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IN SPACE

Memorandum on the Seminars
of March 23 - April 20, 1965

prepared by

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**THE SOVIET UNION AND THE UNITED STATES
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Five seminars on the Soviet space program were conducted by the Program of Policy Studies in Science and Technology of The George Washington University in the spring of 1965. The seminars were organized by Robert Jordan of the Program, and participants came from government, industry and the academic world. Many areas of special knowledge were represented, and the meetings were designed to facilitate the exchange of factual knowledge and of interpretations of Soviet developments in politics, military affairs, and science as they relate to space.

This memorandum is intended to telescope the discussions and to compare, but not to analyze, some of the interpretations offered. No transcript of the meetings was made; this paper is based on rough notes and the advice of some of the participants. Repetition of material in the papers presented by Messrs. Porter, Sheldon, Ploss and Wolfe has been minimized, since the Program has copies of these papers available. This memorandum should not be taken as an authoritative source of information on the Soviet space program but only as a convenient reference for the participants of the seminars. The participants restricted their statements to unclassified information and interpretations drawn from public sources. Some controversial remarks, therefore, were not challenged at the meetings and are unchallenged in this paper. Certain factual data have been updated and are presented in parentheses and footnotes.

I. The Soviet and American Space Programs Compared

The participants expressed some disagreement as to the relative strengths and weaknesses of the U. S. and Soviet space programs. Tentative comparisons were ventured, however--some of which have since been overtaken by events.

It was generally agreed that the U. S. is ahead:

...in the development of civilian uses of space

...in the physical sciences

...in tracking

...in lunar and planetary exploration

...in international cooperation

...in attracting friends among the world's scientific community

The Soviet Union is ahead:

...in manned flight

...in medical and biological science

...in rocket thrust and payload delivery

...and in appeal to the common man, especially in the underdeveloped world.

Neither the U. S. nor the Soviet Union has an absolute lead in the space race.

If the Soviets have really placed a low priority on the development of practical civilian uses of space, e. g., meteorology, communications, navigation and geodesy,¹ it may be because they place a low priority on civilian uses of all untried technology.

¹ Public evidence is growing that priorities are being raised in each of these fields. In all probability, Soviet satellites for all these practical purposes are flying today.

Perhaps they are letting the U. S. do the ground work. Perhaps they have less need
²
 for such inventions as communications satellites. And perhaps they have neglected
 the areas of physical science necessary for such developments. The data which have
 been released indicate to some observers that the quality of Soviet work in physical
 science in space is questionable and the quantity small. Other observers character-
 ized it as spotty rather than poor in general. Still others cautioned that a good deal
 of successful research may not have been revealed. Mr. Porter suggested that the
 apparent weakness of Soviet physical science in space could be explained if we assume
 that Soviet investigators do not have adequate access to electronic computers and
 cannot, therefore, process their results for timely publication or for use in weather
³
 forecasting. This explanation would account for the gradual release of information
 long after experiments and for Soviet behavior in data exchange. The thesis that
 Soviet experiments may be poor is supported by some participants' personal obser-
⁴
 vations of such equipment as the Soviets have displayed and by the apparent Soviet

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- 2 At the time of the seminar, the Soviets were known to have some interest in communications satellites. The year before, Charles Sheldon had tagged C-14 as a Molniya-type failure. But compared with the U. S. program, the Soviet program had seemed to give these satellites a low priority and little public attention. A few days after the seminar had speculated about why the Soviets were not particularly interested in TV-satellites, Molniya I was launched.
 3. New weather centrals for satellite data are being organized as of January 1966.
 4. Since the Soviets are known to disguise their hardware before displaying it, observers must employ some guess-work in their evaluations.

failure to make significant discoveries during the fruitful period when U. S. investigators found the Earth's tail, provided descriptive data about the ionosphere, and studied the nature of the Van Allen Belt. One participant blamed the Soviet system for poor performance; neglected areas may be dominated by mediocre scientists, protected by the rigidities of personnel policy; though early Sputnik experiments ranged from mediocre to bad, the scientists who planned them have not, to his knowledge, been replaced. Other observers hesitated to assume that the personnel system, the scientists or the investigations of the Soviets were anything less than first-rate. There is also the possibility that the Soviets have been behind and are now attempting to catch up with and overtake the U. S. in space physical science. A recent series of satellites within the larger Cosmos series have a variety of elliptical orbits and could be scientific.

While it was agreed that the U. S. has a tremendous advantage in its worldwide tracking system, there was some doubt about how much the lack of such a system really handicaps the Soviet program. Their failure to establish a worldwide tracking network was attributed to human error, probably on the part of the politicians. The alternatives to such a network are floating stations or greater sophistication in single-station tracking and adjustment of launchings for single-station observation. The Russians prefer the latter alternative. The sophistication in tracking thus forced on the Russians may have yielded technical dividends, and independence from host nations is a diplomatic advantage. But continuous tracking is likely to be increasingly important; the Soviet program may suffer if the Soviets do not arrange a network of their own or accept the loan of ours.

Despite Soviet firsts in lunar landing and photography and despite the comparatively greater percentage of their total space effort dedicated to escape missions, ⁵ they have not been as successful as the U. S. in gathering information about the Moon and the planets. (The recent soft landing on the Moon may have altered the balance.) In the race for the Moon, the Soviet Union and the United States were given even odds by most of the participants, the rest favoring the Soviet Union at least for the first manned circum-lunar flight.

With international cooperation in space the U. S. has scored a diplomatic victory. The Soviets may now regret their isolation, and they have begun to take an interest in joint efforts (particularly by making overtures to bloc countries and more recently to France). Their security policies complicate cooperation however. Our willingness to share experiments and prestige with foreign scientists and our readiness to publish information about space study have won support among the world scientific community. Even scientists in the bloc, who are invited to witness some U. S. efforts, are still denied access to Soviet experiments. (A bloc meeting in Moscow, late in the fall of 1965, indicates Soviet policy toward bloc scientists is changing.)

The participants gave the Soviet Union an unquestioned lead in manned flight and in medical and biological space science. (Recent events have altered the balance considerably, though the Soviets may still have a slight edge.) It was denied that there is any truth to rumors that the Soviets are careless with human life in space. They may

5. The Soviet percentage was ten times greater in planetary and four times greater in lunar efforts than the U. S. percentage.

have taken even greater precautions than did the U. S. before first attempting a man-in-space launching. Gagarin's flight was preceded by a great deal of precursory work, and his ship was placed in such an orbit that it would have re-entered the atmosphere in a few days automatically if the retro-rockets had failed.

At the time of the seminar, the payload weight gap may have favored the Russians as much as three to one. (This gap has been reduced and it may not have had a long-run detrimental effect on the U. S. program.) The greater sophistication and miniaturization forced on the U. S. have produced a valuable and versatile technology, probably unmatched by the Soviets. The secrecy surrounding Soviet experiments, however, does not allow us to be sure that their technology has actually suffered from more generous weight allowances, and little satisfaction can be gained from the knowledge that the Soviet lead in weight orbited continues to grow.

The success of the Soviet program as propaganda probably took the Soviet leaders by surprise. In the eyes of common men everywhere, Soviet space victories established the once famously "backward" Russia as a leader in world science and eroded the U. S. claim to scientific and military supremacy. While the secrecy surrounding Soviet investigations may offend scientists, it adds the thrill of surprise to the great achievements of the Cosmonauts. Prestige in space technology has created interest in Russian manufactures, but this too was probably an unexpected dividend. Current use of space propaganda is a more controversial subject and will be discussed later.

To judge by appearances, both the Soviet Union and the United States have carefully planned, long-term space programs which are a mixture of both military and

non-military projects. To some observers the Soviet program seems to concentrate on specific goals while the U. S. develops a broader program--the rifle vs. the shot-gun.⁶ Both programs grew out of post World War II development of large rocket-propelled missiles, and it is probable that the decision to go into space was made independently by the two governments. So much lead time is required for space experiments, that we cannot say specific victories by one nation produce specific reactions in the policies of another. But there is such a thing as a space-race, and the race is an important motive behind political decisions to continue financing such expensive experiments.

II. Problems of Evaluation

Soviet security policy and showmanship make it difficult to evaluate the accomplishments of the Soviet program. Some investigators assumed that the Soviet program is at least as advanced as the U. S. program, except where there is good reason to believe that it is not. Others hesitated to credit the Soviets with any capability they have not yet demonstrated.

The secrecy of the Soviets about their space program is itself an interesting topic. No entirely satisfactory answer has been found for the Russian behavior, but it invites speculation. If a certain matter is secret, the fact that it is secret is also secret. Soviet spokesmen will offer evasive or misleading answers when asked about it. It would appear that launch data are military secrets. But the range of secrecy seems to go beyond the requirements of military security. We can assume that their reluctance

6. This metaphor is now thought to be dated.

to share any information unnecessarily may stem partly from a characteristically Russian distrust of foreigners, as well as a "need-to-know" policy. The advantages of exchange to scientists might be expected to favor a relaxation of secrecy, but though the Soviets keep exchange agreements, they interpret them more strictly than we do and release little information.

They may be concealing weakness. Perhaps they are not performing experiments in compliance with international agreements. Perhaps they perform them, but their results are embarrassing. Satellite failures are sometimes admitted, especially when they cannot be hidden, so there is no absolute ban on reporting failure. But satellites are identified by catch-all series names and specific missions are not announced in advance. The naming system is designed to disguise something--perhaps it is failure. Accordingly, the U. S. is attempting to arrange exchange in areas where we believe their results would not reveal weaknesses.

Mr. Sheldon's paper gave examples of Soviets at various levels readily committing themselves to specific goals far in advance, something U. S. leaders are reluctant to do, though we release technical details in great quantity immediately prior to actual tests. It was noted that the United States, too, limits information on military space activity to an extent that may seem unnecessary to foreigners and that U. S. policy may thus contribute to a cycle of retaliatory secrecy.

The Soviets say that the names of space scientists must be concealed to safeguard their lives. In effect, this anonymity protects them from attempts by Westerners to

7. Three or four Cosmos satellites out of 103 flown have been disguised failures--C-27, C-41, C-60 and C-96. The disguise would also hide military operations similar to the operations they criticize when we engage in them.

contact them. More important, perhaps, secrecy about the identity of personnel is characteristic of a tight security system anywhere. The activities of a program may be predicted if the whereabouts and specialities of its participants are known. (Secrecy about space personnel is also a U. S. practice, but to a lesser extent.) Mr. Krieger pointed out that one could surmise some identities by the sudden disappearance of some of the best Russian scientists from the literature in 1957.

The widespread secrecy has effects on public opinion, though these effects may be secondary to the original reason for secrecy. Surprise announcements make space victories more dramatic. While the scientific community may be offended, the unanticipated news impresses the common man in the underdeveloped world—and disturbs the common man in the developed world.

If every peaceful experiment is considered potentially important by the military, one would expect maximum secrecy, broken only in exceptional cases and for good reasons, such as a demand by scientists for exchanges in order to get vital information. The world demand for news about Soviet space might lead propagandists to claim the right to publicize the program more than military security officers would like. A desire to show off might lead the space people to release information about victories immediately to head off an American claim to a "first." But if the program exists primarily for propaganda purposes, as some participants suspect, the benefits of secrecy may be psychological. Secrecy would promote speculation about military power and scientific superiority which couldn't be tested by reference to facts. It would thus attract attention to victories and confuse the opposition. If one assumes, as most participants

did, that there are several rationales behind the Soviet space program and several groups interested in it, then the secrecy and publicity about any aspect of the program are the products of a mix; they may vary with events and with the rise and fall of individuals and groups and may be subject to influences outside Russia. If there are several rationales, the problem of evaluation is subtle and complex.

III. The Problem of Organization

The Soviet space program's organization is characterized by an integration and coordination of industrial, academic, political and military institutions and personnel. The Party oversees and decides the policies of the scientific, technical and educational sectors, choosing administrators, and the context of the work. The scientists supervise experiments and have authority to determine how to implement the regime's goals. The military trains the Cosmonauts, missile designers and some of the scientists. The Soviets appear to have a single space program, while the U. S. has two. What would be the significance of one program vs. two? Some reasons offered for the apparent difference between the two organizations are:

1. The difference in organization may be the product of different political traditions. The Russians trust monopoly⁸ and the Americans trust plurality and competition. Supporting this interpretation was the information

8. German scientists drafted by the Soviets for work in rocket development were divided into groups "to stimulate competition." Could this have been merely a concession to the bourgeois origins of the Germans?

that one motive behind Congress' decision to create NASA, while continuing a military space organization, was the feeling that the military alone might sacrifice long-run strategic advantage to short-run budgetary considerations.

2. The difference in organization may be the product of different levels of affluence. We can afford two programs; Russian can afford one.

3. The Soviet Union's single program may reflect a single over-riding goal, determined by ideology or by national defense, and the U. S.'s twin programs may be the product of multiple goals and/or twin approaches. For the U. S., then, one goal is purely military and secretive in the interests of national security and the other is peaceful, useful and scientific in the interests of supporting an open society, promoting a better life, exploring nature and setting an example by publishing data and by bringing other nations into cooperative ventures. The Soviets, of course, claim peaceful goals and say our program is primarily aggressive.

4. The organizations might reflect the original goals behind their establishment, but those goals might have been changed over time. Perhaps the goals of both programs are similar, despite the different organizations, because the advantages to be gained from space are similarly attractive to both countries.

5. The single program of the Soviets might be considered the normal way for a government to go about developing a space program. The proper task of the political analyst, then, would be to explain why the U. S. has two programs.

6. The difference may be superficial.

IV. The Rationale behind the Soviet Program

The participants were sharply divided on the problem of the rationale behind the Soviet program. Two opposing views were developed at some length.

The theory was advanced by Mr. Crane that the Soviet program had an essentially different purpose from that of its American counterpart because of influence of ideology on Communist policy. Soviet policy is seen as aggressive and coherent. It has a single overriding purpose--to advance world communism. The Soviet space program would, then, be a part of an intertwining military-political strategy with one target--the mind--and one aim--world communism. ("Political" was defined as "designed to influence decisions and attitudes without the actual use or direct threat of armed force," and "Military," as "implying the logic of force in preventing or waging war.") Organizational unity follows from conceptual unity. The space program is, thus, one of several instruments for managing the conflict between East and West, a conflict the Soviets do not want to resolve; doctrine and military power, real and mythical, are designed to confound Western military strategy and to

deter the U. S. from using its power at a sub-nuclear level. Both weapons and doctrine are designed to have a long-term psychologically debilitating effect on the enemy, to protect revolutions of "national liberation," and to heighten the prestige of the Soviet system. According to this thesis, space developments offer both implied military power and enormous prestige. This would determine the Soviet emphasis on man-in-space. The Russians have not seriously thought in terms of practical strategy in case of war; they do not anticipate war because they depend on deterrence. There is evidence that some Soviet authorities fear this strategy, and certain military leaders have been pressing for a more realistic approach since Khrushchev was forced to step down.

Opposing the above view, some participants stated that Soviet military strategy is not at this time primarily aimed at the foreign policy goals of international communism, though there is a chance that it will take that direction in the future sooner than let China take the lead. Soviet strategy is in a state of crisis. The policy of peaceful coexistence is not primarily aggressive; it was designed to cool off the hot Cold War and to free resources for building socialist prosperity; expensive and dangerous entanglements are generally avoided. Cuba was an exception and a painful lesson. Current doctrine bans direct military intervention in national liberation wars. A military-political propaganda campaign, as outlined above, is a reality, but it is less a sinister plot than it is a cheap substitute for an aggressive foreign policy. The military is primarily concerned with defense. Deterrent missile strategy plays the role of protector of the U. S. S. R. territory; conventional forces continue to occupy a significant, though subordinate part of the military program. Both military sectors,

conventional and deterrent, are primarily concerned with the Soviet Union's own vital interests. The military has resented exploitation of a myth of power by Khrushchev. Military professionals of various shades of strategic thinking want more resources, and some would prefer a more ambitious foreign policy.

According to Colonel Wolfe, Soviet space may be somewhat military in orientation. The unified space program makes it possible that a strong military bias influences the choice of projects. Military men work in all parts of the space program, and scientists may offer military potential to get support for various projects. The Soviets probably use the same military support technology in space that we use. They are probably just as watchful for breakthroughs as we are—perhaps more so. Probably, the military bias gains strength in times of international tension, though conventional forces may then command even more attention. Even in times of good feeling, however, a military bias may frustrate cooperation with other countries. The U. S.'s divided program has thus given us a diplomatic advantage the Soviets may envy.

The military bias in Soviet space should not be interpreted as a space bias in the Soviet military. Colonel Wolfe pointed out that, while a sort of military space lobby was apparent around 1962, the publicity since given to military space indicates that the Soviet Union considers it a future possibility, but not a present prospect,⁹ except as support. The military shares the prestige of space exploration, which may be important to them since pacifist propaganda has somewhat eroded popular respect for the military establishment. Hopefully, however, the Soviets have no clearer idea of how to use space for war than we do.

9. Recent commentary on orbital rockets is ambiguous.

These opposing views, and the shades of opinion between them, depended on participants' attitudes toward the role of ideology in the Soviet system (only touched upon by the seminar), the real military potential of space, and the alignment of political power within the Soviet Union.

V. The Military Potential of Space

One view held that the myth of the power of space weapons has confused long-range planning in the U. S. and probably in the Soviet Union as well. The myth is subtly exploited by Soviet propagandists to imply military strength--and it may be believed by the propagandists. Khrushchev probably believed it. More recently both sides have been cautious in evaluating the military potential of space. Some participants felt that biological and chemical warfare may offer more military potential than does space. Others felt that nothing in space will replace land warfare, but that supporting satellites might give a critical advantage to ground forces in as yet undiscovered ways.

An alternative view held that nuclear weapons have made world war obsolete and have eroded territorial bases of security, but that the military of both countries have not yet fully understood the implications of their weapons and so they continue a necessarily fruitless search for a new military doctrine. Space developments may further erode territorial sources of conflict by advancing the kinds of enterprises that require cooperation and supranationalism.

Another view held that rapid technical change often creates the unforeseen. If there is continued hostility between the U. S. and the U. S. S. R., and a continued

stalemate in the balance of terror, we can presume that the Soviets will be alert to any space development that might alter the balance.

The idea of nuclear blackmail by a covey of nuclear bomber satellites "hovering" over a country was dismissed by the participants as technically problematic and ineffective as a believable threat as long as the enemy has the power to retaliate. Hence, Polaris-type submarines and other mobile-launch devices would have to be countered by a really effective ABM system before a satellite bomber, if immune to ABM's, would be a real advantage.

Some of the diplomatic problems of a satellite nuclear deterrent are significant. Satellites have not yet evoked formal protests of territorial violation, though they have been informally accused of spying; armed satellites might be another matter. For the U. S., armed satellites would compromise the neutral status of the host nations of tracking stations. Fear of accident might generate hostility. It was noted that a bomber in orbit would cause no diplomatic problem as long as its payload was not revealed, so both the big space powers are free to have secret bombers.

For the present, technology is probably still too primitive for space weapons to be useful. Earth-based missiles are probably as effective and cheaper, and they seem to offer more potential for development, in the short run at least. Thus we can expect both the U. S. and the Soviet Union to comply with the U. N. resolution not to orbit nuclear weapons. Inspection and control are unlikely and violations are possible, but the situation, though hopeless, is not serious. The terrestrial arms race has been as threatening as any we can anticipate in space. Looking farther into the future, the relative potentialities of space and terrestrial weapons are harder to estimate.

VI. Space and Soviet Politics

An imperfect, but useful, picture of Soviet political groupings in recent years has been that of a "conservative" alliance (heavy-industry and military people who want strict controls and greater investment for all branches of the military) vs. the "liberals" (light-industry people and others who prefer economic decentralization, a thaw in political controls, and the more economical military alternative--a nuclear deterrent). The discussants used this division as a convenient point of departure. Soviet propaganda usually seems to ally space with the nuclear deterrent and hence with the "liberal" group. But space can be so expensive that it may in reality compete for funds with consumer industry as well as with heavy industry. (Kosygin recently specifically denied this.) The seminar did not place the space program clearly in either the "conservative" or the "liberal" camp.

The Soviet military professionals are demanding (as of spring 1965) greater attention to their views, and they may wish to channel space funds into ground forces build-up. However, insofar as space victories encourage Soviet nationalist feeling, build life-affirming optimism about the future, and explain continued austerity, publicity for space may help to counter pressure for liberalizing the system. It was suggested that the prestige of space had rubbed off on the military establishment in general. Space has also been used by some leaders--especially by N. S. Khrushchev--as a source of personal prestige. Certainly the regime identifies the space program with itself. But though space exploration may be particularly inspiring to the Russians, the glamour attached to the cosmos might not be enduring considering the other needs

of the country. Mr. Ploss' paper considers the possibility of a split within the Party-State hierarchy on this question.

VII. Cooperation

If the Soviet space program is now and remains a coherent part of a plan to undermine the noncommunist world, U. S.-Soviet cooperation has little meaning. On the other hand, if Soviet policy is more flexible, the success of the current U. S. policy favoring cooperation may depend on the improvement of U. S.-U. S. S. R. relations--which in turn may depend on the international political climate. It was noted that cooperation may eventually hinge on whether technical developments show space to be militarily important. The problem of the peacemaker is to find nonmilitary enterprises which are advantageous to both powers and which cannot be handled by one alone. ¹⁰ Suggestions included space rescue and some of the multinational projects listed at the end of this paper.

Favoring U. S. cooperation with third countries are the diplomatic advantages of offering more than the Soviets do. Also, the pressures of technology make cooperation desirable. We need more tracking stations, for instance, and host nations demand that all work be open. Cooperation is inhibited by proprietary attitudes toward technology, a shortage of mutual interests in space, the lack of a political framework for cooperation that several countries will accept, and NASA's

10. The seminar did not discuss the kind of business-like cooperation that may be necessary if two communications systems via satellite are to function simultaneously in an orderly and profitable way. The Franco-Soviet cooperative color-TV tests via Molniya were arranged after the seminars.

time-consuming approval process. Some participants doubted that cooperation is really better than competition, and it was suggested that there is a utopian tendency to think that space is a "key"—that technology, by inspiring cooperation, will resolve old political problems. An increase in communications, for instance, may not make us any more able to live with one another. In any case, it was noted that the Russians are becoming more aware of the advantages of third-country cooperation and may decide to compete with us for partners in space experiments.

Projects suitable for international cooperation were suggested:

- a. Satellite television. A demonstration satellite (in India or South America) of some kind might establish technical feasibility and bring the U. S. to formulate a negotiating position for a worldwide system.
- b. Navigation satellites.
- c. Air traffic satellites.
- d. Arms inspection satellites.
- e. Weather satellites.
- f. Astronomical research. This field is particularly good because so many nations can be taken in as full partners.