SUMMARY OF NARRATIVE

Subject:	A. S. Kalashnikov
Position:	Missile and nuclear weapons tester; former member of Military-Technical Committee of Ministry of Defense and Chairman of Strategic Rocket Forces; former chairman of the commission on nuclear testing at Semipalatinsk
Location:	Institute for Defense Studies (INOBIS), Moscow
Interviewer:	INOBIS
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Both the U.S. and the Soviet Union always stressed the vulnerability of strategic and tactical nuclear weapons, especially fixed, land-based missiles, which can be successfully destroyed using conventional weapons. Therefore the Soviets continually improved the protection of silos, de-concentrated and dispersed silo groups, and created mobile ICBM systems which could roam the vast territory of the country. The principal Soviet strategic advantage was this vast territory—22 million square km. The principal U.S. advantage was its access to warm water, of which the Soviet Union had virtually none. Even when Soviet submarines came out into open waters they were immediately detected and tracked. In order to fully exploit their advantage Soviets created mobile land-based systems. By contrast, the U.S. had only approx. 1,000 land-based Minuteman III launchers and 54 Titan II launchers. But in general the U.S. based its missiles away from its territory in order to draw the fire away from its territory.

Tactical Nuclear Weapons

Kalashnikov was a member of the military-technical council of the MoD; Kalashnikov argued that it was a grave mistake to outfit operational and tactical missiles with nuclear warheads. However these arguments were in vain because it was the industrial complex that dictated procurement and production.

First Definition of Missile Role and Silo Design

From 1950-61 Kalashnikov worked at Kapustin Iar as head of First Testing Directorate testing virtually all ballistic and cruise missiles designed during that time. After observing a test on Sept. 14, 1958, Khrushchev commented that in the future missiles would be the sword and shield of the country. The following day Kalashnikov

[60] INOBIS carried out the interviews resulting in this narrative at various times during the month of April 1993.

was directed to draft a highly secret report on options for silo designs to increase survivability of Soviet missiles. The report outlined three options:

1) single-launch dispersed silos

2) groups of four silos

3) re-fire: single silo containing missile drum

The first option was selected for prototype testing using an R-12[61] missile. The first launch occurred in spring of 1959. Kalashnikov considered the type of basing to be the single most important determinant of system effectiveness.

Threat from NATO Countries

The following technological developments particularly threatened security:

1) Technological achievements of the U.S. generally, particularly the ever increasing accuracy of U.S. missiles. Accuracy doubled every 5 years:

1960	Minuteman IA	4 km radius
1965	Minuteman II	2.1 km
1970	Minuteman III	1.2 km
1975	Minuteman IIIA	.8 km
1980	M III (single warhead)	.5 km
1985	MX (self-guided)	.25 km
1990	MX (self-guided)	.15 km

2) Cruise missiles with self-guiding warheads

3) Reconnaissance-strike systems with separate self-guiding elements used as anti-tank weapons in Europe

Threat from Warsaw Pact Countries

The following Warsaw Pact systems were the most destabilizing:

1) The Tem 2-S [probably SS-16] mobile missile system, which had an astounding effect on the U.S.

2) The Pioneer SS-5 [SS-20] mobile missile system

3) Silos of the "Oss" type with super-hardening for SS-18 liquid fuel missiles

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[61] SS-4.

4) Nuclear tactical/operational missiles and nuclear artillery

Regarding Periods of High Tension and Danger

Crises were primarily manufactured in the highest echelons of party and government leadership, some for political, some for economic or other reasons. An example: in June 1966 Kalashnikov was assigned to conduct a demonstration test of the R-16[62] missile for De Gaulle. What De Gaulle saw had a profound effect on him. He turned to Brezhnev and asked, "You've got quite a lot of missiles. Where are they aimed?" Brezhnev replied, "At cities, including Paris." At that time NATO headquarters was located in Paris. After the exercise De Gaulle cut short his visit and left the country. This story illustrated how the high leadership periodically deliberately brought about political tensions.

Mutual Assured Destruction

Soviets did not accept the concept of mutual destruction. But the doctrine of retaliatory-meeting strike (RMS)[63] in effect produced the same result—mutual destruction. This (RMS) was a senseless doctrine. The targets of retaliatory strikes for both U.S. and USSR were administrative-industrial centers, air bases, C^3 centers, and others, which resulted in the destruction of the industrial and military potential and of the population. The targeting of launchers did not make sense from our point of view because RMS relieved the launchers of their missiles and it did not make sense to hit empty silos. It was impossible for either us or for the Americans to destroy warheads in flight.

Protection from Surprise First Strike

Soviets had several concrete projects for protection against a surprise first strike.

1) Silo protection was continually improved.

2) More attention began to be paid to the early warning system. This was done primarily by organizations subordinated to the Radio Industry Ministry, headed by Valerii Dmitrievich Kolmykov. Kalashnikov was a strong advocate of a sophisticated early warning system, including introduction of "noise-like" [scrambled] C^3 signals. His arguments were resisted by Kolmykov who got bad advice from his chief designer and consultants. The need for a strong early warning system was finally made clear by Pleshakov,[64] an arms control negotiator in Geneva and Kolmykov's deputy, who claimed that Radio Ministry's resistance to modernizing the system had put the Soviets far behind the Americans and undercut the Soviet negotiating position.

The situation regarding EW protection against a surprise attack was quite serious. In 1975 a commission, of which Kalashnikov was a member, was set up to study the problem. Kalashnikov, after consulting with bright young specialists whose views were often suppressed, pointed out that Soviets could not keep up with the U.S. in terms of

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[62] Probably the SS-8.

[63] Referred to elsewhere in interview records by the Russian phrase, *otvetno-vstrechnyi udar.*

[64] Authors were not able to identify this person in the military-industrial sector.

accuracy. However, as U.S. accuracy increased, the velocity of the reentry vehicles (RVs) also increased, and their size decreased. This leads to the possibility of disabling the RVs by putting ordinary chaff in their way. This idea led to preliminary R&D on the SAMBO system led by Kalashnikov in conjunction with Sergei Pavlovich Nepobedimyi, who was designing a similar system for protection of tanks against missiles. The preliminary work led to four or five abstracts [*avtorskie svidetel'stva*]. The outlines of the system: burst 500 - 1,000 m above the silo or C^3 center scattering "ordinary elements" in a horizontal plane with a velocity of 2,000 km/s (in addition to the speed of the RV itself).

Support was found for this idea, and it was proposed to Ustinov and presented to an MoD Collegium in April 1980, which included Gorshkov (VPK—Smirnov's first deputy) and members of the industrial complex. Gorshkov was opposed to the idea because PRO[65] was developing its own anti-missile system, under the direction of the Nudelman KB[66] at the time. However, eventually the protocol was signed by all the members of the Collegium and Nudelman's work was subordinated to this project. This was a serious project, which continues to undergo development and has yielded some positive results. Work is now continuing in the KB headed by Nikolai Ivanovich Vushchii. The work involves both radar/radio and optical detection methods, including a phased array system for electronic scanning. If the system is built and deployed, it will eliminate the possibility of a surprise attack on our silos.

Right now the emphasis continues to be on precision weapons which can destroy silos and other targets with reasonable accuracy. Weapons are not developed in a vacuum, but in response to something.

Scenarios for Limited Global Nuclear War

Scenarios for limited global nuclear war were not developed. NATO's medium-range missiles (with ranges to 2,000 km) did not present a threat to us. Our medium-range SS-20s had a range of 4,500 km; the SS-4, SS-5 have ranges of 2,500 and 4,500 km.

Strategic Superiority

The Soviet Union did strive for strategic superiority. It achieved superiority in the following areas:

1) Number of launchers

2) Silo protection

3) Yield of warheads

4) Range and power of missiles

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[65] PRO — *Protivoraketnaia oborona* — Anti-Missile Defense. Anti-missile defense was a responsibility of the commander-in-chief of the Air Defense Forces (Voiska PVO).

[66] KB — *Konstruktorskoe buro* — Design Bureau. The complete designation is *opytno-konstruktorskoe buro* (experimental design buro). Authors could not identify Nudelman's first name and biography.

However, the Soviets were never able to create a sophisticated, survivable, integrated command, control and communications system. This was their "Achilles' Heel." Kalashnikov produced an analytical report for the General Staff comparing C^3 systems of the U.S. and USSR. This analysis had a devastating effect on the GS because it reported that the U.S. possessed eight command and control centers which were absolutely protected, while the Soviet Union had none. This report created some movement toward modernization. Kalashnikov calculated that after sustaining an all-out nuclear strike—the Soviets would be able to launch only 2% of their missiles. This calculation was based on data supplied by several industrial NIIs, including TsNIIMash [the Research Institute of the General Machine Building - Missile - Ministry] (which reported a figure of 6%) and NII-4 [the Research Institute of the Strategic Rocket Forces] (10%). However, a figure of 2% is most realistic—out of 100 surviving silos, only two would be able to launch their missiles.

Kalashnikov produced an *avtorskoe svidetel'stvo* to build two spherical command centers inside mountains: one for the General Staff, one for the SRF (Strategic Rocket Forces) command. However, a major difficulty was the lack of an adequate communications infrastructure. The Soviets had [have] only one military communications cable linking Moscow with the Far East. By contrast, the U.S. has a network of command centers linked by a computerized communications system. If one region or sector of this communications net was knocked out, bypass links could be set up in a matter of seconds.

Therefore, Soviet superiority in the number of launchers did not give them any real advantage. This numerical superiority reflected a mechanistic, wasteful approach to force building.

The Soviets had amassed a superior first-strike arsenal. But they were not able to destroy an aggressor in a retaliatory strike because they did not have an adequate C^3 system for launching their surviving missiles.

Nuclear War in Europe

The Soviets tried to plan for nuclear scenarios, however they were all senseless. The main threat for NATO was the large number of Soviet tanks located in Europe. The Soviets had no incentive to escalate the war to the nuclear level because the consequences would be equally devastating for Europe and for the European part of the Soviet Union. The leadership believed, with good reason, according to Kalashnikov, that Soviets could certainly win a strictly conventional war in Europe and advance at least to the English Channel. The ban on tactical nuclear weapons has without question drastically reduced the level of the Cold War.

Economic Competition

The Soviets were not on even ground with the U.S. economically. U.S. GDP in 1981 equaled $2,925 billion. 1981 Soviet GDP equaled R939.16 billion. But they spent more on weapons, which led in the end to the ruin of the economy and the pauperization of the people. The arms race and instability were aggravated by military bases outside the borders of the two superpowers, considering that they reduced flight times, etc.

1972 Exercises

During this time there were tests held at Semipalatinsk to determine the nuclear survivability of all existing silo and command center designs. For this underground nuclear tests and above-ground tests using conventional explosives equivalent to 10 kilotons were used. For the above-ground tests many kinds of equipment were used, including mobile missile platforms, SS-20s, planes, tanks, other kinds of armor, etc. Kalashnikov was deputy in charge of missiles on the commission conducting the tests. Findings: ground bursts were generally effective at disabling silos, but results were somewhat mixed. Air bursts were very effective against planes, tanks, etc.

Deployment of SS-20

There were several reasons for the deployment:

1) Obsolescence of existing medium-range missiles. Existing missiles were: R-12 [SS-4] - deployed March 1959, unprotected, above-ground launchers, with range of 4,500 km and carrying a .5 megaton single warhead; R-14 [SS-5] above-ground, unprotected with 4,500 km range and 1 megaton warhead. Both were liquid fuel missiles with low combat readiness. These two systems were deployed in the European and Central Asia parts of the USSR, first on unprotected above-ground launchers, then, as a result of Khrushchev's decree of May 30, 1960 (mentioned above) in group silos, hardened to withstand only 2 kg/cm^2 [28 psi]. Deployed in silos 1964. The Soviets wanted to eliminate these obsolete systems and replace them with solid-fuel missiles.

2) The Soviets wanted to deploy a mobile missile system.

3) By this time the Tem-2S mobile ICBM [probably SS-16], using the MAZ-500 mobile launcher, had been developed, and was in production, but it was banned by the SALT II agreement. Kalashnikov pointed out that it was technically a simple matter to convert the 60 existing ICBMs into the Pioneer [SS-20], which was permitted by the agreement: simply remove the second stage of the missile. Thus the SS-20 was born. The Central Committee decree was prepared in a matter of days. The creation of the SS-20 caused a great uproar in the West, particularly in American military circles.

Strategic Superiority Revisited

The Soviet Union did strive for strategic nuclear superiority. In 1975 the U.S. had 1,710 launchers operational. We had 2,558. After 1968 the U.S. practically did not add any launchers.

Soviet megatonnage per warhead was two to three times that of the U.S. However, the *udel'naia moshchnost'* [warhead size in proportion to weight, thrust, and range of the missile] of the U.S. warheads was 25% greater than Soviet. Soviet missiles had far greater launch weight than U.S., e.g., the Minuteman weighed 35 tons, carried three warheads and had a 10,000 km range. Soviet missiles compensated for the inadequacy of their designs by their great launch weight and throw weight. The pressures in their burn chambers were lower because of less sophisticated materials. Even the Soviet solid fuel missiles had far greater weight than their U.S. counterparts.

NATO Threat

The Soviet Union perceived a threat from NATO behavior. The main goal of the U.S. during the Cold War and the arms race was to force the Soviet Union to commit the maximum resources to nuclear and other weapons in order to destroy its economy. This strategy was in the end successful because when the Soviet Union was committing 60 to 70% of its industry to defense needs, the economy crumbled.

During a meeting involving Central Committee Defense Secretary Dmitrii F. Ustinov and Chief of the General Staff Zakharov,[67] Kalashnikov argued that industry was overextended and committed too much to armaments. This economic over-extension was driven by the arms race and by the growing complexity and sophistication of modern weapons. During and after WWII, four industrial plants were required to build a tank. Now, after the arms race at least 150 plants are needed. This means that many industrial plants, which under normal conditions would be non-defense, were deliberately and systematically drawn into defense production. The U.S. was much stronger economically. U.S. industry was working at 75% capacity throughout the Cold War period, while Soviet industry was working at full capacity. The U.S. GDP rose consistently. From 1967 to 1981 real GDP actually declined in the Soviet Union.

Every year since 1969 the U.S. produced 280 - 300 missiles. The Soviet Union produced 540 - 570. This vast industrial base devoted to the production of missiles destroyed the national economy and pauperized the people. Most important, the Soviet Union had more than 20 types of missiles serving essentially the same roles. The military's ambition had always been to eliminate this redundancy and have just two or three types, e.g., one heavy and one light ICBM. Kalashnikov repeatedly made proposals to this effect. But these arguments were always rebutted with the question of what would happen to the workers if KB [design bureau] Chelomei or KB Iangel', which operated the Iuzhnoe facility, were closed down. During one particular meeting of the Defense Council held by Brezhnev in the Crimea, the redundancies were clearly demonstrated and the proposals for design of MR-100[68] and R-37[69] were also presented. Brezhnev made the militarily senseless and economically destructive decision to keep all designs in production.

At this meeting Kalashnikov argued for the design of a solid-fuel missile to replace the SS-18 to be known as the SS-21 and developed at Iuzhnoe. The SS-18 was not canceled, but Kalashnikov's proposal was received favorably. Some of these missiles would be rail-based. Grechko was strongly opposed to the rail option because he thought that the railroads, which are the Soviets' lifeline, would be seriously disrupted by rail-based missile launches. Kalashnikov headed the development team for this missile [ultimately produced as the SS-24].

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[67] Zakharov, Matvei Vasil'evich — Marshal of the Soviet Union — Chief of the GS from 1960 to 1963 and from 1964-1971.

[68] The MR-100 is probably the manufacturer's number for the SS-17, the Iangel' four-warhead missile proposed in July 1969. The Strategic Rocket Forces (SRF) designation for the same missile was the RS-16 (missiles often were known under two or three designations; the manufacturer's number, the SRF number and, for some systems, a number for general space applications).

[69] Almost certainly a general space missile system number for Chelomei's SS-19 known also by the SRF number RS-18.

Closing remarks

Kalashnikov is convinced that throughout the period of the development of nuclear missiles, especially when the Soviets began their production in earnest, the U.S. was very afraid of Soviet nuclear power, and of the possibility of accidental or unauthorized launch. The fact that Bush agreed to equal numbers of warheads for each side in the recent START II agreement, even though Russian warheads are of much higher yield, reflects this concern, especially in view of the political instability in Russia, and constitutes a great concession in favor of the Russians. Kalashnikov noted that it would be a great loss for history to lose a civilization like the United States. History shows that advanced civilizations have always been destroyed by more primitive ones (Rome, the Moors in Spain, etc.).

SUMMARY OF INTERVIEW

Subject: A. S. Kalashnikov

Position: Missile and nuclear weapons tester; former member of Military-Technical committee of Ministry of Defense and Chairman of Strategic Rocket Forces; former chairman of the commission on nuclear testing at Semipalatinsk

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Interviewer: John G. Hines

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The communications system was the Soviets' Achilles' Heel in the late 1960s and early 1970s. The U.S. cable communications system is very survivable because it consists of a computerized grid with many nodes that is difficult to knock out completely. U.S. command centers are very well protected and employ long-wave communications. By contrast, the Soviet cable communications are very weak, leading to poor survivability in models. This vulnerability has not been corrected to this day. A new cable system linking Moscow with the Far East has not been put in.

The Soviet Military-Industrial Complex was very resistant to change and innovation and there were "titanic battles" for the quality of weapons. For example, there was great resistance to introducing scrambling devices [*shumoobraznye signaly*] into Soviet naval communications. Kalashnikov became convinced of the need to introduce these devices in the early 1980s after talking with Admiral Lobov, commander of the Northern Fleet. Lobov described shadowing a U.S. fleet on maneuvers and not hearing any radio traffic. A tremendous battle ensued involving the Minister of Radio Industry Kolmykov. Such battles were commonplace during the Brezhnev period, when the Military-Industrial Complex became entrenched.

A great tragedy for rational weapons development was the closing of the General Staff Scientific-Technical Council (NTK) by Grechko. The NTK was an independent body not responsible to any of the ministries. It was therefore difficult to muffle. After Grechko disbanded it the only NTKs left were ones belonging to the services of the Armed Forces. However, they were greatly weakened.

Q: Did the Soviet Union conduct tests to compare the effects of ground-bursts vs. height of bursts?

A: When the first silos were built Soviets needed data for building shock absorption. The first tests to assess the effectiveness of shock absorption were conducted in 1963-64. At first these tests used conventional high explosives, but later on more elaborate tests using nuclear blasts were conducted. These later tests were made using silos and a

command center. Later still, above-ground tests were conducted using conventional explosives to measure the effect on equipment like tanks, planes, etc. A series of tests was conducted in Novaia Zemlia in 1961, but only to measure warhead yields.