



Directorate of
Intelligence

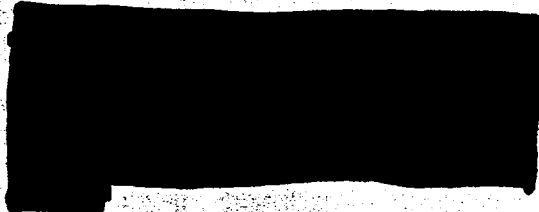
~~Secret~~

Soviet Satellite Defense Against the US Miniature Vehicle Antisatellite Weapon

An Intelligence Assessment

APPROVED FOR RELEASE

10 SEPT 99



~~Secret~~

September 1983

Soviet Satellite Defense Against the US Miniature Vehicle Antisatellite Weapon

Summary

*Information available
as of 1 August 1983
was used in this report.*

The Soviets will have only a limited capability to defend their satellites against an attack by the air-launched miniature vehicle (ALMV), the US antisatellite (ASAT) weapon system that is scheduled to be deployed in 1987. The ASAT weapon will be capable of attacking low-altitude satellites, including most of the Soviet reconnaissance satellites. Once the Soviets detect an attack, the most likely tactic they would employ to defend their satellites is maneuvering to avoid interception, [REDACTED]

[REDACTED] Soviet technological advances and of Soviet perceptions of the ASAT threat indicate a moderate likelihood that the Soviets will develop additional defenses— [REDACTED]

[REDACTED] by the late 1990s. Although these countermeasures would increase the probability of satellite survival, they can only be implemented after major technical problems have been solved. The weight of countermeasure packages added to present satellites probably would require the use of a new launch vehicle, and the Soviets have a suitable launch vehicle under development. Alternatively, the Soviets may choose to incorporate countermeasures in newly designed satellites [REDACTED]

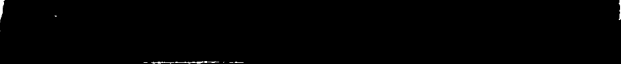
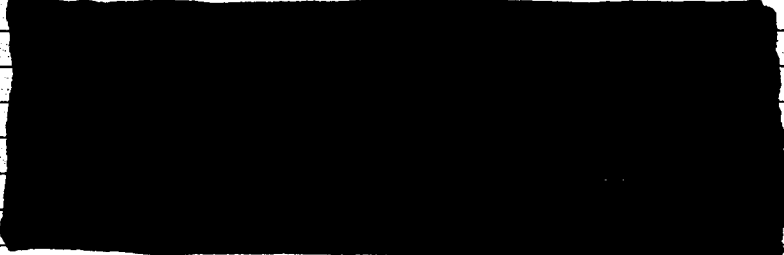
[REDACTED] Although we believe that the Soviets may attempt to increase satellite maneuver capabilities by increasing propellant capacities, we see no new spacecraft designs that include this or other modifications for defensive countermeasures. [REDACTED]

We believe the Soviets know enough about the ASAT system to develop countermeasures designed to increase the survivability of their satellites. Open-source reports about the ALMV contain data on the probable Soviet target satellites, physical dimensions of the ALMV, main components of the system, initial basing of the F-15s modified for ALMV launch, prime contractors and budget, and even a detailed design drawing of the ALMV. We believe this information would allow the Soviets to model the ASAT system accurately enough to predict attack geometries and to identify threatened satellite targets during an attack. [REDACTED]

Pages: iv

Exemptions: (b)(3), (b)(7)

Contents

	<i>Page</i>
Summary	iii
The Air-Launched Miniature Vehicle Program	1
Soviet Knowledge of the ASAT System	2
Soviet Warning and Countermeasure Command	4
Possible Countermeasures	5
Maneuvering	5
Replacement Satellites	7
	
Attack on F-15 or Airbase	8
	

Pages: vi

Exemptions: (b)(3), (b)(1)

~~Secret~~

Soviet Satellite Defense Against the US Miniature Vehicle Antisatellite Weapon

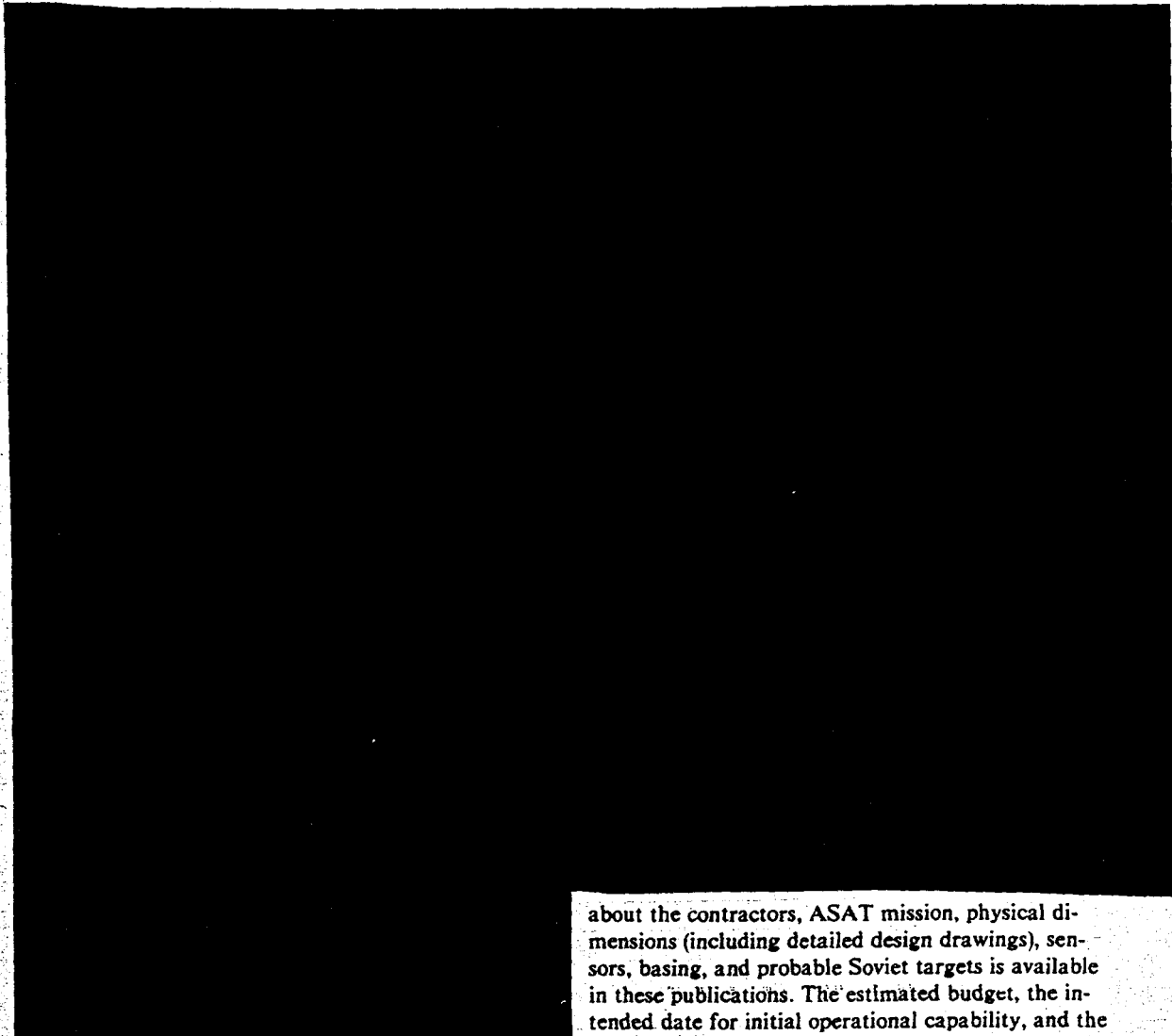
The Air-Launched Miniature Vehicle Program

The US air-launched miniature vehicle (ALMV) is part of a direct-ascent, hit-to-kill antisatellite (ASAT) weapon that is scheduled to be deployed in 1987. The weapon consists of the ALMV payload and a two-stage booster. It is carried to launch point by an F-15 aircraft that has been modified to carry cooling and computer interface support equipment on a pallet in the ammunition bay and the ASAT weapon beneath the fuselage. (S)

In a typical intercept plan, the F-15 carries the ASAT weapon to an altitude of about 13 kilometers (km); then it performs a supersonic dash and ejects the ASAT weapon.

~~Secret~~

~~Secret~~



Soviet Knowledge of the ASAT System

A large amount of open-source information on the ALMV and its subsystems is available to the Soviets, and they have recently published a detailed description of the ASAT system in one of their military journals. The major source of information is *Aviation Week and Space Technology*, along with technical journals, Congressional and Defense Department reports, and *Jane's Weapons Almanac*. Information

about the contractors, ASAT mission, physical dimensions (including detailed design drawings), sensors, basing, and probable Soviet targets is available in these publications. The estimated budget, the intended date for initial operational capability, and the C³ (command, control, and communications) and tracking support provided by NORAD also have been reported. Proposed plans to update tracking and targeting capabilities of supporting radars have also been published.

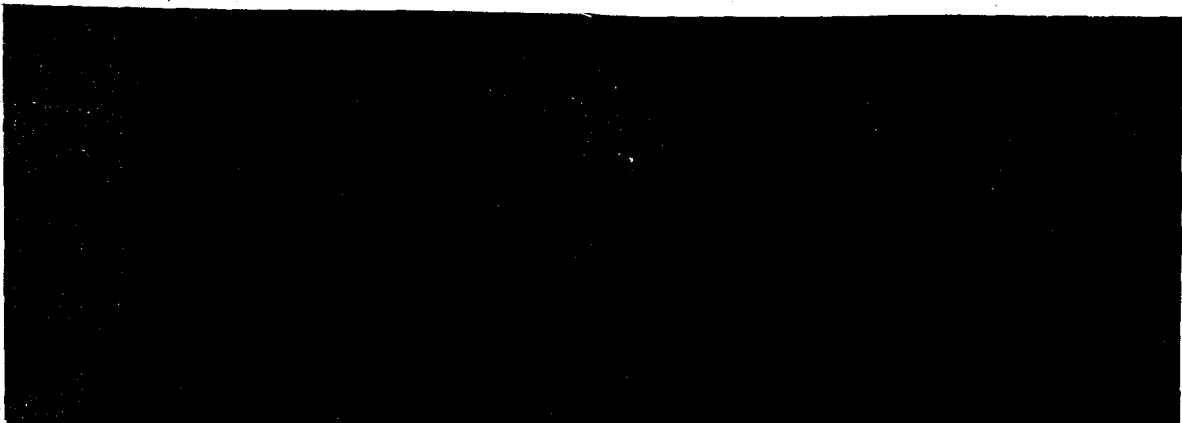


~~Secret~~

Pages: 3

Exemptions: (b)(3), (b)(1)


~~Secret~~



The information collected from these various sources will enable the Soviets to tailor countermeasures to specific system limitations.

Soviet Warning and Countermeasure Command

Defensive countermeasures against an attack on an individual satellite will depend on the Soviets' capability to obtain a warning of the attack and direct the satellite's response. A control center may receive the warning and relay commands to the satellite; or the satellite could be equipped with onboard sensors to detect the attack and could be programed to initiate defensive options.



Once a warning has been received and the decision to implement a countermeasure has been made, the new programming data must be sent to the satellites.

~~Secret~~

Definition of Probability Terms

<i>Term</i>	<i>Percent</i>
<i>Very low</i>	1-10
<i>Low</i>	10-40
<i>Moderate</i>	40-60
<i>High</i>	60-90
<i>Very high</i>	90-100

Possible Countermeasures

The Soviets have at least nine possible future options for defense against the ALMV. [REDACTED]

Maneuvering

The only Soviet method of direct defense against an ALMV attack is maneuvering [REDACTED] the Soviet low-altitude satellites likely to be targeted are maneuverable, except for the ELINT 3 [REDACTED]

[REDACTED] Soviet filings with the International Telecommunications Union indicate that this network will be operational in 1985. Most current Soviet satellites were designed in the 1960s [REDACTED]

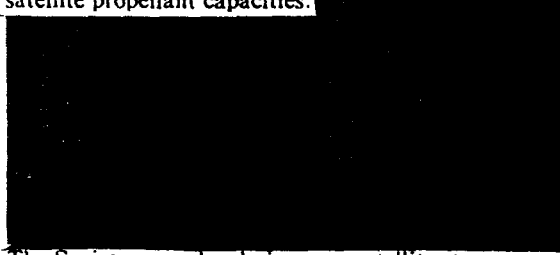
[REDACTED] Soviet reconnaissance systems probably will have to be modified or replaced with new designs. Past Soviet development trends indicate that modifications and follow-ons will be operational in the late 1980s. [REDACTED]

Present Soviet EORSAT, RORSAT, and HiRES 2 photoreconnaissance satellites were designed in the 1960s and carry enough propellant to perform only operational or mission-related maneuvers. [REDACTED]

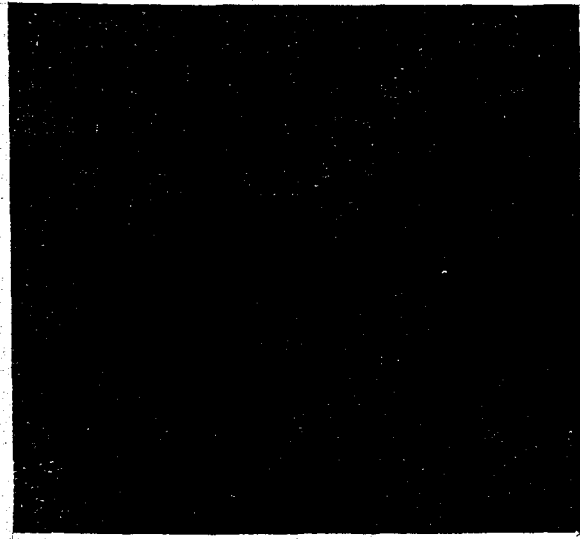
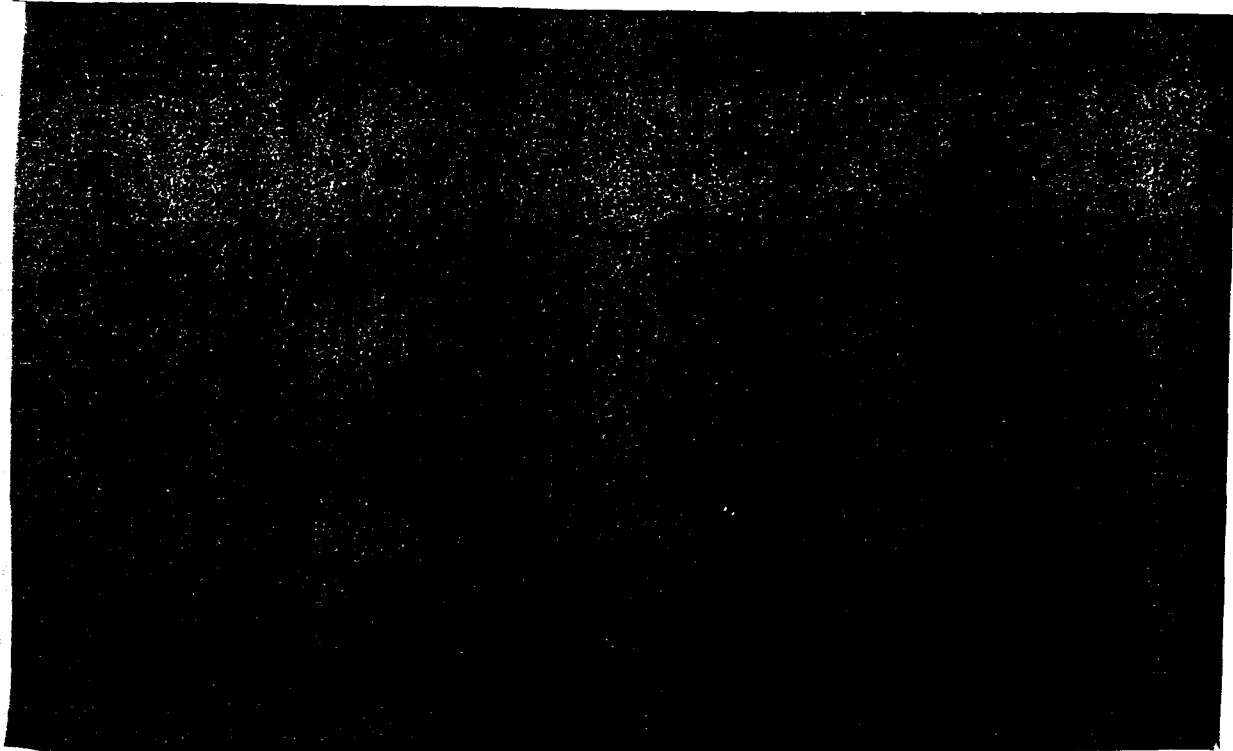


The maneuver capabilities of Soviet satellites could be increased by using larger space launch boosters, higher energy propellants, lighter subsystems, or increased satellite propellant capacities.

RORSATs and EORSATs to be deployed by 1990, and they might have increased maneuver capabilities.



The Soviets may also design new satellites to carry more propellant. We expect the next generation of



attack, we believe the Soviets will most likely use this countermeasure to defend their maneuverable satellites because it would be easier to deploy than other options.



Replacement Satellites

the Soviets intend to increase their space assets before and during a conflict. This option could involve launching replacement satellites and maintaining spares in orbit.



Although Soviet knowledge of the ALMV system probably is not complete enough to calculate the exact magnitude of maneuver necessary to avoid an ASAT

Although replacement

~~Secret~~

would be very expensive, the ability to replace damaged or destroyed satellites provides an alternative to redesigning their spacecraft for other countermeasures. [REDACTED]

Attack on F-15 or Airbase

Although attacking the F-15 with interceptor aircraft is a theoretical option, the aircraft operates so close to the United States when launching the ASAT weapon that such an attack would only be likely in war. Furthermore, the high performance characteristics of the F-15 make it extremely difficult to intercept.

~~Secret~~

Pages: 9, 10

Exemptions: (b)(3), (b)(7)(C)