

'Foretesting' ABM Systems: Some Hazards

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Technical intelligence must be content with delimiting the possibilities of foreign weapon development.

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I am moved to respond with what I hope is a "reasoned" rejoinder to Mr. Tauss' piece in your Winter issue describing his work in postulating a Soviet ABM system.¹ What he had done, essentially, was: to devise a hypothetical antimissile system for exoatmospheric intercept that would be consistent with the appearance of the Hen House radar at Sary Shagan and the VHF signals that had been associated with it; to have this system tested mathematically to show that its performance would be adequate; to assume therefore that the Soviets were actually in an advanced stage of developing such a weapon system, though they might not "construct it to operate in quite this manner"; and to urge that U.S. countermeasures in general be initiated on the basis of such early hypothesizing and without community coordination.

In order that my response be constructive and fair, I find it necessary to provide a brief look at my conception of how the game of technical intelligence analysis ought to be played when its objective is the definition of advanced foreign weapon systems. This will lay bare my peculiar biases.

When reading in alumni magazines about the exalted accomplishments of my fraternity brothers, I am tempted to use the defensive ploy of envisioning myself as today's version of Sherlock Holmes' brother,

Mycroft. Lacking both energy and ambition but having the tidiest brain with the greatest capacity for storing facts of any man living, Mycroft Holmes became the most indispensable man in England, a point of omniscience dealing out true answers concerning all government problems. He thus represents what an intelligence analyst could wish to be: wise beyond compare, a storehouse of vital information nowhere else available, and able to pluck out from it any truth upon demand.

However appealing such a role may be to contemplate, it will of course simply not wash. There are several reasons. One is that the real business of technical intelligence analysis as it relates to advanced weapon systems cannot be that of dealing out true answers on the basis of an omniscience gained through years of experience. This is an important point to make because Mr. Tauss tended to attribute value to the work he described on the basis of its having provided an in some degree true answer. This attitude is embarrassing to the technical analyst: however moot other aspects of the article may be, there can be little contention about the fact that its definition of the ABM system in question was wrong. One of the objectives of this essay is to show that this awesome consideration actually need not be disabling at all.

Aim: Delimitation

No longer in this business can one make a bold enlightened grasp for the precise and only answer. In the analysis of foreign weapon systems, protected by all the mechanisms of security the modern state can erect, the problem has become one of cautiously (and above all, elegantly) defining the bounds of what is technically possible. By seizing on every bit of usable information made available, by utilizing techniques of systems analysis, Mycroft's replacement must with vigor and credibility bound an ever-narrowing range of possible capabilities for the weapon system under scrutiny.

In many regards this procedure is unsatisfactory; it is detested by some, scorned by others, and really understood by very few. I personally am excited by its challenge and feel that it is an absolutely necessary approach in coping with modern intelligence problems. Its objectives and accomplishments have limits, however, which it is critically

important that we recognize and understand.

A number of factors have made it necessary to resort to this bounds-defining type of analysis. Principal among these causes is the extremely conservative policy—in the sense of "covering all bets"—followed in our own military planning. This planning—as to our targets of attack, projected forces, deployment of new weapons systems, and development of even more advanced ones—must, of course, be responsive to the enemy threat; and one of the purposes of intelligence is to define that threat. But in order to provide every assurance for the national security, it is natural to insulate the military planning decisions against errors in the definition of the threat. Protection is sought by giving credence, for planning purposes, to the maximum possible offensive or defensive capability a foreign weapon system could have. This cautious policy effectively diminishes the contribution to planning made by intelligence on foreign weapon systems. It has also led to some of the greatest imbroglios imaginable when two sets of enterprising system designers undertake to conjure up the maximum threat from a state of ignorance about what is actually happening.

A second operative factor is, indeed, this lack of information about advanced weapons being developed or newly deployed in those areas of greatest concern to us. No direct access to the real answers we seek exists. Most of the reliable information available is either technical in nature or significant only in terms of technical analysis. The simplest and most critical answers—e.g....., what specific targets a foreign weapon system is designed against, in what circumstances it will be used, what its measured effectiveness is—are consequently far removed from the information immediately available and can be reached only at the end of a long deductive chain which will almost certainly lack several links of significance for the answer. Most importantly, even if one has managed to finger the truth, there is no good way to know for sure that one has done so. And the truth has no unique value unless it is recognized as such by those who must act on it.

The piecemeal analytical trench-warfare we must substitute for a lightning thrust at such answers is also generated by the very nature of the information available: intercepted radar signals, snatches of telemetry, uncertain photography, or perhaps a representative electron tube acquired for analysis. Several fine articles have been published in the *Studies* on the ingenious uses of these types of information. I can rather imagine, however, that people engaged in more direct efforts to

get answers to the central questions might be scornful of such scratching around on the edges. From this point of view it is a miserable way to do the job—expensive, slow, esoteric, and analytically hazardous; it is, however, the only approach that appears to be possible in the absence of direct access to needed information.

In some cases the answers provided by technical analysis are, in fact, precisely the ones sought. Such a situation arises when the questions are asked on behalf of the development of countermeasures aimed at degrading the performance of an enemy system by working on its very detailed technological susceptibilities. Countermeasures development constitutes a unique type of problem, however, and is not really a part of what is being discussed here. It has had an impact on the full range of technical intelligence analysis, sharpening both collection and analytical techniques and giving an inherent value to derived technological facts they might not otherwise have; but it must come somewhat later in the game than the initial grappling with the characteristics of a new enemy system, since it presupposes an understanding of the operational concepts the system embodies and a knowledge of all the elements it embraces.

Side Effects

The use of technical intelligence analysis to set limits rather than give precise answers has had some important effects which should be noted:

As pointed out above, the demand for early description of a newly developed weapon system has been replaced by a willingness to accept and use a methodical, credible delimitation of the possible capabilities of the system.

Judgments as to the intended use of the system are apt to be made on the basis of these capabilities so delimited. When the range of possible capabilities extends over several missions, there is sure to be hell to pay: different people are more concerned about (and consequently will want to emphasize) different threats.

Credibility is vital. This is particularly true when the results are contentious, as they generally seem to be. In order to delimit meaningfully the capabilities of a system, it is necessary virtually to prove by the laws of physics (or other appropriate discipline) that something must be or cannot be the case. It is an unfortunate fact that some of these laws, particularly those relating to weapon effects, are themselves contentious.

Analytical elegance and rigor are the natural response to the complexities of the problem and the need for a demonstrable consonance with respectable science and technology. Technical competence must be continually demonstrated; any slip will result in a degradation of credibility.

The importance of credibility has also led to extensive reliance upon appeals to authority. Panels of experts by the dozens have been formed from scientific and technological cognoscenti to serve either as courts of appeal hearing the technical evidence presented by analytical disputants or as "weekend warrior" pinch hitters who might catch the clue or provide the technique missed by the bureaucracy. (Bureaucratic responses to the threat inherent in these practices include the extensive use of external contracts with firms at the forefront of U.S. weapons development.) These panels often prove to be something of a trial to the working analyst, as they inevitably consist of people noted for their ability to "brainstorm" and overcome apparent obstacles. The primary concern of the technical intelligence analyst, on the other hand, is the search for valid technological constraints to use in creating an analytical framework in which to operate. Such frameworks are apt to be destroyed with gay abandon in a two-day panel session by making design choices calculated to skirt the constraints, while the trade-off penalties for doing so are left unconsidered.

Elegance and the need for credibility, -together with repeated and often hostile technical review, all lead to complex conclusions very carefully qualified in technical jargon which tends to rob them of clean, crisp "punch."

Conflict develops between the technical and current intelligence communities as these conclusions are occasionally hammered into the Peter Rabbit style of current intelligence reporting.

Since these conclusions relate almost always to capabilities as technically derived and unmoderated by considerations of intent, economic feasibility, or political consistency, they create nasty problems in the preparation of estimates. These problems have been well discussed in an article by Wayne Jackson in the *Studies*.²

The disjunction between technical intelligence and the classical collection field grows ever wider as the analyst finds it increasingly difficult to make use of reports whose credibility he cannot fully establish and which generally lack the precision necessary for use in conjunction with technical information. No finer brouhaha has ever arisen, for example, than that surrounding attempts to establish the purpose behind the Soviets' deployment of the Tallinn defensive missile system. Appeals have been made to panel after panel and expert after expert. Not even the New York Times has been overlooked. As the DCI has said, blood has been shed on this question.³ A number of intelligence reports have ostensibly answered it. Very likely there is at least one good answer among those in hand. But which one? Unfortunately, they differ among themselves and none so clearly reflects a credible source that it can be defended against those who would prefer to reach a different conclusion and feel that other evidence supports it. Thus we come full circle and return to our eschewing of what *might* be the truth in favor of chipping away at the technical characteristics of new weapon systems and deriving their capabilities on the basis of peripheral but unchallenged evidence.

Finally, it must be noted that this analytical approach is on the one hand conservative in the extreme but on the other disturbingly reliant upon rational behavior on the part of the foreign designer. Read "rational" as "rational to us." Thus we tend to overrate the capabilities of a foreign system but are occasionally surprised by what we insist are irrational achievements. A serious technical mistake by some other country creates an analytical disaster area as its supposedly sinister import cannot be discovered. A technical approach wholly unappreciated in the United States raises the spectre of an unanticipated future threat. On the whole, however, reliance upon reason seems justified and probably has statistical advantages over resort to intuition, randomly selected reports, or the omniscience of Mycroft Holmes.

These are of course just my views. They are important, nevertheless, to my reaction to Mr. Tauss' article, and I think it important now to say something about that article, in part because it affects the credibility of technical intelligence analysis performed by CIA.

Critique

I have found four major objections to "Foretesting a Soviet ABM System":

It claims accomplishments far beyond those actually achieved.

It fails to recognize the proper function of technical intelligence analysis undertaken on the basis of "a slim amount of data" and ascribes value to the hypothetical system "foretested" on the grounds that it represents a system actually under development. It does not in fact represent one, nor was any reason established for believing it might.

It suggests that countermeasures development can be undertaken apace with the early postulation of the gross parameters of a system.

Its publication is damaging because it is not quite technically respectable in the winter of 1968 and consequently detracts from the credibility of CIA technical intelligence analysts.

It is Mr. Tauss' thesis that a small amount of information enabled us to determine the characteristics and capabilities of a new Soviet ABM system prior to its actual emergence on the scene. The article describes his attempt to do this, first to model and then to investigate the characteristics of a likely Soviet system, though not before several major elements of the system were under test in the USSR. Such attempts are certainly a legitimate concern of technical intelligence analysts. When the amount of information is very small, however, a substantial amount of postulation is required, and the likelihood of being wrong is great.

The system characterization achieved by Mr. Tauss was for the most part wrong, and while it may have been useful at the time, it cannot now be pointed to as an inherently meaningful description of Soviet ABM defenses as he contends. Mr. Tauss does not demonstrate in his article how investigation of the hypothesis showed that it was in any important respect valid. On page 24 of the article is his qualification suggesting that the validity of the postulated model was under any circumstances a matter of little consequence to the analysis performed:

The important thing was that the range-dominant system model

could be simulated and legitimately exercised to investigate its potentials and general vulnerabilities even if the Soviets would not in the final analysis construct it to operate in quite this manner.

If this means that the important thing accomplished was to show that one could not deny an ABM capability to a range-dominant VHF radar, I am sympathetic. If, as the article elsewhere suggests, however, it is contended that simulation and exercise of the model led to the determination of "the general characteristics and net capabilities" of Soviet ABM defenses, I am disturbed. Under these circumstances, a few twinges of concern should be felt when one discovers his model is not quite right. One should at least ponder the question as to whether any other equally wrong theory might not produce equally convincing results.

As we have seen, a postulation may have value even though wrong if its investigation can establish some sort of bound on possible weapons system performance in the absence of any more direct evidence. This process of bounding or setting limits on capabilities gives no inherent validity to the postulation itself, however. Certainly more than a single postulation was possible on the basis of information available to Mr. Tauss and Data Dynamics, Inc., when the reported study was accomplished. Indeed, the location of the R&D Hen House at Sary Shagan makes its inclusion in an *endoatmospheric* system quite an attractive possibility. Later information, to be sure, proved that this was not the case. Because of the number of possibilities which existed, however, and the lack of sufficient information to rule out all but one at the time this work was done, the contention that it reflected ABM defenses as they really would develop was simply not a credible claim. This would remain true even if time had showed the model to be entirely correct. It was not accepted at the time as a credible description of Soviet ABM defenses and consequently lacked the impact claimed for it.

The article contends that the understanding of Soviet developments achieved as a result of this analysis led to major changes in U.S. countermeasures developments. I am unaware of any direct causal association of this sort, though changes did occur in this time period. It is essential to note that these changes were the result of establishing the frequency at which the Hen House radar operated rather than how it operated. This frequency was actually measured by mid-east intercept sites during the 28 October 1962 nuclear test and analytically associated with ABM surveillance radars by engineers working for Space

Technology Laboratories under contract to CIA. These considerations tend to undermine the fundamental message carried by the article and its significance as a "study in intelligence."

The concluding section of the article contends that countermeasures developments should begin early and be supported by intelligence judgments unfettered by detailed knowledge or the agonies of community coordination. This conclusion is not unlike the little girl with the little curl in the middle of her forehead. The effects of vigorously responding to a number of postulations currently caroming about within the ABM intelligence community would be very, very horrid. An insistence upon some evidence and the nasty mechanism of community coordination have, in fact, had value in preventing such responses.

More than this, however, the countermeasures problem is an extraordinarily difficult one. It is necessary that more than an early guess as to how a system might operate be at hand before really meaningful work on countermeasures can occur. The early recognition of new sorts of problems might be achieved, but major countermeasures commitments are unlikely to result from such preliminary analysis. One might point to Mr. Tauss' work and its conclusion that the Hen House radar could be used in an exoatmospheric system (which so unhappily is replaced with the conclusion that the Soviets *will* employ exoatmospheric intercept) as a basis for work now under way on chaff development or the hardening of warheads against nuclear effects. It is also true, however, that we are working hard at making chaff and decoys which will survive reentry down to very low altitudes, even though we still have no evidence of Soviet development of endoatmospheric ABM defenses.

The article contains a number of errors in fact or interpretation which are embarrassing, particularly since some apparently lead to the conclusions reached. These are of no great consequence, however, except that they tend to erode that all-important attribute, credibility.

De Mortuis

Ed Tauss and I discussed all this several days before his unfortunate death, but our conversation quickly wandered off onto even more

controversial paths. Ed was no mean protagonist. He understood the real problems, was excited by them, and felt a great inner need to do something in response. He did some important things about the Hen House and Soviet ABM defenses. They were the right things to do. In my view, the credit for this belongs more to Ed Tauss the man, with all of his enthusiasms which will be so sorely missed, than to this bit of analysis which he chose to record as representative of his activities in the ABM field.

BIBLIOGRAPHY

1 *Studies* XII 1, p. 21 ff.

2 "Scientific Estimating," IX 3, pp. 7-11.

3 See *Studies* XI 3, p. 2.

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