

**Top Secret**

**NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER**



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imagery analysis report

# **Development of Soviet Automatic Combination Guns (S)**

1985

**Top Secret**

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IAR-0019/85  
OCTOBER 1985  
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## DEVELOPMENT OF SOVIET AUTOMATIC COMBINATION GUNS (S)

### INTRODUCTION

1. Within the last 35 years, the Soviets have developed two generations of automatic combination guns, including the first Soviet automatic grenade launcher and at least four automatic gun/mortar systems. Analysis of imagery and collateral information reveals that the F. F. Petrov Design Bureau, associated with Perm Armament and Missile Support Equipment and Research and Development Plant 172 [redacted], was probably responsible for designing most, if not all, of the weapons and that the research establishment at Krasnoarmeysk Ordnance Research and Development Facility [redacted] was principally responsible for the testing of the guns and munitions.<sup>1 2</sup> Because of this association, it appears that Perm Plant 172 and Krasnoarmeysk Ordnance Research and Development Facility are the primary installations where future Soviet grenade-launcher and gun/mortar systems could be identified. (S/WN)

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2. This report, which covers the period from [redacted] summarizes imagery and collateral concerning the research, development, test, and evaluation of selected combination-gun systems and also provides some insight into the technological relationships among these weapons systems. The report contains one location map (Figure 1), 10 photographs, and five small-format photographs or conceptual drawings that include the technical characteristics of the systems described. (S/WN)

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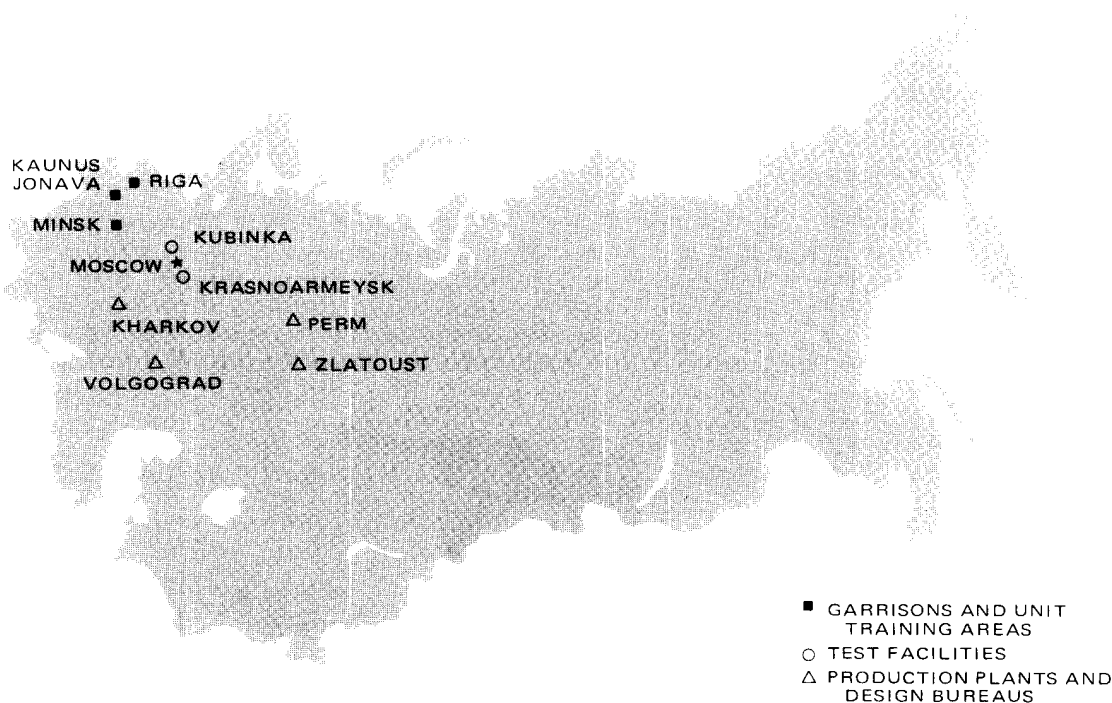


FIGURE 1. LOCATIONS OF FACILITIES IN THE USSR ASSOCIATED WITH AUTOMATIC COMBINATION GUNS

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DISCUSSION

The First Generation

3. In the early 1970s, the Soviets introduced the first generation of new automatic artillery systems capable of delivering both indirect and direct artillery fire. Among the new systems defined by the Soviets as combination guns were the Plamya (flame)<sup>3</sup> 30mm automatic grenade launcher AGS-17 and the Vasilek (also called Vasilyok; cornflower)<sup>4</sup> 82mm automatic mortar D-18. A third system—an 82mm, self-propelled (SP) combination gun used by airborne forces—probably a prototype for the 120mm SP Gun BMD (2S9\*), was developed and tested but never series produced.<sup>5</sup> All three combination guns were tested at Krasnoarmeysk Ordnance Research and Development Facility. [redacted]

Plamya and Vasilek Combination Guns

4. The Plamya grenade launcher (Figure 2) and the Vasilek mortar (Figure 3) have been at Krasnoarmeysk since at least 1968. Both systems are primarily antipersonnel weapons, with limited antiarmor capabilities. They were first deployed around 1971 to units guarding the Sino-Soviet border. (S/WN)

5. The Plamya "... is basically a much-improved version of the US 40-mm MK19 MoD O machinegun, which saw extensive service in Vietnam. It therefore represents a departure from the usual Soviet practice of continuous gradual product improvement of infantry weapons and demonstrates their willingness to 'borrow' extensively from worldwide technological advances."<sup>3</sup> (C)

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\* The designator 2S9 when used in relation to automatic combination guns is classified TOP SECRET [redacted] 25X1

\*\* In this report, the classification control markings are abbreviated as follows: [redacted] 25X1  
[redacted] 25X1  
[redacted] 25X1

Description	Belt-fed, blow-back—operated automatic infantry weapon mounted on a tripod or armored vehicle <sup>3</sup> (C)
Function	Close direct and indirect barrage fire support to infantry companies against infantry, motor vehicles, and lightly armored vehicles <sup>6</sup> (C)
Issue	Two per motorized rifle company <sup>3</sup> (C)
Type Fire	Automatic <sup>7</sup> [redacted] 25X1
Range	50–1,730 meters <sup>3</sup> (U)
Rate of Fire	40–60 rounds per minute; cyclic rate of 300–350 rounds per minute <sup>3</sup> (U)
Basic Load	29 rounds <sup>3</sup> (U)
Crew	2–3 <sup>6</sup> (C)
Production	The first Plamya was probably produced at Zlatoust Armaments Plant 66; current production could be at any of the heavy machinegun-producing plants <sup>7</sup> (C/WN)

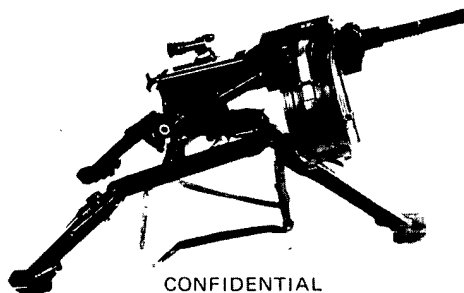


FIGURE 2. PLAMYA 30mm AUTOMATIC GRENADE LAUNCHER AGS-17

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Description	Smooth-bore, <sup>1</sup> four-round-cassette fed, <sup>8</sup> blow-back-operated, automatic combination gun/mortar mounted on a split trail gun carriage and transported on a GAZ-66 light truck [redacted]	25X1
Function	Close support; direct and indirect barrage fire against personnel and armored vehicles <sup>9</sup> <sup>10</sup> [redacted]	25X1 25X1
Issue	Four per motorized rifle battalion of a motorized rifle regiment, or naval infantry battalion of a naval infantry brigade (S/WN)	
Type Fire	Automatic (C)	
Range	5,000–6,000 meters <sup>10</sup> [redacted]	25X1
Rate of Fire	Cyclic rate of 80–120 rounds per minute <sup>10</sup> [redacted]	25X1
Crew	5–7 <sup>9</sup> [redacted]	25X1
Production	The first Vasileks were probably produced at Zlatoust Armaments Plant 66; current production could occur at any of the heavy machinegun-producing plants <sup>7</sup> (C/WN)	

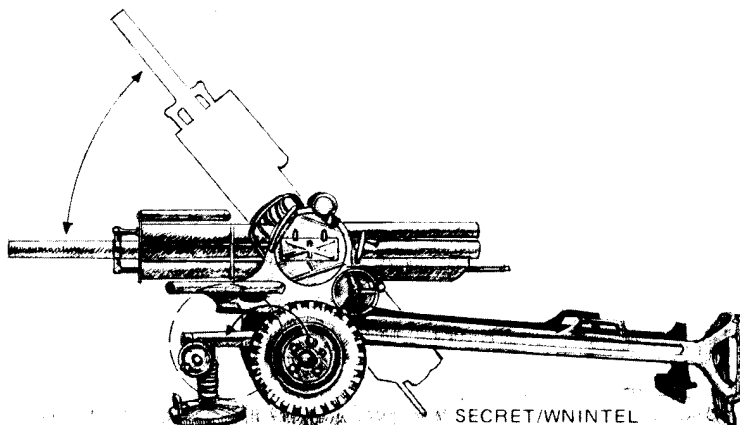


FIGURE 3. VASILEK 82mm AUTOMATIC MORTAR D-18

6. The Vasilek was probably designed in the late 1950s by the F. F. Petrov Design Bureau, with possible assistance from automatic infantry weapons designers. The factory markings on a Vasilek in the Leningrad engineer and artillery museum indicate that it was produced in 1960 and, at least initially, designated D-18.<sup>1 2</sup> (C)

7. The D-18 designator suggests that the Vasilek is a Petrov design, since historically guns with "D" designators, beginning with the 152mm Howitzer D-1, have been Petrov Bureau designs.<sup>2</sup> However, the Vasilek and Plamya systems tested in a

Dvina exercise in the early 1970s were reportedly produced in Zlatoust, probably at Zlatoust Small Arms Plant 66 [redacted] a known producer of machineguns.<sup>7</sup> [redacted]

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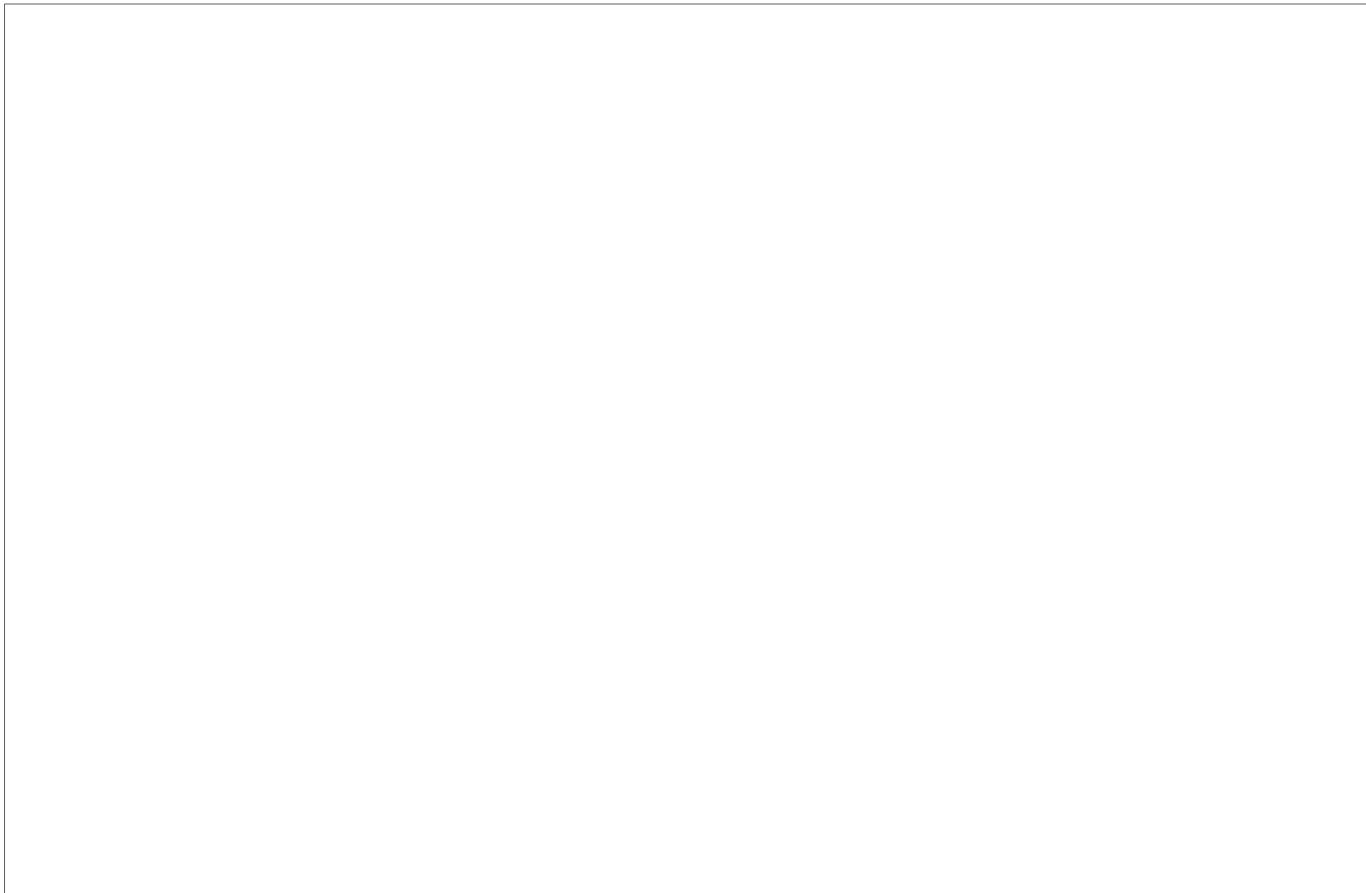
8. A Vasilek mortar in the distinctive GAZ-66 carrier was first observed at Krasnoarmeysk in May 1971 (Figure 4), the year Vasileks were initially deployed. The carrier was probably developed in the late 1960s, since the GAZ-66 truck was not introduced as the replacement for the old GAZ-51/-63 until the mid-1960s.<sup>11</sup> (S/WN)

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**Probable Prototype 2S9**

[redacted]

[redacted]

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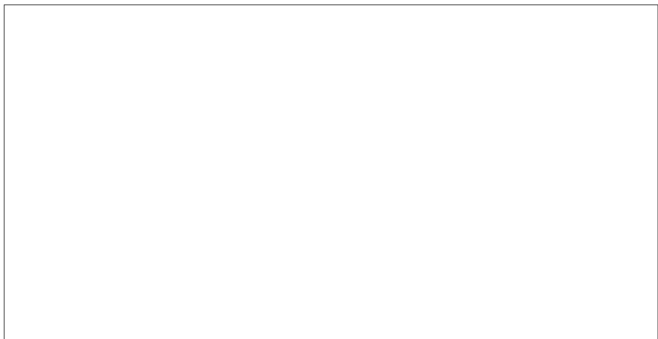
9. The probable prototype 2S9 (Figure 5) was first observed at Krasnoarmeysk on [redacted] in a display that included the Plamy and Vasilek systems (Figure 6). The appearance of the probable prototype 2S9 with the Vasilek at Krasnoarmeysk makes this vehicle a prime candidate for the often-mentioned,<sup>12</sup> but never identified, 82mm SP Vasilek. [redacted]

11. Automotive tests of the probable prototype 2S9 were possibly conducted at an automotive test facility, on the extreme northeast end of the Krasnoarmeysk range. In August 1971, vehicles similar in size and configuration to the probable prototype 2S9 were observed at this facility (Figures 7 and 8). The probable prototype 2S9 was not observed again at Krasnoarmeysk, and by 1975, the automotive test facility possibly associated with its development had been abandoned. [redacted]

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10. The probable prototype 2S9 was probably developed between 1968 and 1970 through the joint efforts of the Petrov Design Bureau and designers at Volgograd Tractor and Armored Vehicle Plant [redacted]. Volgograd is where the original BMD was designed and is currently produced.<sup>13</sup> During the late 1960s, the Volgograd de-



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Description	Turret adapted, possibly automatic 82mm combination gun/mortar on an amphibious, airborne-associated, light universal (multipurpose) chassis (an elongated six-road-wheel variant of the BMD) (S/WN)	
Function	Close direct and indirect fire support to Soviet airborne and air assault units; barrage fire against infantry and light armor <sup>10</sup> [redacted]	25X1
Issue	Unknown	
Range	5,000–6,000 meters (same as Vasilek) <sup>10</sup> [redacted]	25X1
Rate of Fire	Unknown	
Crew	Four (based on BMD crew) <sup>16</sup> (C)	
Production	The prototypes were probably assembled at Volgograd Tractor and Armored Vehicle Plant; series production has not been identified <sup>13</sup> [redacted]	25X1

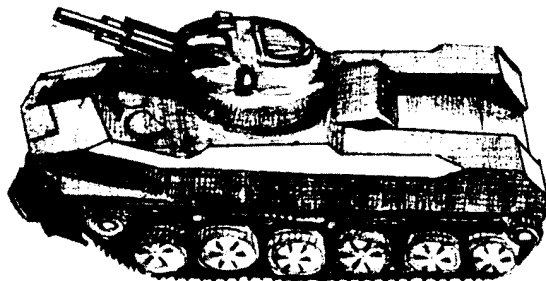
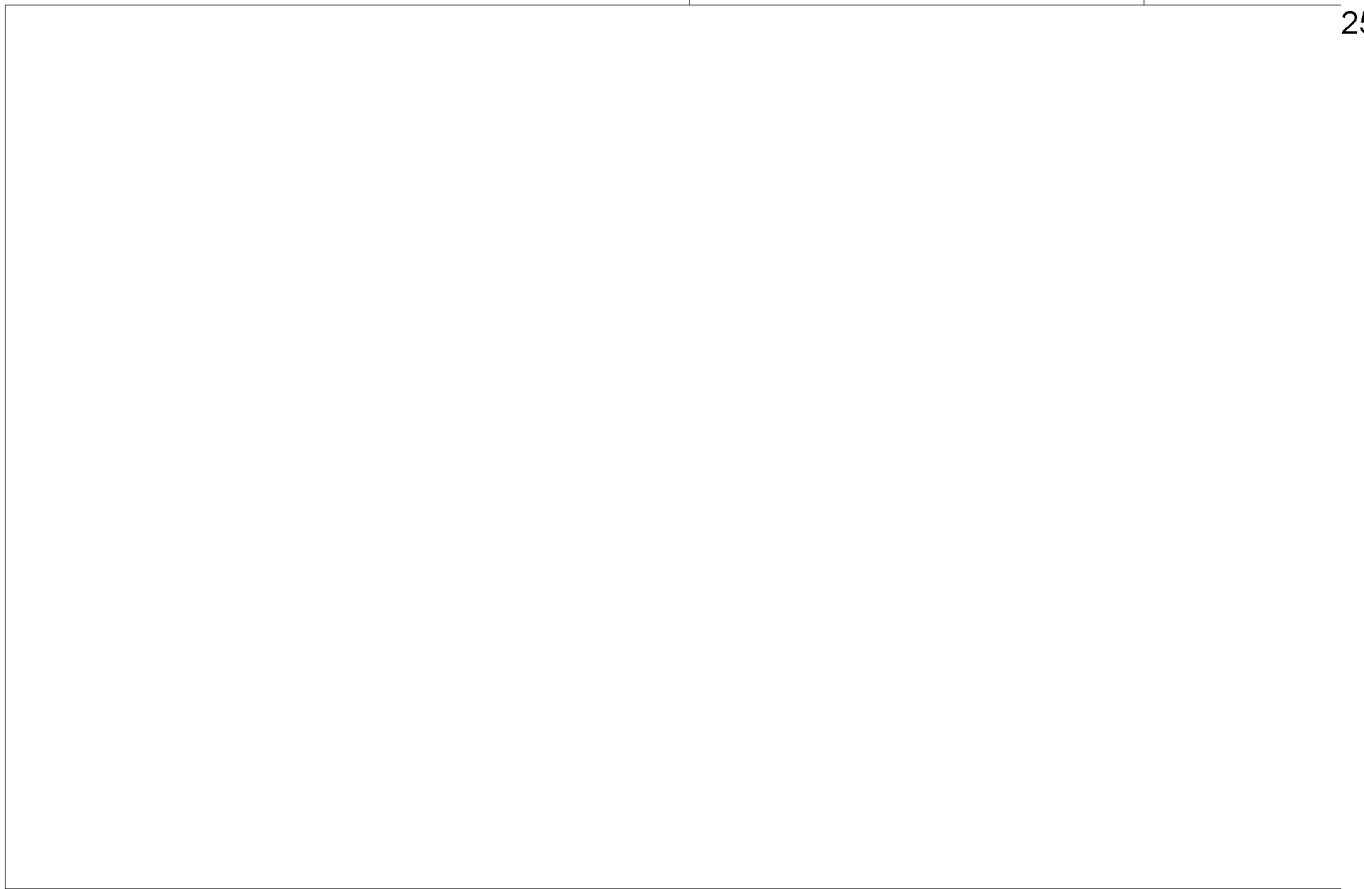


FIGURE 5. PROBABLE PROTOTYPE 2S9 [redacted]

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[redacted] in the Baltic Military District, on [redacted]  
[redacted] (Figure 9). Jonava is 18 nm northeast  
of Kaunas and, at the time, housed a training regi-  
ment of the 44th ATD.<sup>14</sup> The correlation of imagery  
sightings and collateral reports indicates a logical  
sequence of events, from possible developmental  
testing at Krasnoarmeysk through possible field  
testing with the 44th ATD. However, there have

been no identifications of this vehicle deployed 25X1  
with airborne units since the Jonava display, and 25X1  
the system never went into series production. In  
fact, the limited number of probable prototype  
2S9s produced was probably later refitted with the  
upgraded 120mm combination gun of the 2S9  
when it became available. [redacted] 25X1



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### The Second Generation

13. By 1975, the Soviets had developed and were testing a second generation of combination guns. Two systems of that generation, the 120mm SP Gun BMD (2S9) and 120mm Combination Gun (2S17\*); have been identified. [redacted]

[redacted]

#### 120mm SP Gun BMD (2S9)

[redacted]

14. The 2S9 is the older and better known of the second-generation combination guns and has been the subject of numerous reports since it was identified at Riga Training Area 1 [redacted] in March 1981. The 2S9 is probably the upgraded version of the probable prototype 2S9

with a new and more effective 120mm main gun (Figure 10). [redacted]

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15. The 2S9, like its prototype, was probably jointly developed by the Petrov Design Bureau and the Volgograd Tractor Plant. The automotively complete chassis are assembled at Volgograd Tractor Plant and shipped by rail to Perm Plant 172 for final assembly. [redacted]

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16. The 2S9 was possibly imaged on [redacted] at Krasnoarmeysk and was first confirmed on the firing line on [redacted] (Figure 11). Following extensive testing at Krasnoarmeysk, the 2S9 was displayed at Kubinka Army Barracks Tuchkovo South AL-2 [redacted] (Figure 12) with other new armored fighting

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\*The designator 2S17 when used in relation to automatic combination guns is classified TOP SECRET [redacted]

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Description	Turret adapted, combination gun/mortar 2A51 <sup>5</sup> mounted on an amphibious, air-borne-associated, light universal, multipurpose chassis (an elongated six-road-wheel variant of the BMD) [redacted]	25X1
Function	Close direct and indirect fire support <sup>17</sup> to Soviet airborne and air assault units [redacted]	25X1
Issue	18 per airborne or air assault regiment (S/WN)	
Range	500-12,000 meters indirect; 700 meters direct <sup>17</sup> [redacted]	25X1
Rate of Fire	Unknown	
Crew	Four (based on BMD crew) <sup>16</sup> (C)	
Production	Perm Plant 172 is the final assembly plant for the 2S9; the main guns were produced at Perm which receives the automotively complete chassis from Volgograd Tractor and Armored Vehicle Plant <sup>13</sup> [redacted]	25X1

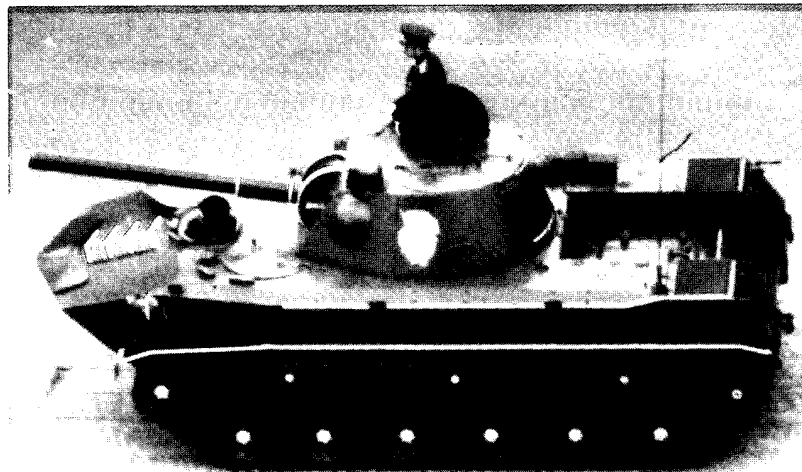


FIGURE 10. 120mm SP GUN BMD (2S9) [redacted]

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vehicles on [redacted] The first possible 2S9 chassis identified at Perm Plant 172 was in the shipping yard on [redacted] (Figure 13). By May 1981, limited series production had apparently begun at Perm Plant 172. The 2S9 was deployed with airborne units in 1981 and publicly paraded in Moscow on 9 May 1985. [redacted]

opment probably involved the Petrov Design Bureau at Perm Plant 172, Volgograd Shipyard and Heavy Equipment Plant Krasno 264 [redacted], and Kharkov Tractor and Missile Support Equipment Plant Ordzhonikidze [redacted]

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**120mm Combination Gun (2S17)**

17. The 2S17 (Figure 14) is the lesser known of the second-generation combination guns. This system consists of a 2S9 turret and main gun on a 2S1 SP Howitzer M1974 chassis. The 2S17 devel-

18. The involvement of Volgograd Shipyard in armored vehicle production is not new. The turrets and chassis for all armored vehicles, including BMDs and 2S9s, assembled at Volgograd Tractor Plant are produced at the shipyard. Therefore, the 2S9 turrets used for the 2S17 will be acquired from the Volgograd Shipyard. [redacted]

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Description:	Turret adapted, 120mm combination gun/mortar 2A51 <sup>5</sup> mounted on an amphibious 2S1 chassis [redacted]	25X1
Function	Close direct and indirect fire support possibly to motorized rifle units <sup>17</sup> [redacted]	25X1
Issue	Not yet deployed (S/WN)	
Range	500–12,000 meters indirect (approx; same as 2S9); <sup>5</sup> 17 700 meters direct <sup>17</sup> [redacted]	25X1
Rate of Fire	Unknown	
Crew	Four (based on 2S1 crew) <sup>18</sup> (U)	
Production	Kharkov Tractor Plant Ordzhonikidze will probably be the final assembly plant for the 2S17; the chassis are produced at Kharkov which will receive main guns from Perm Plant 172 and turrets from Volgograd Shipyard and Heavy Equipment Plant Krasno 264 <sup>19</sup> [redacted]	25X1

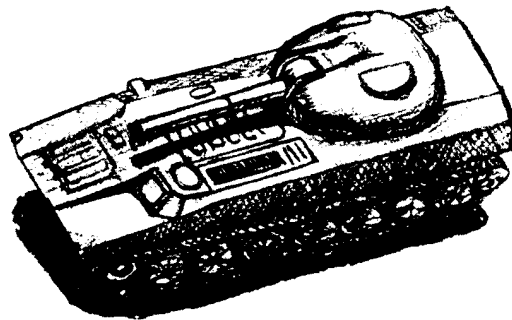


FIGURE 14. 120mm COMBINATION GUN (2S17) [redacted]

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19. The 2S1 chassis that is used for the 2S17 is produced at Kharkov Tractor Plant Ordzhonikidze, and this plant or Perm Plant 172 will probably be the final assembly plant for the 2S17. Most of the military chassis that are based on the MT-LB are designed and produced at Kharkov, which is also currently the final assembly plant for the 2S1.

20. The 2S17 was first observed on [redacted] adjacent to a 2S9 on the firing line at Krasnoarmeysk (Figure 15). This was the only observation of the system at Krasnoarmeysk in 1977. In September 1977, a 2S1 chassis was in the shipping yard at Perm Plant 172, where it remained through August 1978 (Figure 16). This chassis was probably used by the Petrov designers to work out problems with the integrated system. [redacted]

21. Testing of the 2S17 resumed at Krasnoarmeysk in December 1979 and continued through the end of 1984. Testing of the 2S17 has not been observed at Krasnoarmeysk since then. Testing of its counterpart used by airborne forces, the 2S9, stopped approximately when the 2S9 was deployed. Thus, the termination of 2S17 tests suggests that the 2S17 may be ready to enter series production and initial deployment. [redacted]

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**Imagery Analyst's Comments**

**Deployment of the Combination-Gun Systems**

22. It is apparent that the airborne forces were the first consideration in the development of a self-propelled combination-gun system. The very nature of airborne operations demands such a system. Soviet airborne units are projection forces

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that are dropped into an area to mount high-speed, intense assaults. Airborne artillery crews using towed artillery are vulnerable to small-arms and artillery fire throughout the operation. In the battle zone, the artillery crews have little protection as they attempt to locate and mate artillery pieces to prime movers, establish firing positions, and relocate to new positions. Furthermore, the transport of towed artillery and its prime movers into the battle area presents a tremendous logistical problem because of the number of aircraft needed. (S/WN)

maneuver elements of the airborne unit. The 2S9 is also cost effective. It can provide the direct and indirect fire support previously achieved through the coordination of howitzer, antitank gun, and mortar fire. Theoretically, an airborne unit would have to air drop one howitzer, one mortar, one antitank gun, and three prime movers to get the support provided by dropping one 2S9. [redacted]

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23. The 2S9 eliminates many of the problems that towed artillery presents to Soviet airborne units. Once inside the vehicle, the crew has armor protection and is immediately ready to fire and maneuver. Moreover, the combination gun can move at the high rate of speed and over the same terrain as BMD-equipped maneuver elements. In contrast, towed systems require setup and breakdown time on each move and have limited cross-country mobility, all of which are hindrances to the

24. The 2S17 may be deployed to certain ground forces units. Currently, a motorized rifle unit of the new-type army corps at Minsk Headquarters Motorized Rifle Division/Army Barracks AL-1/SA-6 [redacted] and Kyakhta Army Corps Headquarters/SA-6 Regiment/Barracks AL-1 [redacted]<sup>0</sup> each have six 2S9s. These vehicles may be part of an airborne/air assault unit but could also be place holders to be replaced by 2S17s at a later date. The Soviets evidently recognize the values of such a system to their more conventional ground forces. [redacted]

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REFERENCES

IMAGERY

All applicable satellite imagery acquired from [redacted] was used in the preparation of this report. (S/WN)

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Small-Format Imagery

Figure

No	Source	Accession No	Date	Classification
2	Army/FSTC	AST-2660P-301-84 p 6, neg 559828	[redacted]	CONFIDENTIAL
4	DIA	2-2154-026-84	[redacted]	CONFIDENTIAL
10	AFSC/FTD	IR 6 901 0372 85	[redacted]	CONFIDENTIAL

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2. *Jane's Armour and Artillery, 1983-84*, Fourth edition (UNCLASSIFIED)
3. US Army/FSTC. AST-266OR-023-82, *Soviet AGS-17, 30-mm Automatic Grenade Launcher (U)*, Sep 82 (SECRET) [redacted]
4. "Moskaus geheimer automatischer Morser: 'Vasilyok'—Die Kornblume' (Moscow's Secret Automatic Mortar: 'the Vasilyok'—'the Cornflower')," *Soldat und Technik*, Frankfurt am Main, Feb 84, p 73 (UNCLASSIFIED)

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- 5. DIRNSA. G/00/4185-80, *Variant of Soviet Self-Propelled Weapon System with Covername ANONA Uses Same Chassis As 122-mm Howitzer* [redacted] 25X1  
[redacted] 25X1
  - 6. DoD. IIR 2 227 0485 80, *Procedure for Use of Automatic Grenade Launcher (Avto Maticheskiy Granatomyot Stankovyy) Used by Soviet Motorized Rifle Units (U)*, 16 Dec 80 (CONFIDENTIAL)
  - 7. DIA. DIADIN 167-1E, *Automatic Weapons Manufactured by Small Arms Plant in Zlatoust (C)*, 170237Z Jun 78 (SECRET) [redacted] 25X1
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  - 12. *"AM Vasilek automatic 82 mm mortar," Jane's Defence Weekly, Vol 1, No 4, 4 Feb 84 (UNCLASSIFIED)*
  - 13. CIA. TD-00-K-323/21063-84, *Weapons Programs at the Astrov Design Bureau of the Mytishchi Machine-building Plant*, 062000Z Dec 84 (SECRET) [redacted] 25X1
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  - 15. NPIC. Z-20075/81, IAR-A094/81, *Airborne Activity at Riga, USSR (S)*, May 81 (SECRET) [redacted] 25X1  
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  - 16. US Army/ITAC. RAC-24/8002/83, ATC-II-1110-082-83, *BMD Family of Airborne Associated Vehicles (U)*, Feb 83 (SECRET) [redacted] 25X1
  - 17. SSO CHVILLE. *Soviet 120-mm SP Howitzer (ABN) M1981 Deployment* [redacted] 161525Z May 85 (SECRET) [redacted] 25X1  
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  - 18. DoD. IIR 2 218 010083, *122 mm Self-Propelled Howitzer*, 1 Mar 83 (UNCLASSIFIED)
  - 19. NPIC. [redacted] IAR-0042/84, *Imagery Analysis in the Evaluation of Soviet Weapon System Development Cycles (S)*, Apr 85 (TOP SECRET [redacted]) 25X1  
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- \* The extracted information is classified CONFIDENTIAL.  
 \*\* The extracted information is classified SECRET [redacted] 25X1  
 \*\*\* The extracted information is classified SECRET [redacted]

**REQUIREMENT**

This report responds to topic 3.5.7 of the *U.S. Foreign Intelligence Requirements, Categories, and Priorities*, (S) [redacted] ICS84-7513, 1 January 1984 (S) [redacted] 25X1

The author of this report is [redacted] Comments and queries regarding the report are welcome. They may be directed to the Land Armaments Branch, Tactical Forces Division, Imagery Exploitation Group, NPIC; [redacted] (C) 25X1  
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