

Defense Intelligence Assessment

Mobile Short-Range Ballistic Missile Targeting in Operation DESERT STORM ~~(S)~~

Key Judgments

~~(S/NF)~~ Efforts to destroy Iraqi mobile short-range ballistic missiles (SRBMs) during Operation DESERT STORM have provided valuable lessons [redacted] in overall U.S. capabilities to target mobile ballistic missile systems. This experience has validated the usefulness of several target intelligence support techniques that had never been tested in combat. Area limitation analysis, [redacted]

[redacted] was generally successful in narrowing the size of potential SRBM operating areas prior to the outbreak of hostilities. [redacted]

Iraqi tactics further defined the launch areas. By the end of the first week of hostilities, it became apparent that the Iraqis were operating from seven discrete "launch baskets." [redacted]

~~(S/NF)~~ The geographic contraction of mobile SRBM operating areas, however, was still not sufficient to allow for effective targeting. [redacted]

[REDACTED]

~~(S/NF)~~ Improvements in national and tactical intelligence collection and architecture might provide more timely cuing to strike aircraft in certain situations. However, the inherently mobile nature of SRBM-type targets will probably not support the translation of this type of targeting to a "fixed target" solution

[REDACTED]

The key to successful future operations against this type of target appears to be developing intelligence capabilities to sufficiently narrow search areas to the point that tactical aircraft

[REDACTED] can effectively search the area and localize targets of interest.

~~(S/NF)~~ [REDACTED]

The DESERT STORM experience also highlights the need to develop and exercise an adaptive targeting architecture aimed at shortening current target intelligence, mission planning, and force execution timelines. The lessons learned in Operation DESERT STORM can provide the framework to develop more effective and realistic approaches to targeting mobile systems in the future.

Mobile Short-Range Ballistic Missile Targeting in Operation DESERT STORM ~~(S)~~

Introduction

~~(S/NF)~~ Efforts to destroy Iraqi mobile short-range ballistic missiles (SRBMs) during Operation DESERT STORM have provided valuable lessons regarding overall U.S. capabilities to detect, locate, identify, and target mobile ballistic missile systems. This study examines the information gained in Operation DESERT STORM, including intelligence successes and shortfalls. In addition, intelligence estimates made before the outbreak of hostilities, mobile SRBM target intelligence support provided during the war, and an assessment of the results of the counter-SRBM targeting efforts against Iraq are surveyed.

Prehostilities Intelligence Assumptions

~~(S/NF/AVN)~~ Numerous general assessments regarding Iraq's SRBM force, including operational concepts of force dispersal and system capabilities, were made before the war.

These elements, coupled with traditional electro-optical imagery search and analysis, resulted in specialized target materials being produced both before and during the war.

Iraqi SRBM Force Dispersal and Forward Deployment

~~(S/NF/AVN)~~ The operational paradigm of Iraqi SRBM operations developed prior to the conflict

proved to be a generally accurate portrayal of actual Iraqi wartime operations. By late August 1990, the bulk of the Iraqi SRBM force had dispersed from central support bases, such as Taji, to dispersed support bases

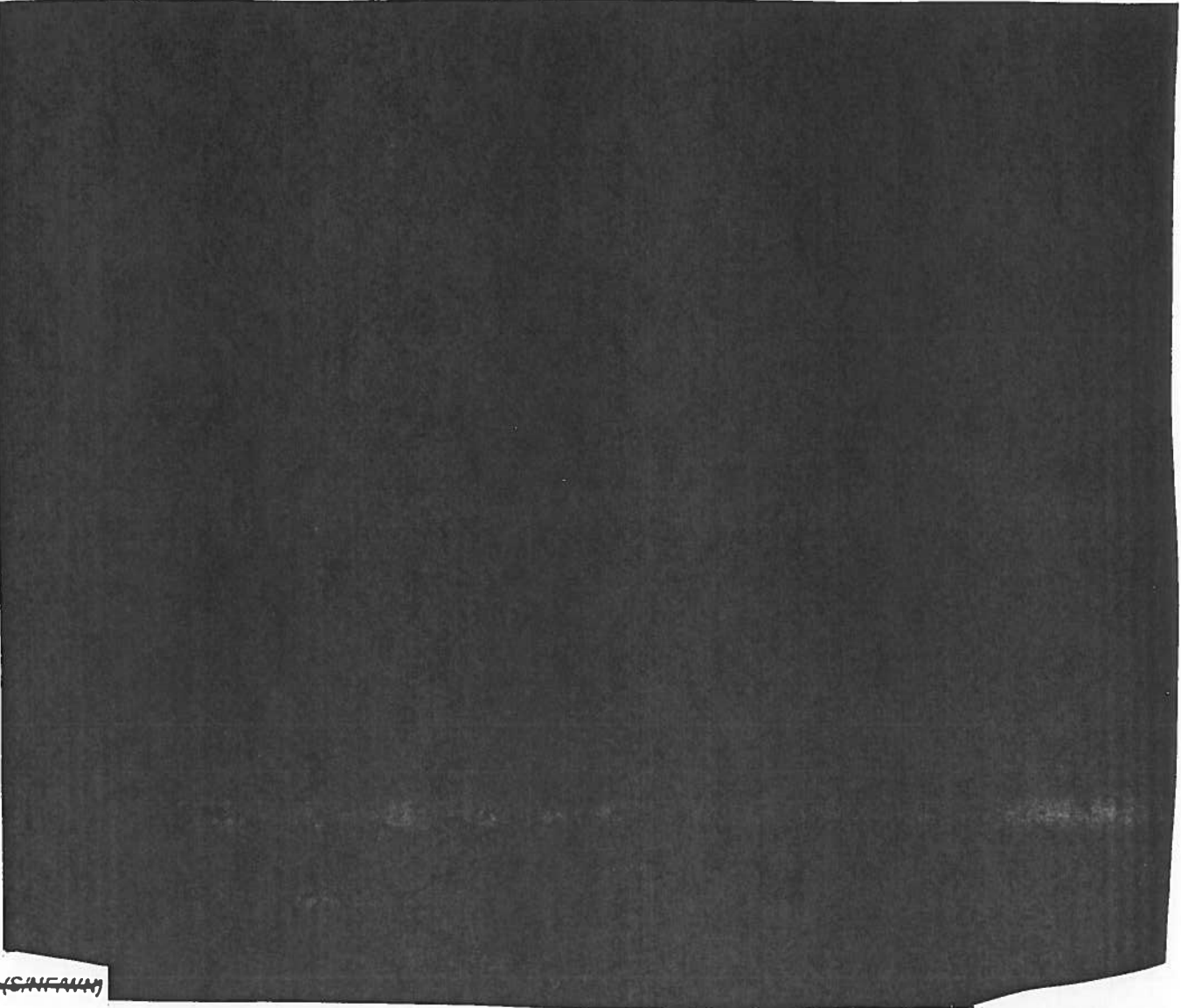
~~(S/NF/AVN)~~ The effectiveness of the imagery effort in identifying SRBM-related dispersed support bases cannot be accurately quantified.

the analysis resulted in the identification of dozens of potential SRBM forward support facilities that were targeted during the war.

The dilemma of targeting these facilities became particularly acute in western Iraq late in the conflict. It became the sole remaining western

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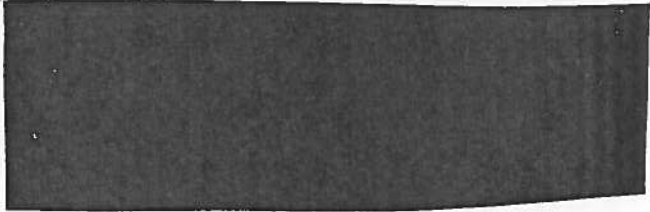


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mobile SRBM launch area during the final period of the war, and it most likely contained at least one support base.

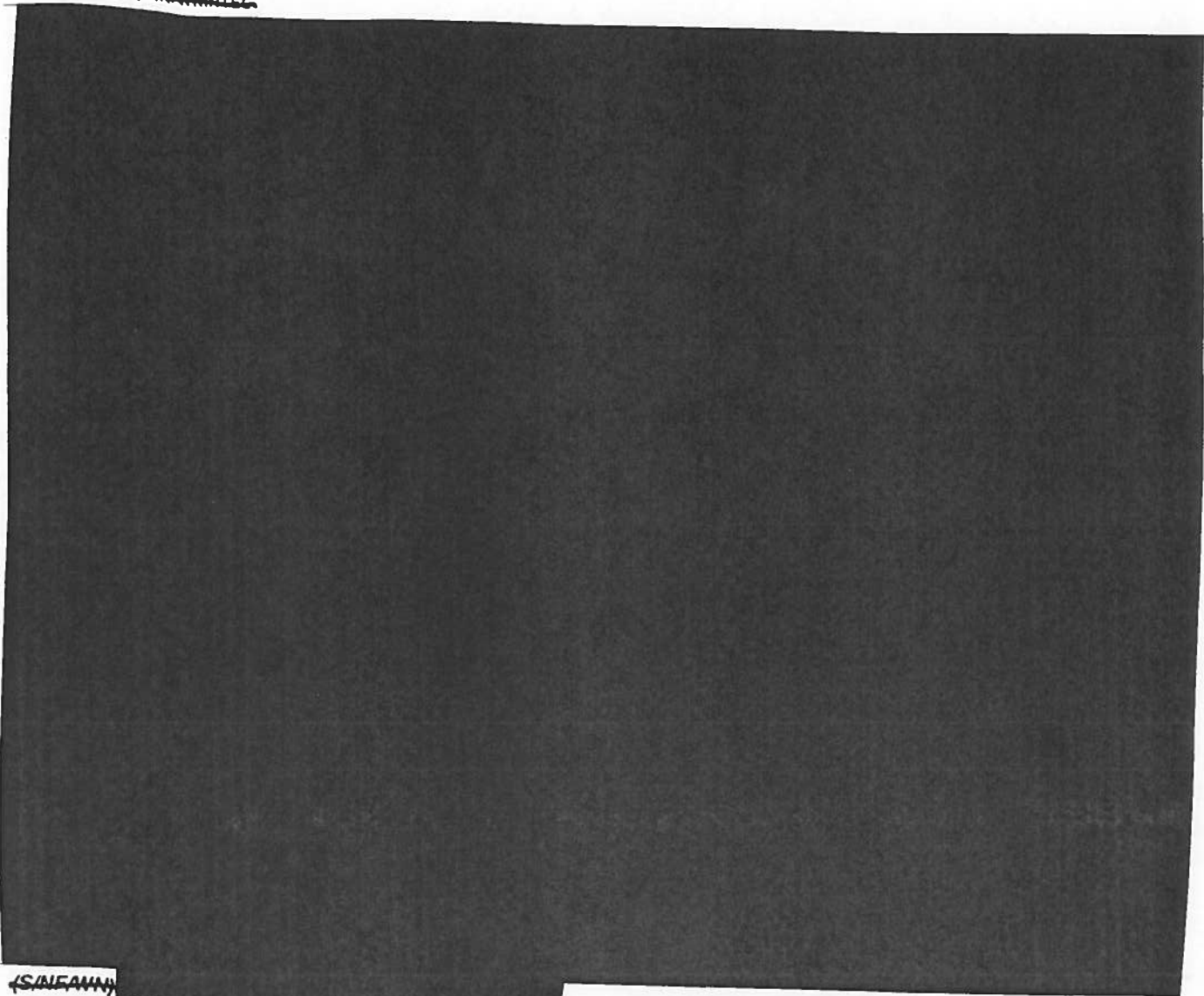
Mobile SCUD Presurveyed Launch Positions

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Iraqi Extended-Range SCUD System Capabilities Assessment

~~(S/NF/AVN)~~ Technical estimates of Iraqi SRBM capabilities were particularly important

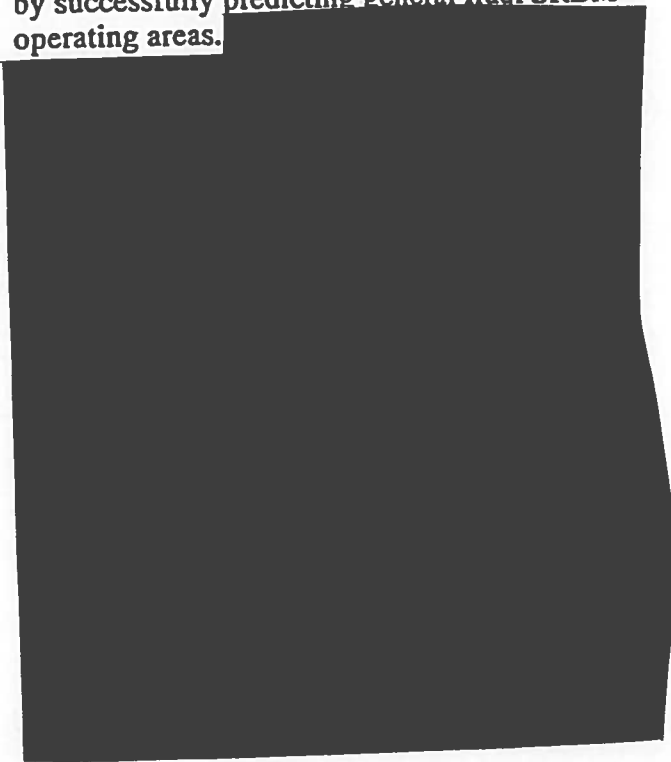
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and imagery were also used to shed light on general SRBM operating areas.

~~(S//NF//NF)~~ This area limitation analysis significantly reduced the overall imagery search (and later armed aircraft search) requirements by successfully predicting general Iraqi SRBM operating areas.

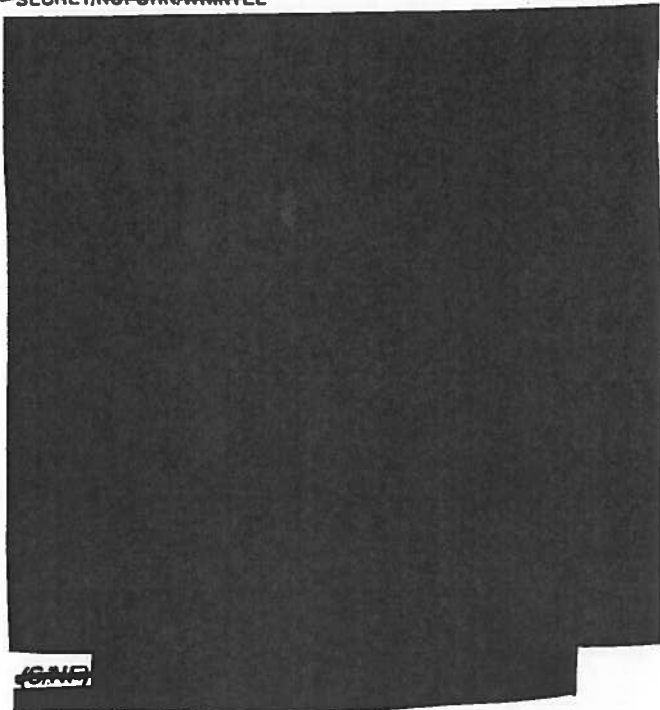
to the mobile missile target support mission. Operational launches later confirmed the model-derived assessments of Iraqi-modified SCUD range, payload, and accuracy. Assessments of maximum modified SCUD range proved valuable in bounding potential launch areas prior to the outbreak of hostilities. Based on these estimates, range arcs within 580 to 620 kilometers of probable targets in the U.S. Central Command (USCENTCOM) area of responsibility and in Israel defined potential launch areas. These factors, further refined by area limitation analysis, proved reliable in predicting general SRBM launch areas during the war



Mobile SRBM Operating Area Limitation Analysis (S)



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~~(S//NF)~~ From a targeting perspective, prehostilities intelligence analysis provided a firm basis for determining general Iraqi SRBM operating areas and high-potential launch zones.



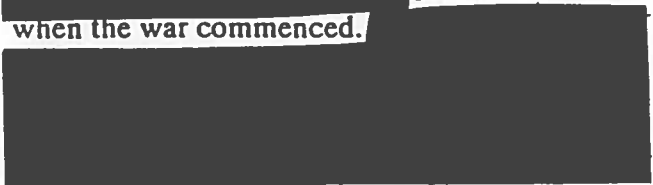
Wartime Mobile SRBM Targeting Support

~~(S//NF//SI//NF)~~



Wartime Locational Intelligence

~~(S//NF//SI//NF)~~ Iraqi SRBM tactics and additional intelligence data quickly focused the location of SRBM firing sites (initially based on prewar area limitation and imagery signature analysis even further when the war commenced.



[REDACTED]

~~(S/NF/WN)~~ By the end of the first week of hostilities, it became apparent that the Iraqis were operating from a relatively small number of discretely defined "launch baskets." These launch baskets can be roughly described as seven launch areas [REDACTED]

[REDACTED] As the war progressed, the number of launch baskets decreased. By war's end, the Iraqis were launching almost exclusively from [REDACTED] areas in the west, the [REDACTED] the south, and [REDACTED] in central Iraq; the latter probably as a result of the Coalition threat in the southern launch baskets [REDACTED]

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[REDACTED]

~~(S/NF)~~ Mobile SRBM "Launch Basket" Areas in Western and Southeastern Iraq.

Effect of Iraqi SRBM Tactics

~~(S/NF)~~ Iraqi SRBM operating tactics, presumably largely influenced by Soviet doctrine, were specifically designed to minimize the vulnerability of the missile force by denying precise locational cuing to the enemy both before and after launch operations. [REDACTED]

Use of Ready-Hide Positions and Rapid Redeployment Tactics ~~(S/NF/WN)~~

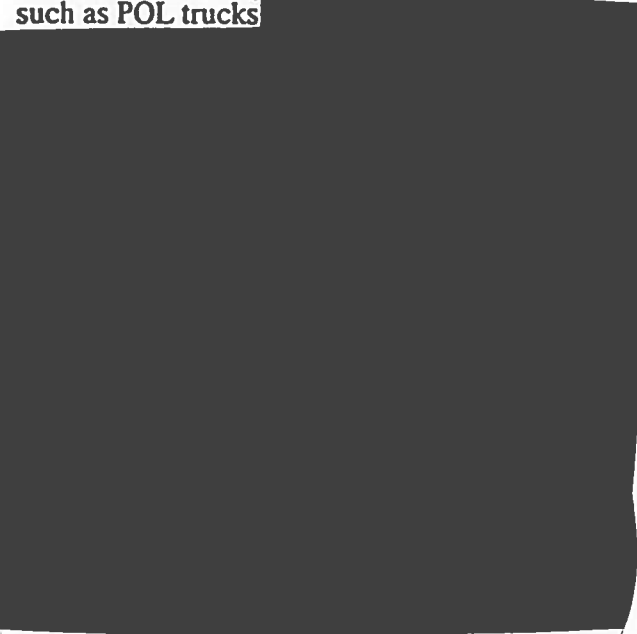
~~(S/NF/WN)~~ [REDACTED]

~~(S/NF/WN)~~ Concealment Methods. Iraqi mobile missile launcher crews also effectively used terrain concealment measures [REDACTED]

[REDACTED] to

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~~(S/NF/WND)~~ *False Target Generation.* SRBM targeting was greatly complicated because of the high number of apparently false targets attacked during counter-SRBM operations. This false target phenomenon appeared to be the result of both Iraq's use of decoys and its predilection for operating the mobile missile force in areas that generally support numerous other large vehicles, such as POL trucks



Intelligence Cuing Shortfalls ~~(S)~~



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The Counter-SRBM Effort – Measures of Effectiveness (S)

~~(S/NF/AVN)~~ The targeting challenge posed by the mobile missile operations problem presents equally difficult problems in measuring the effectiveness of such an effort. Traditional measures of effectiveness based on thorough battle damage assessments provide a confused picture of the results of Coalition counter-SRBM efforts and may not prove to be the most germane means of assessing the campaign's effectiveness.

~~(S/NF/AVN)~~ Coalition aircrews reported that more than 60 launchers were damaged or destroyed.

A review of available imagery and limited quantities of available gun camera film indicate that many of these reported kills were against vehicles similar in appearance to mobile launchers, such as POL trucks.

~~(S/NF/AVN)~~ The uncertainties regarding

the Iraqi's use of decoys, and the

launcher's mobile nature (which allowed Iraq to quickly move or hide destroyed or damaged launchers) make bomb damage assessments extremely difficult. What is more quantifiable, at least at present, is the impact of Coalition counter-SRBM operations on Iraqi mobile missile operating tempos.

~~(S/NF/AVN)~~ A comparison of Iraqi mobile SRBM operations between the 1988 "War of the Cities" during the Iran-Iraq war and the Gulf war indicates that Coalition anti-SRBM efforts had a significant effect on reducing Iraq's operating tempo, either by destroying launchers and related logistics or by disrupting Iraqi operations. These numbers suggest that anti-SRBM efforts may have contributed to the decline in Iraqi operating tempo, although such figures cannot be viewed as conclusive. This is particularly apparent given the disparities between Iraqi war aims during the Iran-Iraq war and DESERT STORM and the concomitant uncertainties surrounding Iraqi strategy during the two conflicts.

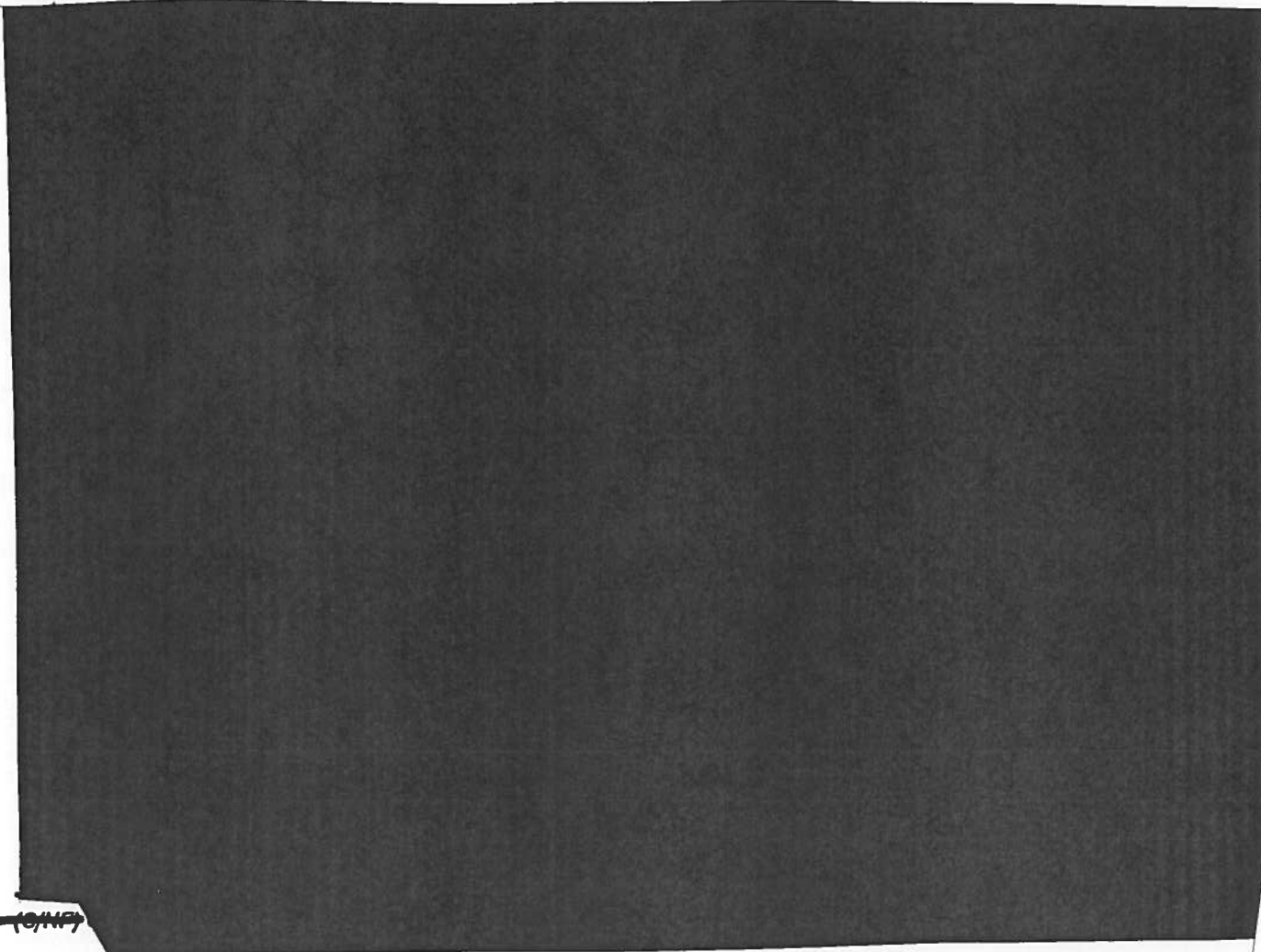
The low operating tempo that Iraq sustained during DESERT STORM is especially telling in western Iraq where, after the second week of the conflict, Iraq was able to launch only four SCUDs per week. Furthermore, launches from western Iraq, where the counter-SRBM effort was exceptionally intense, constituted a continually diminishing percentage of total Iraqi SRBM launches.

Conclusion:

~~(S/NF/AVN)~~ The DESERT STORM experience should assist intelligence and operational planners in

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improving current targeting strategies against mobile ballistic missile systems in the Third World and against the Soviet problem. The proliferation of these systems along with improved guidance packages and the potential availability of chemical and biological warfare warheads provide Third World countries with an attractive and relatively cost-effective attack option. More importantly for these states, acquiring ballistic missiles or a nuclear, biological, or chemical warfare capability would allow them to achieve regional political status and the ability to apply geopolitical pressure against other countries.

counter-SRBM operation needs to be built upon. Area limitation analysis, with the special imagery signature analysis conducted before and during the war, proved to be a valid predictor of general mobile SRBM operating areas



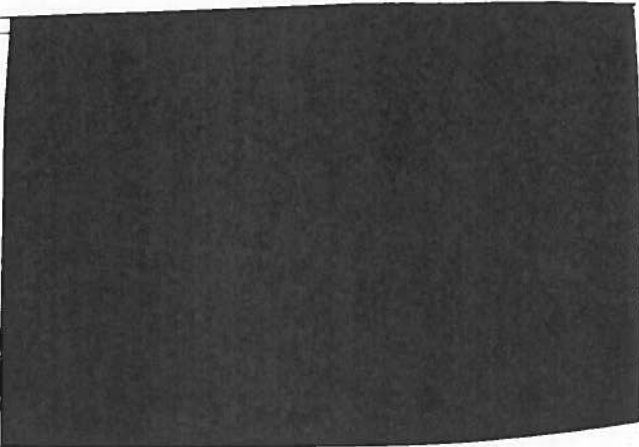
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successes occurred, they clearly did not provide a clear-cut solution to the targeting problem that Iraqi mobile missiles posed.

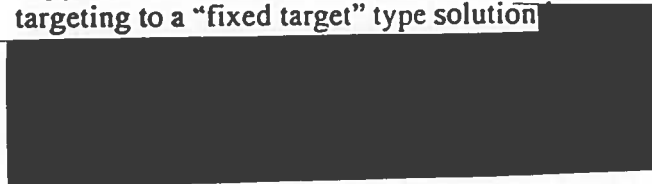
~~(S//NF//SI)~~ The DESERT STORM



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~~(S/NF)~~ Improvements in the intelligence architecture might provide somewhat more precise and timely cuing to strike aircraft in certain situations. However, the inherently mobile nature of these targets will probably not support the translation of mobile missile targeting to a "fixed target" type solution



The key to successful future operations against relocatable targets appears to be the development of realistic intelligence capabilities to sufficiently narrow search areas to the point that tactical aircraft,



can effectively search the area and localize targets.



~~(S/NF/AN)~~ The lessons learned during Operation DESERT STORM can provide the framework for developing a more effective, realistic approach to targeting both Third World ballistic missiles and Soviet mobile intercontinental ballistic missiles in the future.