Section 6

A WORD ON “OLD” BMD AND “NEW” BMD

Section 6
A WORD ON "OLD" BMD AND "NEW" BMD

No one knows whether directed-energy weapons can be built with the characteristics assigned to the hypothetical systems of Section 3. Even if such systems can be built, it is not clear that their performance will match, much less exceed, the performance of terminal and midcourse BMD systems in level of protection (attack price) and in cost relative to offsetting offensive improvements. The boost-phase BMD systems receiving so much attention today were a year ago at the periphery, to say the least, of technical discussion of missile defense. It is important not to lose sight of the status of traditional reentry and ''advanced" (as they were called a year ago) "overlay" midcourse BMDs.

Naturally, the promise of the better-understood terminal and midcourse systems does not seem so grandiose, nor the flaws so clear-cut, as they do for the conceptual boost-phase defenses discussed in this Background Paper. Sounder technical assessments can be made of the "old" BMDs than of the "new" concepts. Rough concepts gloss over all the difficult design problems that inevitably limit achievable performance and turn up serious problems; nonetheless, identifying potentially unsolvable problems at this early stage of study does not mean they will remain insurmountable. BMD architectures incorporating boost-phase intercept are not known to be able to perform better, dollar-for-dollar, than BMD architectures incorporating only midcourse and reentry intercept. They are just not known to be worse. Terminal defense systems have been studied, designed, and tested for years, and it is generally agreed that such systems, acting alone, can enforce a modest attack price of between 2 and 8 RVs (perhaps equivalent to 20 to 80 percent of a booster) per defended aim point. Though their capabilities are modest, reentry and midcourse defenses suffice for modest defensive goals. There is no need to incur the technical risk of "new" boost-phase intercept schemes unless one aspires to levels of performance clearly beyond those possible with "old" concepts.

Many of the "new" concepts for boost-phase intercept are not new at all. They have been studied and discussed in one form or another for 20 years. Conversely, there are some new ideas for improving terminal and midcourse BMDs.[1] The spirit of technical optimism that accompanied the new emphasis on boost-phase intercept in the past year affected thinking about "old" BMD as well.

For terminal defense systems, the new features receiving attention are, first, non-nuclear warheads on interceptor missiles and, second, airplane-borne infrared sensors as supplements to ground-based radars. The principal benefit of non-nuclear intercept is that interceptors can be deployed nationwide without public concern about the safety of defensive nuclear warheads. Non-nuclear kill does not permit the defense to avoid all the disruptive effects of nuclear bursts, however, since the offense can still arrange for RVs to detonate when they sense interceptor impact ("salvage fuzing"). The miss-distance/weight relationship of the non-nuclear warhead requires the interceptor to approach more closely to the RV, and this in turn requires a homing seeker on the interceptor. Terminal homing obviously creates new opportunities for offensive countermeasures.

Airborne optical sensors obviously do not suffer radar blackout, but they can suffer the analogous problem of infrared redout. Decoy discrimination remains a problem, though it acquires some interesting new features. Details of these new aspects of terminal BMD are obviously classified. Though important, these aspects are fairly straightforward extensions of traditional techniques rather than revolutionary "breakthroughs."

New thought about midcourse defense focuses on alleviating the Achilles' heel of systems that use infrared sensing to support intercept in space: the ease with which the offense can accompany attacking RVs with clouds of decoys. One approach receiving attention is simply to cheapen the interceptor and shoot at everything, RVs and decoys alike. Another is to probe the attacking

[1] See Julian Davidson, "BMD: Star Wars in Perspective," *Aerospace America*, January 1984, p. 78.

objects with an active sensor, rather than relying on their thermal emissions, in the hope of discriminating RVs from decoys. Some of these "active discrimination" schemes are complex and expensive and might in turn be susceptible to offensive spoofing. A third aid to discrimination is the boost-phase defensive layer itself, which might constrain the number and type of penetration aids the offense could mount on each booster in addition to reducing the total number of objects approaching the midcourse tier. Fourth, extensive use of space-based sensors would allow the defense to observe penetration aids throughout their flight (including during deployment from the bus) rather than just as they approach the United States. It remains unclear whether these techniques will be worth the costs and new countermeasures they would bring to the defense.