The Strategic Defense Initiative : Military and Political Implications

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by

NAUSHAD ALAM

CENTRE FOR INTERNATIONAL POLITICS,
ORGANIZATION AND DISARMAMENT
SCHOOL OF INTERNATIONAL STUDIES
JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI—110067. INDIA

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जवाहरलाल नेहरु विश्वविद्यालय
JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI-110067

CENTRE FOR INTERNATIONAL POLITICS,
ORGANIZATION AND DISARMAMENT,
SCHOOL OF INTERNATIONAL STUDIES

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C E R T I F I C A T E

This is to certify that the dissertation entitled, "STRATEGIC DEFENCE INITIATIVE: MILITARY AND POLITICAL IMPLICATIONS", being submitted by Mr Naushad Alam in partial fulfilment of requirement for the award of the Degree of Master of Philosophy in this University, is a record of the student's own work, carried out by him under my supervision and guidance.

It is hereby certified that this work has not been presented for the award of any other degree or diploma.

M.L. Sondhi

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CHAIRMAN

PROFESSOR T.T. POULOSE
SUPERVISOR

Gram : JAYENU Tel. : 667676, 667557 Telex : 031-4967 JNU IN

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PREFACE

PREFACE

President Reagan's Star Wars speech unfolding his plans for a new defense strategy that will alter the basic concepts of nuclear strategy developed over the past three decades, is as historic as Sir Winston Churchill's 1946 Fulton speech of "iron curtain" ushering in the cold war, and President Kennedy's proclamation of US determination to land a man on the moon. Neither of the earlier speeches, however, had the ominous implications for humanity that Reagan's announcement has. SDI represents a shift from Mutual Assured Destruction to Mutual Assured Survival which signifies a change from deterring a nuclear war to waging, wining and surviving one.

For the last 20 years the assumption on how to maintain nuclear peace has been based on basic idea. And the idea has been that one should have the capacity to retaliate a nuclear attack and inflict an unacceptable damage to the aggressor. This has been in fact a precondition and an essential prerequisite to maintain nuclear peace. However, with the President's 23rd March speech, a big question mark has been put on the whole concept of MAD. Now the Americans are talking about the possibility of maintaining nuclear peace by means of an enhanced ability to deter war through an increasing capability to defend against attack. Therefore,

this so called 'Star Wars' is going to usher in a revolutionary change in the world strategic scenario. This work of mine is a mild attempt to unfold the various dimensions of Strategic Defense Initiative and help in understanding the world strategic scenario in context of changing focus from MAD to MAS.

The first chapter of this dissertation deals with the various compulsions -- political as well as military -- which helped in the formulation of this idea. In the same very chapter an attempt has also been made to trace the early BMD programme of both the Super Powers.

The second chapter deals with the SDI technologies and its feasibility.

The third chapter concentrates mainly on the political aspect of the SDI i.e. its impact on the NATO alliance and the response of three major members of the Western Alliance -- Britain, France and West Germany.

Finally, in the concluding part, some inferences have been drawn about the impact of SDI on the world strategic scenario.

Most of the relevant source materials at hand - primary, as well as secondary - as far as possible have been consulted for this work. The methodology is historical-analytical.

I take this opportunity to acknowledge my great indebtness to Professor T.T.Poulose, my esteemed supervisor

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Naushad Alam.
NAUSHAD ALAM

List of Acronyms

ABM	-	Anti-Ballistic Missile.
ASAT	-	Anti-Satellite
ATBM	-	Anti Tactical Ballistic Missile
BMD	-	Ballistic Missile Defense
DEW	-	Directed-Energy Weapon
Eureka	-	European Research Coordination Agency
HKV	-	Homing Kill Vehicle
ICBM	-	Intercontinental Ballistic Missile
IR	-	Infra red
KEW	-	Kinetic-energy Weapon
KKV	-	Kinetic-Kill Vehicle
MAD	-	Mutual Assured Destruction
MAS	-	Mutual Assured Survival
MIRV	-	Multiple Independently Tarjected Re-entry Vehicle.
NASA	-	National Aeronautics and Space Administration.
PBV	-	Post-boost Vehicle.
PK	-	Probability of Kill.
RV	-	Re-entry Vehicle.
SDI	-	Strategic Defense Initiative
SDIO	-	Strategic Defense Initiative Organisation.

Chapter - I

INTRODUCTION AND HISTORICAL BACKGROUND

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INTRODUCTION AND HISTORICAL BACKGROUND

In his 23 March, 1983 address to the nation, President Ronald Reagan announced the concept of Strategic Defence Initiative (SDI) popularly known as "Star Wars". Its purpose, according to the American President, is the potential of newly emerging technologies to support an effective defense against ballistic missiles in order to strengthen American security and that of its allies.

> What if the free people could live secure in the knowledge that their security did not rest upon the threat of instant U.S. retaliation to deter a Soviet attack, that we could intercept and destroy Strategic Ballistic Missiles before they reached our own soil or that of our allies.[1]

With the inception of the nuclear age, the distinction between offense and defense, a typical characteristic of the period of conventional warfare, appeared to be a thing of the past. Bernard Brodie, one of the leading pioneers of nuclear strategic thought in 1946 said, "there is no defence against the Bomb."[2]

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1 President Ronald Reagan, Address to the Nation on Defense and National Security, 23 March 1983. Public Papers of the Presidents of the United States (Washington, 1984), P.441

2 Robert M.Lawrence, Strategic Defence Initiative Centre for Space Law and Policy, (London, 1987), p.3.

Brodie rightly believed that no defense to protect various soft targets could work against a nuclear attack precisely because of its characteristics of being sudden, enormous and indiscriminate destruction.

Since the atomic bombardment of the two cities of Japan - Hiroshima and Nagasaki - the concept that the nuclear deterrence and not the nuclear defense that is needed to maintain nuclear peace has come to stay. Such a policy requires that a nation seeks to deter a nuclear attack by (i) building nuclear retaliatory forces that could not be destroyed by an enemy's first strike and (ii) credibly promising that a first strike would be followed by a nuclear retaliatory counter attack surpassing in horror any loss and any possible gain anticipated by the initiator.[3]

In the early phase of Cold War, the Americans had technological superiority in the nuclear destructive capacity. The Soviets had the power to cripple the USA in the first strike but the Americans had the capacity to absorb the First Strike and then to retaliate and destroy

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3 Lawrence, n.2, p.4.

the Soviets. Robert McNamara in fact, termed the US nuclear capacity in early 60s as Assured Destruction. However, soon the Soviets caught up. From then onwards the United States and the Soviet Union could be seen as "two scorpions in a bottle", both immobilized by virtue of their antagonist's fatal power.[4] In light of the Soviets' increasing capability to match the American nuclear power, McNamara's Assured Destruction theory was transformed into Mutual Assured Destruction or MAD.[5] In its classic form, MAD is the capacity to inflict an unacceptable degree of damage upon any aggressor even after absorbing a surprise first strike.[6]

For the last 20 years the assumption on how to maintain nuclear peace was based on one basic idea. And the idea has been that one should have the capacity to retaliate a nuclear attack and inflict an unacceptable damage to the aggressor. This was in fact a precondition and an essential prerequisite to maintain nuclear peace. "We accepted the notion that if both we and the Soviet

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4 Ibid., p.5.

5 Ibid., p.5.

6 Alain C. Enthoven and K. Wayne Smith's, How Much is Enough : Shaping the Defense Program, 1961-1969 (New York, 1971), p.174.

Union were able to retaliate with devastating power even after absorbing a first strike that stable deterrence would endure".[7] Thus the advocates of the doctrine of Mutual Assured Destruction hold steadfast to their opinion that MAD alone stabilises the strategic situation between the two super powers. However, the American President Ronald Reagan, in his speech of 23 March 1983, has argued that Strategic Defense Initiative would provide a doctrine of Mutual Assured Survival (MAS). He has gone further to say that such a doctrine would render nuclear weapons obsolete. The President called upon "the scientific community in our country, those who gave up nuclear weapons, to turn their great talents now to the cause of mankind and world peace to give us the means of rendering these nuclear weapons impotent and obsolete."[8] Thus there has been a clear cut policy shift in the US strategic doctrine since 1983. Now they are talking about the possibility of maintaining peace by means of an enhanced ability to deter war through an increasing capability to defend against attack. The focus has shifted from MAD to MAS.

Ronald Reagan, "The Presidents Strategic Defense Initiative : Presidential Foreward", Department of State Bulletin, March 1985, p. 65.

8 Reagan, n.1, p. 442.

Genesis of the Idea

The concept of star wars was neither the creation of Pentagon nor that of the MIC (Military Industrial Complex). It was in fact the brain child of the president himself on the advise of Edward Teller. The Secretary of State (at that time General Alexander M.Haig) affirmed it that the speech was made without consulting the Pentagon : "I know the aftermath the next day in Pentagon where they were all rushing around saying, what the hell is strategic defense."[9] The Joint Chiefs of Staff had made no recommendation and the US NATO Allies were neither consulted nor informed. This is again testified by the statement of George Keyworth, the President's Science Adviser. He said, "This was not a speech that came up. It was a top down speech --- that came from the President's heart."[10]

During the Republican Party campaign in 1980, Reagan was shown around the North American Defence Command (NORAD), an arcane inside a mountain in Colorado General James Hill. The then Commander-in-Chief had demonstrated

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9 William J.Broad, "Reagan's Star Wars Bid, Weapons in Space/The Origin of Star Wars", New York Times, (New York), 4 March 1985.

10 E.P.Thompson and Ben Thompson, Star Wars : Self Destruct Incorporated (London, 1985), p.4.

NORAD's ability to track countless objects in space and provide early warning of attacks against the continental united states. President Reagan responded that it seemed ironic that the American technology can do all of these things, yet they cannot stop any weapons that are coming to them.

> NORAD is an amazing place. They actually are tracking several thousand objects in space, satellites of ours and everyone else's even down to the point that they are tracking a glove lost by an astronaut that is still circling the earth up there.
>
> I think the thing that struck me was the irony that there, with this great technology of ours, we can do all this yet we cannot stop any of the weapons that are coming at us, I don't think there has been a time in history when there was not a defense, a defense against some kind of thrust, even back in the old fashioned days when he had coast artillery that would stop ships if they came.[11]

Mr.Reagan's sentiments were in step with those of the Republican Party, which in its platform, adopted on 15 July, 1980, called for vigorous research and development of an effective anti-ballistic missile system. It also called for new offensive missiles and an overall military and technological superiority over Soviet Union.[12] However,

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11 Robert Scheer, With Enough Shovels (New York,1982) p.104.

12 Broad, n.9,

The idea of Strategic Defense Initiative popularly known as Star Wars did not come as a bolt out of blue. There were definite lobbies working behind the scene. These lobbies did not in fact command massive and irresistible interests. Their point of influence lay precisely in their access to the President and in the way in which they were able to feed his fantasies and to massage his sense of ideological mission.[13] The most prominent among these was the lobby led by Edward Teller, the founder of Lawrence Livermore Laboratory. Ronald Reagan had visited the Livermore Laboratory, when he was the governor of California and from here his association with Dr.Edward Teller began. Besides being the founder of Lawrence Livermore Laboratory, he is a member of Herz Board and the group meeting at the Heritage Foundation. Reagan selected as his personal science adviser, Dr.George Keyworth, a nuclear physicist strongly endorsed by Dr.Teller.

Research at the weapon laboratories most notably Livermore and Sandia, was developing exotic new lasers and particle beam technologies. Dr.Teller

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13 Thompson and Benthompson, n.10,p.4.

calls them the third generation weapons. For decades Teller has been interested in technologies that could defend the United States from Soviet nuclear weapons. It would be wonderful, he wrote in 'The Legacy of Hiroshima'- 1962 "if we could shoot down approaching missiles before they could destroy a target in the United States".[14] If third generation weapons are feasible, they could free the country from the legacy of Hiroshima which Teller had helped create in the New Mexico desert on 14 November, 1980.[15]

The technological developments were watched closely by a group of influential scientists, aerospace executives and retired military officers who began to meet in Washington D.C. at the Heritage Foundation. Their common goal was to formulate a plan for creating a national system of defense. However, by the end of 1981 this group split into two. One faction was of course led by Dr.Teller and the other by General Graham.

The group split over differing visions of how to

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14 Broad, n.9,

15 Gary L.Guertner, Donald M.Snow, The Last Frontier - An Analysis of the Strategic Defense Initiative (Washington D.C., 1986), p.17.

carry out the task of Space-based defense, Mr.Bendetsen, Dr.Teller and Reagan's kitchen cabinet separated into a small group to investigate sophisticated proposals that would require much research before being ready to use, while General Graham and his group known formally as High Frontier emphasized systems that could be built primarily off the shelf.[16]

Another factor in the split according to General Graham was that Dr.Teller insisted on the inclusion of third generation weapons. "He wanted very much to live in the nuclear option," the general said, "the man is carrying a load and has taken a lot of abuse as the father of H.bomb. Now he wants to see nuclear technology turn out to be the answer in the opposite direction to save the western world."[17]

Graham's High Frontier lobby put forward the proposal of a three layered defense. General Graham also argued for the replacement of MAD (Mutual Assured Destruction) with the strategy of MAS (Mutual Assured Survival). Although the High Frontier proposals were investigated

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16 Broad, n.9.

17 Ibid.

by the Pentagon and also by the Congressional Office of Technology Assessment, they were rejected by both. However, it did not discourage the President. He continued to cite the High Frontier report, which he evidently found to be ideologically nutritious, with its space-fic diagrams, its elaborate layered defences and its homely promise of MAS.[18]

The Political Compulsions

As the state of politics goes today, perhaps the first and the foremost duty of a political executive is not the security of the nation but to ensure the security of his own political future. President Reagan is, of course, not an exception.

Perhaps, two notable factors which led to the conception of the idea of Strategic Defense Initiative were :

(1) The Freeze Movement.

(2) Debate on MX basing.

Though, like any other nation, America was also bothered about its security, yet until 1980 the American

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18 Thompson and Benthompson, n.10, pp.8-9.

worry had not become very pronounced. In the election campaign of 1980, Ronald Reagan, and the Committee on the Present Danger, through the notion of the Window of Vulnerability awoke them and made them realize that the American security was not impregnable. The Window of Vulnerability was intended to scare Americans into supposing that there was a hole in their skies, a hole left there by the negligence of President Carter - through which they might expect Soviet ICBMs to enter at any moment.[19] The Soviets might launch a first strike and would destroy all the Titans and Minutemen in their silos, thereby disarming America and making retaliation impossible.[20] It is in this context that President Reagan declared that the SALT II had been flatly floated because of strategic imbalance and went ahead with the idea of Strategic Defense Initiative in order to close the window of vulnerability.

This sudden sense of insecurity undoubtedly contributed to the strength of the American Freeze Movement and to the astonishing speed with which it

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19 Ibid., p.10.

20 Ibid., p.10.

spread. By November of 1982 the tide had reached the point where the freeze had been placed as an issue on the ballat of 10 or 11 States and had been carried in all but one. Among the States voting 'yes' to the freeze was the President's own California and the State concerned contained over one quarter of the population of the USA. Senators and Congress persons were receiving heavy mail from their constituents and, in consequence voting against certain military appropriations. Opinion polls showed a majority for the freeze among Republican voters.[21]

The freeze movement was organised and made articulate by a staunch peace movement, with international loyalties and with altruistic concerns. The US Catholic bishops in their carefully argued pastoral letter of November 1982 have characterized the doctrine of MAD (Mutual Assured Destruction) as both insane and immoral. It was insane because to implement it would mean global suicide and it was immoral because it premised the security of each side on the threat to kill tens of

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21 Ibid., p.15.

millions of people on the other side. The promise of SDI is that it accepts these condemnations of MAD and provides a direct answer, however, radical it may appear to be. Its very elegance can be seen in five simple phrases that capture its sense :

(i) SDI is defense, not offense, relying on protection against attack rather than the real threat of mass annihilation.

(ii) It will be non-nuclear.

(iii) It will be deployed in space and not on the American soil.

(iv) It can lead to the elimination (reduction) of offensive nuclear weapons, thus ending the tyranny of MAD and as a bonus restoring the US broad ocean barrier to attack.

(v) Finally it will be produced through the ingenuity and skill of US high technology.[22]

The President at the Press Conference on 14 December, 1982 alleged that the land based missiles were becoming

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22 Robert E.Hunter, "SDI Return to Basics", Washington Quarterly, Winter 1986, pp.156-157.

increasingly obsolete because "we have stayed static and have not improved in the last 15 years in any of our missiles".[23] The President asserted that it had opened a window of vulnerability for the United States. In fact within the last 15 years the United States had deployed three new types of strategic ballistic missiles. (Poseidon, Minutenan III and Trident I) and two new types of bomber-launched missiles (the short-range missile, SRAM, and the air launched cruise missiles ALCM) - a total of some 2,900 new missiles.[24]

The Republicans during the 1980 election campaign had made extensive propaganda that the Soviets were deploying thousands of ICBM warheads accurate enough to threaten their fixed silos. However, the concept of window of vulnerability and about the Soviet accuracy to destroy the American missile Silos were all hypothetical. Minuteman's vulnerability - on paper is premised on the Soviets obtaining a deployed accuracy of 0.14 nautical mile circular error probability or better.[25] In the words

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23 Christopher Paine, "MX : Too Dense for Congress", The Bulletin of the Atomic Scientists, Feb.1983, p.5.

24 Ibid.

25 Christopher Paine, "Running in Circles with the MX", The Bulletin of Atomic Scientists, Dec.1981, p.6.

of Iin Miller, Chief of the Ballistic Missile System Branch of the Defense Intelligency Agency, "with today's force they do not have an acceptable PK (Probability of Kill) capability."[26] The perception of the window of vulnerability of the US strategic community is linked to its obsession with the Soviet landbased missile force and its perceived ability to take out the US land based force in a first strike because of the multiple warheads. The US has 1,052 landbased missiles with about 2,100 warheads. The Soviets have some 1,400 landbased missiles with more than 5,000 warheads. The Americans argue that the Soviet could disarm their entire land based missile force by using about 3,000 warheads at the rate of three per silo to assure destruction of each missile and still be left with 2,000 warheads in landbased missiles.

However, this is not the whole picture. Only one fourth of the US arsenal is in landbased missiles. If the Soviets were to carry out a first strike they would spend nearly 40 percent of their somewhat smaller strategic arsenal to take out 25 percent of US arsenal. That would leave US with three-fourths of its larger

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26 Ibid.

arsenal (50 percent in submarine based missiles and 25 percent on bombers), while the Soviet Union would have 20 percent of its arsenal in submarine-borne missiles, 5 percent on its bombers and 35 percent on land. This is not advantageous to the Soviet Union, especially when its submarines have to pass through narrow sea passages that are continuously monitored by the US.[27]

The panecea for all these hypothetical threats was the mobile MX Missile with its accurate warheads. It has always been one of Reagan's favourite themes and had featured in his first election campaign. But as soon as he was elected as President he found that he had bought a problem for himself. There was absolutely no consensus on its basing mode. As explained by Secretary Weinberger in his testimony, Reagan's solution to the conendrum of MX basing is two fold. First, place the first 36 missiles in the silos vacated by the retirement of the dangerously antiquated liquid-fuelled Titan II missiles, and harden these silos to a theoretical 5,000 pounds per square inch. Then decide by 1984 among

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27 K.Subrahmanyam, "The Star Wars Delusion", in Steven Anzovin, ed., The Star Wars Debate (New York, 1986), vol.58, No.1, pp.191-192.

three options for deployment of the remaining 64 missiles in 1988-89. In the Reagan administration's view, the primary options are ; continuous air borne patrol, an ABM defense of silo based-missiles, and deployment in survivable locations under ground. A fourth possibility was also mentioned by Weinberger in testimony - basing in tunnels drilled into the south side of Mesar where the missile would presumably be immune from Soviet missile fired over the North Pole.[28]

In fact all the proposals for MX basing mode were criticised by the supporters of his own "window of vulnerability" gospel. After the debate on the mode of MX basing, it was realised that the defences against ICBMs must be extended right through the whole arc of their flight from the moment of blast-off and not be confined to their terminal phase. They must be carried into space and in Caspar Weinberger's words, "engage ballistic missiles and warheads along their entire launch-to-impact trajectories."[29] Thus this debate on the MX basing mode gave a big thrust to the concept of Strategic Defence Initiative.

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28 Paine, n.24, p.8.

29 Caspar Weinberger, Annual Report to Congress Fiscal Year 1985 (1984), p.193.

He was bothered at that time not only about getting MX through the Congress but also with the bishops' pastoral letter and the freeze movement. The MX on the one side and the bishops and the freeze on the other were always at loggerheads. If he favoured the MX, the bishops and the freeze advocates would knock it down. On the other hand, if he pacified the bishops and the freeze movement, one of his favourite themes of his 1980 election campaign - the MX project could not have been implemented and the "window" would have remained vulnerable. Thus the most important political challenge of the day was how to contain the MX as well as bishops and the freezers, and also to get himself re-elected, when the Democrats were trying to woo his own voters by supporting the freeze. The President got away with all these through his novel idea of Strategic Defence Initiative. Through his SDI he offered the perturbed Americans an impregnable shield far more secure than the freeze. He wrested the moral crozier from the bishops and regained high ground of homiletics. The President asked :

> Nevertheless, it will still be necessary to rely on the specter of retaliation, on mutual threat. And that's a sad commentary on the human condition. Would not it be better to save lives than to avenge them?[30]

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30 Reagan, n.1, p.442.

Meanwhile he could go ahead with Trident, Pershing, Cruise, and MX since he had to keep the Soviets out of the window until he could get the shield called, the Strategic Defense Initiative.

Studies Following the President's Speech

Presidential National Security Study Directive 6-83 (NSSD 6-83) called for the Defence Department to study and report on how such a research and development programme might be shaped.[31] Two study groups were constituted by the Department of Defense for this purpose, one to examine the technology necessary for ballistic missile defense (BMD), the other to assess the strategic and arms control policy implication of BMD. The technology study group, called the Defensive Technologies Study was headed by Dr.James Fletcher, former head of the National Aeronautics and Space Administration (NASA). The Committee consisted of 50 defense scientists and engineers and called on the technical aid of hundreds of individuals from academia and industry. It prepared a Report on "Eliminating the Threat Posed by Nuclear Ballistic Missile". It became

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31 Ballistic Missile Defense Technologies, Congress of the United States, Office of Technology Assessment (Washington, D.C., 1985), p.37.

known as Flecher Panel Report. The other panel making a study on the policy implications of BMD was chaired by Fred Hoffman, the Director of Pan Heuristics; a policy "think tank" based in Los Angeles. This Future Security Strategy Study Team produced a report entitled, "Ballistic Missile Defense and US National Security".

The Fletcher and the Hoffman Report :

The Defensive Technologies Study Team (DTST) opened the body of its summary report with a rhetorical question. What has happened to justify another evaluation of ballistic missile defense as a basis for a major change in strategy?"[32] The answer provided by the Panel is a technological breakthrough that can now intercept and destroy the ballistic missile right from its point of launch to the terminal point i.e. throughout its entire ballistic trajectory. The President reiterated on 28 December, 1984 :

> We accepted the notion that if both we and the Soviet Union are able to retaliate with devastating power even after absorbing a first strike, that stable deterrence would endure. That rather novel concept seemed at the time to be sensible for two

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32 Donald L.Hofner, "Assessing the President's Vision : The Fletcher, Miller and Hoffman Panels", DAEDALUS, vol.I, Spring 1985, p.93.

> reasons. First, the Soviets stated that they believed that both sides should have roughly equal forces and neither side should seek to alter, the balance to gain unilateral advantage. Second, there did not seem to be any alternative. The state of the art in defensive systems did not permit an effective defensive system.
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> Today both of these basic assumptions are being called into question. The pace of the Soviet offensive and defensive build up has upset the balance in the areas of greatest importance during a crisis. Furthermore, new technologies are now at hand which may make possible a truly effective non-nuclear defense.33

The panel looked into infrared laser and radar sensors for tracking missiles high in space, at high speed projectiles and powerful laser and particle beams for intercepting missiles immediately after they were launched. The Defensive Technologies Study Team also concluded that the most effective systems for BMD would be the use of multiple layers. It said that a series of moderately effective layers could be more effective and therefore reliable. The report noted that if each layer in a three-tired system allowed even 10 percent of its targets to leak through, the overall leakage rate for the whole defense system would be only 0.1 percent.[34] Finally it

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33 Reagan, n.7, p.65.

34 Hofner, n.32, p.94.

concluded on an optimistic note that although enormous hurdles remain, the technological advances of the past two decades show great promise for ballistic missile defense. It recommended that a vigorous research and development programme be pursued. The Hoffman panel had little or nothing to say what strategy and security might look like in a world of nearly perfect defenses. Their silence on this point was perhaps unavoidable, given their views of the Soviet Union's strategic objective as "domination of the Eurasian periphery". The preferred mode in exploiting their military power is to apply it to deter, influence, coerce - in short, to control other states. Following this view to its logical conclusion, the panel concluded that the Soviets would make vigorous efforts to defeat any US defenses.[35]

What the Hoffman panel proposed were progressive stages of defense deployments, starting most immediately with anti-tactical ballistic missile (ATBM) defense for Europe, based upon available technologies for terminal defense. The next stage of defense build up would come as soon as more advanced terminal and mid-course technologies were available. These defenses could be deployed to protect critical military targets in the United States.

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35 Ibid., p.97.

The third stage would be reached with the availability of exotic boost-phase defenses, these would be deployed to exert "leverage" on the Soviets, even if they prove unable to meet fully sophisticated Soviet responses, that is even if they fell short of the President's goal.[36]

Thus there was some difference in the emphasis of the policy and technology studies. The technology study apparently stressed the need for futuristic defenses, such as beam weapons located in space, and to achieve a comprehensive defense capability. The policy study reportedly emphasized the role that less effective 'intermediate' defenses could play in stabilizing US Soviet relations. The difference concerned whether near-term BMD technology, which could provide only limited coverage should be emphasized or long term "exotic" defenses which might provide a comprehensive defense capability.[37]

Accepting the major recommendations of both the study groups, the government framed the Strategic Defence Initiative organisation. Air Force Lieutenant General,

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36 Ibid., p.97.

37 Keith B.Payne, Strategic Defense : "Star Wars" in Perspective (Boston, 1986), pp.20-21.

James A.Abrahamson was appointed as its Director. This organization was charged with undertaking -

> A comprehensive programme to develop key technologies associated with concepts for defense against ballistic missiles. The technology plan identified by the Defensive Technologies Study and the policy approach outlined in the Future Security Strategy Study will serve as general guides for initiating this programme. The SDI will place principal emphasis on technologies involving non-nuclear intercept and destruction concepts. The basic approach will be to consider layered systems than can be deployed in such a way as to increase the contribution of defenses to deterrence and move the United States towards its ultimate goal of a thoroughly reliable defense..38

The Early BMD Systems : The US ABM Programme

By early 1957, the US Army was working on a nation-wide Ballistic Missile Defense System called the Nike-Zeus. The Nike-Zeus interceptor was to be directed from the ground based radars towards the incoming Soviet RVs. This system was for high altitude interception. Finally in December 1962, this system successfully intercepted an Atlas missile.

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38 Caspar Weinberger, Memorandum on "Strategic Defence Initiative Organization (SDIO) charter. 24 April, 1984. Cited in Ballistic Missile Defence Technologies, Congress of the United States, Office of Technology Assessment (Washington, D.C.), September 1985, p.38.

In spite of successful test in December 1962, the Kennedy administration decided not to deploy it for several convincing reasons. The steady growth in the sophistication of the radar and computer technology and various research on the possible counter measures had convinced the administration that ABM systems based on Nike Zeus was not reliable. Moreover, the realization that it would eventually accelerate the arms race thereby destabilising the strategic stability was yet another factor.

The emphasis on research and development shifted to tackling problems relating to counter measures. Since in higher altitude dummys and decoys travel with the same speed because of the absence of atmospheric drag, it is very difficult to distinguish between the decoys and the RVs. As atmosphere acts as filter for the decoys (light body gets burned because of atmospheric friction) it was realised that an improved system would have to be a low-altitude interceptor capable of very high acceleration. In 1963, the army started working on Nike-X that could be capable of interception at a low altitude. This system was to employ faster burning rocket (later called Sprint). The target track, missile track and discrimination radars were all replaced by a single phased-array radar, the missile site radar (MSR). Phased-array radars, in

addition to their ability to perform multiple functions, had the advantage of fixed installations that needed no mechanical scan and could be much more easily protected.[39]

In 1965 the US Army began to develop another interceptor, called the Spartan, which would detonate a nuclear warhead above the atmosphere where it would generate intense X-rays that might be expected to knock out several incoming re-entry vehicles at once.[40] The basic difference between the Spartan and the Sprint was that of range. The range of Sprint was just 25 miles while that of Spartan was several hundred miles.

On 18 September, 1967, Defense Secretary McNamara announced that the United States would employ a partial ABM System. This system known as Sentinel was to incorporate the Spartan for high altitude interception and the Sprint for low altitude interception. Both missiles had nuclear warheads. The proposed US ABM system was not to protect the American soft targets against Soviet nuclear attack, but instead would offer a shield against potential Chinese ICBM (Potential : China had not even developed ICBM then) and an accidental Soviet attack.[41]

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39 Alexander Flax, "Ballistic Missile Defense : Concepts and History", DAEDALUS, vol.1, Spring 1985, p.35.

40 n.31, p.45.

41 Ibid., p.48.

However, the realisation that numerous missiles with nuclear warheads were going to be deployed stired a wide public opposition. The administration was forced to suspend the construction work in early 1969 pending a presidential decision. On 19 March, 1969 President Nixon announced the deployment of Safeguard System - a modified system of Sentinal. Under this modified system there was no change in the weapon system or the radar components, but was to be deployed in different numbers and different locations. The first priority for the deployment was the protection of US nuclear forces against a Soviet attack, the second priority was the provision of a nationwide defense against a hypothetical Chinese attack and a subsidiary role was defense against accidental attack from any source.[42]

The initial deployment provided for the defense of Minuteman Silos at Grand Forks Air Force Base in North Dakota and at Malmstfom Air Force Base in Montana. However the signing of the ABM treaty in 1972, radically changed the Safeguards deployment plan. It permitted the deployment of only 100 interceptors either around the national capital or around hardened missile silos. The US decided

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42 Flax, n.39, p.36.

to defend their Minuteman ICBM silos at Grand Forks Air Force Base. It became operational in mid-1975 and since it was an unreliable defense, it was phased out.

Soviet BMD Programme :

The Soviet anti-aircraft programme started from 1950 onwards. Their first anti-aircraft, surface to air, missile SA-1 was deployed around Moscow in mid 50's. Later on the range of these surface to air missile was increased and they were capable of interception at much higher altitude. Probably the first Soviet system with rudimentary ABM capability was Griffon missile system. It was deployed around Leningrad in 1960.

Around 1963 another new Soviet missile SA-5 was developed. Special features of this class of missile include some ABM capability and high altitude interception of supersonic aircraft such as US XB-90, which was in its initial stage of production. However, the US changed its tactics and switched on to low altitude aircraft which evade radar detection. Thus US XB-70 was never produced. For low-altitude interception SA-2 and SA-3 missiles were more suited.

In 1964, during their annual May Day military display, the Soviets had paraded a larger interceptor missile, Galosh, through Moscow. They had also begun to deploy the necessary radar systems, the 'Hen House' (early warning radar) and the 'Dog House' (battle management radar).[43] The Galosh which is currently operational is nuclear armed and is designed for long range high-altitude interception.

Eventually the AMB-1 (Galosh) system consisted of complexes at four sites around Moscow. Each site had sixteen launchers and two sets of missile-tracking and guidance radars, for a total of six radars per site. Initial tracking of incoming ICBMs threat assessment, and target hand over to missiles for defense was provided by a very large phased-array radar. Later, a second radar of the same type was added to another location.[44]

The Galosh missile system is not leak proof. Since it is meant for high altitude interception the offense can always penetrate by overwhelming the defense through

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43 n.31, p.49.

44 Flax, n.39, p.39.

light weight decoys. The frequencies of the systems radars are relatively low and can be blinded by a nuclear blast. And finally since the number of radars are very few they can be destroyed by a concentrated attack. Therefore, the Soviet Galosh missile system which is currently operational around Moscow is not reliable against an all out massive retaliation by US nuclear forces. It can at best serve as an insurance against a third country : either China, France or Britain.

Chapter - II

AN OUTLINE OF THE SDI TECHNOLOGIES

Chapter - II

AN OUTLINE OF THE SDI TECHNOLOGIES

The most fundamental difference between earlier BMD (Ballistic Missile Defense) developed in 60's and the current BMD is that while in the former case the ABM (Anti Ballistic Missile) system could intercept and destroy an incoming ballistic missile warheads in its terminal phase i.e. when they enter into earth's atmosphere, the current BMD concepts posit systems that can intercept ballistic missiles and their RVs at all stages of their flight, immediately after its launch to the terminal phase. Secondly, whereas the earlier ABM system consisted of ground based interceptors of various ranges supported by ground based radars, in the current BMD programme, ground basing is not necessary and probably the preferred mode of basing is high in the space.

The most preferred concept in the current BMD programme is to have a multi layered defense. Early layers would reduce the number of warheads that later layers would have to handle. The later layers would tackle those warheads which had evaded destruction by the earlier layers. The idea behind having several layers is that the defense can be made highly effective and

reliable even if the individual layers are less than perfect. For example if such layer has a 90% effectiveness, a combination of three such layers will have an overall efficiency better than 99%. It means only 10% of the 10% of the 10% would get through the proposed layered defense, permitting a leakage of 0.1% only. It means that no more than one warhead in 1000 would reach its target.[1]

To understand the various technologies related to SDI, it is necessary to have a rudimentary knowledge of the typical trajectory of a ballistic missile. Missiles usually consist of two or three separate rockets also called boosters. On the top of the uppermost stage sits the "bus" carrying the warheads.

Boost Phase

It begins the moment a ballistic missile is fired out of its Silo. One by one the boosters ignite, burn out and fall away. In the process it releases hot gases and easily detected infra red signal. A current Ballistic Missile takes between three to five minutes to climb through the Earth's atmosphere. The MX takes about three

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1 E.P.Thompson and Benthompson, Star Wars : Self Destruct Incorporated (London, 1985), p.21.

minutes against five for the liquid fuelled SS-18. By the end of the boost phase, the missile is travelling at seven kilometers per second.[2]

Post-Boost Phase

It is also referred to as the bus deployment phase. During this phase warheads and other penetration aids are being released from the "bus" or post-boost vehicle. The third-stage booster falls away, leaving the post-boost vehicle and its cargo, upto ten multiple independently targeted re-entry vehicles or MIRVs, each carrying a nuclear warhead directed at a separate target. Powered by a low-thrust rocket, the post-boost vehicle or "bus" manoeuvers through space, dropping off its re-entry vehicles in programmed sequence and directing them on their distinct trajectories. The post-boost vehicle can also carry decoys and other penetration aids to confuse or overwhelm the defense.[3]

Mid-Course Phase

Once the warheads and decoys had been released, they travel through space for approximately 15 to 20 minutes

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2 J.C.Fletcher, "The Technologies for Ballistic Missile Defense", Issues in Science and Technology, Fall 1984,

3 Ibid.

(7 to 10 minutes for SLBMs) before re-entering the atmosphere. This flight phase is called the mid-course phase. There are now as many as fourteen and in the absence of arms control limitations, potentially twenty to thirty) warheads and one hundred or more decoys for every ballistic missile launched.[4] The use of decoys to fool the defensive system is very effective, because in vaccum of space the velocity of warheads and decoys is the same and as such cannot be distinguished.

Terminal Phase

The terminal phase begins when the re-entry vehicles, decoys, penetration aids, and debris begin to re-enter earth's upper atmosphere at an altitude of about 100 kilometers. Light weight objects, including some decoys and debris, are slowed by atmospheric drag and then broken apart by the force of deceleration. The heavier re-entry vehicles, which are "hardened" to survive the heat and deceleration, continue on their trajectories. The terminal phase ends some two minutes after it begins, when the re-entry vehicles (by this time a glowing red) detonate over their targets.[5]

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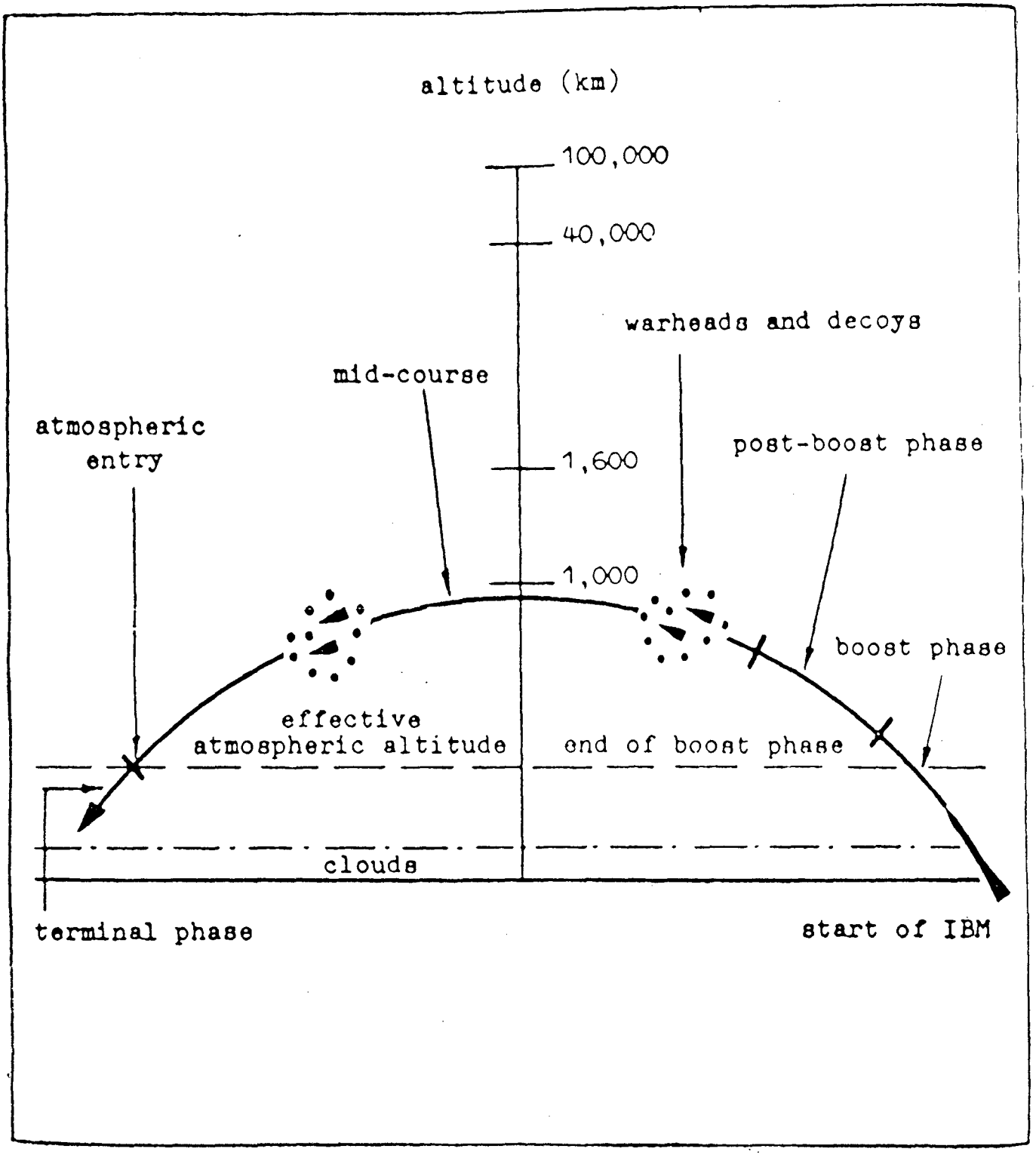
4 Hans A.Bethe, Jeffrey Boutwell, Richard L.Garwin, "BMD Technologies and Concepts in the 1980s", DAEDALUS, vol.I, Spring 1985, p.57.

5 Fletcher, n.2, .



TRAJECTORY ELEMENTS OF INTERCONTINENTAL BALLISTIC MISSILE

Source: "Space-Strike Arms and International Security"
Strategic Digest (idsa) May 1986, P-555

A strategic defense capable of engaging appropriate targets all along the ballistic missile flight path must perform certain key functions:

Surveillance and Acquisition : Attacks must be detected and the number, location and probable destination of all threatening objects must be determined.

Discrimination : Actual missiles, buses, and warheads must be distinguished from non-threatening decoys and other debris.

Pointing and Tracking : Targets must be tracked with whatever precision required by the weapon designated to destroy that target, and that tracking information must be communicated to the defensive weapon.

Target Destruction : A defensive weapon must deliver sufficient energy to a target rapidly enough in order to destroy it.

Kill Assessment : Those targets that have been successfully destroyed must be identified and distinguished from survivors. In addition, if it can be determined why a target warhead was not destroyed, (incorrect pointing, for example), this information can be used for a subsequent

attack .[6]

Boost Phase Defense : The boost phase defense is perhaps the most important layer of defense in the current BMD programme because of the following reasons :

(i) At this stage the missile has not yet released any of its warheads and penetration aids. Destruction of one missile means destruction of all the warheads and penetration aids in one shot. Literally it means the defense catches the Soviet missiles when they have all their eggs in one basket.

A little slackness in the boost phase defense would multiply the problem to an enormous degree in later phases of defense. Each missile that survives can release hundreds of RVs and decoys and these have to be tracked, discriminated and destroyed - a very formidable task indeed precisely because it is very difficult to distinguish decoys and the real warhead because in the absence of atmospheric drag they travel in space with the same velocity. Therefore, the success of mid-course defense is tightly linked with the boost phase defense.

(ii) The booster rocket is a much larger and fragile target than the RVs and the decoys.

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6 Ballistic Missile Defense Technologies, Congress of the United States, Office of Technology Assessment, (Washington, D.C., 1985), p.146.

(iii) Its flame is an abundant source of infra-red radiation, enabling the defense to get an accurate fix on the missile's location. It is during this phase that the rocket burns and offer highly intense and specific observables which can be detected at a very far off distance.

But the boost phase defense is also the most difficult technically and has drawn the largest number of fire from the critics. As it has been mentioned the boost phase lasts upto 3 to 5 minutes and only in this short span of time, the boost phase defense has to provide early warning of an attack by sensing the booster's exhaust plumes, ascertain the precise number of the attacking missiles and if possible their identities; determine the trajectories of the missiles and get a fix on them, assign, aim and fire the defensive weapons, assess whether or not interception was successful and if time allowed, fire additional rounds. How much time this would take depends on how automated the system would be and how quickly decision could be made. In particular, requiring that human intervention be necessary before the defence can commence firing imposes extreme time constraints on command and control procedures.[7] Moreover, all these have to be done in the presence of all the counter measures

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7 Ibid., p.142.

that may be directed against unfavourable weather condition, radio interference and other unforeseen obstacles. Because of the above mentioned features of time constraint, Luke skywalker-like beam weapons have become the centre of SDI technology in its boost phase. These beam weapons would either be based in space or would reflect power from the earth to large orbiting mirrors in high altitude and these mirrors would direct the power via smaller battle mirrors in low altitude against the ascending booster. Five types of beam weapons are mainly being investigated in boost phase defense :

(i) Chemical lasers

(ii) Excimer lasers

(iii) Free-electron lasers

(iv) X-ray lasers

(v) Particle beams.

LASER

LASER is Light Amplification by Stimulated Emission of Radiation. It provides intense and undirectional beam of light. If any atom is excited by pumping some amount of external energy (either by heat or bombardment of photons), the sub-atomic particles i.e. electron jump from one orbit to the next higher energy level. When an excited electron drops back to a lower energy state, it

emits radiation at a precisely defined wave length. This radiation stimulates other molecules to do exactly the same thing. They drop back to the same lower energy level, thereby emitting radiation in step with original radiation and having the same wave length. This effect quickly spreads throughout the lasing material and a laser beam is produced.

It is extremely coherent in the sense that the troughs and crests of light waves emerging from the lasing material are all perfectly aligned. It means that a lot of power can be packed into a laser beam and it can be set to longer distances without diffraction. The laser operates in any transparent environment, including air, inert gas, vacuum and even certain liquids. It can be very finely focussed on a certain spot, thereby generating a lot of heat. However, the most powerful lasers currently in existence are of the order of a million times weaker than those which would be needed to attack a rocket booster.[8]

Chemical Lasers :

Chemical lasers use the energy from a chemical reaction between two fuels to produce laser radiation.

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8 Thompson and Benthompson, n.1, p.22.

The most mature chemical laser technology for high powered lasers is the hydrogen fluoride (HF) or the deuterium fluoride (DF) laser, in which hydrogen and fluorine combine to form hydrogen (deuterium) fluoride. Relatively high levels of power have already been produced in this type of laser, although a major scale up from these levels is still needed before power levels necessary for BMD can be obtained. The HF (DF) wave length is 2.7 (3.8) microns (millionths of a meter).[9]

Excimer Lasers

An excimer is an excited dimmer, or two atom molecules, typically consisting of a noble gas (i.e. argon, Krypton, Xenon) atom and a halogen (i.e. chlorine, flourine) atom. In an excited state, these two atoms can form a bound molecular system. When the molecule drops to a ground state, it rapidly disassociates into two separate atoms : noble gases do not form stable molecules in the ground state. The excited population of excimer molecules is produced by a pulsed electrical discharge process, rather than by a continuous chemical reaction. The light produced, therefore, occurs in pulses. After the pulse of laser radiation is produced,

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9 n.6, p.148.

the process repeats with a new electrical charge, leading to another "pumping" of excited dimmer molecules. Relative to HF lasers, excimer lasers have the advantage of a shorter wave length/typically 0.3 to 0.5 microns.[10]

Spreading angle in radiaus

(1 Radian = $\frac{360}{2\pi}$ = 57.3°) = 1.2 x ratio of the wave length of the radiation to the diameter of the laser aperture[11]

$$\text{Spreading angle in radiaus} = 1.2 \times \frac{\lambda}{D} \quad \ldots\ldots (1)$$

where λ = Wavelength of the radiation.

D = diameter of the apperture.

Therefore, it is clear from equation (1) that the decrease in the spreading angle depends upon either a decrease in wavelength of the radiation or increase in the diameter of the apperture. Therefore, to make the beam more coherent and more effective, wavelength should be minimized and mirror size should be maximized. Since the

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10 Ibid., p. 150.

11 Ibid., p. 148.

wavelength of an excimer laser is much less compared to an HF laser, it would require a much smaller size of a mirror to to produce a certain diameter of coherent beam as compared to an HF laser. For example for a distance of 40,000 kilometer an HF laser would require a perfect mirror of about 130 meters in diameter to keep the beam size down to 1 meter in diameter at the target. However, for the same purpose, an excimer mirror would require a mirror of only 15 meter diameter.[12]

Free Electron Laser

In free electron laser beams the highly coherent radiation is generated by passing free electron through highly fluctuating magnetic field. This phenomenon is based on the principle that when free electrons are passed through magnetic field, they twist from its path thereby emitting electromagnetic radiation. The emitted coherent radiation consists of pure energy.

Particle Beams :

Particle beams consist of sub-atomic particles like protons, electrons, neutrons, positrons, etc. accelerated approximately upto the velocity of light. In

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12 Ibid., p.150.

fact this beam consists of a bit of matter and not of pure energy. This is based on the principle of particle acceleration by certain devices like cyclotron, electron accelerators, etc. The beam of fast-moving atoms is very penetrating and goes through the metal skin of the missile and into the electronic brain that guides it. By altering or destroying the internal mechanism of a missile, the beam finally destroys it.

Charged particles beams are not suitable for transmission over long distances because they are deflected by the earth's magnetic field. Scientists have instead proposed using neutral hydrogen ions and stripping off the extra-electron.[13] Such a weapon, however, can work only outside the atmosphere. Even a small amount of air will strip off the electrons, resulting in a beam of charged particle. These will be bent by the earth's magnetic field and will also be scattered by collusions with atmospheric molecules. As a result, the beam will not be effective against targets below about 100 Km.[14]

X-Ray Lasers

The X-Ray laser as proposed by Dr.Teller will derive its energy from a nuclear explosion. By a nuclear explosion,

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13 Bethe, Boutwell, Garwin, n.4, p.62.

14 n.6, p.154.

a lot of energy can be pumped into a lasing material producing an extensively coherent but very intense beam of laser. The wavelength of this laser is equivalent to the wavelength of X-ray and that is why it is called X-ray laser. By farming the lasing material into bundles of fibres of correct dimension it is possible to focus the beam of X-rays to a few thousand Kms.

Because of their short wavelength, X-ray differs from other lasers in three important respects.

First, unlike optical lasers, powerful X-rays cannot be pointed by mirrors. Second, the X-ray generated from the wires cannot be as tightly focussed as optical lasers This means they can only be used from moderately short distances (a few thousand kilometers), and probably not from geosynchronous orbit (36,000 Kms above the earth).

Third, the soft X-rays do not penetrate the earth's atmosphere and thus can be used only against missiles or war heads travelling through the vaccum of space.[15]

However, another aspect of the same technology is that since it is very light, it can be very cheap and easy to lift into the space as compared to heavy battle

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15 Bethe, Boutwell, Garwin, n.4, p.61.

stations with their precariously large mirrors in case of other optical lasers.

Kinetic Non-nuclear Kill

A time tested and the most classic strategy of destroying a target has been to hit it with an object moving with a certain velocity. All kinds of kinetic non-nuclear weapons like arrow, rocks, bullet, etc. work on this principle only. Thus missiles and re-entry RVs which move with a very high velocity can be destroyed by simply colluding it with another object moving with a certain velocity. When an ascending booster is collided with a certain velocity, it is certain to get destroyed. However, the problem lies in arranging the collision - in reaching the missile or warhead and hitting it.

In a simple gun, the velocity is given impulsively to the projectile while it is within the barrel itself and in case of a missile, the requisite velocity is obtained by the gas expelled at a very high velocity, through its back nozzle, thereby giving momentum to the projectile and reducing its mass. Current interest in the use of guns for ICBM boost-phase intercept centres on space-based electromagnetic "rail guns", in which the projectile would complete the circuit between two

conducting bars or rails. A modest voltage applied to these rails would produce very large currents, the magnetic field behind the projectile expelling and continuously accelerating the projectile. Sub-kilogram projectiles have been accelerated in this fashion to speeds of 10 Kms, and somewhat more is feasible .[16]

For the operation of a kinetic non-nuclear kill a constellation of battle station, each containing a number of missile is needed. Satellite sensors would detect the launch, and would pass on the information to the battle stations. The battle station in turn aim and fire at the ascending booster and when close enough homing detectors would be used to direct them to their targets. Thus the target would be destroyed either by hitting it straightaway or by detonating an explosive near it, sending fragments into it (because, outside an atmosphere an explosion does not produce a shockwave and therefore the fragments would be necessary for a kill).

The imperfections of the HKV (Homing Kill Vehicles) system could easily be exploited by the use of various counter measures :

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16 Hans A.Bethe, and Richard L.Garwin, "New MBD Technologies", DAEDALUS, vol.II, Summer 1985,p.357.

(i) A modest irregular acceleration of the booster would impose unattainable manoeuvering requirements of the HKV.[17]

(ii) Large foil screens carried by the booster could obscure the flame, thereby preventing homing altogether.[18]

(iii) The explosion of nuclear weapons at high altitudes could provide background heat that would make difficult the tracking of the boosters by near IR (Infra-Red) detectors.

(iv) A booster that burned out within the atmosphere would be immune to them, since friction with the air could blind their homing sensors. The Soviets are currently testing an MX-like ICBM (the SS-X-24) which would therefore effectively shorten the maximum interceptor range from the attainable against SS-18.[19]

(v) Because of the time required for each rocket or projectile to reach its target, missiles would only be vulnerable if there was a battle station virtually overhead. Therefore, battle station would have to be deployed in very large numbers. Even at the current level

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17 Ibid., p.358.

18 Hans A.Bethe, Richard L.Garwin, Kurt Gottfried and Henry W. Kendall, "Space-based Ballistic Missile Defense", Scientific American, vol.251, No.4, October 1984, p.47.

19 n.4, p.156.

of Soviet armament the cost of simply lifting such a fleet into orbit would run at around $ 13 billion.[20]

The homing technology outside the atmosphere was successfully demonstrated by the US Army in 1984. On 10 June a projectile launched from Kwajalein Atoll in the Pacific intercepted a dummy Minuteman warhead at an altitude of more than 100 miles. Similar technology is utilized by the US Air Forces air launched ASAT weapon.

Post-Boost Phase Defense

Normally the post-boost phase lasts for 6 minutes, though it can be shortened by certain technological breakthroughs. During this phase the bus dispenses its RVs (re-entry vehicles) and decoys. Therefore, at the beginning the leverage is quite high and gradually it declines as it progresses and in the end the leverage is the lowest. This is precisely because destruction of the bus at the early stage means destruction of the entire RVs and decoys it carries while at the end of its flight, it had dispersed with most of the warheads. Secondly, the leverage in this stage is high because the post-boost vehicles are themselves softer (easy to destroy) compared

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20 Union of Concerned Scientists, The Fallacy of Star Wars (New York, 1984), p.101.

to the individual warheads which are relatively harder to destroy. As in the case of boost-phase defenses, small errors in post-boost performance can have larger consequences in the later phases because once the RVs and decoys are released, they will multiply the task of defense manifold. By their very nature post-boost defences have little ability to defend selectively unless and until the RVs are released from the PBV, the specific targets of the warheads are difficult to determine. Therefore, the post-boost phase defenses cannot effectively conduct preferential defense, in which limited defensive resources are concentrated on defending only some sites at the expense of permitting attacks on others to continue unimpeded. Thus, the PBVs have to be attacked indiscriminately.

Midcourse Phase Defense :

Midcourse phase starts after the release of the RVs and the decoys from the PBVs, and it lasts until they re-enter the atmosphere. During this phase the RVs and the decoys travel in a certain trajectory in space and the duration of the flight is normally 20 minutes for ICBM RVs and much shorter for an SLBM RVs. Though there is much more time to engage the defense in this phase as compared to the boost phase (3 to 5 minutes) and post-

boost phase (5 to 6 minutes), the task of defense in this phase is much more difficult.

Whereas the booster is easily detectable by their rocket plumes, the warheads once in space emit only feeble infra-red radiation. During this phase the warheads are released by the PBVs and the defense has to engage against each and every warhead. The enormity of the problem can be understood by the simple fact that the SS-18 which now has 8 warheads, is big enough to carry 30.[21] Then, there can be many decoys as well. False warheads, metallic ballons, radar reflecting chaff and infra-red reflecting aerosols would accompany the warheads on their journey, and it would be extremely hard to distinguish real warheads from decoys because in the vaccum of space all objects travel at the same velocity, since there is no atmospheric drag to hold back the lighter payloads. This would be very expensive and it would be hard to devise a system that could deal effectively with all types of decoys that could be imagined.

Leverage is low in the midcourse. Since once the RVs are released from the PBVs, their precise trajectories

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21 Charles Krauthammer, "The Illusion of Star Wars", The New Republic, May 14, 1984, p. 16.

could be determined. Hence in this phase the defense has the potential for being selective as well.

Terminal Defense :

The terminal phase starts when the RVs re-enter the atmosphere. At this stage the real warheads again become distinguishable from the chaff ballons and decoys because they burn up due to atmospheric friction. All information about the attack is handed from space based midcourse sensors to infra-red sensors located abroad high altitude aircraft, launched on warning of attack.

Ground-based radars work in conjunction with the air-borne sensors to define the precise trajectory of the warheads before the interceptor rockets are committed. The terminal interceptors are ground-based, high-acceleration chemical rockets, capable of reaching their targets while they are still, high in the atmosphere (Re-entry vehicles must be intercepted at high altitudes to ensure that even those warheads that are "salvage-fused" that is, designed to detonate when intercepted) will not substantially damage targets on the ground.

The terminal defense rockets are equipped with on-board sensors and guidance systems that scan and home in

on the re-entry vehicle to which they have been assigned. As it nears the target, the interceptor warhead explodes, scattering thousands of pellets in the path of re-entry vehicle.[22]

Another possible defense at the terminal phase is the Swarm jet proposal. A Swarm of non-nuclear rockets is fired towards the incoming RVs towards a region 50 m in diameter at a range of 1 km from defended site.[23] If the management is very accurate, it will definitely destroy an incoming RV. However, an RV may be salvage fused and since it is intercepted very near to the defended area, it would be used to defend only hardened targets that can survive a nearby nuclear explosion.

Ballistic missile re-entry vehicles enter the atmosphere at prodigious speed, and can be manoeuverable making tracking and targeting difficult. Defending a few missile silos is a feasible proposition. But technologically it is not feasible to defend a soft target like a city especially when the RVs are salvage-fused.

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22 Fletcher, n.2.

23 n.4, p.157.

A fool-proof area defense system cannot be built. An enemy might choose to concentrate the whole or a large part of its missile force towards a few selected targets in order to overwhelm a defense. Theoretically the defense should be capable of handling the launch of the whole Russian ICBM arsenal against a single unspecified target which is practically not feasible.

The Basing Modes and Its Feasibility :

Under the SDI scheme there are three possible basing modes of the defensive system under consideration. These basing modes apply to only the first three phases of (i.e.the boost phase, the post-boost phase and the midcourse phase) the ballistic missile fight. The first is to base them permanently in space. The component of the space battle station would be lifted on the space shuttle. Stations would be placed either in a geostationary orbit (so that they orbit the earth in the same time as the earth rotates) where they would remain permanently over the Russian missile silos or in lower orbit where an enormous number of battle stationshave to be deployed to cover up the "absentee" problem. This mode of basing has its own advantages and disadvantages. With enough weapons in orbit some would be on station whenever they were needed,

and they could provide global coverage. On the other hand, they would be inefficient because of the number of weapons that would have to be actively deployed and they would be extremely vulnerable.

The problem in putting the battle station in a geostationary orbit (36,000 or 39,000 kms. from the earth) is that from such a distance it would be very difficult to observe the radiation from the booster and consequently to have an accurate fix on it. As explained earlier the spreading angle depends on the wavelength of the radiation, the diameter of the appertus and the distance to the spot.

$$\theta \propto \lambda \qquad \text{... i}$$

$$\theta \propto \frac{1}{D} \qquad \text{... ii}$$

$$\theta \propto \frac{1}{d} \qquad \text{... iii}$$

From (i), (ii) and (iii) we derive

$$\theta \propto \frac{\lambda}{D\ d}$$

$$\theta \propto K\frac{\lambda}{Dd}$$

where θ = spreading angle in radiaus.
λ = wavelength of the radiation
D = diameter of the appertur
d = distance to the spot
K = 1.2

For infra-red radiation from the booster's flame the wave-length would typically be one micrometer, so that targetting on a spot 50 centimeters would require a precisely shaped mirror 100 meters across - roughly the length of a foot ball field.[24] This is technologically not feasible in the near future because the largest telescope mirrors in the world today is just five meters in diameter.

To overcome this obstacle another basing mode is suggested in which a geosynchronous defensive system might be augmented by other fighting mirrors deployed in low orbit. According to this basing mode, favoured by George Keyworth, President Reagan's scientific adviser, the laser is to be based on mountain peak and beam their rays upto a large relay mirrors (upto 5 meter in diameter) in geosynchronous orbits and these relay mirrors would reflect the laser beam to small fighting mirrors deployed in low orbit, which in turn would redirect the beam to ascending boosters and would destroy them. The main advantage of this scheme is that the expensive lasers and their large power sources are safely on the ground. However, its weakness is that the ever fluctuating density of the

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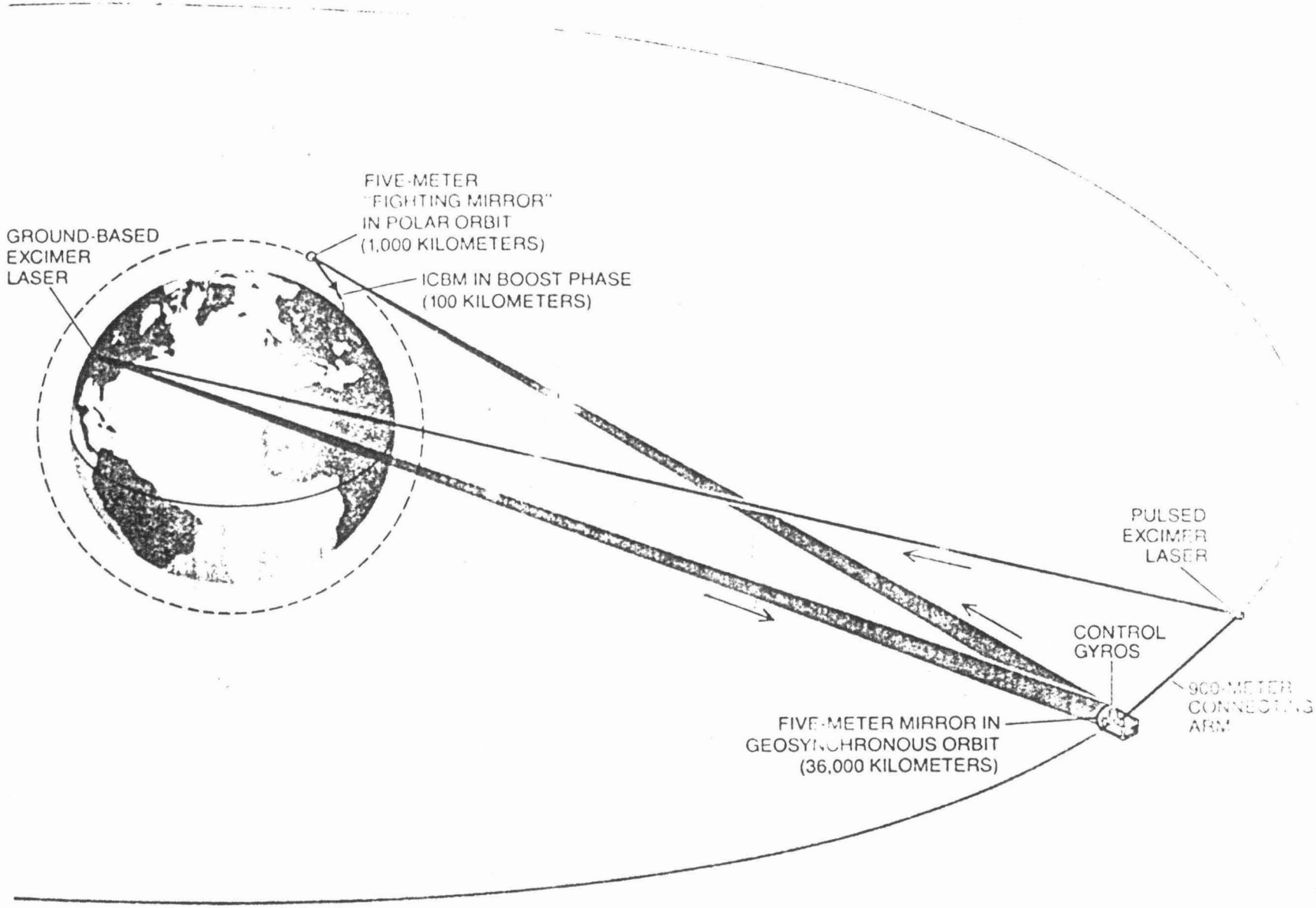
24 Bethe, Garwin, Gallfried and Kendall, n.18, p.44.



GROUND-BASED LASER WEAPON with orbiting optical elements is designed to intercept ICBM's in boost phase. The excimer laser produces an intense beam of ultraviolet radiation at a wavelength of .3 micrometer. The ground-based mirror would send its beam to a five-meter geosynchronous mirror, which would in turn reflect the beam toward a similar fighting and viewing mirror in a comparatively low orbit; this mirror would then reflect the beam toward the rising booster, depending on its ability to form an image of the infrared radiation from the booster's exhaust plume to get a fix on the target (*diagram at left*). In order to compensate for fluctuations in the density

Source: "Space-based Ballistic-Missile Defense",
Scientific American, Oct 1984 P.44.

atmosphere will diverge and dilute the beams' intensity and therefore, reduce its destructive potential. But now a technique has been developed by Garwin in principle at least to compensate for atmospheric distortion with adaptive optics.[25]

Even for the sake of argument let us assume that by certain technological breakthroughs such a system could be made to work perfectly, yet there are other hurdles as well. The skin of a booster can be hardened to withstand an energy deposition of 200 megajoules per Square meter. By this estimate total energy deposition of 225,000 megajoules is required to destroy all the 1400 ICBMs in current Russian nuclear arsenal. If the time available for interception were 100 seconds and the lasers had an electrical efficiency of 6 percent, the power requirement would be more than the output of 3,001,000 megawatt power plants.[26] This would come to more than 60% of the electricity generating capacity of the entire U.S. There is no existing technology to store such a large amount of power and to discharge it instantaneously. Moreover this

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25 n.4, p.151.

26 Bethe, Garwin, Gottfried and Kendatt, n.18, p.45.

estimate is the most conservative one as it assumes an ideal condition, where the defensive shot has a 100% accuracy. The Russians would not shorten their boost phase, they would not enlarge their ICBM's stockpile and would not employ any countermeasure against the defensive system.

Yet another basing mode under consideration is the pop-up method. The battle station would be kept on ground until such time as they were needed. The problem with the pop-up system is that it would suffer from formidable time constrain. It would have to climb to a certain height simply in order to see its target over the horizon. The pop-up boosters, therefore, has to have much more velocity than that of an ascending ICBM so that it is in a position up on the horizon to attack the target. If the pop-up systems are based at sea, though they will be nearer the Soviet missile silos, they will be vulnerable to anti-submarine strike.

Pop-up interceptions of ICBMs would have to be launched from submarines, since the only accessible points close enough to the Russian ICBM silos are in the Arabian Sea and the Norwegian Sea, at a distance of more than 4,000 kilometers. An interceptor of this type would have

to travel at least 940 kilometers before it could 'see' an ICBM just burning out at an attitude of 200 kilometers. If the interceptor were lofted by an ideal instant-born booster with a total weight-to-payload ratio of 14 to one, it could reach the target-sighting point in about 120 seconds. For comparison, the boost phase of the new U.S. MX missile (which has a weight-to payload ratio of 20 to one) is between 150 and 180 seconds. In principle, therefore, it should just barely be possible by this method to intercept a Russian missile comparable to the MX, provided the interception technique employed a beam that moves at the speed of light. On the other hand, it would be impossible to intercept a large number of missiles, since many silos would be more than 4,000 kms. away, submarines cannot launch all their missiles simultaneously and 30 seconds would leave virtually no time for the complex sequence of operations the battle management system would have to perform.

According to Fletcher panel report, it is possible to build ICBMs that could complete the boost phase and dispense their MIRVs in only 60 seconds, at a sacrifice of no more than 20 percent of payload. Accordingly all pop-up interception schemes, no matter what kind of anti-missile weapon they employ, depend on the assumption that the U.S.S.R. will not build ICBMs with a boost phase so

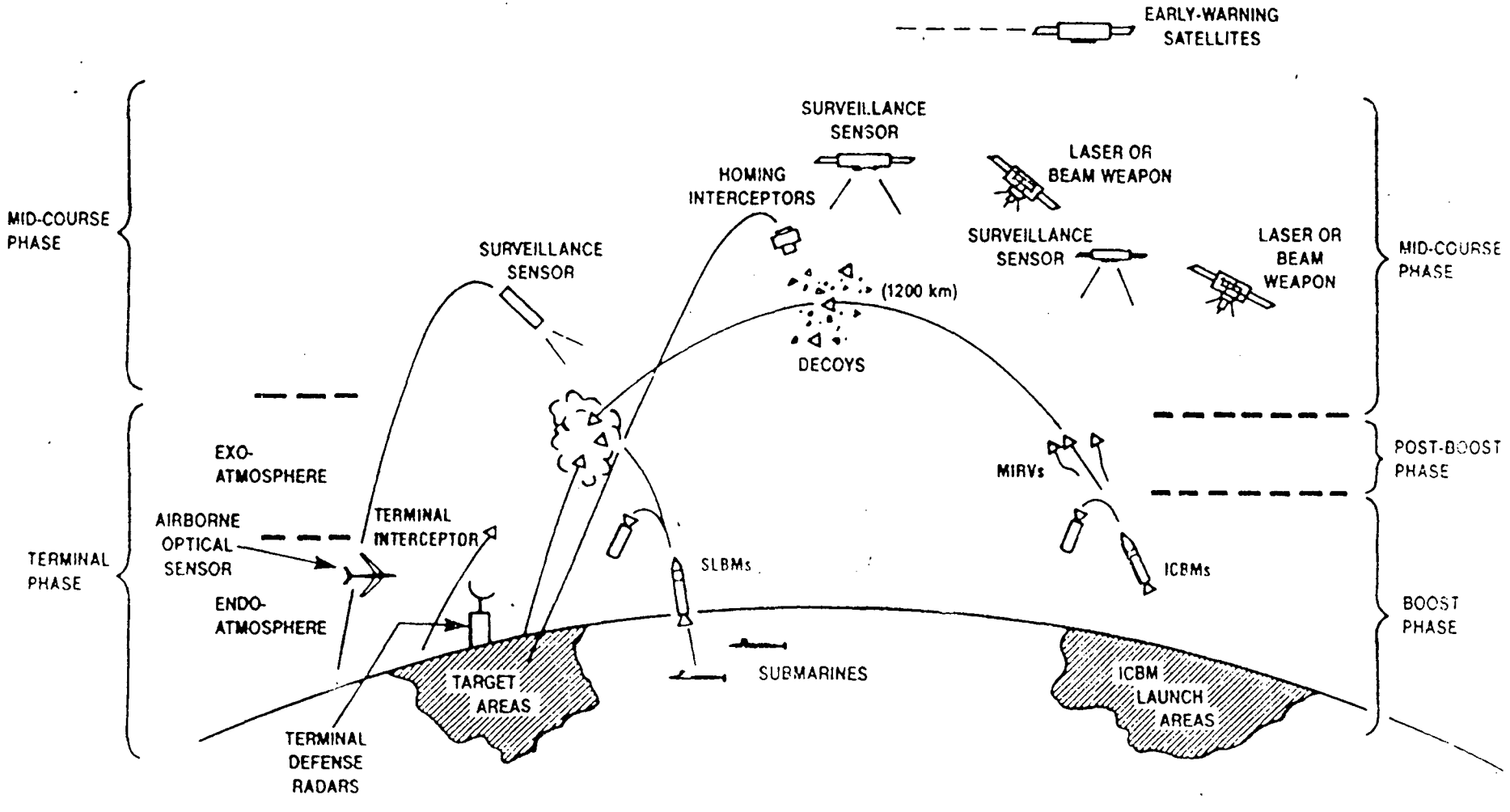

Fig. 3 Multilayered BMD System

Source: "BMD Technologies and Concepts in the 1980s", DAEDALUS, Vol 1, Spring 1985, P-59

short that no pop-up system could view the burning booster.[27]

The Countermeasures :

The Soviet Union will not just sit idle while the U.S. is engaged in developing their nuclear shield. There are many offensive countermeasures which are very cheap and can easily foil the current space defensive system of the U.S. Testifying on the subject of countermeasures before the House Armed Services Committee, Richard D.Delauer, Under Secretary of Defense for Research and Engineering stated that any defensive system can be overcome with proliferation of decoys, decoys, decoys, and decoys.[28]

Blinding :

Sensors are one of most important part of the current space ballistic missile defense technologies of the US. There are a number of ways through which Sensors can be blinded, thereby making the entire defensive system impotent. One very simple blinding technique is through nuclear detonation. An RV can be salvage fused or detonated as programmed. A nuclear detonation produces

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27 Bethe, Garwin, Gottfried and Kendall, n.18, p.43.

28 Ibid., p.47.

intense electromagnetic radiation at all frequencies. The sensor is over loaded with energy at frequencies to which it is sensitive and it gets disabled. Morever, a nuclear explosion in the upper atmosphere causes ionization glows over a range of infra-red wave lengths and these glows mask signals from potential targets.

Spoofing and Hiding :

One of the most important counter measures is different decoys. An aluminized balloons can be used to surround both RVs and decoys and, therefore, making the discrimination between an RV and a decoy difficult. Since these decoys are very light they can be put in large number on one missile.

During the deployment of warhead, a cloud of balloons can be placed around them, which would not only absorb and reflect radiowaves but also disperse the radar radiation reflected from the warheads. By spraying of an acrosol cloud which is a source of infra-red radiation, around warheads, it can be used to camouflage warheads own infra-red radiation.[29]

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29 Report of the Committee of Soviet Scientists for Peace against the Nuclear Threat - Space Strike Arms and International Security, Moscow, 1985. cited from Strategic Digest, May 1986, p.593.

Counter-Measures to Weapons :

The booster themselves could be protected against the effects of the lasers. Possible measures include coating the whole booster with a material that burns off the skin of the vehicle, releasing an enormous amount of heat, thereby neutralising the laser effect.

Secondly, booster can be spun in a very high speed so that a directed energy beam which needs several seconds before it can melt a hole at a point in the booster, is dispersed over a large area.

Thirdly, attaching skirts to the bottom of the booster, the Sensor will get confused and will give wrong calculation about the distance between the flame which the sensor detects and the body of the missile, which the battle station must attack.

Fourthly, by reducing the boost-phase, the defensive system will face a formidable time constraint and its job will become severely complicated. In addition to the time constraint, certain defensive weapons like X-rays and particle beams will become ineffective in the atmosphere. The Soviets are currently testing their equivalent to MX (which is a fast burn booster) the SS-X-24.

Saturation

The Fletcher Committee report has suggested layered defense and through this, has calculated that 99.9%

accuracy can be achieved. It means 0.1% can still leak through the defense. Therefore, on every 1000 warhead, 1 might leak through. Therefore, one possible counter-measure is simply to increase the number of warheads. A Soviet SS-18 can accomodate upto 30 warheads in the absence of any treaty obligation and, therefore, proliferation of warheads is not a problem for the Soviets.

Secondly, the Soviets in order to inflict an unacceptable damage can always go for a preferential offense i.e. concentrating on a few cities only in order to overwhelm the defense. Therefore, theoretically the American defense should be capable of handling the launch of the whole Russian ICBM arsenal against a single unspecified target which is technologically not feasible.

Thirdly, in the terminal phase, a more crude but no less threatening counter-measure can be, to resort to the use of extremely large warheads (say 50 megaton range) against population ventures. Such a warhead can cause massive damage even if exploded at high altitude, and can be salvage fused i.e. fused to explode when attacked.

Evading-Circumvention

Another possible counter measure to the space based defensive system is the launching of the SLBMs on depressed trajectories. The massive deployment of cruise

missiles of different basing modes can be yet another measure. Since they fly at very low altitudes, their detection by the space-based Ballistic Missile Defense will be difficult. Moreover, some of the defensive weapons like X-rays and particle beams will be ineffective in the atmosphere.

Suppression

And finally there is every reason to believe that the Soviets, before launching a nuclear attack will take the precaution of first knocking out the key and vulnerable parts of the defensive system. One possible active counter-measure will be placing the so-called "space mines" close to the orbit of the other side's battle station and to detonate them when occasion demands.

Secondly, as the space battle stations will be moving in a fixed orbit, it is very easy to destroy them by ground-based lasers of a very high intensity.

Thirdly, if an adversary was to put a satellite into the same orbit as that of the anti-missile weapon but moving in an opposite direction and if the satellite was to release a swarm of one ounce pellets, each pellet could penetrate 15 cm of steel and much farther if it were suitably shaped. Technologically it is not feasible

to launch anti-missile defensive system strong enough to withstand such projectiles.

Fourthly, spraying a small cloud of even micro particles in the opposite orbit to the defensive system will damage the delicate reflecting mirrors, and consequently the laser beams cannot be focussed very accurately.

Thomas Krebs, (formerly the Pentagon's chief analyst on Soviet space warfare capabilities) maintains that the employment of the above mentioned counter-measures is not that easy. They may create problems for Soviet military planners itself. Some counter-measures undermine others. For example, shielding boosters increases their weight, requiring them to carry fewer warheads. This would undermine the Kremlin's option of increasing warheads. The military planners of the Pentagon are not ignorant of these counter-measures. They have a number of technical means to foil these counter-measures.

Accordingly, Mr Krebs argues for three options which are open to Moscow :

(i) The Soviet BMD programme funded at much higher levels than Reagan's SDI could guarantee Soviet strategic superiority and can force America to abandon their project.

(ii) Cruise missiles and other air breathing systems can be very effective counter-measures.

(iii) A massive propaganda against SDI in Europe will generate political opposition and consequently will have a decisive effect on the project.[30]

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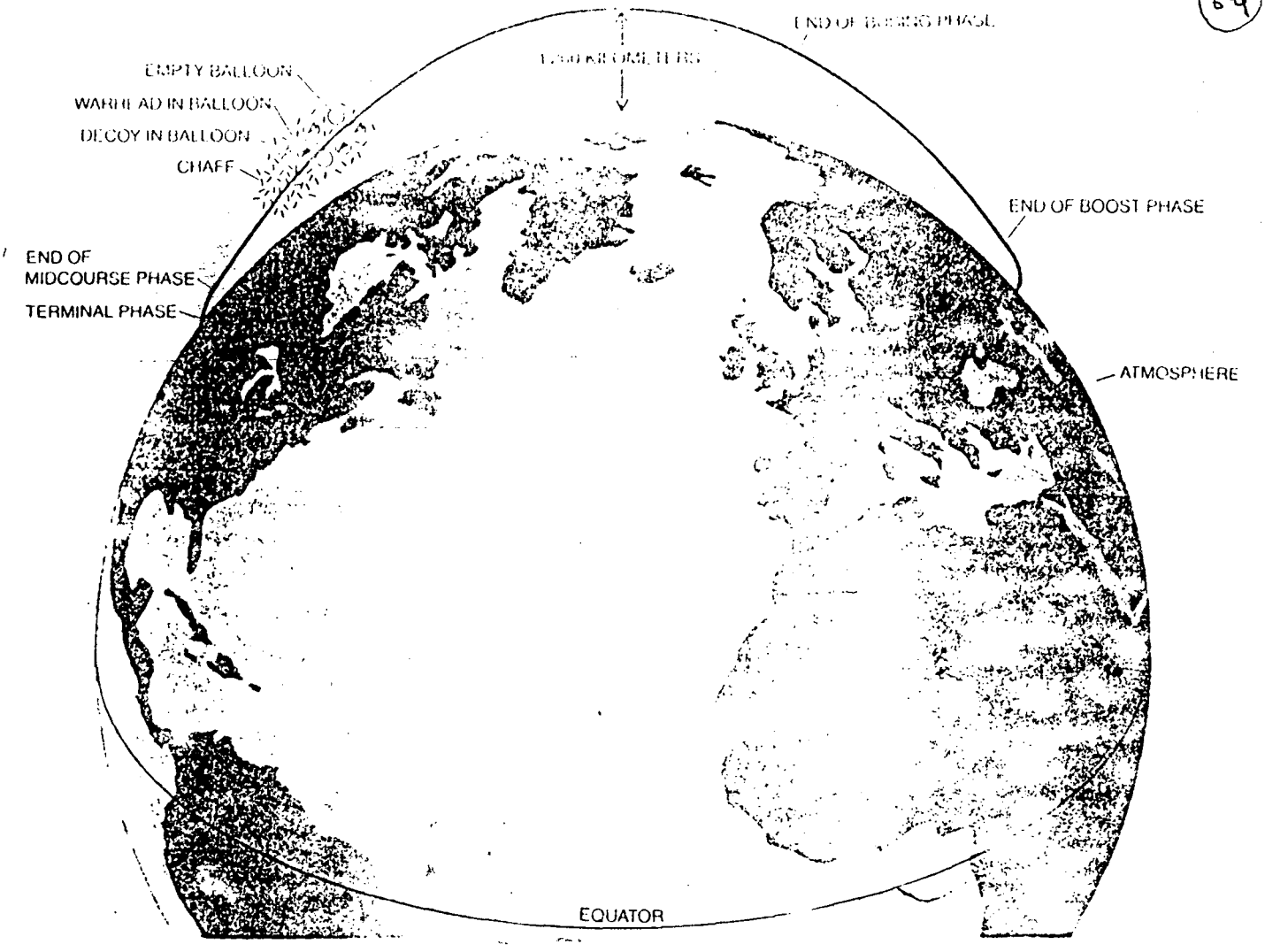
30 Thomas Krebs, "Can the Soviets Counter SDI" ? in Zbigniew Brezezinski (eds.), Promise of Peril The Strategic Defense Initiative (Washington D.C., 1986), pp.262-263.



FOUR DISTINCT PHASES are evident in the flight of an intercontinental ballistic missile (ICBM). In boost phase the missile is carried above the atmosphere by a multistage booster rocket. Most modern strategic missiles carry multiple independently targetable reentry vehicles (MIRV's), which are released sequentially by a maneuverable "bus" during the busing, or postboost, phase. If the country under attack had a ballistic-missile-defense system, the bus would also dispense a variety of "penetration aids," such as decoys, balloons enclosing MIRV's and decoys, empty balloons, radar-reflecting wires called chaff and infrared-emitting aerosols. During the midcourse phase the heavy MIRV's and the light penetration aids would follow essentially identical trajectories. In the terminal phase this "threat cloud" would reenter the atmosphere, and friction with the air would retard the penetration aids much more than the MIRV's. For ICBM's the flight would last between 25 and 30 minutes; for submarine-launched ballistic missiles (SLBM's) it could be as short as eight to 10 minutes.

MISSILE	GROSS WEIGHT (KILOGRAMS)	END OF BOOST PHASE		END OF BUSING		USUAL PAYLOAD
		TIME (SECONDS)	ALTITUDE (KILOMETERS)	TIME (SECONDS)	ALTITUDE (KILOMETERS)	
SS-18	220,000	300	400	?	?	10 MIRV'S ON ONE BUS
MX	89,000	180	200	650	1,100	10 MIRV'S ON ONE BUS
MX WITH FAST-BURNING BOOSTER	87,000	50	90	60	110	SEVERAL MICROBUSES WITH MIRV'S AND PENETRATION AIDS
MIDGETMAN	19,000	220	340	—	—	SINGLE WARHEAD
MIDGETMAN WITH FAST-BURNING BOOSTER	22,000	50	80	—	—	SINGLE WARHEAD WITH PENETRATION AIDS

CHARACTERISTICS OF FIRST TWO PHASES in the flight of an ICBM are given for five missiles: the SS-18, a very large, multiple-warhead ICBM already deployed by the U.S.S.R.; the MX, a large, multiple-warhead ICBM currently under development by the U.S.; the Midgetman, a smaller, single-warhead ICBM now in the early planning stages in the U.S., and two hypothetical missiles comparable to the MX and the Midgetman that have been specifically designed to co
this case the
only with suitable penetration aids but also with fast-burning boosters, thereby reducing the time available for the defense to detect their infrared emission. The SS-18 is constrained under the terms of the SALT II Treaty to carry no more than 10 MIRV's; it is actually capable of carrying 30 or more smaller warheads. A single-warhead missile such as Midgetman need have no bus and hence there would be no distinction in its case between the postboost phase and the mid-

Source: "Space-based Ballistic-Missile Defense", Scientific American, Oct 1984 P. 40.

Chapter - III

SDI AND THE WESTERN RESPONSE

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SDI AND THE WESTERN RESPONSE

The Alliance Concern :

The raison d'etre of NATO has not been that Allied territories be protected by superior war-winning capabilities but rather by a deterrent capability provided by the US - sufficient to threaten the survival of any major attack, even at the risk of America's own survival.[1] The extended deterrence guaranteed by the US to its allies after the Soviets acquired the long range nuclear weapon capabilities further reinforced the above mentioned faith because it implied that America would no longer remain immune, in case deterrence failed.

However, President Reagan's speech on 23 March, 1983 introducing the Strategic Defense Initiative is going to change the strategic scenario considerably. Until now the US has maintained the credibility of the above mentioned deterrent threat. However, the introduction of SDI has put a big question mark on the US sincerity to maintain the credibility of this deterrence. If the US goes ahead with the deployment of the current Strategic Defense System it appears that the nature of

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1 Christopher Bertram, "Strategic Defense and the Western Alliance", DAEDALUS, vol.1, Spring 1985, p.280.

NATO alliance will change substantially. A major crack in the alliance system seems to be in the offing thereby reducing its cohesion and in the process, the nature of the East-West relations will undergo substantial change.

The SDI speech of President Reagan came as a surprise to the NATO allies. They were not consulted before. The initial reaction was simply to hope that the speech was an aberration and that there would be no significant follow through.[2] However, later on when the follow up action was taken seriously, they realised that the Reagan administration was very serious about it and thus their concern became very pronounced. Always inclined to be a little suspicious of US readiness to take its allies concerns sufficiently into account, many Europeans see in the American failure to consult them in advance a clear indication that SDI is intended primarily, if not exclusively, to defend the United States. As such, the programme feeds European concern about American tendencies towards unilateralism, if not isolationism.[3]

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2 Lawrence Freedman, "The Star Wars Debate : The Western Alliance and Strategic Defence", Part II, in Robert O.Neill, ed., New Technology and western Security Policy, p.157.

3 Arnold Kanter, "An Alliance Perspective", in Zbigniew Brzezinski, ed., Promise or Peril : Strategic Defense Initiative (Washington D.C., 1986), p.287.

Though it is difficult to pin point a coordinated West European response to the Strategic Defense Initiative, yet their broad concerns may be formulated as follows :

First, they are very sckeptical about the technological feasibility of the leak proof strategic defense. If Americans get a shield against incoming ballistic missile, the Soviets will not lag behind. They would soon catch up and would have their own BMD shield. In such a situation both super powers would substantially increase their offensive weapons in order to penetrate the defense. This increase in the offensive weapons would disturb the strategic stability which is one of the essential components of deterrence.

Secondly, the West European alliance countries doubt that a strategic defense would be meaningful to them because of their geographical proximity to the Warsaw Pact countries. Since a strategic defense of America against a Soviet ballistic attack would have around 30 minutes time, this time frame would be drastically reduced in the case of Western alliance countries bordering warsaw pact countries. This would also drastically reduce the technological feasibility of a Strategic Defense for them. Thus with the deployment of Strategic Defense systems, America would be invulnerable and the

allies would be left exposed. Since extended nuclear deterrence is tied with America's own vulnerability and now that this condition no longer exists, they fear strategic decoupling of America's security from that of Western Europe, resulting in a fortress America and an unprotected Europe.

Thirdly, the INF deployment in early 80's had split Europe in two camps. One section favoured it on the ground that it manifested a physical linkage of the American security with that of the Allies. However, the other side opposed it on the ground that deployment of INF system manifested an American desire to limit a possible nuclear war to the European theatre only. The deployment of Strategic Defense shield around the US would undercut the earlier argument for the deployment of the IMF System.

Fourthly, it would have a crippling effect on the resources of the alliance as a whole. The deployment of BMD on both the sides would increase the offensive strategic arms race in order to penetrate into the defense of the opposite camp. Thus the Allies would be forced to allocate more budget on defense, and the US, because of its deficit due to Strategic Defense Initiative programme would cut its allocation to the alliance.

Fifthly, by holding out the prospect that nuclear weapons will become 'impotent and obsolete', the Reagan administration has in a sense criticised the rationale that European leaders have espoused in order to defend the INF deployment.

By implying that INF deployment was immoral and irresponsible it has given credibility to their political opponent. Thus SDI implicitly questioned the value of INF deployments for which many of them are paying a significant domestic political price.

Sixthly, current US declaratory policy holds that the Soviet Union, in contrast to the United States, is less deterred by threats against urban industrial targets than by threats against nuclear offensive forces and other military assets, political leadership targets, and war-supporting industries.[4]

The technological feasibility of BMD capabilities appears that it will be more effective in defending specific hard targets than large population and industrial centres. Thus the logic dictates that the Soviet BMD

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4 Ibid., p.292.

will be able to defend those areas which the US declaratory policy asserts are key to deterring the Soviet Union. However, the protection of soft targets like large population and industrial centres are the core of the US nuclear deterrence strategy. Taking the declaratory policy at its face value we may conclude that the mutual development of strategic defenses may have asymmetrical consequences for deterrence. The United States may be more deterred than the Soviet Union from launching nuclear as well as conventional attack.

Seventhly, the most serious political implication of SDI may be for British and French nuclear deterrents. If a Soviet BMD is built it will soon be effective against the British, French and Chinese offensive system. Though it is true that NATO's strength is enhanced by the nuclear forces of these countries, yet they cannot substitute for the US deterrent. Therefore, their loss is not going to effect much in strategic terms.

However, its political ramification is considerable. The other NATO allies view the British and French deterrents as a reinforcing link between the US strategic forces and their own security.[5] They would be disturbed if this link

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5 Ibid., p.297.

link were weakened or severed. And since SDI will be the source of this unwanted development, there will be a very intense hostile reaction against it.

The British and the French will react more profoundly. The independence of their foreign policy, their claim to special status both in the alliance and in the international order and most important, their ultimate guarantee against a failure of the US nuclear commitment could all be called into question.[6]

Moreover, now that the credibility of the French and the English nuclear deterrence will decrease considerably, they will obviously increase their offensive nuclear forces in order to reinforce their declining nuclear credibility. As a result it would complicate the treatment of third country forces in US-Soviet arms control agreements.

Eighthly, if a BMD for the US and the Soviet Union comes into existence then the sense of shared risks between the Western alliance and the US is gone. Extended deterrence will cease to exist and only credible use of the Soviet nuclear forces will be against the allied targets, i.e. western Europe and the Far East. Similarly

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6 Ibid., p.297.

in the presence of the Soviet BMD, the US nuclear force can be used against Soviet allies i.e. in Eastern Europe. Thus it will present a vision of a nuclear war limited to Europe, a scenario the West Europeans have been striving for thirty years to avoid. A preemptive Soviet strike against American tactical nuclear forces in Europe will lose its risk for the attacker because of the threat to escalate to the strategic nuclear level, just as a nuclear strike against other West European targets, for the first time, become militarily rational.[7]

Even the multiplication of the indigenous nuclear forces will not change the scenario. Europeans will be relying on deterrent forces that can be blunted by Soviet's first strike but cannot retaliate against the Soviet targets. Even if Europeans try to penetrate the Soviet BMD through tactical missiles and other air breathing systems, it will not have any significant deterrent effect because of the absence of the threat of American strategic missiles.

Again even if the defensive shield against ballistic missile attack were to protect both the United States as

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7 Bertram, n.1, p.291.

well as its European allies, the situation is not going to change significantly. The allies would,by the mere fact of geography, remain exposed to tactical and other air breathing systems. Conversely, the US would remain relatively safe by sheer geography against non-ballistic missile systems. Thus the core of the extended deterrence, the "shared vulnerability" between the US and its allies is again absent, thereby putting a big question mark on its credibility.

Since the formation of NATO the most important contribution of US to the NATO alliance has been its commitment to joint security with its allies. Throughout the post-war period the US military policy has maintained an attack on any of its allies as an attack against itself. Such an extension of a nation's security commitment has been made credible by a real solidarity of risks. For the last thirty four years, the vulnerability of the United States to nuclear attack coupled with her military presence in Europe, has manifested this solidarity of risk. Therefore, the extended nuclear deterrence which has been the core of the cohesion of NATO alliance needs two pre-requisites.

(i) The US shall be vulnerable to a nuclear attack;

(ii) The US shall be capable of adding its nuclear power to deter an attack on Europe.

However, if the Soviets develop their own strategic defense in response to US's SDI, and if both have equally effective BMD capabilities, then the two above mentioned pre-requisites will be absent and hence the extended nuclear deterrence will lose its credibility.

The introduction of Strategic Defense Initiative in the present scenario suggests a fundamental shift from a time tested past strategic concept as well as from the basic philosophy of the Alliance itself. For Europeans, the American strategic vision is one more expression of a shift in the American world outlook, away from coalition policies and towards an assertive protected United States acting on its own.[8]

Finally Christoph Bertram in his Strategic Defense and the Western Alliance has posed a very significant and fundamental question. Is it worth risking the future of the western alliance for the sake of uncertain and doubtful technological promises? Is it worth, on such shaky foundations, instilling in Europeans, the fear that they will be left to themselves in the face of Soviet military power, and in the Americans the illusion that a European

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8 Ibid., p.294.

war will not profoundly shake their own security?

It is difficult to pin point a coordinated West European response to the Reagan Administration Strategic Defense Initiative. Britain responded unilaterally and wanted a bilateral British-USA relationship on SDI.[9] France attempted a coordinated European response.[10] FRG put its legs in both a European perspective and a bilateral FRG-US relationship.[11]

British Response to the Strategic Defence Initiative

President Reagan's speech on 23 March 1983 laying down the foundations for SDI came as a complete surprise to the British government, which like other NATO allies was not consulted before. At first it did not take the idea of SDI very seriously and thought that it would soon die. The British officials, who had not been consulted in advance, were horrified... The basic hope was that as the announcement had so obviously slipped through the policy

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9 Rakesh Gupta, ed., SDI : Aims, Implications and Response (New Delhi, January, 1988), p.101.

10 Ibid.

11 Ibid.

filter, that the machine would now correct the mistake and the plan would soon die without a trace .[12] The government of Prime Minister Thatcher was pursuing a $ billion modernization programme for the British sea-based independent deterrent and consequently the British government was coping with domestic political controversy involving its offensive force modernization programme when the President condemned offensive forces morally and proposed to make them obsolete.[13] Thus the British policy towards SDI has had a hesitant and even disjointed look, slow to emerge and not particularly well coordinated when it did appear.[14]

Upto the end of 1985, the British response to the SDI was marked by four features :

(i) Make no hasty response to the SDI,

(ii) Give the SDI programme only limited support.

(iii) Seek UK's participation in SDI research,

(iv) Deal with SDI on a bilateral basis directly with the United States.[15]

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12 Lawrence Freedman, "The Small Nuclear Powers", in Ashton Carter, David Schwertz, eds., Ballistic Missile Defense (Washington, 1984), pp.292-93.

13 Keith B.Payne, Strategic Defense : Star Wars in Perspective (London, 1986), p.197.

14 Trevor Taylor, "Britain's Response to the Strategic Defence Initiative", International Affairs (London), No.2, Spring 1986, p.217.

15 Ibid., p.217.

(i) Make No Hasty Response to the SDI :

The spring 1984 British Defence White Paper indirectly criticised the SDI since it asserted the role of nuclear weapons and the need for a credible deterrence strategy.[16] However, an explicit British policy on SDI did not emerge until Prime Minister Margaret Thatcher's visit to Washington in December 1984.

There was no pressure to react to the SDI because of three reasons :

(i) Since the BMD technology was at its infancy, the SDI was taken as a long-term programme. The task of Strategic Defence Initiative organisation which was created in 1984 was seen as coordinating the existing research projects. It was a long way to take decision on the deployment of this system.

(ii) The British government was convinced that the Soviet Ballistic Missile Defense which will come up as a response to the SDI would not be operational and effective before the twenty first century. During this period, the Trident

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16 Statement on the Defense Estimates 1984, vol.I, (London, HMSO, 1984), cited by Trevor Taylor, "Britain's Response to the Strategic Defense Initiative", International Affairs (London), No.2, Spring 1986, p.218.

missile system which the British government was procuring would remain a credible deterrent. The SDI did not therefore threaten the Trident decision in itself, and this eased pressure for a rapid British response.

(iii) The SDI had had little popular impact in Britain, and with its large parliamentary majority, the government was under no substantial domestic pressure either to support or to oppose the American programme.[17]

The British refusal to the 60 day deadline for response to a formal invitation by Caspar Weinberger in March 1985, to participate in SDI research further proves that the British was in no hurry to make the response. Though the completion of the participation agreement on 6 December 1985 was quite hurried, it was done on the personal insistence of the Prime Minister because the Prime Minister Mrs. Thatcher wanted to provide President Reagan with a firm backing before the reconvening of the Geneva Arms Reduction talks in January 1986.[18]

Qualified Support to the SDI Programme

The British response to the SDI programme was that of a qualified support. It can be seen in two major

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17 Taylor, n.14, p.218-219.

18 The Guardian, 7 December 1985.

instances. The first is the 'four points' agreement reached by President Reagan and Mrs.Thatcher in December 1984. The Prime Minister Mrs. Margaret Thatcher reportedly agreed to support the SDI under four conditions :

(1) The US and Western aim is not to achieve superiority, but to maintain the strategies balance, taking due account of the Soviet developments.

(2) SDI-related development would, in view of treaty obligations have to be a matter of negotiation;

(3) The overall aim is to enhance rather than undercut deterrence;

(4) East-west negotiation should try to achieve security with reduced levels of offensive systems on both sides.[19]

This implied that

(a) the strategic balance should be achieved on the basis of equality and equal security;

(b) the reduction of the level of offensive weapons which is the ideal of SALT-II; and

(c) the pursuit of SDI within the perspective of arms control strategy to further strengthen deterrence.[20]

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19 Taylor, n.14, p.220.

20 Gupta, n.9, p.108.

These four points left many questions unanswered and there were several ambiguities about where the line between 'research' and 'development' is to be located; whether negotiations were to be held between the United States and its allies or between the United States and the Soviet Union; whether failure of negotiations would mean that SDI would not proceed further, and whether 'deterrence' was to continue to rest on the prospect of mutual assured destruction involving nuclear weapons.[21]

The second was the speech of Howe, the British Foreign Secretary in March 1985 at the Royal United Services Institute in London. He criticized the SDI programme on the following points :

(1) BMD deployment could be destabilizing;

(2) BMD deployment could be overly expensive and absorb funding for needed military programmes;

(3) BMD deployment would be inconsistent with the SALT-I ABM Treaty and would threaten the prospects for arms control; and

(4) A comprehensive defense might be technically infeasible.[22]

These two major instances marks the limit which Britain wants to impose on its support for the SDI.

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21 Taylor, n.14, p.220.

22 Payne, n.13, p.199.

Seek Participation in SDI Research

Once the British government has given a qualified support to the SDI programme it was but natural to insist on share in the related research. In fact the British government was not so much interested in acquiring some technical knowhow about Ballistic Missile Defence, rather it was interested in the technological spin off which could be used in other military and civilian use. The Ministry of Defense, which led the drive for UK's participation, once Mrs.Thatcher had given the qualified support, was particularly interested in the relevance of SDI research for other military applications rather than for civilian purposes.[23] It was felt in the British circle that the participation in the SDI programme would provide an opportunity to the British technocrat to work at the highest scientific level thereby expanding and enriching the technological base. A related factor was that Britain had never viewed the French Eureka proposal as a realistic alternative means for Europe to develop SDI technologies, but instead had supported it as a means of establishing a single market in Europe for high technology goods, and for promoting more dynamic attitudes to high-risk but potentially high-profit near products among Europe's industrialists and

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23 Taylor, n.14, p.222.

financers.[24] The British government by acting in an intermediate role, with a Whitehall SDI participation office acting as a conduit through which SDI contracts would flow, the British government could keep an eye on what was going on and perhaps even help to protect the interests of British companies.[25] British has recognised the significance of SDI spin off in air defence and talks of air defence initiative (ADI).[26]

Thus it was clear that the British policy was clearer and more decisive on the specific issue of participation than it was on SDI as a whole.

Deal with United States on a Bilateral Basis :

Though other NATO allies were equally interested in the technological spin off from SDI project, Britain did not make a collective front with the other allies to have better slice of the cake. Instead it proceeded individually and wanted a bilateral relationship with the US on this issue. The probable reasons for this might be the following :

(i) Britain was aware of the US concern that West Germany was a poor security risk for high technology.

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24 Ibid., p.222.

25 Ibid., p.223.

26 Gupta, n.9, p.111.

(ii) Britain thought that by being first off the mark, it could get some quick contracts and demonstrate to the other allies that SDI participation was worthwhile.

The SDI project has posed two questions for Britain, both national as well as alliance perspectives. While the impact of SDI on the feasibility of Trident system was a national question, its effect on the security of Western Europe had an alliance perspective. While it was recognized that the European views on the participation issue might be vulnerable, and while Britain went along with inconclusive discussions about this in the West European Union (WEU), outright French hostility to SDI made a seven-nation position on the issue difficult, and the German government too was divided between the views of the Christian Democrats (CDU) and the Free Democrats (FD).[27] Thus Britain went on unilaterally and sought a bilateral relation with USA.

In fact, the SDI programme had presented a dilemma for United Kingdom. On the one hand, it was concerned about its effect on strategic stability and European security, on the other hand it was equally interested in its technological spin off which could be put to other military and civilian use. In fact, this dilemma explains the changing emphasis of British policy on SDI.

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27 Taylor, n.14, p.226.

West German Response to the SDI

Like other European allies, West Germany was also not consulted before and consequently it was taken aback by Reagan's speech on 23 March 1983 on SDI. The immediate German response was cautious but negative.[28] Hans Ruhle, the Director of Planning Staff in the Ministry of Defence had commented :

> Less positive consequences should derive from the fact that the American President links his proposal to a clear critique of the basic assumptions and means of existing security system. This is not changed by the fact that he considers a transition period of at least twenty years necessary, during which time the present means of deterrence has to be maintained. By ascribing a generally offensive character to nuclear missiles and thereby classifying them as dangerous and destabilising, he thus accepts in this respect the essential points of the critiques of the dual-track decision in Europe and thus makes the political realization of this programme more difficult.29

The Foreign Minister, Hans Dietrich Genscher and the Minister for Defence, Manfred Warner, had criticized the project. In December 1983, Genscher was reported to have warned US Secretary of State, George Schultz about the threat of an arms race in space.[30]

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28 Christoph Bluth, "SDI : The Challenge to West Germany", International Affairs (London), vol.2, Spring 1986, P.247.

29 Ibid., pp.247-248.

30 Ibid., p.248.

The reservation of west Germany on the SDI project was on the following count :

First, the United States is often criticized in the west European press for an absence of "sensitivity" to its allies and the introduction of the SDI was viewed as yet another example of this insensitivity. The German Chancellor Helmut Kohl was paying a considerable domestic political price in implementing the deployment of US INF on its territory. Precisely at this juncture the introduction of SDI, with its moral condemnation of nuclear weapons and the promise to make them obsolete had strengthen the political opponents of the Chancellor.

Secondly, West Germany, because of its geographical location, is extremely sensitive to the Soviet attack. It is only because of this concern that it is keeping hundreds of thousand of US troops on its mainland to deter a possible Soviet attack. Now with the introduction of SDI, Germany fears decoupling of American security with that of the allies. Therefore, the German Defence Minister, Manfred Warner had repeatedly warned about the "Fortress America" and unprotected Europe.[31]

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31 James Markham, "Bonn is worried by US Arms Research", New York Times, (New York) 14 April, 1984.

Thirdly, West Germany maintains that SDI, instead of strengthening deterrence by strategic stability would reduce it because it would produce strategic instability. Once the nuclear weapons become obsolete, the Soviet Union would obviously exploit its conventional superiority over NATO.[32]

However, from mid-1984 the German stand began to change. The following points appear to be the reason for the reorientation of the German position :

(i) the SDI is a research programme, not a deployment programme;

(ii) any move towards defense would include protection for US allies;

(iii) the Soviet Union for years has been pursuing energetically its R & D programme for strategic defense.[33]

Perhaps the most important consideration for this change in German stand was the realisation of technological spin off from SDI which could be put to other economic and fruitful use. This is amply demonstrated by Chancellor Kohl in his speech to the Bundestag in 1985 :

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32 William Broad, "Allies in Europe Are Apprehensive about Benefits of 'Star Wars' Plan", New York Times, 13 May, 1985.

33 Payne, n.13, p.196.

> In view of the magnitude of funding with which the US government plans to support its SDI research programme, it is quite evident to everyone even now that important and far-reaching results will be achieved - results whose significance, including the economic importance, will go far beyond the sphere of strategic defense.
>
> We will and must also be interested in utilizing research results in our industry that will have revolutionary civilian application. We must ensure that the FRG and West Europe are not outdistanced technologically and thus become second rate.[34]

Chancellor Kohl rejected Weinberger's 60 day deadline to join SDI research programme and backed collective West European response to the SDI programme to be in a better bargaining position and to have more influence on US decision about development and strategy. He emphasised that the SDI had brought back the Soviet Union to the negotiating table in Geneva. Kohl's chief concern was that participation in SDI research should not become a technological "one-way street" which would benefit only the United States.[35]

The French Response

Among the NATO allies France has been most critical of the current US BMD programme. The initial reaction to

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34 Payne, n.13, p.196.

35 International Herald Tribune, 19 April 1985.

Reagan's 23 March speech on SDI was described by one French official as a mixture of scepticism, bewilderment and a mild dose of embarrassment.[36] They were sceptical because of the doubt of the technological feasibility and financial soundness of the SDI. Moreover they were concerned about the structural change in the nuclear strategy i.e. the doctrine of deterrence based on MAD. They were bewildered because they were not consulted and as the SDI in a way strengthened the Peace Movement and, therefore, questioned the very rationale behind the decision to deploy INF and TNF in west Europe. And they were embarrassed because of a naive assumption that the allies would see the benefit of depending on America against strategic nuclear missile attack much the same way as America and also due to additional cost to the French and British nuclear forces resulting from the Soviet response to the American programme.

As early as February 1984 the French President Mitterand expressed the desire for a cooperative "European Space Community" as the most appropriate answer to the

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36 Benoit d'Aboville, "A Few Notes on the European Attitudes towards the SDI, talk presented to the East-west Institute, New York, 9 November 1984. Cited in John Fenske, "France and the Strategic Defense Initiative : Speeding up or Putting on Breaks", International Affairs (London), vol.2, Spring 1986, p.221.

military realities of the future :

> We must look beyond the nuclear realm if we wish not to fall behind with regard to a future closer than is generally believed. Europe should be capable of launching a manned space station, which will allow us to observe, to transmit, and thus to take action against any menace ... then Europe will have taken a big step towards its own defence.... A European Space Community would be to my thinking the most appropriate response to the military realities of tomorrow.37

The next important incident in the series which reflected the French attitude towards SDI came in June 1984 at the Disarmament Conference in Geneva. The French ambassador reiterated his government's faith in nuclear deterrence and the ABM Treaty. He said :

> A situation in which each of the two main powers sought to render its territory completely invulnerable, that is, to escape all reprisals while at the same time being uncertain of success, would be full of dangers...38

He also proposed an international conference to discuss four points :

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37 John Fenske, "France and the Strategic Defence Initiative : Speeding up or Putting on Breakers", International Affairs (London), No.2, Spring 1986, p.223.

38 Ibid., p.233.

(i) Anti-Satellite Weapon (ASAI) restrictions, especially concerning high orbits;

(ii) A ban on the testing and development of directed energy weapons, for an initial period of five years (thus bringing them explicitly within the purview of the ABM Treaty, which mentions 'ABM systems based on other physical principles' in Agreed statement D);

(iii) Strengthening of registration and verification provisions of the 14 June 1975 UN Convention on Outer-Space objects;

(iv) Extension of the bilateral United States-Soviet agreement on the inviolability of reconnaissance satellites (the national technical means of verification Article XII, ABM Treaty).[39]

Since the SDI had more or less the same military and political fall out on Britain and West Germany, France from early 1985 onwards started exploring the possibilities of a common European front to handle the current US BMD programme. Moreover, it became louder in its criticism about the technological, scientific and economic threat posed by the American research programme.

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39 Ibid., p.233.

It encouraged the British and West Germans to form an intra-European front to deal with SDI. But before this intra-European reflection could produce results, Mr Weinberger wrote his famous letter of 26 March 1985, offering the alliance to participate in the SDI project and asking for their response within 60 days.

Within a month of Mr.Weinberger's letter, France proposed as a quasi-alternative to the SDI, a European high technology, space-oriented research effort labeled as 'Eureka'. Eureka is a near acronym for European Research Coordination Agency. 19 European States have agreed to develop cooperatively many of their non-military high-technology ventures. The West European response to embark on this joint venture has been three fold :

(i) Recpupling its global trading position in high technology;

(ii) transforming the weak, fragmented national economies into more of a single, strong internal market; and

(iii) reflecting over President Reagan's SDI plan, and its implications for European dependency on USA and a second-class status.[40]

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40 Bierre-Henri Laurent, "Eureka or the Technological Renaissance of Europe", Washington Quarterly, Winter 1987, vol.10, No.1, p.55.

In fact the driving force behind this joint endeavour of European countries was the realisation that an individual European power is no match for the gigantic American and Japanese trade field. They correctly realised that in order to have a say in the world market, they have to pool their scientific and industrial talent and put a common front against the Japanese and the American challenge. A common front would give them a better bargaining power. They have proclaimed that heavy doses of cooperation within Europe, rather than competition, will result in their regaining world market.

In fact, the current American BMD programme had a direct bearing on the evolution of Eureka. The list of interests as areas initially selected for Eureka resembles the fundamental research objectives of the SDI : optical electronics, super-computer lasers and particle beams, artificial intelligence and high-speed micro electronics, etc.

The French initiative towards downgrading the role of SDI stems from two factors :

(i) The barriers to European participation in SDI increased substantially during 1985-1986, and France became

more wary about the size and numbers of US contracts. The latest estimate suggests that between 1% to 2% SDI contracts will cross the Atlantic.Britain has received most of the SDI money going to Europe. Some $34 million, according to the UK Ministry of Defense. Of this sum (about $ 24 million) has gone to industrial firms and the rest to university research groups and government laboratories. France is number two in SDI receipts, with contracts totalling about $ 5 million. The figures for Italy have not been stated, but they are believed to be no more than a few million dollars. For West Germany, the sums are minuscule - a mere $ 50,000 according to the German Foreign Ministry.[41]

(ii) Eureka, not SDI, appeared to contribute directly to the needed major internal revolution that would diminish and finally annihilate national partitions and structural rigidities. It would work to break the barriers to European economic growth, new jobs and trade power.

Eureka from birth was destined to stay as close as possible to the civilian market place. Yet, as External Relations Minister Roland Dumas himself admits, this goal should not impede the use of results from Eureka for military purposes.[42]

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41 Current News, 23 July 1987, p.44.

42 Fenske, n.37, p.235.

In May 1985 during the Bonn Economic Summit, President Mitterand rejected French participation in the SDI. Mitterrand said at a news conference that Europeans should concentrate on their own research programme rather than "wasting their talent on a non-European undertaking".[43] During the June 1985 spring meeting of NATO foreign ministers in Portugal the United States hoped to acquire NATO endorsement for the SDI but gave up because of stiff French opposition.[44]

The French have rejected the SDI on grounds generally parallel to those of the Germans, British and American critics of the programme. They maintain that the SDI would threaten to upset the stability of deterrence by retaliatory nuclear threat and would lead to an isolationist America unconcerned about European security. They are also worried because the increased BMD deployment by the Soviet Union would degrade the French independent deterrent and compel them to take offensive countermeasures. They have also criticised the SDI for being, potentially, the means of escalating the arms race, which will lead to the militarization of space.

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43 Broad, n.32,

44 John Goshko, "NATO Support for SDI Blocked by France", Washington Post (Washington) 7 June, 1985.

Finally, the French appear to perceive the SDI as an arrangement, wherein the US would dominate Western Europe in the area of high technology. According to the French, the SDI would relegate Europeans to the role of subcontractors' to the United States. The French fear that such an arrangement would deny the Europeans full access to the potential civilian technological benefits of SDI. The anticipated role of 'sub-contractor' also appears to be an affront to French prestige and national independence. Asked about his refusal to participate in SDI, President Mitterrand reported a conversation he had with President Reagan : "Subcontractors'. That is the word I heard. The word was said in English. It confirmed my intuitions".[45]

After the 1986 elections Jacques Chirac said in September 1986, "So long as we are faced with the excessive arms build-up of the two super powers and imbalance of the conventional forces in Europe, our security will involve the nuclear strategic deterrence". This obeissance to nuclear deterrence is followed by the caution on SDI thus, "In that respect, one must adopt, with regard to the Strategic Defense Initiative, the responsible, clear sighted

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45 Fenske, n.37, p.236.

attitude of a country which has no intention of making its decisions according to the dictates of others".[46]

However, the French Government is concerned about the technological challenge presented by SDI. Though they do not expect to receive a large share of SDI work and believe that the strict US regulations limiting technology transfer and the pressure upon Congress to spend US dollars in America will prevent them from reaping significant financial benefits. Yet SDI is attractive to them because of the new fields of research involved. Even small contracts involving cooperation with US firms would yield valuable technological advances. Defense analysts and experts in high technology research believe that more active participation in SDI research would be essential if France wants to maintain its high profile in civil as well as military fields. The French are also interested in possible spin-offs for the civilian sector of their economy : advances in electronics, telecommunications, software, high speed computers and artificial intelligence. This concern is well demonstrated in Jacques Chirac's speech of September 1986 :

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46 Gupta, n.9, p.107.

> Nevertheless, the advances that will come in space and other technologies, particularly within SDI and in many other European frameworks in which we are playing a noteworthy part, will sooner or later lead to an evolution of concepts and weapons. France is duty bound to remain vigilant : on pain of being left on the sidelines of technological progress and possibly falling behind- which would ultimately make her more vulnerable - she must pay the greatest attention to maintaining the reasons and manufacturing capabilities of French industry in all the high-technology sectors.47

Thus the French officials and analysts insist on the need to "decouple" thinking about the long term military dimension of SDI from the nearly immediate challenge to the scientific, technological and economic future of France.

We may conclude that inspite of the reservations of the alliance partner on technical, strategic and political grounds, they have not all together rejected the idea as bogus and nonsense. The following are the incentives to join the project.

1) Participation in the SDI will ensure that the high-technology 'gap' between the United States and Europe does not widen. The consideration of advanced technology and access to the potential civilian 'spin-offs of SDI research

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47 Ibid., p.10.

appears to provide an extremely strong incentive for participation in the SDI. Even if effective defenses are never achieved, the civilian benefits in computer, telecommunications and laser technology could be tremendous. NATO-Europe does not want to be excluded from such civilian commercial benefits resulting from major high-tech research programs.

2) The SDI has proved helpful in the arms control process. The allies sincerely believe that the SDI brought the Soviets back to the negotiating table following their November 1983 walkout and thus it can provide arms control leverage.

3) Finally, yet another incentive to participate in SDI project is that it will ensure a long term allied voice in matters concerning BMD deployment.

Chapter - IV

CONCLUSION

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President Reagan's Star wars speech unfolding his plans for a new defense strategy that will alter the basic concepts of nuclear strategy developed over the past three decades is as historic as Sir Winston Churchill's 1946 Fulton speech of "iron curtain" ushering in the Cold War, and President Kennedy's Proclamation of US determination to land a man on the moon. Neither of the earlier speeches, however, had the ominous implications for humanity that Reagan's announcement has .[1]

SDI represents a shift from Mutual Assured Destruction (MAD) to Mutual Assured Survival (MAS) which signifies a change from deterring a nuclear war to waging, winning and surviving one. Colin S.Gray developed the Mutual Assured Survival perspective. He says that for the last two decades the US has been dependent on the latent nuclear threat, but the American society has shown little inclination to think beyond pre-war deterrence, let alone to invest large resources in a capability to prevail in, survive and recover from nuclear war.[2] Criticising the doctrine of mutual

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1 K.Subrahmanyam, "The Star wars Delusion", in Steven Anzovin, ed., The Star Wars Debate, vol.58, No.1, (New York, 1986), p.189.

2 Colin S.Grey, "Strategic Stability Reconsidered", U.S.Defense Policy in the 1980s", Daedalus, Fall 1980, p.143.

deterrence, based on the idea of mutual assured destruction, Edward Teller said, "MAD was a ridiculous plan...based on the idea that the two countries would hold each other's population hostage, that we would not protect or defend our people against a nuclear attack".[3]

The process of shifting from a doctrine of mutual deterrence based on the idea of mutual assured destruction, to one of actually fighting a nuclear war began with US Defence Secretary James Schlesinger in 1974. President Reagan is further reinforcing the concept of nuclear fighting by an attempt to develop a capability to destroy the warheads after they are launched. Until now both sides had only swords to fight with, but now one side is proclaiming its intention to acquire a shield.[4]

Reagan administration has time and again emphasised that the SDI project is intended to make a shift from offence to 'defense dominated' world. However, it requires either of the two pre-requisites ;

(i) A defensive technology that was so robust and cheap that counter measure or an offensive build up would be

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3 Robert Scheer, With Enough Shovels (New York, 1982), p.104.

4 Subrahmanyam, n.1, p.189.

futile;

(ii) Or a political climate that would engender arms control agreements of unprecedented scope. Unfortunately neither of these two conditions is in sight.

The SDI, in order to be effective should have some weapon which would penetrate the atmosphere in order to destroy the offence in its boost-phase itself. Once this technological breakthrough is made, according to experts it will not be difficult to slightly increase the range and destroy the ground-based targets. In fact the development of a space based so-called 'defensive shield' with offensive capability will further enhance the first strike capabilities of the US strategic nuclear forces. This may be perhaps one of the many reasons for President's Reagan's backing out of the earlier promise of sharing the SDI technology with the USSR.

If we assume that all technical problems are solved and a leak proof system is possible, the United States would find itself in a position of overwhelming strategic superiority, defended and still retaining its offensive capabilities. The Soviet Union would be left with a largely useless offensive force which could not penetrate to the target. The result would be that the Soviet Union with its offensive nuclear forces, would be placed in a

dilemma of 'use them or never use them' during the deployment stage. Logical reasoning dictates that the Soviet Union might be tempted to attack before the system becomes operational, because it knows that its forces would be impotent once deployment was complete and as a result the US would gain overwhelming strategic superiority. Thus the proposed SDI project could provoke an armed conflict between the super powers even before it becomes operational.

One of the principal factors leading to the ABM accord was a conclusion reached by both the super powers that the then existing technology did not offer the prospect of a robust ballistic missile defenses. As a result, both were concerned that deployment of relatively ineffective ABM systems on either side could prompt a proliferation of offensive nuclear forces, an action-reaction cycle that would result in higher levels of offensive arms. Therefore, both the super powers rightly felt that an agreed limit on ABM systems would put constrain and reduce the offensive ballistic missile forces. The ABM Treaty explicitly prohibits regional and nationwide ballistic missile defences. It permitted the deployment of only 100 interceptors either around national capital or designated ICBM complex.

The Star wars project does not abrogate this inescapable strategic logic in the slightest. By introducing some measure of certainty into US and Soviet military planning, the treaty has weakened the logic for upgrading offensive capabilities. Thus the Star War project would trigger an arms race of an unprecedented nature because in the event of both the super powers possessing a Ballistic Missile Defence, (though the Soviets tend to follow the American lead in the arms race, they always catch up) they would try to increase their offensive forces in order to penetrate the adversary's sheild. This would make the strategic balance more precarious than it is today.

Yes, we have witnessed a quantum jump in both the super powers offensive weapons since the signing of the ABM treaty but to a large extent the responsibility for this lies with the US. MIRVs are conceived as an ideal countermeasure to Ballistic Missile Defense and in the light of the reasoning of ABM Treaty, it should have been abandoned with the signing of the ABM Treaty. Nevertheless the US did not try to negotiate a ban on MIRVs. In spite of warning from scientific community and the Arms Control and Disarmament Agency (ACDA) that MIRVs in the long run would be advantageous to the Soviet Union because of their large ICBM force, and consequently would undermine

the strategic balance, the Nixon administration went ahead with MIRV testing and deployment, thereby assuring that the Soviets would follow suit. The United States began deploying MIRVs in 1970, five years ahead of the Soviets and by the end of the decade it had increased its strategic warheads from 4,000 to 9,000; the Soviets moved from fewer than 2,000 to around 5,000 strategic warheads during the same period.[5]

President Reagan's Strategic Defense Initiative programme directly challenge the strategic premises on which the world has avoided a nuclear holocaust for the last three decades. The notion of strategic stability is the product of the concept of Mutual Assured Destruction, i.e. the pillar of the doctrine of Mutual Deterrence. It grew out of the realisation that given the enormous destructive power of both the super powers, they cannot afford to risk a nuclear war because in the process both will get destroyed. Both the super powers have the potential to inflict an unacceptable damage on its adversary. Thus the realisation of the mutual vulnerability to an

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5 Peter A.Clausen, "SDI : In Search of a Mission", in Zbigniew Brezezinski, ed., Promise or Peril; The Strategic Defense Initiative (Washington D.C.1986), p.170.

unacceptable limit has deterred each from launching a nuclear strike.

Therefore, according to the concept of Mutual Assured Destruction the vulnerability of populations and the invulnerability of retaliatory forces would contribute to stability. Conversely, any attempt to break out of this hostage relationship - either by protecting one's population or by acquiring the capability to carry out a disarming strike against the other would be destabilizing.

The only aim of the SDI is not merely to protect the United States and its allies from the incoming ballistic missiles. It has certain other ulterior motives as well. These have been well brought out in "High frontier : A New National Strategy", published in February 1982, by the Heritage Foundation, a U.S. right wing think tank. It has pointed out three major objectives :

(i) It will confront the USSR with precisely the sort of armaments competition that the Soviet leadership most fears.

(ii) It will severely tax, perhaps to the point of disruption, the already strained Soviet technological and industrial resources.

(iii) And it will seriously threaten the very foundations of the strategic structure the USSR has built at great

cost over the past twenty years.[6]

Thus one of the principal objectives of the SDI is to engage the Soviets in sophisticated armament race of an unprecedented scale and to wreck the relatively weaker Soviet economy by bleeding the Soviets white.

The President seems to have ignored the conclusion of James Fletcher Committee Report which says that the ultimate utility, effectiveness, cost, complexity and degree of technical risk in this system will depend not only on the technology, but also on the extent to which the Soviet Union either agrees to mutual defense arrangements or offensive limitations.[7] The Strategic Defense Initiative project deludes the public into thinking that the solution to the dual problem of nuclear weapons and troublesome adversary can be resolved by new weapons system, rather than by political means.

Given the technological feasibility of a leak proof ballistic missile defence, an impermeable shield is not possible. Yet in the name of this fantasy, a confrontation

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6 Subrahmanyam, n.1, p.190.

7 David B.Rivkin, "what Does Moscow Think", in Steven Anzovin, ed., The Star Wars Debate, vol.58, No.1, (New York, 1986), p.200.

is being forced upon the Soviet Union and that too when a very flexible leadership is in power. The present leadership means serious business and small concessions on the so-called Ballistic Missile Defence project might lead to deep cuts of an enormous nature. Moreover, NATO is being plagued by severe tensions.

Faced with mounting criticism, the US administration spokesman has said that the SDI programme is just a research effort and that no decision to deploy will be made for many years. However, there is no precedent for a $ 26 billion, five-year military research programme without any commitment to deployment. As Hans A.Bethe and his fellow-scientists have warned, such a project will acquire an 'institutional momentum'. When a trillion dollars is waved at the US aerospace industry, the project will rapidly acquire a life of its own, independent of its public justifications. Sir Geoffrey Howe has also noted that 'research may acquire an unstoppable momentum of its own'.

In its ideological expression Strategic Defence Initiative is the ultimate decomposition of deterrence theory and the attempt by the US nuclear ideologists to return to the womb of Hiroshima. Since the Soviets acquired nuclear parity with the US, the US has always been panicky

and fretful. Since then, the US had tried to steal a nuclear superiority over the USSR. The SDI is yet another manifestation of the US quest to regain that nuclear monopoly of the past (1945-50) when the US was armed with a nuclear bomb while others were not. Let us abolish the other's bomb ! Let us arm us with an impermeable shield! Let us once again be able to threaten a world which cannot retaliate ! This is no exaggeration. In fact Caspar Weinberger testified before the Senate Armed Services Committee 1984 :

> If we can get a system which is effective and which we know can render their weapons impotent, we could be back in a situation we were in, for example, when we were the only nation with a nuclear weapon.[8]

Thus we may conclude that the effectiveness of the so-called Ballistic Missile Defense would be uncertain and would make the strategic stability more precarious than what it is today. Both sides would expand their offensive forces to guarantee full confidence in their ability to penetrate defenses of unknown reliability. Moreover, the

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8 E.P.Thompson and Benthompson, Star Wars : Self Destruct Incorporated (London, 1985), p.65.

incentive to strike first in a crisis situation would be much more than what it is now. It would reduce the chances of controlling events in a crisis and possibly provoke the nuclear attack it was designed to prevent. A nuclear holocaust will become unavoidable resulting in planetary destruction.

There will never be an impermeable shield against nuclear evil. There is -- and there has been for forty years -- only one shield against chaos; and pitifully weak and yet somehow indestructible shield, the human conscience. It is as full of holes as a sieve, but it has held out chaos for forty years. It is time to put it in repair.[9]

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9 Ibid., p.67.

Appendix- I

The Conclusion of President Reagan's
March 23, 1983, speech on Defense
Spending and Defensive Technology

Now, thus far tonight I've shared with you my thoughts on the problems of national security we must face together. My predecessors in the Oval Office have appeared before you on other occasions to describe the threat posed by Soviet power and have proposed steps to address that threat. But since the advent of nuclear weapons, those steps have been increasingly directed toward deterrence of aggression through the promise of retaliation.

This approach to stability through offensive threat has worked. We and our allies have succeeded in preventing nuclear war for more than three decades. In recent months, however, my advisers, including in particular the joint Chiefs of Staff, have underscored the necessity to break out of a future that relies solely on offensive retaliation for our security.

Over the course of these discussions, I've become more and more deeply convinced that the human spirit must be capable of rising above dealing with other nations and human beings by threatening their existence. Feeling this way, I believe we must thoroughly examine every opportunity for reducing tensions and for introducing greater stability—

into the strategic calculus on both sides.

One of the most important contributions we can make is, of course, to lower the level of all arms, and particularly nuclear arms. We're engaged right now in several negotiations with the Soviet Union to bring about a mutual reduction of weapons. I will report to you a week from tomorrow my thoughts on that score. But let me just say, I'm totally committed to this course.

If the Soviet Union will join with us in our effort to achieve major arms reduction, we will have succeeded in stabilizing the nuclear balance. Nevertheless, it will still be necessary to rely on the specter of retaliation, on mutual threat. And that's a sad commentary on the human condition. Wouldn't it be better to save lives than to avenge them? Are we not capable of demonstrating our peaceful intentions by applying all our abilities and our ingenuity to achieving a truly lasting stability? I think we are. Indeed, we must.

After careful consultation with my advisers, including the Joint Chiefs of Staff, I believe there is a way. Let me share with you a vision of the future which offers hope. It is that we embark on a program to counter the awesome Soviet missile threat with measures that are defensive. Let

us turn to the very strengths in technology that spawned our great industrial base and that have given us the quality of life we enjoy today.

What if free people could live secure in the knowledge that their security did not rest upon the threat of instant U.S. retaliation to deter a Soviet attack, that we could intercept and destroy strategic ballistic missiles before they reached our own soil or that of our allies?

I know this is a formidable, technical task, one that may not be accomplished before the end of this century. Yet, current technology has attained a level of sophistication where it's reasonable for us to begin this effort. It will take years, probably decades of effort on many fronts. There will be failures and setbacks, just as there will be successes and breakthroughs. And as we proceed, we must remain constant in preserving the nuclear deterrent and maintaining a solid capability for flexible response. But isn't it worth every investment necessary to free the world from the threat of nuclear war? We know it is.

In the meantime, we will continue to pursue real reductions in nuclear arms, negotiating from a position of strength that can be ensured only by modernizing our strategic forces. At the same time, we must take steps to reduce the risk of a conventional military conflict escalating to nuclear war by improving our non-nuclear capabilities.

America does possess -- now -- the technologies to attain very significant improvements in the effectiveness of our conventional, non-nuclear forces. Proceeding boldly with these new technologies, we can significantly reduce any incentive that the Soviet Union may have to threaten attack against the United States or its allies.

As we pursue our goal of defensive technologies, we recognize that our allies rely upon our strategic offensive power to deter attacks against them. Their vital interests and ours are inextricably linked. Their safety and ours are one. And no change in technology can or will alter that reality. We must and shall continue to honour our commitments.

I clearly recognize that defensive systems have limitations and raise certain problems and ambiguities. If paired with offensive systems, they can be viewed as fostering an aggressive policy, and no one wants that. But with these considerations firmly in mind, I call upon the scientific community in our country, those who gave us nuclear weapons, to turn their great talents now to the cause of mankind and world peace, to give us the means of rendering these nuclear weapons impotent and obsolete.

Tonight, consistent with our obligations of the ABM treaty and recognizing the need for closer consultation with our allies, I'm taking an important first step.I am directing

a comprehensive and intensive effort to define a long-term research and development programme to begin to achieve our ultimate goal of eliminating the threat posed by strategic nuclear missiles. This could pave the way for arms control measures to eliminate the weapons themselves. We seek neither military superiority nor political advantage. Our only purpose -- one all people share -- is to search for ways to reduce the danger of nuclear war.

My fellow Americans, tonight we're launching an effort which holds the promise of changing the course of human history. There will be risks, and results take time. But I believe we can do it. As we cross this threshold, I ask for your prayers and your support.

Thank you, good night, and God bless you.

Note : The President spoke at 8.02 p.m. from the Oval Office at the White House. The address was broadcast live on nationwide radio and television.

Following his remarks, the President met in the White House with a number of administration officials, including members of the Cabinet, the White House staff, and the Joint Chiefs of Staff, and former officials of past administrations to discuss the address.

Source : Ballistic Missile Defence Technology, Congress of the United States, Office of Technology Assessment, Washington D.C., 1985, pp.297-298.

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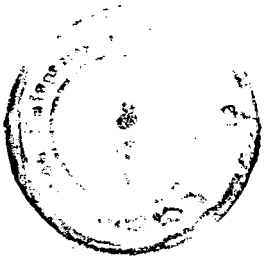

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