State Center, who, believe me, know what's what in ecology matters.

23. [Shcherban] As chairman of the state commission, you know better than anyone else what the bill is for spacecraft launches. Couldn't you cite a couple of figures from this document?

24. [Kiyenko] Resurs-F, when it completed its program, produced an economic impact of 20 million [rubles]. That exceeded the cost of the vehicle, the rocket, and the launch many times over.

25. [Shcherban] Many of our readers are convinced that the entire space armada circling our globe serves, to a large extent, the interests of the military-industrial complex. In the final analysis, majors and colonels aren't launched into space so they can observe from orbit how the winter sown crops have sprouted, are they? For what purpose, it is being asked, have we achieved the world's highest resolution with our cameras--down to 5 meters--which can be used to view the wheat crops in detail from space...

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26. [Kiyenko] The satellites which are being placed into orbit under the supervision of our state commission are intended solely for solving national economy problems. It is peaceful technology. And by the way, thatspace armada, as you call it, is more like a small flotilla in comparison with the one which is working for all the other sectors. We cannot even satisfy the demands of our consumers. Throughout the country, more than 1,100 organizations use space survey materials to solve approximately 300 national economy problems. At customers' requests, we are passing on as much as a million pieces of space information. We are supplying it to more than 60 countries around the world for hard currency. And it's only because of the shortage of space equipment that we can't saturate the domestic and foreign markets with its products.

27. If we want to have enough sausage and enough butter, then we should talk about increasing that armada. Indeed, the demand is there! Just one space photograph costs anywhere from \$1,000 and \$4,500. And as for the majors and colonels, I will say this: their training, skills, and reactions and the way they think are perfectly suited for ensuring that the expensive space missions are completed successfully.

28. [Shcherban] It sometimes happens that satellite fragments which have not completely burned up fall to Earth. They are quite often taken for UFOs. Such falls, so our readers assert, have recently become more frequent. Incidentally, one such burned fragment, a spherical object, recently fell on a cornfield in Voronezh Oblast. Fortunately, no one was hit. Can you guarantee that some unburned chunk of space metal won't ever crash through the roof of someone's house somewhere?

29. [Kiyenko] I'd call that a loaded question. Yes, I do know of instances when remnants of spacecraft have returned to the ground against our wishes. They are, beyond all doubt, anomalies. Such instances have been written up both in our country and abroad. But in any specific instance, it must be determined what country the fragment belongs to. Our equipment has been designed so that nothing is supposed fall back to Earth and, if something does fall, that it does so in completely unpopulated areas.

30. [Shcherban] Incidentally, regarding unpopulated areas, from where are your satellites launched?

31. [Kiyenko] We prefer to operate from the Northern Cosmodrome in Arkhangelsk Oblast. During powered flight, the rocket flies over unpopulated areas: taiga, tundra, marshes, and the Arctic Ocean. Frequently, the launches take place at dawn.

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32. If only you knew how beautiful the cosmodrome is at that time of day...