COMMAND AND CONTROL OF SOVIET NUCLEAR WEAPONS: DANGERS AND OPPORTUNITIES ARISING FROM THE AUGUST REVOLUTION

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When we first met back in June I asked Gennadi whether the Soviet nuclear command system might collapse under the pressure of social and political upheaval in the country. At the time he expressed optimism that the system could endure extreme pressure, including the duress caused by disunity within the top leadership.

Although every expert admits that some unforeseen loophole lurks in any system of safeguards, the Soviets have gone to really extraordinary lengths to prevent the illicit use of nuclear weapons. Their safeguards are more stringent than those of any other nuclear power, including the United States. The overall design of Soviet nuclear command and control is ingenious and its designers were deservedly awarded Lenin prizes for their efforts.

Gennadi’s opening remarks reveal one of the features, and this is really a critical feature, of the process of nuclear weapons release that would have thwarted the coup plotters had they tried to order the use of nuclear weapons.

As Gennadi indicated, the preliminary and direct commands necessary to launch nuclear forces could not have been transmitted to the firing units of the strategic rocket forces, the ballistic missile submarines, or the air force bombers unless the senior commanders of those services, Maksimov of the SRF, Chernavin of the Navy, and Shaposhnikov of the air force, consented to and participated in the issuance of these commands.

Under the conditions present during the coup—

Senator BIDEN. Excuse me, let me interrupt for a moment. Would each have the authority to issue a command to its own service or would all three have to participate for any service to launch?

Mr. BLAIR. No, they are responsible for their own service.

Senator BIDEN. Thank you.

Mr. BLAIR. So this leads to the concept of a four-key system with three key people at the top, plus the respective senior commander of the particular armed forces that were affected.

Under the conditions present during the coup, the top leaders could not have bypassed these senior commanders, though I might point out that there are provisions under special circumstances for doing so. These conditions were not present during the coup.

I think it is fairly widely known that all three of the senior commanders decided among themselves to disobey any launch orders from the coup plotters in a process of discussion that began on the morning of August 19, I believe, following a meeting with Yosov that was followed up in telephone conversations later on.

And so this decision on the part of the three senior commanders categorically ruled out the possibility of a Soviet strategic attack. You can ask the question, would the situation have been different if Maksimov, Chernavin, or Shaposhnikov had been willing to follow orders? In answering this question, we should recognize that the coup plotters themselves, as far as anyone knows, made no attempts to change the status of nuclear forces.

Second, the complicity of all three individuals filling the key positions at the top—the president, the minister of defense, and chief of the general staff—would have been required in order for them to have had any chance of starting an attack. As Gennadi said, the system of safeguards at the top requires the positive participation of all three, the positive participation of three footballs at the top.
The system is designed so that no single individual, including the President, can authorize the launch of nuclear weapons. The permission command, you could call it the football command, which comes from three sources, requires the involvement of the President, the defense minister, and chief of the general staff. Any exceptional exceptions to this rule would concern, again, special circumstances that were not present at the time.

Third, the acting president, Yanayev, almost certainly did not acquire the nuclear authority that President Gorbachev held before the coup. The fact that the coup plotters stripped President Gorbachev of his nuclear authority by isolating him and by taking away equipment that he and his military aide needed to give Gorbachev's approval to send a permission command, a football authorization command, is one thing. It is quite another thing to say that Yanayev himself could have done this.

This point deserves some elaboration. There are several reasons to doubt whether Yanayev could have circumvented the technical and organizational safeguards that protected Gorbachev's sole prerogative for issuing the presidential vote in favor of sending the permission command or the football command.

Although this is complex, remember that the defense minister and chief of general staff also must generate, independently generate, codes that are combined with the presidential codes before a fully valid permission or football code can be formed.

First, Yanayev could not have operated the equipment stolen from President Gorbachev because any sensible safeguard would arrange for Gorbachev to possess unique information that only he would possess and that he would provide to activate the equipment. Furthermore, Gorbachev's loyal military aide also possessed unique information needed to generate the presidential code. In addition, that aide surely could have simply disabled the device in an emergency. That is the first reason why Yanayev did not acquire the command authority.

Second, backup equipment reserved for presidential successors almost certainly could not have been used by Yanayev. I think this point is interesting because Vice President Yanayev was actually second in the line of succession, followed by the Chairman of the Soviet Supreme, another conspirator in the plot.

Parenthetically, under the old system headed by the General Secretary, the two successors to the General Secretary were Politburo members who assumed this responsibility on a rotating basis, I believe, even on a daily basis.

Senator Boren. Excuse me, Mr. Blair.

Ms. Hudson, can Mr. Pavlov follow this? Does he understand what is being said? Does he agree with what is being said, for the record?

Mr. Pavlov. Yes.

Mr. Blair. The presidential successors are, moreover, partially equipped with the technical wherewithal to approve nuclear release. However, this transfer of authority from the president to the successors can only be effected under special conditions and there are additional persons involved in determining whether those conditions have been met.

Who these people they are and what role they played in the coup are open questions. But they certainly would include officers of the general staff who would have responsibility for establishing the communication links from the successors' football, from his code system, to the general staff.

And it is not at all clear that such individuals were at all sympathetic; they probably were not, to the coup plotters.

So in summary, if I could advance a kind of complex conditional statement, I hope it is not too complicated. Let me just say this in summary.

If Yanayev tried, which he did not, and succeeded, which he almost certainly did not, in acquiring the relevant nuclear authority, his third in the full permission code, and if both the Defense Minister Yasov and the Chief of the General Staff, Moiseyev, had joined with Yanayev to order the launch of nuclear forces, a plan for which no evidence exists, and if one or more of the senior commanders of the strategic forces were willing to obey launch orders from the coup plotters, which they clearly were not, then and only then, under conditions that obtained at the time, the danger of nuclear attack would have been very real indeed.

Under these hypothetical circumstances, the Soviet nuclear command system would have triggered the launch of weapons. Standing outside the system, reasonable people, I believe, would consider such an attack to be illicit. But the system itself, the system of safeguards itself——

Senator Boren. Could you explain for the record what you mean by illicit?

You said, standing outside the system, reasonable people would consider such attack to be illicit. What is the implication of that statement?

Mr. Blair. The implication is that the nuclear command system itself, the technical and organizational mechanism, would not have been aware that this was an illicit launch. And by that I mean a launch ordered by individuals who had seized control in an illicit coup.

Senator Boren. Thank you.

Mr. Blair. From the inside of the command system—the apparatus, the established procedures, and mechanisms—as opposed to from the outside from a political perspective or other perspective, such an attack would not have violated established safeguards and would have seemed fully authorized.

Although the confluence of all these conditions remained only hypothetical possibilities during the coup, it is frankly somewhat unlikely, given that the unwillingness of the strategic force commanders to obey any orders from the coup plotters provided a crucial check and balance in the system. This particular safeguard depended on the willingness of the commanders to commit a treasonous crime.

There is an important lesson here. No system of safeguards can reliably guard against misbehavior at the very apex of government, in any government. There is no adequate answer to the question, "who guards the guards?"

In the final analysis, nuclear stability depends on the competence and rationality of the top leaders. Few would give the coup
plotters the benefit of that doubt. These desperate men were exhausted, confused, and sometimes intoxicated.

As noted earlier, the situation below the top was calm and stable. Concerning the very bottom level of the chain of command, nuclear safeguards remained extremely strong. The combat crews in the strategic rocket launch posts, the ballistic missile submarines, and the long-range bombers, as Gennadi indicated in his testimony, are physically incapable of employing their weapons unless and until they receive both the preliminary and direct commands mentioned by Gennadi Pavlov.

I might note that the bombers in peace time and during the coup were not uploaded with nuclear weapons and were not on alert. So this point is a little moot.

This situation is in contrast to U.S. forces, at least those at sea, which I think most people know, are not physically incapable of launching their forces without such codes. They are physically capable.

In the Soviet submarine force information that must be received prior to launch includes a complex of codes, a signals package that comes, as was indicated or implied by previous testimony, by a combination of codes sent by the general staff and the navy commander in chief.

These codes include codes that are checked by a team that used to include a political officer. This team checks the validity of the launch codes. It also involves the checking by the executive officer of the validity of the correct frequency over which the order was sent from the general staff. And it also involves the entry of signals received in this launch order into a device called the decoding and interlocking device on the submarine, which involves automatic validation by electronics systems of the validity of the order.

And if that validation occurs, if it is positive, then the device will allow the mechanisms on the submarine to do their work, including the fire control system and the missiles themselves.

If the codes are invalid, then that system cannot function. The fire control system cannot be used, nor can the missile control system be used.

There are a range of other safeguards in the Soviet system. I will not go into them. They are too complex for this forum, but I can really just say that they are extremely impressive.

Senator Biden. Extremely impressive.

Mr. Blair. Impressive. Suffice it to say that the danger of an unauthorized launch of Soviet strategic forces appears to be so remote as to be negligible.

And from what I understand about the whole system, I think the argument that missile defenses such as the GAPLS proposal, Global Protection Against Limited Strikes, that that argument that such systems are needed for insurance against unauthorized launch of Soviet strategic nuclear forces is a specious one.

The evidence that we have, I believe, in our possession would dispute the merits of such a system. Although I have to say that no one has the full picture. I think, or knows the full story of Soviet nuclear safeguards.

Another misconception arising from the coup's circumstances is that the Soviet Union lost its ability to retaliate if it were attacked at the time. The statements of some Soviet officials have fueled this speculation and there is, indeed, a grain of truth in it because the Soviet command system clearly did suffer some loss of cohesion and coordination.

But the primary difficulty during the coup concerned the implementation of orders to initiate a strategic attack, a first strike, or preemptive attack. Soviet release arrangements are such that the nuclear command system retained its ability to order a retaliatory strike. It is designed in such a way that it even retained the ability to execute a launch on warning strike during the coup.

This predisposition to launch on warning which is also strong on the U.S. side, arguably poses the greatest contemporary danger of nuclear inattention. This danger would have been even more serious if, during the coup, the West had decided to alert its nuclear forces as a precaution and if a false alarm had suddenly occurred at the height of the crisis. As Gennadi indicated, information from early warning systems could trigger the issuance on the Soviet side of a preliminary command which would free up access on the part of launch crews to the equipment that is used to directly launch their forces.

And as Gennadi indicated, the transition from peace time to crisis situations involves the reversal of priorities between combat readiness and safeguards. A lot of safeguards get shelved in the course of the transition from peace time to crisis to war. We can rejoice in the fact that the West reacted calmly to developments and that the situation was not aggravated by malfunctions in early warning systems.

Nevertheless, and this is my closing comment, I think relaxing the hair-trigger on the nuclear postures ought to receive priority attention by both sides. Thousands of missiles poised for quick launch are relics of a political age that no longer exists.

Thank you.

Senator Biden. Thank you very much. My first question relates to the relative safety of and control over different Soviet nuclear systems. Like the American nuclear arsenal, the Soviets have intercontinental ballistic missiles on land and at sea, weapons carried by long-range bombers, short-range missiles on land, artillery shells on land, cruise missiles at sea, torpedoes at sea, and additional systems.

Now, I would like to ask Mr. Pavlov to provide us with his assessment of the relative controls over these various weapons. Which systems have the tightest controls, and which have the loosest controls?

For example, if a sea-based nuclear system were captured, could its nuclear weapon be detonated?

Mr. Pavlov. In the Soviet Union, or namely in the nuclear forces of the Soviet Union, there is a single strategy for providing a guaranteed level of security of all types of nuclear weapons irrespective of the branch of forces the nuclear weapons belong to or the type of nuclear forces or weapons. This guarantee, the basis for this guarantee, lies in the fact that there is a certain algorithm in the process of forming and sending the command down to the subordinate units, the command on nu-
clear weapons, as well as on the principle of separating the rights and authorities.

All the commands have to undergo controls by different types of means of verification along the chain of command. Then there are also different types of defense providing the security of the nuclear weapons. And these defensive mechanisms consist of different technical means and organizational measures.

So, first, as applied to the nuclear weapons themselves, then to the means of delivery of the nuclear weapons and the direct organizational technical measures of the protection of the nuclear weapons themselves, this is what constitutes the basis for the guarantees of their security. To be able to make the right division among all the requirements within the system of nuclear weapons, simulations are done which make it possible to solve this or that task or perform this or that command within a certain guaranteed interval.

But to be able to do that you have to find solutions for a whole number of problems that have to do with the evaluation of the different types of nuclear weapons.

For example, if we compare them according to the degree of autonomy, then we can rate them the following way. In the system, the security of different types of nuclear weapons the following way, and the security will diminish as the list will go down.

The list can be the following: first in the list will be the ground-launched intercontinental ballistic missiles in silos.

Second is the ground-launched ICBM's on mobile launchers. Third, sea-launched ballistic and cruise missiles on submarines. Four, air bombs and air-launched cruise missiles. Five, sea-launched cruise missiles on surface ships.

Last on the list concern the tactical ballistic missiles and air bombs and torpedoes. All the tactical nuclear weapons which are ground, air and sea launched.

So the basis of the division of this list is the principle of manageability of the systems and the degree of their security, and as you see as you go down the list, the time that is necessary to prevent, for example, an unauthorized launch diminishes.

However, I would like to clarify so that nobody has misconceptions of this enumeration, this list of different types of nuclear systems is presented this way with one limitation, and the limitation being that all these weapons supposedly are in the same degree of combat readiness.

And to prove that or to illustrate that, I will give you another classification of the same systems of weapons, but according to the principle of their combat readiness. It will be constituted by the same list of weapons, systems, but it will be reversed and the security will go out from bottom to top.

This characteristic shows the principle of automation of the control of nuclear weapons systems, and as you see, one of the same lists of nuclear weapons can have different characteristics depending on the parameters according to which you list them.

To be able to provide or to calculate the required and guaranteed level of security, you have to look at all the weapons systems from different angles and find the optimal solution.

Thank you.
tion if pressure is applied to the weapon or fire or power sources, et cetera.

And I think, for example, artillery shells, of which there are many in the Soviet Union, do not have a PAL device on the warhead itself, but they will have devices inside of the warhead which are designed to prevent its detonation in the event it is captured and handled with a hammer for example.

But Gennadi’s assessment that resulted in the list that he gave you, putting together weapons on the bottom, also reflects the autonomy of these forces. For example, in a crisis, when tactical weapons are dispensed—

Senator Biden, let me interrupt you if I may, I understand Mr. Pavlov’s answer, but maybe I am not posing the question the way I should in order to get the type of response I’m looking for.

Mr. Pavlov has described the chain of command for an authorized launch of a tactical nuclear weapon. I understand that.

What I would like to know is, how easy is it to circumvent legitimate authorization? Is it clear from both of your testimony that with strategic weapons it is not easy to circumvent authorized, or in the case of a coup, legitimate control over strategic weapons.

Now my question is, with regard to tactical nuclear weapons, whether it be a nuclear artillery shell or a nuclear armed torpedo, in the circumstance where there is an unauthorized attempt to circumvent the chain of command, what is the likelihood of success? Let us say, the republics are at odds with one another or whatever the circumstances, and they go to war, how easy is it or difficult is it for an individual or a group of individuals to launch a tactical nuclear weapon, be it an artillery shell or a nuclear torpedo, against the will of the central command?

Mr. Pavlov, I will try to answer your question. The answer is the following: The requirements for the security of the nuclear weapons, both strategic and tactical are the same, but the way they are realized is different, depending whether it is tactical or strategic nuclear weapons.

I would like to clarify my understanding of the nuclear weapons in the Soviet Union we understand the following when we speak about nuclear weapons. The nuclear weapon is a totality, is a system of the following components. First of all, a nuclear warhead, means of its delivery and use, and the organizational system for the command and control of the totality that I have mentioned above.

So having explained what we understand by nuclear weapons I can explain to you how the security of different parts of the nuclear weapons is achieved and maintained.

Senator Biden. Please do because maybe it will help clarify things.

Mr. Pavlov, if I were to answer this question very briefly, I could say that the safeguards for the tactical weapons, all the requirements for them are the same as in the case of the strategic weapons and they are all met in our system.

It is all achieved through an organization of measures and a technical mechanism which control the access to the actual rooms where the equipment controlling the nuclear weapons is placed.

There is also very strict control and different stages of verification to be able to get access to the rooms or to the place where the containers of nuclear warheads or the nuclear warheads are kept.

First of all, there are locks, both mechanical and electromechanical which are placed on the rooms where nuclear weapons are held, and besides the nuclear warheads themselves are kept in containers which are also equipped with locks, mechanical and electromechanical.

Furthermore, the warhead itself has a device on the surface of the weapon or even inside the warhead which controls access to this weapon.

There are even further constructive measures which I would like to avoid while answering this question.

Mr. Blair, just to try to clarify somewhat, I think Gennadi’s answer reflected the autonomy of operation of nuclear weapons and that tactical nuclear weapons were on the bottom of the list, and because there is more autonomy among the operators of those weapons, there is more chance for them to fiddle with the devices. There is more opportunity for these protective blocks to be circumvented.

Also, tactical weapons in a crisis are dispersed and the autonomy grows even further and in some cases, these blocks are deliberately unlocked. Some of these protection systems are deliberately shed as part of the process of preparing for the possible use of weapons.

So I think the summation of the argument is that he would like to say that tactical nuclear weapons are clearly at the bottom of the list, but he is not prepared to say that the existing safeguards would allow a weapon to be detonated if captured.

There are tactical nuclear weapons that I think are deployed, particularly at sea, where weaknesses in prevention of unauthorized launch are quite serious. For example, a nuclear armed torpedo as of now could be on any range of different kinds of submarines actually is protected primarily by a little ignition device that is kept in the captain’s safe. I have talked to a fire control officer who operated the nuclear torpedo system on a ballistic missile submarine and he told me, and this was supported by someone else who served on an attack submarine with nuclear torpedoes, that it was not an effective safeguard.

Senator Biden. If the captain of that submarine concluded that he wished to launch that nuclear torpedo, using the device kept in his safe, with the cooperation of the political officer and crewmembers in “the room” where you actually had access to the firing of that torpedo—could he, with the cooperation of people on that submarine, absent any control from outside that submarine, launch that nuclear torpedo?

Mr. Blair. Launch the torpedo which would detonate, that is right. Now this helps—

Senator Biden. I would like to ask Mr. Pavlov whether he agrees with that.

Mr. Pavlov. Any unit, if it is autonomous, will always have certain means to perform its task and to perform its mission, if it has to. And it is exactly the set of these measures which provide for the execution of the combat mission.
From the point of view of security, these means and measures of security are dispersed among many people as well as many mechanisms which exist only, for example, on a ship, that provide for the security of the weapons.

But certainly if all the people that have any kind of control over the weapons agree among themselves to take a certain step, then the decision will be quite clear.

Mr. Blair. This is why, say even tactical weapons on land which may be equipped with various devices, could be put in a state of less effective safeguards as they were prepared for possible use.

And the autonomy of these units would be such that the risk of unauthorized use would increase. But I think one of the important points here to realize is that this does not mean that if a weapon were captured it could be detonated.

For example, an artillery shell, if it is captured by an unauthorized terrorist group, is designed not to detonate in the event that they hammer on it or apply power sources or what not. But that same device—

Senator Biden. What I am quite frankly talking about is the opposite situation whereby you have a group of middle rank to high level officers in one of the republics, and as a consequence of a political decision they make, relative to the autonomy of the republic or the requirement to maintain cohesion with Moscow, that in a moment of conflict, they, this autonomous command, could decide to engage tactical nuclear weapons, bypassing the layers of controls and going beyond the authority of a field commander in whose possession this tactical weapon was.

That is the question I really have, but I will yield to unless you wish to respond to that, I yield to my colleague and I will come back for additional questions.

Is there any response that either one of you have?

Mr. Pavlov. If you would permit, I would try to formulate an answer to your question. The process of seizure by any terrorist groups of the nuclear weapons or any of the elements that constitute nuclear weapons, is something that is necessarily taken into consideration during the calculation and setting of the level of the necessary security. That also concerns the units and even the launch groups.

They would perform different types of simulations before we work out the guaranteed level of security, and we are actually basing, if the very low units down the chain of command, on the launch crews, while doing the simulations, particularly taking into consideration that some of the people that have nuclear weapons can be not well educated in the field and they do not really see any difference, whether they have a nuclear warhead or any kind of toy in their hands.

We have worked out a system of guarantees of security for the very low links in the chain of command. In other words, launch crews, and we have applied the same principle to the top leadership so that it shows that no matter what the actions on the part of the coup plotters could have been during the coup, for example, and what actions the top leadership would have wanted to take, they would not have been able to perform them.

Senator Biden. Thank you, thank you very much.

I yield to my colleague.

The Chairman. Thank you very much, Mr. Chairman. A comment and a question. The comment is to congratulate the Chairman on holding these hearings because what we are dealing here with—I do not think we realize the scope is the very survival and health of the human race—here in this room at this time, talking about these questions that we have a heard time grasping.

Now as I understand it, if you compare the two security systems, ours is a shade less secure than the Soviet system. Am I correct in that assumption or am I wrong? And I have one other question following up on that. And that is if the Soviets saw signals indicating they were under attack, would they have the freedom, then, to launch weapons themselves?

Mr. Blair. Would who have the ability to launch weapons after indications? Would the Soviets?

The Chairman. Yes. After an indication on the Soviet's part, that there is an American weapons system. And also do you consider the Soviet system more secure than ours, or vice versa?

Mr. Blair. I think the Soviet system of strategic nuclear command and control is the most stringent that you could almost imagine, that they have gone to really extreme lengths to ensure that only the top state leadership can authorize the use of nuclear weapons. The system is particularly well integrated into the land-based intercontinental ballistic forces. But I think you can sum this up by saying that the Soviets have, for example, no system of predelegation of nuclear authority down the chain of command, which is the case in the United States. They have also installed devices on all their strategic nuclear forces that prevent the use of those weapons without first receiving codes from higher authority to unlock those weapons.

Unlike the United States which has all of its sea-based forces unlocked. And in general, I would say that the system of safeguards on the Soviet side are quite strict by comparison to the U.S. side. The Chairman. To interrupt, in essence, are they more stringent than our system?

Mr. Blair. I believe that they are much more stringent than our system. The second part of your question concerns rapid release of nuclear weapons on the part of the Soviets in response to early warning indicators. The Soviets actually devised the system that we described in our opening statement to streamline the command system to ensure that they could release nuclear weapons within the time frame of a ballistic missile attack launched by the United States, that is to say, within 15 to 30 minutes.

The system came into being in the early 1980's and as Gennadiy described in his opening statement, it is geared to the issuance of the appropriate commands during the period of missile flight that would allow the Soviets to fire their forces before the impact of incoming missiles. So the Soviets, like the United States, have gravitated toward a policy of launch on warning over the last 10 years, and have exercised this system. From beginning to end—from the detection of a missile to the release of weapons—by the process that Gennadiy described this morning, it would take no more than about 15 minutes on the Soviet side.

The Chairman. Thank you very much. Does Mr. Pavlov agree?
Mr. PAVLov. I am really sorry to say that, but I do not think that I have mentioned any precise figures in my conversation, the conversation that I had.

Mr. BLAIR. I was not attributing the 15-minute time line to Gennadi.

The CHAIRMAN. I gather he concurs. Thank you very much.

Senator BIDEN. Gentlemen, let me ask you a few more questions, if I may. Did you want to add something?

Mr. BLAIR. No.

Senator BIDEN. The notion of accidental launch. My question is, if an operational Soviet missile was fired by accident and did not follow its programmed trajectory, would it self destruct?

Mr. BLAIR. I think the answer to that requires that we first note that Soviet intercontinental missiles, both land-based and sea-based, are equipped with explosive charges that are designed to blow up the missile in the event that it deviates too much from its programmed trajectory. So the answer to your question depends on whether an accidental launch would cause the missile to deviate outside of its range of tolerance. If it did, it would blow up the missile.

If the Soviets deliberately fired a missile at China, for example, and it went off trajectory and headed toward the United States, it would self destruct.

Senator BIDEN. But, if they fired at China and that was its intended target, it would explode, I assume. in China.

Mr. BLAIR. Well, sometimes missiles go fairly far off trajectory.

Senator BIDEN. I understand that.

Mr. BLAIR. Let me just add that an accidental launch of a ballistic missile is likely to lead to the launch of the missile on its normal trajectory, so this system would not probably come into play, but it could be modified to deal with the question of accidental launch. If there were not proper codes inserted in the missile before launch, then the missile could self destruct. This is a system that exists only on the Soviet side, not on the U.S. side.

Senator BIDEN. So we have no such system to detonate a missile that goes off its trajectory. Is that right?

Mr. BLAIR. Not for combat missiles that are on alert and might be launched in war time. Of course there are explosive charges on test missiles launched out of Vandenberg, and those can be exploded on command by a range safety officer.

Senator BIDEN. You indicated, Mr. Blair, at the outset of your testimony, that there are certain conditions that exist. You qualified your statement about how this chain of command was—my phrase, not yours—close to impenetrable in the sense that there was no reasonable prospect that there would have been or could have been a launch during the coup. But you several times qualified this, if I remember correctly, with the phrase that "there are certain conditions or special circumstances." Under conditions present during the coup, the top leaders could not have bypassed senior commanders. They could do so under special conditions that were not present.

What are you referring to?

Mr. BLAIR. Well, I do not know all of the special conditions, but one condition would be the transmission of a preliminary command of a certain kind that would instruct launch crews in the field to switch over to an automatic mode of launch, which means that they would basically step out of the process and allow the further control of their weapons to be assumed by the top leadership because the Soviets have this remarkable system that allows the top leaders in bunkers in the Moscow vicinity to physically fire weapons in the field by remote radio command. And so there could be a special circumstance in which that mode of operation goes into effect. But that would have required the permission of the senior commanders in the field.

That is to say, the senior commanders would have to have gone along with this preliminary command to transfer the missiles from the launch crews to the top command for possible firing on their orders.

Other conditions would be primarily related to nuclear attack against the Soviet Union. In the event of an attack against the Soviet Union, all kinds of conditions can be present that would change the mode of operation and allow, for example, the general staff to bypass the senior commanders and go directly to either the launch crews or directly to the launchers to fire by remote radio command

Senator BIDEN. But I assume—correct me if I am wrong—I assume that requires the preliminary command—

Mr. BLAIR. That is right. Some form of preliminary command would have to have been in effect before the intermediate commanders could have been bypassed. But the system is largely—let me emphasize that this procedure is largely devoted to circumstances of an attack against the Soviet Union that disrupts the chain of command.

Senator BIDEN. When you say largely, what is the exception. How about the small part that is not included in largely. I mean, does the political personnel, the President of the Soviet Union, the Defense Minister, Chairman of the Joint Chiefs—can they, by remote radio control, launch the entire ICBM arsenal of the Soviet Union?

Mr. BLAIR. Do you want to ask Gennadi that question?

Senator BIDEN. Yes. I would like to ask Gennadi that. Is it yes or is it no?

Mr. PAVLov. No.

Senator BIDEN. Thank you.

Mr. BLAIR. I might respond that ballistic missile submarines, long-range bombers, and older land-based missiles are a not be operated in this manner. The remote launch—

Senator BIDEN. Let me rephrase the question then. Can the modern ICBM, fourth generation ICBM, be launched by remote radio command if the President, the Chairman of the Joint Chiefs, and the Defense Minister so agree in a crisis, for good cause. Can it be done?

Mr. PAVLov. Yes.

Senator BIDEN. All right. Now, in recent days there has been a great deal of discussion about nuclear weapons in relation to the creation of independent republic governments where strategic and tactical nuclear forces are located. For example, the leader of the Republic of Kazakhstan indicated last week that he wanted to see
his Republic retain control over nuclear weapons located within that Republic, and this tended to undercut earlier assurances that nuclear weapons would be consolidated on Russian territory. Was there a second safeguard in place to prevent a republic government from ordering their militias to take control of strategic or tactical nuclear weapons located within their Republic? For example, are there devices installed at some Soviet missile silos to detect unauthorized entry and automatically disable the weapons that are in those silos?

Mr. BLAIR. I think I will just give a brief answer first and then maybe I will follow up. But I think the answer, part of the answer is that yes, there are systems and devices that in effect could trap the weapon systems to prevent that unlawful entry or penetration of the danger zones of those weapons would trigger the disabling of the weapons system.

Mr. PAVLOV. I would like to remind you that in the Soviet Union the blocking devices are set throughout the whole chain of command and control in all types and parts of the nuclear weapons. They are set on the nuclear warheads themselves, on the launchers, and also on the nuclear weapons. So it can be accessed during the flight of a nuclear weapon. And also, in their operation, a lot of factors—different factors are taken into consideration, different influences, such as material, energy-based, and information influences, and the decision is made on the basis of the type of influence on this device—on the weapon, whether it is informational or any other type.

And decisions might differ. I will not go into detail on that, but the decision will be unambiguously made depending on the situation.

Mr. BLAIR. I think Gennadi would also—I do not want to put words in his mouth, but probably he would say that this would mean war if there were an attempt to forcefully seize custody of Soviet nuclear weapons in those areas. If there were an attempt on the part of the governments of the Republics to move to take custody of those weapons, that it would be tantamount to war.

Senator BIDEN. Therein lies the problem.

Mr. BLAIR. Therein lies the problem, but I think Gennadi's view, again, to speak for him briefly because we have had this discussion, is that—I think he would say that the positions of the Republics would be more likely to take war over weapons that was a problem. Will I be next to useless.

Senators BIDEN. You are referring to strategic weapons as being next to useless.

Mr. BLAIR. Tactical weapons.

Senator BIDEN. Tactical. Why would the tactical weapons be next to useless?

Mr. BLAIR. Tactical or strategic.

Senator BIDEN. Why would the tactical weapons be next to useless?

Mr. BLAIR. Because they would be used on the territory of the country, I believe.

Mr. PAVLOV. I would like to express my own opinion, and that opinion coincides with the statements that have been made by Boris Yeltsin, the President of the Russian Republic, that we have to liquidate, eliminate, all the tactical nuclear weapons, since they have lost their major purpose in terms of their operation in the European theater of operations.

Now, for the United States, the tactical weapons have not posed any threat to the United States and cannot pose any threat to the United States.

Senator BIDEN. Well, there is growing sentiment that tactical nuclear weapons have lost their rationale. And so I suspect there are a lot of people who share the view expressed by Mr. Yeltsin—I mean, I happen to be one of them. But what have I been trying to get at here today is a fuller understanding of what happens in the event that unpredictable circumstances occur, as unpredictable in the mind of some—or as predictable in the minds of some—as the coup attempt and its subsequent failure.

Based on what has been said here this morning by Mr. Pavlov and reinforced by Mr. Blair and vice versa, I understand the following. With regard to strategic nuclear weapons, the likelihood of a RENEGADE, nonrepresentative group of individuals taking effective control of them, so that they would be able to, if they desired, launch and detonate them, is very, very small.

On the other end of the spectrum, although there are ingenious and redundant safeguards built in, the ability of a smaller group of individuals to take control of several or many tactical nuclear weapons would be more easily accomplished, although still not easy. Case in point, as I understand you, Mr. Pavlov, you indicated that if the captain, and others on a submarine concluded among themselves that they wished to launch a nuclear torpedo, they could do so. But you believe that is unlikely.

And further, you, with your vast experience in this area, have concluded that the likelihood of one of the republics' governments somehow taking control of the tactical nuclear weapons is not very high because you believe that they are of little use to them.

And last, you believe, as does Yeltsin, that notwithstanding all the safeguards that are built in the Soviet Union, the individual Republics, Europe, the world, would be better off if we all got rid of all of our tactical nuclear weapons.

Is there anything in my summary with which you disagree? And if there is or if you would like further clarification, I will attempt it.

Mr. PAVLOV. I completely agree with what Mr. Chairman has stated. Coming back to the issue of the tactical nuclear weapons, we can say only one thing. That the whole world will be able to breathe much more easily once all the tactical weapons that really have lost all the rationale behind them are eliminated. Because, as far as Europe is concerned, if we are starting to deal in terms of human values, if we are trying to build one human home, then these are a value that we should discard.

And since tactical nuclear weapons are highly autonomous, they indeed pose a great threat to the security and no matter how strict we are trying to make the safeguards and actually achieve that, there will always be or might arise a possibility of a seizure of these nuclear weapons that we had not thought would happen. And since this is the case, then there is the possibility of an unauthorized use of these nuclear weapons.
And in the end, as a summary, I would like to say that the best enemy is the one that is dead. In other words, the best weapons in the world are the ones that are eliminated.

Senator Boren: Well, let me conclude with one very broad statement and ask for each of you to give me some input as to the value of what I am about to propose. Based upon your testimony today and other information which I have received in my inquiry and the inquiry of my staff, I think it is fair to conclude that there are both positive and negative features of the command and control system for nuclear weapons on each side.

For example, as I understand it, and this is not classified information, I am just speaking from the public literature, there is on the U.S. submarine system no technical safeguard to prevent launch without adequate warning from a higher authority. In other words, the submarine commander who had the cooperation of certain members of his crew could launch nuclear weapons at his or her own discretion. Indeed, if he were a commander of a Trident submarine, theoretically he could launch up to 200 warheads, each of them with 10 times the destructive power of what was dropped on Hiroshima.

On the Soviet side, the dangers seem to lie not in this kind of decentralization as much, but in an overcentralization. And that may, in a crisis, place nuclear decisions in too few hands.

These facts, the deficiencies in the command and control systems in both the Soviet and U.S. arsenals, along with the dangers that now surround the Soviet arsenal, and the opportunity we apparently have of negotiating deep reductions in that arsenal, lead me to conclude that conditions are right to take what I think is an unprecedented step. That step would be to establish without delay a joint commission on the reduction of nuclear threats.

The commission would consist of civilian and military experts from each side. Experts such as our witnesses today, who should begin meeting with each other as you have two, first, to share information that would lead to stronger protection on each side against unauthorized or accidental use of nuclear weapons. And second, to share ideas and develop joint recommendations as to how the two sides can achieve early and massive reductions in their nuclear arsenals through simultaneous measures.

I think it behooves emphasis that there is no existing institution that now performs either of these functions. The so-called risk reduction centers established in the mid-1980's, are intended to facilitate communication in times of crisis. The new commission, in contrast, would be mandated to share information and develop recommendations for technical and procedural changes in each side's command and control system.

Nor is the commission's second mandate, relating to arms control, now being performed. Heretofore, each side has developed an arms control proposal unilaterally and principally with the aim of negotiating maximum reductions in the other side's arsenal consistent with making minimum reductions in its own arsenal. Negotiations then proceed with each side trying to wear the other down. In contrast, the commission's mandate that I have in mind would be to work together. Experts from the two sides working side by side, not across the table from each other, in search of an answer
to the question: in a world in which nuclear weapons cannot be dis-invented, how low can we safely go?

In sum, the commission would seek ways and means to achieve the safest possible arsenals through changes in existing systems and the smallest possible arsenals through deep reductions in both arsenals simultaneously. One of the real obstacles, inevitably, will be to change habits of mind both here and in the Soviet Union. Specifically, there will be the matter of classification, the conditioned reticence of each side to reveal aspects of its own system, some of which we observed here today.

And it seems to me that by allowing your participation in discussions such as this, Mr. Pavekov, Moscow has demonstrated, at least in part, a willingness to talk openly about its control systems, both good features, and understandable, more reluctantly, the bad features. And I would hope that the Pentagon and the intelligence agencies will work to see what information we could declassify to participate in a mutually beneficial information exchange.

I will be inquiring about that during the second phase of this morning's hearings when the committee hears from Mr. Gershwin, the National Intelligence Officer for Soviet Strategic Programs. But my question to the panel this morning is this. Would the panel please comment on the desirability, at least conceptually, of such a joint commission. And what recommendations you might make, if any are deemed appropriate.

Now let me say before you answer that, quite frankly, your response will affect whether or not I move forward with this commission. To the best of my knowledge, you two are the first on either side with the background and knowledge you each possess, to have spent a great deal of time with one another already, discussing certain things, some of which, I suspect, you were not prepared to discuss with us here today.

And so if you all do not think it is such a good idea, maybe it is something that warrants being put on hold. But I wonder if you will both be willing to comment on this notion of such a commission.

Mr. Blair, Well, I personally strongly endorse the basic idea. Senator Biden, I guess I would have been rather of different mind a few years ago because when I began to conduct research in the area of Soviet nuclear command and control, I think it would have been, 3 years ago, it would have been very hard to have this kind of dialogue with Soviet counterparts. Glasnost has really seeped into the precints of the Soviet government and academy. And individuals on the Soviet side are actually far more forthcoming about the methods and systems used in their nuclear command system than their own experts over here are.

So I am very encouraged now that there is an opportunity to engage Soviet experts in really fruitful dialog, particularly on the questions of command and control and operations and safeguards. I think that would be the primary value added of this commission. It would focus on an area that really has just been neglected for a long time, and could also work in conjunction with other efforts that are now starting in the Government.

As you may know, the Congress last year required the Pentagon to report on the feasibility and desirability of several new ideas for
nuclear weapons safeguards, such as devices that would allow weapons to be destroyed after launch, postlaunch destruction devices, the more extensive use of things like permissive action links and so forth. So I think that there is a growing interest in talking about safeguards and developing ideas and putting them into practice. And now is the time to start that process. There are very able and willing people on the Soviet side to engage in this.

If I may say so, I think the Soviet experts in this field are really very, very expert in the field. And they are accessible and we could have a very good commission, I think, formed of U.S. and Soviet experts.

Senator BIDEN, Mr. Pavlov.

Mr. Pavlov, I would answer this question as an expert in the field of safeguards and security systems. The system will never be secure if you first create the system and then you try to impose all different kinds of devices on it, to provide for its security. So this is a process that has to involve simultaneously the prognosis of the possible situation that might occur in the future and the actual steps to create the guarantee of security. And the achievement, that can be made by any type of a body or organ that we are describing is to have the decision ready and discuss the certain steps and have the decision ready for the politicians to take it up and act on it.

I am not a politician, and here I would like to touch upon the major points, which I think will be of great interest in terms of the future work of the experts in the field. I would cite the following issues as the major points that should be undertaken by joint expert commissions. First of all, the organizational measures have to be taken in order to expand the responsibility of each side to prevent an unauthorized use of nuclear weapon.

In other words, we have to deal with the issues of improving and raising the effectiveness of different types of safeguards and security systems, both passive and active, that would prevent an unauthorized launch of nuclear weapons. Then, on the basis of the results that can possibly be achieved, the recommendations of the actual mechanism of an international commission that would work on the prevention of an unauthorized use of nuclear weapons would be worked out. Or we can also talk about the system of the elimination of the possible consequences of such an unauthorized use of nuclear weapons.

I think what is most effective in terms of the work of such a joint commission is the determining of the level of the guaranteed and the required stability, in other words, setting those limits that make the transition from the nuclear weapons being the factor—the combat factor or being the combat readiness and from the safeguards—of the nuclear weapons being safeguarded and corresponding to alternative measures of security of their transfer into the weapons of combat readiness. And after all the issues I have mentioned demand international decisions and the work of experts on the international arena. Thank you.

Senator BIDEN. Well, let me say, I have learned a number of things today, both in preparing for this hearing and from the testimony. There is apparently considerable incentive, on the part of the Soviet Union, to deal with this issue and I would argue that the same is true for the United States. For the Soviets, it is neces-