NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

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basic imagery interpretation report

SA-10 SAM Deployment, USSR (S)

DEPLOYED SAM FACILITIES
BE: Various
USSR

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RCA-04/0001/83 25X1
NOVEMBER 1983
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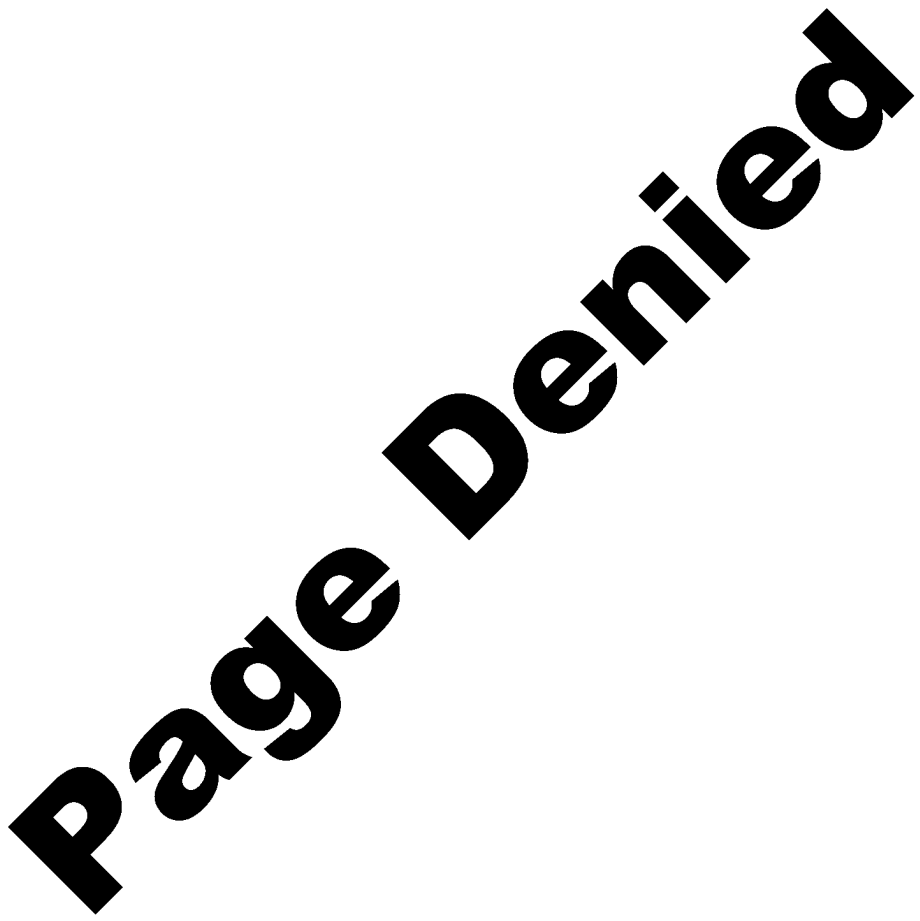

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ABSTRACT

1. This report consolidates imagery-derived intelligence on the Soviet SA-10 surface-to-air missile (SAM) system acquired since The report includes information on the rate of SA-10 site construction and deployment, the calibration and testing of SA-10 components, and the use of camouflage, concealment, and deception (CC&D) efforts in the SA-10 program. This program has grown by 12 new sites to a total of 66, and it is evident that production rates for SA-10 launchers have increased. (S/WN)

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INTRODUCTION

2. Since September 1982, the cutoff date for the most recent NPIC basic report on the SA-10 SAM system,[1] 12 new SA-10 sites have been identified in the Soviet Union, bringing the known total to 66. Eleven sites previously identified but unoccupied have received SA-10 equipment during this period. The construction of BIG BIRD radar sites around Moscow continued, with six sites now identified and construction for an additional five under way. The rapid rate of deployment at Moscow and the increased flow of SA-10 equipment through the Kapustin Yar Marshalling Area (KYMA; suggests an increased production rate for the SA-10 launcher. (S/WN)

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3. The removal of three SA-10 transporter-erector-launchers (TELs) and a mobile FLAP LID radar from Sary-Shagan Missile Test Center (MTC) Launch Complex G indicates the probable beginning of field trials for the mobile version of the SA-10. The presence of a TIN SHIELD radar at Launch Complex G suggests that this radar is undergoing system integration testing for possible incorporation with the SA-10 system. Construction of new instrumentation sites at Launch Complex G tracking and guidance facilities may be related to improving SA-10 missile performance. (S/WN)

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5. This report contains two maps, three tables, and eight annotated photographs. (S/WN)

BASIC DESCRIPTION

6. The SA-10 is the newest Soviet strategic SAM system. It is assessed to be a medium-range, all-altitude system capable of tracking and engaging multiple targets simultaneously. The major SA-10 components currently being deployed include a canister-launched missile, a towed launcher designed to hold four missile canisters, a CLAM SHELL low-altitude target acquisition radar, a FLAP LID target engagement radar, and a BIG BIRD long-range acquisition radar. (S/WN)

7. The SA-10 missile system was developed at Sary-Shagan MTC Launch Complex G, where SA-10 components were first identified in 1973. Missile flight tests were underway by 1975. Troop training began in 1979 at Sary-Shagan MTC Launch Complex E and in July 1980 the first deployment of the SA-10 was identified at Moscow. (S/WN)

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8. Since 1981, the Soviets have been developing a mobile version of the SA-10 at Launch Complex G consisting of an SA-10 transporter-erector-launcher (TEL) and a FLAP LID radar mounted on a self-propelled MAZ-type vehicle. These modifications will improve the mobility and reduce the relocation time of

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deployed SA-10 firing units. Deployment of the mobile version of the SA-10 is not expected before 1985.

9. The TIN SHIELD, a 3-dimensional target acquisition radar, has been present at Launch Complex G since August 1982 and may be undergoing system integration with the SA-10. (S/WN)

Site Construction and Deployment

10. A total of 66 deployed SA-10 sites have been identified to date at eight places in the Soviet Union (Figure 1 and Table 1); 42 have received equipment, and 24 are under construction or awaiting equipment. Twelve sites, all in the Moscow area, are new since September 1982 (Figure 2) and except for two scratch-built sites, are collocated with SA-1 sites. Moscow has been the focus of all recent SA-10 deployment, and it will probably remain so until all the E-ring sites have been completed. Once the SA-10 deployment at Moscow is complete (probably mid-to-late 1984), the Soviets will most likely resume deployment in other areas where site construction is under way but has been proceeding slowly. (S/WN)

11. The recent deployment rate at Moscow suggests an increase in the production of SA-10 launchers. Gorkiy Armaments Plant Novoye Stalin 92 [redacted] has produced SA-10 launchers since at least August 1977, nearly three years before the first SA-10 deployment. An estimated production rate of seven launchers per month allowed the Sovi- 25X1

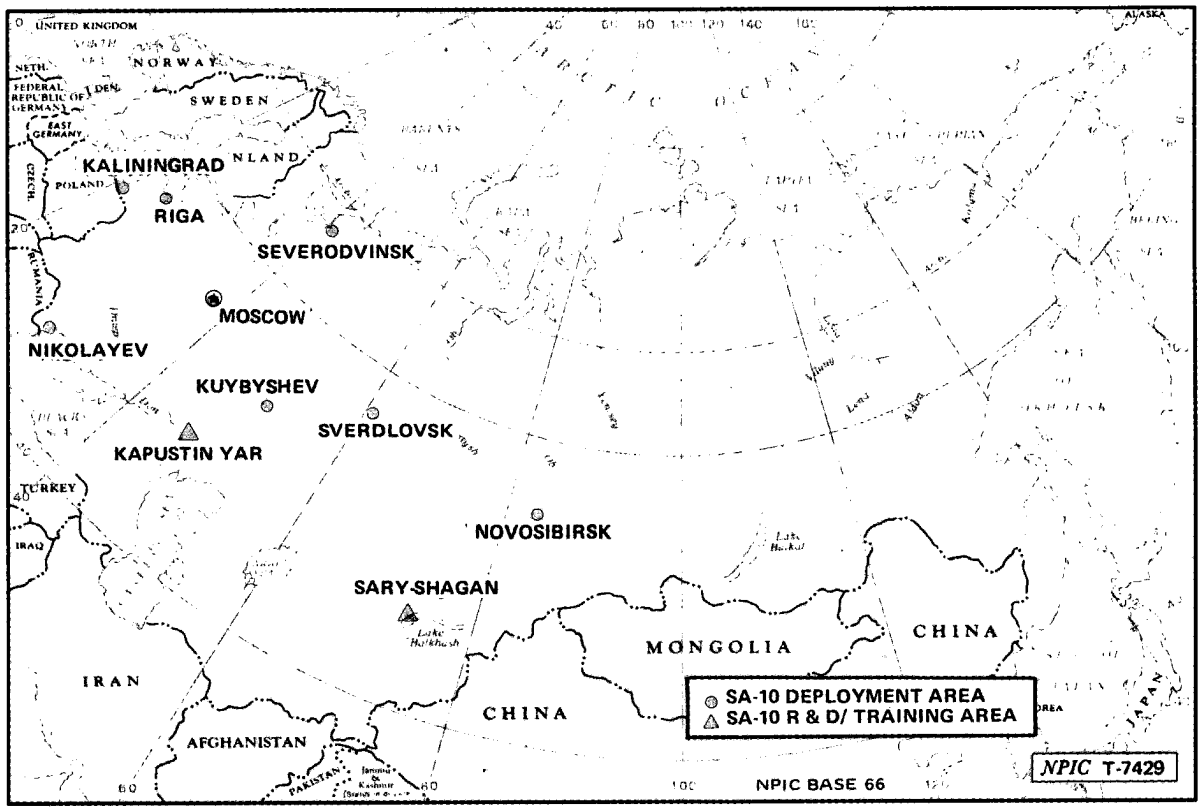

FIGURE 1. LOCATIONS OF SA-10 SAM DEPLOYMENT IN THE USSR

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Table 1.
Status of SA-10 Sites, USSR

Installation	Geographic Coordinates	BE Number	Type of Site	Construction First Ident	SA-10 Equip First Seen	SA-10 Equip Currently Deployed*	Remarks**
Kaliningrad SAM Site B28-10	54-44-42N 020-04-10E		Scratch built			6L, 1CS, 1FL, 2 TETs	
Kaliningrad SAM Site B32-10	54-52-50N 020-16-40E		Scratch built			6L, 1CS, 1FL, 2 TETs	6 additional hardpoints installed
Kaliningrad SAM Site C24-10	54-28-50N 019-54-56E		Reconfigured from SA-3 site			6L, 1CS, 1FL, 2 TETs	3 additional hardpoints installed
Kaliningrad SAM Site C28A-10	54-35-58N 019-50-56E		Reconfigured from SA-2 site			6L, 1CS, 1FL, 2 TETs	
Kaliningrad SAM Site C30-10	54-52-24N 019-57-11E		Reconfigured from SA-3 site			6L, 1CS, 1FL, 2 TETs	
Kuybyshev SAM Site B07-10	53-17-53N 050-34-06E		Reconfigured from SA-2 site			—	SA-2 equip still deployed within site
Kuybyshev SAM Site C29-10	53-20-44N 049-26-01E		Reconfigured from SA-2 site			—	Slow rate of construction
Moskva SAM Site C07-10	55-55-13N 038-19-31E		Small clearing in SA-1 firing area			6L, 1CS, 1FL 2 TETs	Firing unit operates from unimproved SA-1 site
Moskva SAM Site C09-10	55-47-55N 038-21-25E		Small clearing in SA-1 firing area			6L, 1CS, 1FL 2 TETs	Firing unit operates from unimproved SA-1 site
Moskva SAM Site C10-10	55-40-37N 038-20-34E		Small clearing in SA-1 firing area			6L, 1CS, 1FL 2 TETs	Firing unit operates from unimproved SA-1 site
Moskva SAM Site C12-10	55-32-45N 038-21-35E		Small clearing in SA-1 firing area			6L, 1CS, 1FL 2 TETs	Firing unit operates from unimproved SA-1 site
Moskva SAM Site D20-10	55-09-02N 037-11-12E		Scratch built			—	—
Moskva SAM Site E01-10	56-28-58N 037-41-55E		Collocated with SA-1 site			—	Complete; construct-ed around YO YO radar bunker
Moskva SAM Site E02-10	56-31-55N 037-59-17E		Reconfigured from SA-3 site			—	Site complete
Moskva SAM Site E03-10	56-21-48N 038-18-48E		Scratch built			—	Site complete
Moskva SAM Site E04-10	56-20-25N 038-23-21E		Collocated with SA-1 site			—	Under construction
Moskva SAM Site E05-10	56-13-40N 038-32-12E		Collocated with SA-1 site			—	Complete; construct-ed around YO YO radar bunker
Moskva SAM Site E06-10	56-07-20N 038-42-53E		Collocated with SA-1 site			—	
Moskva SAM Site E07-10	56-01-03N 038-51-43E		Collocated with SA-1 site			—	
Moskva SAM Site E08-10	55-53-27N 038-54-28E		Collocated with SA-1 site			—	
Moskva SAM Site E10A-10	55-44-07N 038-53-48E		Collocated with SA-1 site			—	
Moskva SAM Site E10-10	55-37-20N 038-55-36E		Collocated with SA-1 site			—	
Moskva SAM Site E12-10	55-28-41N 038-49-12E		Collocated with SA-1 site			—	
Moskva SAM Site E13-10	55-22-28N 038-43-14E		Collocated with SA-1 site			—	
Moskva SAM Site E14-10	55-15-47N 038-32-09E		Collocated with SA-1 site			—	
Moskva SAM Site E15-10	55-09-35N 038-21-52E		Collocated with SA-1 site			—	
Moskva SAM Site E16-10	55-05-20N 038-10-18E		Collocated with SA-1 site			—	
Moskva SAM Site E17-10	55-02-45N 037-55-32E		Collocated with SA-1 site			—	
Moskva SAM Site E18-10	55-05-20N 037-42-48E		Scratch built			—	
Moskva SAM Site E19-10	55-00-30N 037-29-54E		Collocated with SA-1 site			—	
Moskva SAM Site E20-10	55-00-43N 037-14-21E		Collocated with SA-1 site			—	
Moskva SAM Site E22-10	55-09-35N 036-52-10E		Collocated with SA-1 site			12L, 1CS, 1FL, 2 TETs	Located at YO YO radar bunker
Moskva SAM Site E23-10	55-14-26N 036-38-07E		Collocated with SA-1 site			12L, 1CS, 1FL, 2 TETs	
Moskva SAM Site E24-10	55-20-57N 036-27-28E		Reconfigured from SA-3 site			12L, 1CS, 1FL, 2 TETs	
Moskva SAM Site E25-10	55-27-53N 036-24-36E		Collocated with SA-1 site			12L, 1CS, 1FL, 2 TETs	
Moskva SAM Site E26-10	55-36-45N 036-19-13E		Collocated with SA-1 site			12L, 1CS, 1FL, 2 TETs	
Moskva SAM Site E27-10	55-44-25N 036-16-06E		Collocated with SA-1 site			12L, 1CS, 1FL, 2 TETs	
Moskva SAM Site E28-10	55-52-55N 036-13-30E		Scratch built			12L, 1CS, 1FL, 2 TETs	
Moskva SAM Site E29-10	56-01-19N 036-19-31E		Reconfigured from SA-3 site			12L, 1CS, 1FL, 2 TETs	
Moskva SAM Site E31-10	56-07-50N 036-29-38E		Collocated with SA-1 site			12L, 1CS, 1FL, 2 TETs	
Moskva SAM Site E32-10	56-15-24N 036-29-50E		Scratch built			12L, 1CS, 1FL, 2 TETs	
Moskva SAM Site E33-10	56-21-23N 036-45-54E		Reconfigured from SA-3 site			12L, 1CS, 1FL, 2 TETs	
Moskva SAM Site E34-10	56-24-30N 037-00-20E		Collocated with SA-1 site			12L, 1CS, 1FL, 2 TETs	
Moskva SAM Site E35-10	56-26-36N 037-12-01E		Collocated with SA-1 site			12L, 1CS, 1FL, 2 TETs	
Moskva SAM Site E36-10	56-29-23N 037-28-25E		Collocated with SA-1 site			12L, 1CS, 1FL, 2 TETs	
Nikolayev SAM Site A09-10	46-57-33N 032-07-29E		Reconfigured from SA-3 site			6L, 1CS, 1FL, 2 TETs	
Nikolayev SAM Site A15-10	46-54-05N 032-03-16E		Reconfigured from SA-3 site			9L, 1CS, 1FL, 2 TETs	
Nikolayev SAM Site A21-10	46-51-48N 031-55-16E		Reconfigured from SA-3 site			6L, 1CS, 1FL, 2 TETs	
Nikolayev SAM Site A25-10	46-55-30N 031-53-54E		Reconfigured from SA-3 site			9L, 1CS, 1FL, 2 TETs	
Nikolayev SAM Site A32-10	47-01-29N 031-55-56E		Reconfigured from SA-3 site			6L, 1CS, 1FL, 2 TETs	
Novosibirsk SAM Site B01-10	55-15-59N 082-58-43E		Reconfigured from SA-2 site			12L, 1CS, 1FL, 2 TETs	
Novosibirsk SAM Site B08-10	55-04-25N 083-16-42E		Reconfigured from SA-2 site			6L, 1CS, 1FL, 2 TETs	
Novosibirsk SAM Site B20-10	54-51-38N 082-49-29E		Scratch built			L, 1CS, 1FL, 2 TETs	
Novosibirsk SAM Site B28-10	55-02-48N 082-36-50E		Reconfigured from SA-2 site			6L, 1CS, 1FL, 2 TETs	
Riga SAM Site A24-10	56-54-21N 023-56-19E		Scratch built			6L, 1CS, 1FL, 2 TETs	
Riga SAM Site A32-10	57-01-45N 023-59-24E		Reconfigured from SA-3 site			6L, 1CS, 1FL, 2 TETs	
Riga SAM Site B03-10	57-06-09N 024-14-23E		Reconfigured from SA-2 site			6L, 1CS, 1FL, 2 TETs	
Riga SAM Site C28-10	57-01-02N 023-30-20E		Reconfigured from SA-3 site			12L, 1CS, 1FL, 2 TETs	
Jelgava (Riga) SAM Site A03-10	56-44-56N 023-49-36E		Reconfigured from SA-2 site			6L, 1CS, 1FL, 2 TETs	
Severodvinsk SAM Site A02-10	64-36-50N 039-49-30E		Scratch built			6L, 1CS, 1FL, 2 TETs	
Severodvinsk SAM Site A12-10	64-31-53N 040-08-23E		Reconfigured from SA-3 site			6L, 1CS, 1FL, 2 TETs	
Severodvinsk SAM Site A24-10	64-29-46N 039-38-53E		Reconfigured from SA-3 site			6L, 1CS, 1FL, 2 TETs	
Severodvinsk SAM Site A36-10	64-38-47N 039-49-48E		Reconfigured from SA-2 site			6L, 1CS, 1FL, 2 TETs	
Severodvinsk SAM Site B28-10	64-35-21N 039-24-53E		Reconfigured from SA-2 site			—	Site construction proceeding slowly
Sverdlovsk SAM Site B05-10	57-01-15N 060-53-45E		Reconfigured from SA-2 site			—	Site consruction Proceeding slowly
Sverdlovsk SAM Site B13-10	56-43-47N 060-56-33E		Reconfigured from SA-2 site				

* L = SA-10 Launcher(s); CS = CLAM SHELL; FL = FLAP LID; TET = Transportable Electronic Tower.
** Red indicates sites identified since

This table is classified SECRET/WNINTEL.

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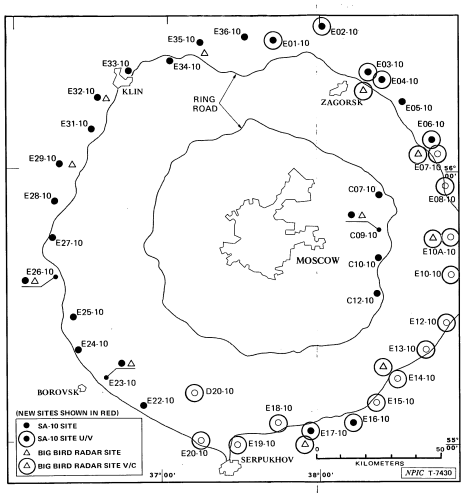

FIGURE 2. SA-10 SAM SITES AND BIG BIRD RADAR SITES IN THE MOSCOW AREA

Table 2.
Big Bird Radar Sites, USSR

Site*	Geographic Coordinates	BE Number	Remarks
Baltiysk AW Radar Facility TALL KING	55-45-07N 019-58-33E		
Moskva SAM Site C09-1	55-47-55N 038-20-52E		BIG BIRD on YO YO bunker
Moskva SAM Site E04-1	56-20-19N 038-23-15E		Ucon
Moskva SAM Site E07-1	56-01-02N 038-51-42E		Ucon
Moskva SAM Site E10-1	53-37-19N 038-55-35E		Ucon
Moskva SAM Site E14-1	55-15-46N 038-32-08E		Ucon
Moskva SAM Site E17-1	55-02-50N 037-55-48E		Ucon
Moskva SAM Site E23-1	55-14-27N 036-38-08E		BIG BIRD on YO YO bunker
Moskva SAM Site E26-1	55-36-44N 036-19-15E		BIG BIRD on YO YO bunker
Moskva SAM Site E30-1	56-01-16N 036-20-28E		BIG BIRD on YO YO bunker
Moskva SAM Site E32-1	56-15-32N 036-38-07E		BIG BIRD on YO YO bunker
Moskva SAM Site E35-1	56-26-25N 037-12-02E		BIG BIRD on YO YO bunker
Nikolayev AW Radar Facility TALL KING	46-59-05N 032-05-45E		
Novosibirsk SAM Support Facility	55-05-44N 082-51-27E		
Riga AW Radar Facility A20-5	56-22-26N 024-01-28E		
Severodvinsk AW Radar Facility A13-5	64-38-02N 039-50-30E		

* Red indicates new facilities since September 1982.

This table is classified SECRET/WNINTEL.

ets to acquire a stockpile of over 200 launchers at the Kapustin Yar Marshalling Area by mid-1980.[2] This stockpile was used for the early SA-10 deployment, and by October 1982 it had been reduced to only 20 launchers. (This does not include the number of launchers undergoing calibration at any one time, which can be as many as 96.) Between October 1982 and July 1983 the number of SA-10 launchers in stockpile had increased to 50. This increase, coupled with the steady deployment of equipment to 12 launcher sites at Moscow during this period, strongly suggests that the launcher production rate at Gorkiy has increased. (S/WN)

12. Deployment of the BIG BIRD radar, the long-range acquisition radar for the SA-10, has been identified at six Moscow SA-1 sites to date (Figure 2, Table 2). At each site, the BIG BIRD radar has been placed on top of the SA-1 YO YO radar bunker after the YO YO radar was removed. Other additions to these bunkers include an earthen ramp built up to the top and a hardstand or a triple arch-roofed bunker added to the front (Figure 3). Although the YO YO radars have been removed, SA-1 missiles are still present near their launch positions at these sites. (S/WN)

13. In addition to the six known BIG BIRD radars at Moscow, construction activity at five other YO YO bunkers indicates that future BIG BIRD deployment is intended (Figure 2 and Table 2). (S/WN)

Predeployment Calibration

14. Prior to deployment, all SA-10 equipment is shipped to the Kapustin Yar Marshalling Area for checkout and calibration (Figure 4). Upon arrival, the launchers, radars, and support equipment are parked in a storage yard at the center of the marshalling area. The equipment remains in storage until space becomes available at one of the eight calibration positions located on Aprons 5 and 7, at which

time 12 launchers (a firing unit) and one FLAP LID radar are transferred from the storage area to the calibration position (Figure 5). The equipment remains in place approximately six to eight months while being calibrated. Near the end of this procedure, several of the unit's launchers are normally removed and taken to Kapustin Yar SAM R&D Area D , where launch crews practice setting up the equipment and may actually fire missiles, though missile canisters themselves are rarely seen at Area D. (S/WN)

15. The SA-10 equipment remains at Area D for about three weeks and then is returned to its original calibration position for final checkout. When all checkout and calibration is complete, the equipment departs as a unit from the Marshalling Area RTP for deployment (Figure 6). Between September 1982 and July 1983, at least eight SA-10 units completed calibration and were shipped from KYMTC, generally corresponding with SA-10 deployment at Moscow during the same period. (S/WN)

System Improvements

16. **Mobility.** Since 1981, the Soviets have been developing an SA-10 TEL and a mobile FLAP LID radar at Sary-Shagan Launch Complex G (Figure 7) for improved mobility. Both employ a self-propelled MAZ-type vehicle. Field trials for this mobile SA-10 system may have begun between when both the TEL and the mobile FLAP LID were removed from Complex G, (although no field training sites have been identified). On an SA-10 TEL was observed in transit near Complex G (Figure 8). The TEL was fitted with a probable electronics box behind the cab but was not carrying any missile canisters. By a TEL and two mobile FLAP LIDs had returned to Complex G. To date, no SA-10 TELs or mobile FLAP LIDs have been identified at any SAM training facility or at the KYMA. Since it is likely that the self-propelled TEL and FLAP LID vehicles would undergo the same lengthy calibration procedure as the towed versions, it seems unlikely that mobile SA-10 equipment will be ready for deployment before 1985. (S/WN)

17. Though the production facility for the TEL and mobile FLAP LID has not been firmly identified, it is probable that the pre-production versions are being assembled at Gorkiy Plant 92 and that Plant 92 may be the intended series production plant. This plant assembles the towed SA-10 launcher and the FLAP LID radar. Self-propelled MAZ-type vehicles like those used for the SA-10 TEL and mobile radar have been observed in the same storage yard as the towed SA-10 equipment. (S/WN)

18. **Radar.** Another possible improvement to the SA-10 system may be the incorporation of the TIN SHIELD radar. The TIN SHIELD is a new, Soviet, three-dimensional acquisition/air warning radar that has been at Sary-Shagan MTC Complex G since Erected on a transportable electronics tower (TET) behind an SA-10 launch pad and apparently connected by cable to nearby SA-10 computer vans, this radar may be undergoing integration testing with the SA-10 system (Figure 7). Integrated in this manner, a likely role would be as a replacement for the CLAM SHELL radar. Unlike the CLAM SHELL, the TIN SHIELD is not dependent on the TET for operation (though it can be mounted on a TET). The TIN SHIELD may play an important role in the mobile version of the SA-10. Its long range acquisition and 3-D capability would help offset any loss of BIG BIRD data and allow the firing unit to operate more autonomously in battle. (S/WN)

19. **Low-Altitude Performance.** The construction of new instrumentation sites at four of the five Sary-Shagan Launch Complex G Tracking Facilities suggest that the SA-10 missile may be undergoing modifications, possibly to improve its low altitude performance. Opti-

cal tracking devices have been installed at Tracking Facilities G2 [redacted], G3 (BE [redacted] G4 ([redacted] and G5 (BE [redacted] and appeared externally complete by mid 1983. (S/WN)

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REFERENCES

IMAGERY

All applicable imagery acquired through [redacted] was used in the preparation of this report. (S) 25X1

MAPS OR CHARTS

SAC. US Air Target Chart, Series 200, Various sheets, scale 1:200,000 (UNCLASSIFIED)

DOCUMENTS

1. NPIC. Z-14634/82, RCA-04/0001/82, *SA-10 SAM Deployment (S)*, Dec 82 [redacted] 25X1 [redacted] 25X1
2. CIA/SOV 83-10123J, [redacted] *Soviet SA-10 SAM Deployment: Slower Than Expected (S)*, Jul 83 25X1 [redacted] 25X1
3. CIA/DDI. [redacted] SOV 83-10118 JX, Jul 83 (TOP SECRET/CODEWORDS/NOFORN/ORCON**) 25X1

*Extracted information is classified [redacted] 25X1

**Extracted information is classified [redacted] 25X1

REQUIREMENT

COMIREX D99
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Comments and queries regarding this report are welcome. They may be directed to [redacted] 25X1 Soviet Strategic Forces Division, Imagery Exploitation Group, NPIC, [redacted] 25X1 [redacted] 25X1

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