SECRET

PART I

MT.

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(File Cover Re-written)

CONFIDENTIAL FILING

MILITARY USES OF LASER TECHNOLOGY IN SPACE

THE U.S. STRATEGIC DEFENCE INITIATIVE

DEFENCE

PART I : DECEMBER 1979

Referred to	Date	Referred to	Date	Referred to	Date	Referred to	Date
22/12/84							
ENDS							

PREM 19/1188

PART 1 ends:-

PM Rex Statement 22/12/84

PART 2 begins:-

CDP to PM 2/1/85

TEXT OF PRIME MINISTER'S STATEMENT ON SDI AT PRESS CONFERENCE IN WASHINGTON ON 22 DECEMBER AS AGREED WITH PRESIDENT REAGAN

President Reagan and I have had a very thorough and extensive discussion of the prospects for arms control negotiations, in the course of which we also naturally touched on the Strategic Defence Initiative (SDI).

I was not surprised to discover that we see matters in very much the same light. I told the President that I had made it absolutely clear to Mr. Gorbachev that there was no question of the Soviet Union being able to divide the United Kingdom from the United States on these matters. Wedge-driving is just not on.

I told the President of my firm conviction that the SDI research programme should go ahead. Research is of course permitted under existing US-Soviet treaties; and we of course know that the Russians already have their research programme, and, in the US view, have already gone beyond research.

We agreed on four points:

1) The US, and Western, aim was not to achieve superiority, but to maintain balance, taking account of Soviet developments;

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

3) The overall aim is to enhance, not undercut, deterrence;

4) East-West negotiation should aim to achieve security with reduced levels of offensive systems on both sides. This will be the purpose of the resumed US-Soviet negotiations on arms control, which I warmly welcome.

CONFIDENTIAL
FM WASHINGTON 212240Z DEC 84
TO IMMEDIATE FCO
TELEGRAM NUMBER 3894 OF 21 DECEMBER
INFO PRIORITY BONN, PARIS, MOSCOW, UKDEL NATO, MODUK.

YOUR TELNO 2173: US STATEMENTS ON SDI AND ARMS CONTROL

1. AS ALREADY REPORTED (TELECONS BAND/PAKENHAM), THE REFERENCE IN THE TIMES IS TO AN UNATRIBUTABLE BRIEFING BY MCFARLANE ON 20 DECEMBER. SHULTZ GAVE A PARALLEL BRIEFING ON THE HILL, WHICH HAS RECEIVED VERY LITTLE PRESS ATTENTION.

2. THE WASHINGTON POST REPORTS MCFARLANE AS HAVING SAID OF THE SDI QUOTE THE RESEARCH PROGRAMME AND OUR INTENTIONS FOR IT HAVE TO BE ON THE TABLE AND A MATTER FOR DISCUSSION AND AGREEMENT AND NEGOTIATION BETWEEN US START SQUARE BRACKETS THE US AND THE SOVIET UNION END SQUARE BRACKETS.... AND THEY SURELY WILL BE ..UNQUOTE. THE NEW YORK TIMES ALSO REPORTS MCFARLANE AS HAVING SAID THAT THE ADMINISTRATION WOULD BE PREPARED TO MAKE THE SDI A SUBJECT OF NEGOTIATIONS.

3. ON ASAT ARMS CONTROL, THE NEW YORK TIMES REPORTS MCFARLANE AS SAYING THAT SHULTZ WOULD BE AUTHORISED TO AFFIRM TO GROMYKO THAT THE US WOULD BE READY TO CONSIDER QUOTE MEASURES OF RESTRAINT UNQUOTE IN TESTING ASAT SYSTEMS NOW UNDER DEVELOPMENT. (THIS IS NOT OF COURSE NEW).

4. IN A FURTHER TWIST IN THIS SAGA, WHITE HOUSE OFFICIALS HAVE BEEN MAKING CLEAR TO JOURNALISTS ON 21 DECEMBER THAT THEY CONSIDER THE WASHINGTON POST AND NEW YORK TIMES COVERAGE OF MCFARLANE'S BRIEFING TO BE UNSATISFACTORY AND THAT THEY PREFER THE REPORT OF THE BRIEFING CARRIED BY THE BALTIMORE SUN. THE BALTIMORE SUN REPORTS MCFARLANCE AS SAYING THAT, AS A CENTRAL PART OF THE US NEGOTIATING POSITION FOR GENEVA THE US WOULD URGE BALLISTIC MISSILE DEFENCES FOR BOTH SUPERPOWERS. THE PAPER SAYS THAT MCFARLANCE MADE CLEAR THAT INSTEAD OF YIELDING TO SOVIET CALLS FOR BANNING SPACE WEAPONS, THE US WOULD ARGUE IN GENEVA THAT QUOTE HIGH TECHNOLOGY DEFENSIVE ARMS UNQUOTE MAKE POSSIBLE A RADICAL SHIFT AWAY FROM THE STRATEGY OF DETERRING WAR BY THREAT OF NUCLEAR DEVASTATION. MACFARLANE IS

/SAID....

(SHB:CHY)

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SAID TO HAVE REFERRED TO THE PROMISE OF STRATEGIC DEFENCE AGAINST BALLISTIC MISSILES AS A QUOTE FUNDAMENTAL CHANGE UNQUOTE AND TO HAVE SAID THAT IT WOULD TAKE TIME TO EXPLAIN THE US CONCEPT TO THE RUSSIANS AND TO DEMONSTRATE THAT IT WAS NOT AN EFFORT TO GAIN A ONE-SIDED ADVANTAGE. THE SUN REPORTS MCFARLANE AS SAYING THAT THE SDI WAS NOW QUOTE AN IMPORTANT PART OF THE FOUNDATION OF OUR THINKING UNQUOTE ABOUT ARMS CONTROL NEGOTIATIONS: AND THAT THE AIM OF SUCH NEGOTIATIONS WAS TO BARGAIN FOR SHARPLY REDUCED EQUEL LEVELS OF OFFENSIVE NUCLEAR MISSILES AND BOMBERS, AND TO ENHANCE EACH SIDE'S SECURITY WITH DEFENSIVE SYSTEMS. THE PAPER ALSO REPORTS, ALTHOUGH THIS IS NOT ATTRIBUTED TO THE OFFICIAL MCFARLANE BRIEFING, THAT THE PRESIDENT IS EXPECTED TO OUTLINE THIS POSITION TO THE PRIME MINISTER AT CAMP DAVID TOMORROW.

5. WE ARE OBTAINING, AND WILL RELAY TO YOU, TRANSCRIPT OF MCFARLANE'S BRIEFING.

6. WE HAVE LEANED THAT THE STATE DEPARTMENT WERE ONLY CONSULTED ON THE DAY ABOUT THE SPEECH ON SDI GIVEN BY WEINBERGER ON 19 DECEMBER (MY TELNOS 3707, 3708 AND 1884). AND WERE UNHAPPY ABOUT IT. THEY APPARENTLY PROPOSED AMENDMENTS: BUT THESE WERE REJECTED BY THE WHITE HOUSE.

7. COMMENT. THE CONFUSION AND CONFLICTING SIGNALS GENERATED BY WEIENBERGER'S SPEECH AND MCFARLANE'S PRESS BRIEFING REFLECT CONTINUING DEEP DISAGREEMENT BETWEEN AGENCIES ON HOW SDI SHOULD BE TREATED IN SHULTZ'S BRIEF FOR GENEVA. ABOUT THE ONLY THING THAT CAN BE SAID WITH CONFIDENCE AT THIS POINT IS THAT THE PRESIDENT HAS MADE NO FINAL DECISIONS.

WRIGHT

IMMEDIATE RESTRICTED

RESTRICTED
DESKBY 211930Z
FM FCO 211715Z DECEMBER 84
TO IMMEDIATE WASHINGTON
TELEGRAM NUMBER 2183 OF 21 DECEMBER 1984
INFO ROUTINE UKDEL NATO, BONN, PARIS, ROME, MOSCOW, MODUK
MY TELNO. 2157: OUTER SPACE ARMS CONTROL - US/UK VIEWS

1. IN AN UNATTRIBUTABLE BRIEFING (PROVIDED AT THEIR REQUEST) FOR US CORRESPONDENTS TODAY WE MADE THE FOLLOWING POINTS:

(I) THERE IS NO QUESTION OF HMG, AS A RESULT OF THE GORBACHEV VISIT, DELIBERATELY PUTTING DISTANCE BETWEEN OURSELVES AND THE US ADMINISTRATION ON ARMS CONTROL IN SPACE.

(II) HMG'S POSITION REMAINS UNCHANGED. THE PRIME MINISTER AND SECRETARY OF STATE IN A NUMBER OF STATEMENTS (GUILDHALL, LORD MAYOR'S BANQUET ETC.) OVER PREVIOUS MONTHS HAVE SPOKEN IN GENERAL TERMS OF THE VALUE OF PREVENTING AN ARMS RACE IN OUTER SPACE.

(III) WHEN IN JUNE THE US ACCEPTED THE SOVIET PROPOSAL FOR DISCUSSIONS ON SPACE ARMS CONTROL (AND THE SECRETARY OF STATE DESCRIBED MOSCOW AS UNABLE TO TAKE YES FOR AN ANSWER), HMG WELCOMED THIS. NATO MINISTERIAL COMMUNIQUES IN MAY AND DECEMBER, TO WHICH BOTH THE UK AND THE US SUBSCRIBED, WELCOMED THE PROSPECT OF US/SOVIET DISCUSSIONS IN THIS AREA: THE LATTER SPECIFICALLY WELCOMED THE SHULTZ/GROMYKO MEETING TO 'DISCUSS NEW NEGOTIATIONS ON THE WHOLE RANGE OF QUESTIONS CONCERNING NUCLEAR WEAPONS AND ARMS IN OUTER SPACE'.

(IV) PRESIDENT REAGAN HAS ALSO WELCOMED THE PROSPECT OF SUCH DISCUSSIONS AND NEGOTIATIONS. HIS 1982 SPACE POSTURE STATEMENT, SPECIFICALLY RE-AFFIRMED IN MARCH THIS YEAR, COMMITTED THE US TO 'CONSIDER VERIFIABLE AND EQUITABLE ARMS CONTROL MEASURES (AFFECTING) SPECIFIC WEAPONS SYSTEMS'. HIS UN SPEECH SPOKE OF 'MEASURES OF RESTRAINT BOTH SIDES MIGHT TAKE WHILE NEGOTIATIONS PROCEED'. THE 22 NOVEMBER ANNOUNCEMENT OF THE SHULTZ/GROMYKO MEETING REFERRED TO 'AGREEMENT TO ENTER NEW NEGOTIATIONS WITH THE OBJECTIVE OF REACHING MUTUALLY ACCEPTABLE AGREEMENTS ON THE WHOLE RANGE OF QUESTIONS CONCERNING NUCLEAR AND OUTER SPACE ARMS'.

(V) YESTERDAY MR WEINBERGER CONFIRMED, WITH REFERENCE TO THE SDI (YOUR TELNO. 3884), THAT NEITHER HE NOR THE PRESIDENT HAD SPECIFICALLY EXCLUDED ANYTHING FROM THE FORTHCOMING TALKS. A SENIOR US OFFICIAL IS ALSO REPORTED TO HAVE SAID YESTERDAY THAT THE SDI WOULD BE ON THE TABLE DURING THE JANUARY TALKS.

(VI) HMG HAVE THEREFORE NOT NOW GONE OFF INTO ORBIT WITH THE

/RUSSIANS...

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ACTION OFFICER:
MR BAND

ADVANCE COPIES TO:
MINISTER
H OF C
MR BAND

RESTRICTED

RUSSIANS. FOR SOME YEARS MOSCOW HAS ARGUED FOR THE 'DE-MILITARISATION' OF SPACE. HMG HAVE CLEARLY OPPOSED SUCH A NAIVE AND SIMPLISTIC APPROACH. ON THE OTHER HAND THE GORBACHEV VISIT SUGGESTED THE POTENTIAL WHICH EXISTED, GIVEN APPARENT SOVIET CONCERNS, FOR NEGOTIATING CONSTRAINTS SUCH AS HMG IN PRINCIPLE FAVOUR.

(VII) IT IS ALSO EVIDENT THAT THE GOVERNMENT'S POSITION IS NOT ONLY IN LINE WITH THE PRIME MINISTER'S VIEWS AS PUBLICLY EXPRESSED ON PREVIOUS OCCASIONS, BUT WITH THE CONSENSUS WITHIN THE ALLIANCE, AND WITH THE POSITION REFLECTED IN STATEMENTS BY THE PRESIDENT AND SENIOR US OFFICIALS.

(VIII) THE DETAILS OF SPACE NEGOTIATIONS MUST BE LEFT TO THE US BUT WE EXPECT THE CONSULTATIONS WE ALREADY ENJOY TO CONTINUE. IT WOULD BE NOT ONLY SURPRISING BUT ALSO ILLOGICAL IF EITHER SIDE FAVOURED A MORATORIUM ON OUTER SPACE DEVELOPMENT AS A PRE-CONDITION TO BE ESTABLISHED PRIOR TO NEGOTIATING REDUCTIONS IN OFFENSIVE FORCES. BOTH PROCESSES SHOULD MOVE FORWARD IN PARALLEL. GIVEN THE LINKAGE ON WHICH THE US INSISTED IN JUNE, IT WOULD BE WRONG TO EXPECT A CHANGE IN THE POSITION NOW.

(IX) WE ARE OF COURSE ALIVE TO POTENTIAL EFFORTS BY THE RUSSIANS TO DRIVE WEDGES BETWEEN THE ALLIES. WE ARE DETERMINED TO RESIST THESE.

(X) WE CANNOT COMMENT ON THE LINE THE PRIME MINISTER WILL TAKE WITH THE PRESIDENT. NO DOUBT SHE WILL REFER TO THESE ISSUES IN ANY PRESS STATEMENT AFTER THAT MEETING.

2. ASKED WHETHER HMG FAVOURED THE US MOVING AHEAD WITH THE PROPOSED RESEARCH PROGRAMME, WE NOTED THAT THE PRIME MINISTER HAD MENTIONED IN HER BBC INTERVIEW ON 17 DECEMBER THAT 'YOU CANNOT STOP RESEARCH GOING AHEAD'. THIS STATEMENT SPOKE FOR ITSELF. THERE WERE OBVIOUS PROBLEMS IN VERIFYING BASIC RESEARCH, WHICH WAS PERMITTED UNDER THE ABM TREATY. HOWEVER, AS FOR LATER STEPS ARTICLE V OF THAT TREATY DREW A CLEAR DISTINCTION BETWEEN RESEARCH ON THE ONE HAND AND DEVELOPMENT, TESTING AND DEPLOYMENT ON THE OTHER.

3. PLEASE PASS, IF APPROPRIATE, TO POWELL AND INGHAM (PRIME MINISTER'S PARTY).

HOWE

UNCLASSIFIED
FM WASHINGTON 210220Z
TO PRIORITY FCO
TELEGRAM NUMBER 3884 OF 20 DECEMBER 1984
INFO PRIORITY UKDEL NATO, MOSCOW, BONN, PARIS, MODUK.

Pl help on file 1.11.SIA

MY TELNOS 3807 AND 3808: SPEECH BY WEINBERGER ON THE SDI

1. TODAY'S US PRESS REPORTS THAT WEINBERGER, IN ANSWER TO QUESTIONS FOLLOWING HIS SPEECH ON 19 DECEMBER APPEARED TO BACK AWAY A LITTLE FROM THE SUGGESTION IN THE SPEECH ITSELF THAT THE US WOULD NOT BE PREPARED TO NEGOTIATE AWAY THE SDI IN ORDER TO SECURE US/SOVIET AGREEMENT ON REDUCTIONS IN OFFENSIVE NUCLEAR SYSTEMS. WHEN ASKED WHETHER THE SPEECH INDICATED THAT THE SDI WOULD NOT BE DISCUSSED, STILL LESS REGARDED AS A BARGANING CHIP, IN FORTHCOMING ARMS CONTROL TALKS WITH THE RUSSIANS, WEINBERGER REPLIED ''I DON'T EXCLUDE ANYTHING ... THE PRESIDENT HAS SPECIFICALLY NOT EXCLUDED ANYTHING ... I TRIED TO EXPLAIN THE IMPORTANCE THAT HE AND ALL OF US ATTACH TO THE DEFENCE INITIATEIVE.

2. WHITE HOUSE OFFICIALS ARE REPORTED SUBSEQUENTLY TO HAVE SAID, IN THE CONTEXT OF THIS REMARK, THAT THE PRESIDENT WAS ''QUITE COMMITTED'' TO THE SDI AND WANTED TO EXPLORE IT WITH THE SOVIETS. ''WE DON'T SEE ANY REASON WHY WE SHOULD BE STAMPEDED BY THE SOVIETS INTO BACKING AWAY FROM ANYTHING THAT COULD SAVE THE LIVES OF MILLIONS OF PEOPLE''.

WRIGHT

SHB/CHY

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a. USA: Foreign Policy Part 2

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COMMS OFFICE REG NO.....
D.T.R. 20th DECEMBER 1984 1023HRS.

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FM WASHINGTON 192350Z DEC 84
TO IMMEDIATE FCO
TELEGRAM NUMBER 3807 OF 19 DECEMBER
INFO IMMEDIATE HONG KONG (FOR PRIME MINISTER'S PARTY), PRIORITY
UKDEL NATO, BONN, PARIS, MODUK, ROUTINE MOSCOW, ROME, TOKYO.

SPEECH BY WEINBERGER ON THE STRATEGIC DEFENCE INITIATIVE (SDI)

1. ON 19 DECEMBER WEINBERGER MADE A MAJOR SPEECH ON SDI TO THE FOREIGN PRESS. EXTENSIVE EXTRACTS IN MIFT (NOT TO ALL).

2. THIS IS THE MOST FORCEFUL AND FULLEST PUBLIC EXPOSITION SO FAR GIVEN BY A SENIOR MEMBER OF THE ADMINISTRATION OF THE RATIONALE BEHIND THE SDI. ITS IMMEDIATE PURPOSE WAS PROBABLY TO REFUTE THE ARGUMENTS, RECENTLY PUT FORWARD IN QUOTE FOREIGN AFFAIRS UNQUOTE BY MCNAMARA, BUNDY, SMITH AND KENNAN, THAT THE SDI AND ARMS CONTROL ARE MUTUALLY EXCLUSIVE. BUT IT IS ALSO CLEARLY DIRECTED AT A EUROPEAN AUDIENCE, (SEE, FOR EXAMPLE, HIS DISMISSAL OF THE QUOTE (DECOUPLING UNQUOTE ARGUMENT), AS AN INDICATION OF THE ADMINISTRATION'S APPROACH TO THE SHULTZ/GROMYKO MEETING IN GENEVA. WEINBERGER IN EFFECT ENDS UP SAYING IN TERMS THAT THE US, IF CONFRONTED BY A SOVIET REFUSAL TO CONTEMPLATE REDUCTIONS IN OFFENSIVE SYSTEMS WHILE SDI GOES AHEAD, WOULD NOT BE PREPARED TO DROP SDI. (SEE PARA 3 OF MY TEL NO 15 TO PEKING)

3. WEINBERGER IS UNLIKELY TO HAVE SPOKEN AS HE HAS WITHOUT EXPRESS PRESIDENTIAL APPROVAL: THE LINE IN THE PRESIDENT'S BRIEFS FOR HIS TALKS WITH THE PRIME MINISTER AT CAMP DAVID ON 22 DEIEMBER IS THEREFORE LIKELY TO BE RATHER SIMILAR.

A: PM'S PARTY
D: NIL
dwb

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FIE M32 AAE

cc: SPC

10 DOWNING STREET

12 December 1984

From the Private Secretary

The US Strategic Defence Initiative

Thank you for your letter of 10 December summarising the recent article in "Foreign Affairs" magazine about the strategic defence initiative.

The Prime Minister has noted this but does not agree with some of its central propositions, particularly the idea that it is impossible to pursue successfully both ballistic missile defence and agreement on strategic arms control. She takes the view that, on the contrary, the two interact closely.

I am copying this letter to Richard Mottram (Ministry of Defence).

Charles Powell

Len Appleyard Esq
Foreign and Commonwealth Office.

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Mr Powell

CABINET OFFICE

NBPM

With the compliments of CDP

28/X

B. G. CARTLEDGE

70 Whitehall, London SW1A 2AS
Telephone 01 233 8378

CABINET OFFICE
70 Whitehall, London SWIA 2AS Telephone 01-233 8378

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B.06897

27 November 1984

Dear John,

Western Arms Control Strategy: Anglo/US Discussions

I am writing to record the outcome of our meeting yesterday at which you, Nigel Nicholls (MoD), David Fewtrell (MoD), David Jago and I discussed the briefing on arms control issues for the Prime Minister's meeting with President Reagan on 22 December. This was in response to the request in Charles Powell's letter of 23 November to Colin Budd that the Cabinet Office should co-ordinate the work involved.

2. We agreed that the main issues for discussion should be incorporated into a speaking note of about three pages. This should begin with an assessment of Soviet perceptions and objectives, on which Mr Gorbachev's visit will enable the Prime Minister to speak with particular authority. I have asked the Assessments Staff to get in touch with Nigel Broomfield (Soviet Department, FCO) about this. The speaking note should then focus on three subjects:

(a) Outer Space

This should cover both ASATS and SDI, reproducing the main arguments in the composite space paper which you are preparing. It should reflect the line the Prime Minister took recently with Mr Shultz, bring out the balance of advantage on ASATS (as stated in the current ASATS paper) and emphasise the need for realism on SDI.

P J Weston Esq
FOREIGN & COMMONWEALTH OFFICE
S W 1

(b) Nuclear Negotations

The linkage to outer space through the potential use of SDI as a lever on arms control should be brought out. This item should also cover parity; the question of a merger between INF and START and the degree of linkage, if any, between the two sets of talks; our confidence in the readiness of the United States to consult on INF; and the need to reject any Soviet preconditions. Nuclear testing might be raised obliquely in the context of the forthcoming Nuclear Non-Proliferation Treaty Review Conference.

(c) Chemical Weapons

This needs to make the point that the subject is one which, for all its complexity, deserves continuing study and effort. The speaking note should cover the maintenance of Western pressure for a ban, prospects for new CW production and the linkage with negotiations, and the maintenance of an effective negotiating hand.

3, To meet the aim of a full and reasoned brief we agreed that the speaking notes should be supported by comprehensive background material which should also include defensive briefing on Trident, MBFR and CDE. The briefing will need to take account of anything that emerges from the Foreign and Commonwealth Secretary's meeting with Mr Shultz on 3 December, when Sir Geoffrey will prepare the ground for 22 December and trail the topics which the Prime Minister proposes to cover with President Reagan.

4. As for the programme of work, you said that the Foreign and Commonwealth Office would now set in hand the initial drafting of all parts of the briefing except the background note on Trident, which falls to the Ministry of Defence. You are also preparing the composite paper on ASATS/SDI which the

Prime Minister will wish to take with her to the United States and may wish to hand over to the Americans (it is not proposed that they should be given a copy in advance). Both the briefing and the composite paper should be circulated to all those at yesterday's meeting, and to the Assessments Staff, by 4 p.m. on 7 December for discussion at a meeting in my room at 2.30 p.m. on 10 December. The final versions must be with No 10 by 14 December before Mr Gorbachev's visit and the Prime Minister's departure for the Far East.

5. Finally, I should be grateful for copies of the briefing on arms control matters which you are preparing for Sir Geoffrey Howe's meeting with Mr Shultz and which David Fewtrell is preparing for the Prime Minister's meeting with Mr Weinberger on 7 or 8 December.

6. Copies of this letter go to Nigel Nicholls and David Fewtrell (MoD), Charles Powell at No 10, and to Martin Morland and David Jago.

Yours ever,

Bryan.

B G Cartledge

Defence : Military Uses of Uses technology 12/77

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10 DOWNING STREET

From the Private Secretary

23 November, 1984

Western Arms Control Strategy: Anglo/US Discussions

The Prime Minister was grateful for your Secretary of State's undated minute on this subject.

The situation has changed in two important respects since Ministers' discussion on 7 November at which it was agreed to prepare further papers on defence and arms control issues for a seminar with President Reagan in February. The first is that the Prime Minister will now be having a substantive discussion with the President on 22 December, with some uncertainty about whether the seminar will still take place in February or at some later date. Secondly, there has been the announcement that US/Soviet talks on arms control will be held in Geneva in early January.

The upshot is that the 22 December meeting will be the only certain opportunity we shall have in the short term to get our points on arms control across to the US Administration at the highest level. If we are to make the most of it, we shall need to do the homework more rapidly than planned and distil the key points for the Prime Minister's brief for that meeting. The points in paragraph 3 of the Foreign Secretary's minute are rather general and not in themselves enough. I do not think that the Prime Minister will want to hand over papers to the President at that stage, though she may wish to offer to provide some soon after.

I should be grateful if the Cabinet Office would coordinate further work on arms control for the Prime Minister's December meeting, with the aim of producing a full and reasoned brief on the main issues dealt with in the Foreign Secretary's minute. If it were also possible to produce the proposed composite paper on outer space in the time available, that would be useful. Until we know about the fate of the seminar, no conclusion can be reached on the

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timescale within which other papers will be needed. But it would be prudent to assume that they will still be required and quite possibly early in the New Year. It seems best for the Cabinet Office to coordinate this work too.

I am copying this letter to Richard Mottram (Ministry of Defence) and Richard Hatfield (Cabinet Office).

Yours sincerely

C. D. POWELL

Colin Budd, Esq.,
Foreign and Commonwealth

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cc PC (2)

Foreign and Commonwealth Office

London SW1A 2AH

10 December 1984

Prime Minister

It is a very anti-SDI article and rather unbalanced. Perhaps the FCO thinks it is 'educative'!

C D P
10/XII

Dear Charles,

The US Strategic Defence Initiative (SDI)

With the Prime Minister's forthcoming meeting with President Reagan in mind, the Foreign Secretary feels it would be useful for her to see the enclosed article, which appeared recently in 'Foreign Affairs' magazine. Of the four authors (George Bundy, George Kennan, Robert McNamara and Gerard Smith) McNamara as US Defense Secretary was responsible for preparing the political ground in the United States which made possible the ABM Treaty, in the wake of the first "strategic defence" debate in the late 1960s; and Smith was the chief US negotiator of the SALT I Agreement concluded between President Nixon and Mr Brezhnev in 1972.

Two points are of particular interest. First, there is the article's central proposition, that it is impossible for the US to pursue with success both ballistic missile defence in the terms conceived under the SDI and agreement on strategic arms control. The Americans were the first to insist on the logic of the offensive/defensive link which the Russians have now belatedly acknowledged. But they still appear reluctant to accept that the linkage will inevitably require mutual restraint on BMD, if reductions in offensive forces are to be achieved.

There is of course another, political rather than strategic, linkage. At her meeting with senior Ministers on 7 November the Prime Minister drew attention to this linkage, and to the leverage US efforts to develop BMD should provide in extracting concessions from the Russians in the nuclear arms negotiations. These two elements of linkage are brought out in greater detail in the paper on SDI and ASATs which was commissioned at that meeting and which has now been completed as part of the preparations for the Prime Minister's meeting with President Reagan on 22 December.

Secondly, the article stresses the need to reaffirm and even strengthen the ABM Treaty. Apart from individual compliance issues (such as persisting uncertainties over the Krasnoyarsk radar), the Treaty draws a very fragile line between permitted research into BMD and field-testing of new

/systems

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systems. If the Treaty - a key security interest for the UK - is not simply to be rendered irrelevant by the march of events over the next few years, a better basis for US/ Soviet confidence in its future seems required.

I am copying this letter to Richard Mottram.

Yours ever,

Len Appleyard

(L V Appleyard)
Private Secretary

C D Powell Esq
10 Downing Street

"THE PRESIDENT'S CHOICE: STAR WARS OR ARMS CONTROL"

Summary

I

1. SDI biggest nuclear arms competition and arms control issue since 1972. Well intentioned but unrealistic: a danger to mankind. Duty of Congress and US public, as well as of victorious President, to see it is radically constrained. (pp264-5)

II

2. Basic flaw: SDI technically unachievable. No prospect of a leak-proof defence against ballistic missiles, let alone other nuclear systems. President's concern to reduce nuclear peril understandable, but has stirred false expectations. In contrast to conventional arms, destructiveness of nuclear weapons means even minimal leakage in defence system is unacceptable. Apart from the President and Mr Weinberger, Administration spokesmen admit perfect defence unattainable. (pp265-7)

3. Improved US defences certain to provoke determined Soviet effort to ensure missiles will get through. Regardless of technicalities involved, Star Wars defence fraught with technical problems eg:

(i) Must work perfectly first time without prior testing;

(ii) Must function automatically, without political control;

(iii) Space-based assets inherently vulnerable to prior or counter-attack;

(iv) Defences ineffective against cruise missiles, bombers and pre-positioned warheads. Hence would provoke Soviet shift from ballistic missiles to other delivery systems. (pp267-9)

/III ...

III

4. Partial defence as unacceptable as comprehensive defence envisaged in President's speech. Would:

(i) Destroy ABM Treaty;

(ii) Stimulate Soviet offensive and defensive force proliferation;

(iii) Deepen East/West mistrust.

Size and time-span of "Star Wars" programme ensures strong Soviet response. Combination of defensive efforts with modernisation of US offensive nuclear forces provocative, stimulating fears of a first-strike strategy. (pp269-272)

5. Conceivable that SDI might deny Russians a first-strike capability. But already denied by US survivable forces and existing attack uncertainties. Even local defence of missile fields would damage ABM Treaty regime and provoke fears of future expansion of defences. (p272)

6. President's offer to share SDI technology with Russians would amount to giving away key to US defences. European Allies recognize certainty that SDI would provoke large-scale competition in both offensive and defensive systems. US risks repeating past mistakes. (pp272-3)

IV

7. By outlawing offensive systems ABM Treaty a safeguard against unbridled arms competition. Threatened by SDI. Even hardware demonstrations during research phase could infringe Treaty. Congress should monitor programme carefully and block funds for activities that threaten Treaty while urging Administration to insist on Soviet compliance (eg, over Krasnoyark radar). But serious discussion of compliance issues impossible if SDI non-negotiable. (pp273-6)

/8. ...

8. Congress should guard against overcommitment of financial/scientific resources to SDI: even though doomed to failure, project could still cost hundreds of billions of dollars. But prudent research on defence possibilities should continue as insurance against a Soviet breakthrough. (pp267-7)

V

9. Unless President changes course, no alternative to damage-limitation by Congress. But arms control is President's second-term priority. Choice lies between SDI or arms control: the two not compatible. Pursuing SDI implies rejection of basis for seeking reductions in offensive forces. President should opt for arms control negotiating options eg:

(i) Re-affirmation and improvement of ABM Treaty;

(ii) Exploration of possibilities for agreement on peaceful uses of space;

(iii) Renewed attempt to cap strategic warhead levels;

(iv) Improvement in high-level communication with Russians on basis of common interests in reducing nuclear threat. (pp277-8)

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PRIME MINISTER

WESTERN ARMS CONTROL STRATEGY

At your meeting on 7 November it was agreed to prepare further papers on defence and arms control issues for your seminar with President Reagan.

The situation has now changed. You will be seeing President Reagan in December. It is uncertain whether the February Seminar will take place or be postponed until May.

The paper provided by the Foreign and Commonwealth Secretary is not really adequate to this new situation. It suggests in paragraph 3 some very general points which you might make to President Reagan in December and assumes that we shall have plenty of time for thinking on the detailed issues between then and February.

If we are to get the best out of the December meeting we shall need to think through the issues and do the homework rapidly, with the aim of distilling the key points for your brief. The US/Soviet Agreement to meet to discuss arms control adds to the urgency.

Agree to issue instructions for further work on the above lines?

23 November 1984

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CCPC

Foreign and Commonwealth Office

London SW1A 2AH

21 November, 1984

Dear Charles,

Western Arms Control Strategy, Including BMD/SDI

I enclose an outline paper from the Foreign Secretary on Western arms control strategy, along the lines requested in your letter of 7 November. It covers a possible approach to the arms control elements of the meetings next month with President Reagan and Secretary Shultz; and considers points which could arise during the February arms control seminar. The paper has been endorsed by Mr Heseltine.

Provided the Prime Minister is content, Sir Geoffrey and Mr Heseltine will arrange for the relevant work to be set in hand.

I am sending copies of this letter to the recipients of yours.

Yours ever,

Colin Budd

(C R Budd)
Private Secretary

C D Powell Esq
10 Downing Street

PRIME MINISTER

WESTERN ARMS CONTROL STRATEGY: ANGLO/US DISCUSSIONS

1. FCO and MOD officials have had a preliminary review, as you instructed, of the following issues which arose from our discussion on 7 November:

(i) How we should approach the arms control elements of the meetings next month with President Reagan and Secretary Shultz;

(ii) How we might best use those meetings to prepare for the more specific and detailed discussions on arms control in the seminar with President Reagan we hope to have in late February;

(iii) How to handle the February seminar itself.

2. In the light of that review, Michael Heseltine and I agree that we should aim in December to achieve two principal objectives:

(a) to set out in broad terms the approach which we would wish arms control strategy to take during the lifetime of the new Administration; and

(b) to put down markers on those particular topics we wish to discuss in February. At some stage we may also wish to discuss the potential ways in which these fit into the overall arms control strategy, and the possible interrelationships between them.

3. In terms of the first objective, you may wish to impress upon the President some of the following points:-

(I) With the revival in US confidence and military strength, with the President's personal triumph, and despite the undoubted obstacles, he

/is

is unusually well-placed to make a historic contribution to international peace and security.

(II) Western public opinion needs evidence of our desire and determination to pursue progress in arms control, if support for our defence policies is to be maintained.

(III) If the economic burden of defence needs is not to become impossible we need to seek agreement on security at a lower level of armaments.

(IV) The Russians profess a similar desire. If they are bluffing, let us call them. If not, and even then we shall need our best efforts, let us actively negotiate towards the President's goal of radical reductions in nuclear weapons by balanced and verifiable steps.

(V) The West has sound positions across the arms control board. It would be wrong to make concessions to bring the Russians back to the table. That would reward their obduracy and create a dangerous precedent. But we should review our present positions in each case, to ensure that they demonstrate the imaginative approach towards genuine arms control which the President called for at the Bonn Summit.

(VI) In this context US ideas for an arms control "umbrella" or "road-map" may be valuable, not least in providing a face-saving device for the Russians to return to talks. There can be no question of diluting our basic and all-important principles of balance and adequate verifiability; equally, these principles should be reflected in ways that encourage, and do not inhibit, progress towards agreements.

/4.

4. Looking now to the February seminar, Michael Heseltine and I agree that we should aim to focus discussion, and therefore put down markers in December, on three main arms control items, in order of the priority which we attach to them:

(A) The two aspects of outer space:

(i) anti-satellite systems (ASATs); and

(ii) ballistic missile defence, in the context of the Strategic Defence Initiative (SDI).

On both we would expect to deploy the sort of arguments contained in the two joint papers on ASATs and SDI we discussed earlier this year, and to explore US attitudes towards the possibility of constraints.

(B) Nuclear negotiations:

(i) how the logical connection between the offensive systems covered in these negotiations and defensive systems in outer space negotiations can be used to give us leverage but without creating new negotiating obstacles;

(ii) how the strategic arms talks (START) can move forward;

(iii) Intermediate-range Nuclear Forces (INF):

(a) whether a merger with START is desirable and/or possible;

(b) whether START could and should resume even without INF if necessary.

(iv) nuclear testing (always a difficult issue given UK and US security needs and Treaty obligations):

(a) how to build on recent US and UK proposals to strengthen Western positions (well short of a comprehensive test ban - CTB), given

/(b) ...

(b) linkage with Non-Proliferation Treaty (NPT) Review Conference.

(C) Chemical Weapons (CW):

(i) how to maintain Western pressure for a ban and hopefully to secure a Soviet response;

(ii) how to sustain an effective negotiating hand:

(iii) prospects for resumed CW production, and linkage with negotiations, in the light of the new Presidential Review Commission which we expect to seek views from Allies.

5. There is also the problem of conventional forces which account for over 90% of global military spending, and the overwhelming burden of Western defence budgets. The following key questions arise:

(i) Multilateral and Balanced Force Reductions (MBFR) - is there a political compromise which would be militarily acceptable given stalemate on basis of present Western objectives?

(ii) Do we wish the Conference on Disarmament in Europe (CDE) process to go beyond confidence-building?

(iii) Do MBFR and CDE come together after the Conference on Security and Cooperation in Europe Vienna review in 1986?

(iv) Do we need an up-dated analysis of Western attitudes towards conventional forces arms control, arms as well as men?

6. At our 7 November meeting you underlined the need for the discussions with the Americans to be fully prepared, on the basis of high-quality papers. Provided you are content with this outline, Michael Heseltine and I will put this work in hand. For the moment we suggest:

/(i)

(i) that for the outer space talks we will prepare a composite paper, drawing on the two joint papers you have already seen, that could be presented in Washington;

(ii) that work on the other subjects discussed in paragraph 4 above should continue to the point at which full papers on each topic can be submitted for our consideration;

but

(iii) that decisions on whether to hand over papers on these should be deferred until the February agenda has been settled and you have sounded the President's own thinking in December.

7. It is clear that in discussing space and nuclear weapons, questions affecting UK Trident (and the French force de frappe) may arise, and will therefore need to be covered in our briefing if not in the papers. (We can consider how to deal with these issues in the papers for discussion with the Americans at a later stage.) These include:

(i) the political (if not military) effect on the two European deterrents if BMD/SDI develop as their proponents recommend. The French take this seriously.

(ii) You will recall that the President raised with you some 18 months ago the relationship between the UK and French deterrents and arms control. We shall need to be clear in our own minds how to respond if he does so again.

Geoffrey Howe

Defence Dec 79

Military USES of Lasers Tech in Space

SECRET

cc MASTER SET

10 DOWNING STREET

From the Private Secretary

7 November 1984

Dear Len,

Ballistic Missile Defence: United Kingdom Policy towards the US Strategic Defence Initiative

The Prime Minister held a meeting this afternoon with the Foreign Secretary, Chancellor of the Exchequer, Defence Secretary, Minister of State in the Foreign and Commonwealth Office and the Minister of State for the Armed Forces to discuss United Kingdom policy towards the US Strategic Defence Initiative. Sir Robert Armstrong, Sir Antony Acland, Sir Clive Whitmore, Sir Percy Cradock, Chief of the Naval Staff, Mr. Goodall and Mr. Cartledge were also present.

The Foreign Secretary said that the Joint Paper which he and the Defence Secretary had circulated tried to make an overall assessment of the US Strategic Defence Initiative and its implications for British interests. It was clear that the original concept launched by President Reagan had undergone important changes. Ballistic Missile Defence was no longer seen as a foolproof system. There was a fuller recognition of both the financial and the political implications, in particular the potential impact on the European allies. The paper concluded that the balance of the arguments lay against the Strategic Defence Initiative in its full form, though the need for continuing research into the technology was recognised. It would be important to discuss the subject with the Americans in ways which did not provoke or amplify a row within the Alliance. The way in which the Prime Minister herself had raised it with Secretary of State Shultz was a good guide. President Reagan would probably give high priority to arms control in his second term, and limitations on weapons in space offered the most promising area for progress. The Foreign Secretary proposed that further studies should be prepared as a basis for discussion with the Americans.

/The Defence Secretary

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The Defence Secretary endorsed the Foreign Secretary's comments. The Prime Minister's discussions with Secretary Shultz had provided a point of departure for further talks. He would add two considerations. First, the Strategic Defence Initiative would need to be addressed in the context of arms control strategy as a whole. A study was needed which would survey the whole range of current and potential arms control negotiations and identify where progress was possible. Secondly, there were likely to be contacts with the French and the German Governments before the Prime Minister met President Reagan, at which the subject of the Strategic Defence Initiative would come up. We needed to be able to talk to our other allies, even if it were not with the same degree of frankness as with the Americans.

In discussion, it was agreed that the focus for further work and for discussion of the Strategic Defence Initiative with the US Administration should be the Prime Minister's proposed meeting with President Reagan. It was only at this level that our influence was likely to have its full impact on American decisions. But that meeting would need to be very carefully prepared by further papers and by discussions with the Americans at both official and ministerial level. The papers would need to be of the highest quality and should review arms control strategy as a whole. A point to be given particular emphasis was the scope for using Strategic Defence Initiative technology as leverage for progress in other arms control negotiations with the Soviet Union.

The possible impact of the Strategic Defence Initiative on the UK's Trident missile force was raised. Expert advice was said to be that it was of no immediate relevance. Even if Ballistic Missile Defence technology was pursued and systems were deployed, it would be at least 20 years before any consequences for Trident would be felt. Even then such consequences were likely to be limited to a need to harden the final stage of the missile.

The risks that research into Strategic Defence Initiative technology would generate its own momentum, leading to inexorable pressure from industrial lobbies for the deployment of a Ballistic Missile Defence system was acknowledged to be considerable, though it was recognised equally that it would be undesirable indeed impossible to cut off research altogether. It was agreed that a political decision to refrain from moving from the research stage to development and deployment would be a very difficult one.

It was agreed that, while preparing for discussions with the Americans, it was important for the UK to continue to develop contacts with the East European countries on the subject of arms control. In doing so, we should be careful

/to keep

to keep in step with the United States and be wary of Soviet attempts to divide the Alliance.

The Prime Minister concluded that the paper circulated by the Foreign Secretary and the Defence Secretary was accepted as a basis for further work which should now be put in hand, taking into account points made in discussion. The purpose of this work was to prepare for her own discussion of the Strategic Defence Initiative with President Reagan, probably in the first quarter of next year. In parallel there should be official level contacts with the US. Any opportunities to explore American thinking through Ministerial contacts should also be exploited. We should also be ready to discuss these matters with France and Germany in the course of regular high level consultations.

Might I suggest that the Foreign Secretary and the Defence Secretary should jointly prepare an outline of the further studies to be put in hand and circulate it to those at the meeting, so that we are all clear about what more is needed. It would be helpful if this could be done by 16 November.

I am sending copies of this letter to Richard Mottram (Ministry of Defence), John Oughton (Mr. Stanley's office, MOD), Peter Westmacott (Mr. Luce's office, FCO), Richard Hatfield (Cabinet Office), Sir Antony Acland, Mr. Goodall, Sir Clive Whitmore and Chief of the Naval Staff.

Yours sincerely,

Charles Powell

Charles Powell

Len Appleyard Esq
Foreign and Commonwealth Office

10 DOWNING STREET

Prime Minister

You have already seen these papers.

2. In your talk with Shultz in Delhi, you said that you would be willing to send over a team for talks with the Americans. The purpose of tomorrow's meeting should therefore be to agree the broad lines to guide our team.

C.D.P. 6/XI

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Prime Minister

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PRIME MINISTER

c Sir Robert Armstrong

Ballistic Missile Defence: United Kingdom Policy towards the US Strategic Defence Initiative

(Meeting of Ministers on 7 November at 4 p.m.)

BACKGROUND

A

In their joint minute MO26/7/2 of October 1984 the Foreign and Commonwealth Secretary and the Defence Secretary set out their views on how the United Kingdom should react to the United States Strategic Defence Initiative (SDI).

2. The background to this issue is set out in comprehensive terms in the Report by Officials attached to the Secretaries' of State minute. It sets out the arguments for and against SDI, including the choice between comprehensive and partial ballistic missile defence (BMD); costs; and implications for arms control. It also points up the risk to the effectiveness of the United Kingdom's national deterrent if SDI provoked the Soviets into increasing their own ballistic missile defences.

3. The Foreign and Commonwealth Secretary and the Defence Secretary urge that the Government should "define its position" and play "a full and constructive role" in the Alliance and public debate about SDI. They fear that President Reagan may commit the new Administration to the SDI unless the Americans' European allies succeed, before the inaugural speech in January, in bringing home to the Administration the damaging consequences of doing so.

HANDLING

4. You will wish to invite the Foreign and Commonwealth Secretary and the Defence Secretary to introduce their papers. Thereafter, the central issue for discussion will be their political recommendations for handling the subject, rather than the Report by Officials which is a clear, comprehensive and well-argued document. You may wish first to clarify some of the implications arising from an early and firm approach to the United States to express our reservations, before turning to the question of arms control. Points to clarify are -

a. President Reagan's commitment to SDI

The SDI has figured quite prominently in the Presidential campaign. President Reagan has already re-affirmed his commitment to the concept on more than one occasion, most recently in the second televised debate with Mr Mondale. Even Mr Mondale has stated at least twice that, despite his opposition to the deployment of a BMD, research into the SDI concept should continue. Is it realistic to suppose that, however vigorously we put out views across in Washington, we could persuade President Reagan and his pro-SDI advisers, before the end of the year, to see the error of their ways and abandon a highly publicised plank of the Republican platform? The Foreign and Commonwealth Secretary should be asked to comment.

b. The desirability of intervening with the United States

Even if we could restrain the Administration, is it desirable? What exactly are we aiming to do? The paper makes it very clear (particularly in Annex C) that the Soviet Union has already engaged in quite substantial research and development on certain elements of a BMD: if the Americans were to be prevailed upon to stop the

SDI in its tracks, would the Russians thereby be inhibited from pursuing their own research and development programme? A United States self-denying ordinance accompanied by a continuing Soviet BMD programme would surely be more destabilising than any scenario envisaged in the paper. The Foreign and Commonwealth Secretary and the Defence Secretary should comment.

5. Turning to arms control, the United States and the Soviet Union have already subscribed - in different ways - to the objective of preventing an arms race in space through a United States/Soviet negotiation leading to verifiable bans on the testing or deployment of certain types of weapon or device. The following issues arise from this:

c. Prospects for negotiation if the SDI were abandoned

What would be the prospects for a negotiation getting off the ground if the United States were to abandon the SDI? Would not this remove any incentive on the part of the Soviet Union to negotiate away their own research and development programme? Would it not be preferable, in arms control terms, for the Americans to stay on their present course and be seen by the Russians to be doing so? The Foreign and Commonwealth Secretary should comment.

d. Soviet perceptions of SDI

There is ample evidence that the Soviet leadership is more worried about United States intentions in the BMD field than about any other aspect of United States military activity. Romanov commented in Helsinki last month that the arms race in space was a much more important issue than Pershing or Cruise deployment. The Americans thus possess, even with the SDI in its infancy, what could turn out to be a powerful lever for arms control

negotiations. As Dr Kissinger among others has pointed out this leverage could perhaps be applied not only to initiating and prosecuting negotiations about the militarisation of space as such but also to securing a resumption of the nuclear arms control negotiations which have lapsed (START and INF). Should we be urging the Americans to throw this leverage away? The Foreign and Commonwealth Secretary and the Defence Secretary should comment.

e. Implications of public criticism of the United States position

Would not public criticism of United States policies by the European allies only weaken the American hand, and strengthen that of the Russians, in any negotiation which may eventually take place? The process of INF deployment in 1983 graphically demonstrated the crucial importance of a united public front as between the leading allies, whatever division of opinion may exist in private allied counsels or in Western public opinion. In public, should we not concentrate on the desirability of negotiations and an eventual agreement on the military use of space rather than on the flaws in the SDI concept as such? The Foreign and Commonwealth Secretary should comment.

CONCLUSIONS

6. Subject to the discussion of these issues, you may wish to guide the Meeting to the conclusion that United Kingdom officials should be authorised to discuss the SDI in depth with the Americans and other leading allies with the following themes -

a. urging the necessity for early negotiations between the United States and the Soviet Union about arms control in space, if possible using this prospect to bring about

the resumption of the other nuclear arms control negotiations as well;

b. acknowledgement that in order to achieve this result it will probably be necessary for the United States to be seen to be pursuing SDI research;

c. indication that for so long as the arms control objective is being seriously pursued, HMG will abstain - as in the case of prospective United States resumption of chemical weapons manufacture - from public criticism of United States activity in the SDI field, taking the line that to the extent that such activity may contribute to an eventual agreement on arms control in space it is to be welcomed; and that we will commend this public stance to our allies; but accompanied by -

d. a firm and thorough exposition of our reservations concerning the whole SDI concept which would make it difficult for us to support any eventual United States decision to proceed from the stage of research to that of development.

Bryan Cartledge.

B G Cartledge

2 November 1984

DEFENSE
Laser Tech
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CONFIDENTIAL

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FM STOCKHOLM 291507Z OCT 84
TO PRIORITY F C O
TELEGRAM NUMBER 251 OF 29 OCTOBER 1984
INFO ROUTINE MOSCOW, HELSINKI

ROMANOV'S VISIT TO HELSINKI

1. WALLACE THE REUTERS CORRESPONDENT IN STOCKHOLM DISCUSSED WITH A MEMBER OF CHANCERY HIS INTERVIEW WITH ROMANOV DURING THE LATTER'S RECENT VISIT TO HELSINKI. QUESTIONED ABOUT THE BASIC PROBLEMS OF THE TIMES ROMANOV INSISTED ON TWO OCCASIONS THAT THE ARMS RACE IN SPACE WAS A MUCH MORE IMPORTANT ISSUE THAN PERSHING OR CRUISE DEPLOYMENT.

2. WHEN ASKED ABOUT OGARKOV'S WHEREABOUTS ROMANOV REPLIED QUOTE MARSHALL OGARKOV IS COMMANDING THE LARGEST SOVIET FORCES IN EUROPE UNQUOTE. AT THIS POINT SOVIET OFFICIALS BECAME AGITATED AND FORCED A HALT TO THE INTERVIEW. WALLACE ASKED A UNIFORMED MEMBER OF ROMANOV'S PARTY TO CONFIRM WHAT ROMANOV HAD SAID. THE SOVIET OFFICIAL SAID ROMANOV WAS NOT QUITE CORRECT AND THAT QUOTE OGARKOV IS COMMANDING THE LARGEST FORCE IN THE EUROPEAN SECTOR OF THE SOVIET UNION UNQUOTE.

3. COMMENT. WALLACE WHO IS A GOOD RUSSIAN SPEAKER WROTE THE ORIGINAL STORY WHICH LED TO THE PRESS SPECULATION ABOUT OGARKOV'S PRESENT POSITION. MALCOLM MACKINTOSH ON HIS RECENT VISIT HERE SAID IT WAS DIFFICULT TO SQUARE OGARKOV HAVING AN IMPORTANT EUROPEAN COMMAND WHILE KULIKOV WAS KNOWN STILL TO BE THE WARSAW PACT COMMANDER IN CHIEF. THE SECOND QUOTE ABOVE SUGGESTS THAT OGARKOV'S COMMAND IS LIMITED TO WESTERN SOVIET TERRITORY BUT PERHAPS WITH A RESERVE CAPABILITY FOR USE IN WARSAW PACT COUNTRIES.

PARSONS

LIMITED
SOVIET DEPT
DEFENCE DEPT
ACDD
NEWS DEPT
PUSD
MR DEREK THOMAS
MR GOODALL
MR JENKINS
MR WESTON

CONFIDENTIAL

DEFENCE: Laser tech in space

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10 DOWNING STREET

From the Private Secretary

15 October, 1984

Ballistic Missile Defence (BMD): UK Policy
towards the US Strategic Initiative

The Prime Minister has considered the paper on Ballistic Missile Defence sent forward under the joint minute by your Secretary of State and the Foreign Secretary.

The Prime Minister's general view is that the case against the strategic defence initiative is not so open and shut as suggested in the conclusions in paragraph 59 of the paper. In particular, in the light of what the paper says of Soviet research in this area, she feels that the Americans have little option but to push ahead at least to the point where they can be confident that they are matching the Soviet Union.

BF11

The Prime Minister would like to discuss this paper soon in a restricted group. We are hoping to arrange this after OD on 22 October.

C. D. POWELL

Richard Mottram, Esq.,
Ministry of Defence

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PRIME MINISTER

Ballistic Missile Defence (BMD): UK Policy towards the US Strategic Initiative

This is the long-awaited MOD/FCO paper. It is a thorough piece of work. You will want to read it in full. Annex B on the technical aspects and Annex C on Soviet attainments and capabilities are particularly important.

The paper sets out the pros and cons quite fairly but in drawing conclusions comes down heavily against BMD on every count. Quite apart from the question whether it is sensible to draw categorical conclusions at this early stage, there are several points to be made the other way:

- the paper's main argument against BMD is that, after prodigious expenditure and prolonged strategic uncertainty, the outcome will be to leave the nuclear balance unchanged. But if this were the predictable and certain outcome, it would imply a degree of irrationality, profligacy and pig-headedness on the part of the US Administration in pursuing it which there is no reason to expect. If it could be demonstrated conclusively that this would be the outcome, then the US would certainly modify its aims. The paper caricatures BMD in order to make its point.

- it is argued sometimes that BMD is pointless because the threat to the US from air-breathing weapons would remain, at others that the protection given by BMD to the US would destroy European confidence in the Alliance and its strategy. Both cannot be correct.

- not enough weight is given in the argument to Soviet potential and capabilities, while the Annex shows them to be ahead of the US in important areas of research. Given what we know the Soviet Union are up to, it seems to me that the

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Americans have no option but to push ahead in this area.

- the paper underestimates the dynamics of scientific progress. You can't disinvent DEW or KEW technology. There's no question of choking BMD at birth as the paper seems to suggest. The goal should be to manage the new technology in as economical way as possible to add to the West's overall security. A cautiously positive approach to BMD is more likely to influence the US Administration than root and branch fault-finding; and we should not second-guess them on the technical aspects on which they know much more. None of this is incompatible with exploring the arms control implications.

In short, the case against BMD is not so open and shut as the paper suggests.

You will want to discuss the paper soon. The choices are OD or a more restricted group. The latter might be better, at least to start with.

Agree to discussion with Lord President, FCS, Defence Secretary, Chancellor, CDS, Percy Cradock and Bryan Cartledge?

CDP

11 October 1984

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PRIME MINISTER

BALLISTIC MISSILE DEFENCE: UK POLICY TOWARDS THE US STRATEGIC INITIATIVE

In his letter of 18th June your Private Secretary indicated your wish to have a detailed Paper on military developments in space. We discussed some aspects of these with you on 16th July, in the context of Anti-Satellite Systems (ASATs).

2. We now attach a joint FCO/MOD Paper prepared by our officials to provide the basis for further discussion between us. The Paper deals with the major issues of Ballistic Missile Defence (BMD), and in particular with the Strategic Defence Initiative (SDI) launched last year by President Reagan. It outlines the overall concept of BMD, in terms of both comprehensive and partial defences; rehearses the strategic arguments for and against such a concept, and reviews the technical difficulties in achieving it; assesses, insofar as these can be predicted at this stage, its economic implications; describes relevant arms control factors; and examines special UK interests, including the implications for the future of our national deterrent. In a series of annexes, the Paper provides further details on the political and technical background to the SDI, US and Soviet capabilities, and civil uses of outer space. The conclusions and recommendations are contained in paragraphs 59 and 60.

3. The Paper underlines the complexity but also the timeliness of addressing the BMD/SDI issue and its huge potential impact - for good or ill - on intra-Alliance relations. Growing Parliamentary and public interest and the prospect of US/Soviet talks, if not this year then probably in the near future, make it highly desirable for the Government to define its position on this subject and to play a full and constructive role in the debate, which is already under way

among Western nations and their publics. Indeed, the possibility that President Reagan, if re-elected, may at his inaugural next January commit the Administration to carrying through the SDI unless by then America's principal European Allies have succeeded in bringing home the damaging consequences of doing so, reinforcesthe need for HMG to reach an agreed view soon, and to put it across vigorously in Washington.

4. The Paper explains what we believe the substance of that British position should be. In summary, there is little reason to believe that a fool proof comprehensive BMD system will be attainable; and on strategic, financial, political and Alliance grounds there must be considerable scepticism as to whether moves to deploy such a system would serve British or Western interests. The net result of any concerted move on the part of the United States or the Soviet Union or both to create such a system could well be a reduction rather than an increase in Western security, serious damage to the cohesion of the Alliance, and a new threat to our ability to maintain public support for the retention of an independent national deterrent. Thus at the end of the day, after prodigious expenditure by both sides, and perhaps a period of severe strategic instability, the development of BMD would seem likely to leave the fundamental nuclear balance between the US and the Soviet Union unchanged.

5. In your speech at the Guildhall on 11th July you rightly warned of the dangers of unrestrained military competition in outer space. We agree that there is a clear case at least for attempting, as you suggested on that occasion, to restrain such a development through arms control measures, and that the sooner negotiations to this end begin, the better. Chances to control new generations of weapons have been missed in the past: we hope history will not record the present as yet another moment of lost opportunity.

6. We recognise, however, that our views need to be balanced and well worked out if we are to influence US decisions and to promote a militarily realistic and politically cohesive approach among our

NATO and Community partners. We do not underestimate the problems, given the apparent commitment in Washington to pursuing their present approach to BMD. The key question is whether at this important juncture the Government should be willing to engage the Americans in serious discussion of the underlying arguments for and against such a concept. The lessons of the Siberian pipeline episode, and other recent causes for intra-Alliance disunity, suggest that when we are convinced of the soundness of our views we do better to emphasize these clearly and at an early stage to US leaders, than to risk allowing the momentum of events to dictate the future.

7. It is incidentally worth noting how far American thinking appears to have shifted away over recent months from the original objectives proposed by the President, which were stated as the search for the means to render all nuclear weapons "impotent and obsolete". This is an undoubtedly attractive proposition for all of us, whether in America, Europe or even the Soviet Union. But it has been clear from the start (and the US Administration have not disputed this) that the nuclear threat as such would not disappear even if a perfect BMD system were ever developed and put in place. The threat from non-ballistic systems - aircraft, cruise missiles, specially adapted submarines, even terrorists - would in practice always be with us. Moreover, a totally leakproof system even against ballistic missiles is now widely discounted even within the Administration. Recognising the flaw in the seductive prospect of substituting "mutual survival" for "mutual deterrence", SDI proponents now argue that the chief virtue of their efforts will be to enhance rather than replace the present strategy of deterrence. They also admit that for this purpose modernisation of their offensive nuclear forces will be increasingly important. In other words, nuclear weapons will remain, for the foreseeable future, at the heart of Western defence strategy and security.

8. There is also an important European dimension to future policy. Our French and German partners have already taken positions in private, and increasingly in public, sceptical of the US Administration's approach to the long-term future of Western security. If we are to move forward in defence and security terms in the general direction charted in the Paper on "Europe - The Future" which you circulated to your European colleagues, it will be important to retain the confidence of our French and German partners that we are prepared, when fully convinced of the reasons for doing so, to play our full part in intra-Alliance debates. If we fail to do so, we risk becoming less central to future, basic considerations of Alliance security interests and the debates about how best to handle these.

9. Taking all these considerations into account, we believe the present Paper provides the right material for reaching a clear and consistent British position. We strongly endorse its conclusions and recommendations and look forward to discussing it soon. We hope that the results of these discussions will indicate the best way in which we can approach the undoubtedly complex problems of handling these issues in our own and Alliance security and political interests.

10. Copies of this minute and the attachment go to the Lord President of the Council, the Chancellor of the Exchequer and Sir Robert Armstrong.

MH GH

October 1984

DEFENCE: Military Uses of Laser technology in Space

Dec 79

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Oct 84

BALLISTIC MISSILE DEFENCE (BMD): IMPLICATIONS FOR UK POLICY TOWARDS THE US STRATEGIC DEFENCE INITIATIVE (SDI)

SUMMARY OF INTERIM REPORT BY OFFICIALS

1. Introduction. Since President Reagan's "Star Wars" speech of March 1983, US work and public interest in Ballistic Missile Defence (BMD) has accelerated. There have been increased intra-Alliance consultations. The present report is an interim assessment, providing for decisions on near-term UK policy.

(Paras 1 - 5)

2. Comprehensive BMD. The US envisage a leakproof multi-layered system of BMD, using a variety of methods including new technologies and space-based components. Only ballistic missiles are covered by the SDI, other nuclear systems would remain, at least initially, unaffected. Arguments expressed in favour include: ethical merit; popularity with US public opinion; enhanced US guarantee to Europe; strengthening deterrence; incentives for deep cuts in offensive nuclear systems; damage limitation in the event of deterrence failing; and the need for prudent hedge against equivalent Soviet efforts. Arguments expressed against include: the project's technical uncertainty; the relative ease and cheapness of countermeasures the probability that numbers of offensive systems would be driven up, rather than down; the increased risks inherent in the automaticity of BMD systems; the non-ballistic nuclear threats which would remain; and the dangers of destabilisation, especially during the transition from deterrence to defence. There are also major arms control and financial implications (which are addressed seperately below).

(Paras 6 - 10)

3. Specific European Concerns. With comprehensive BMD, the top rung of flexible response would have to depend on air-breathing systems and theoretically the strategic balance could be preserved. But in practice European public and political apprehension would focus on the risk of the US becoming decoupled from their defence with the nuclear threat to Europe remaining greater than that to America; the increased risk of war limited to Europe; and the squeezing of US conventional force levels. Damage is thus likely

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to result to Alliance cohesion without real compensating benefit. Deployment of BMD is also likely to have serious implications for small nuclear powers.

(Paras 11 - 17)

4. Partial BMD Systems would provide 'leaky' defence and would be subject to many of the same considerations as comprehensive BMD. It might also lead to a switch to targeting civilian population, as well as allowing easier exploitation of gaps in the defence by offensive countermeasures. Again offensive forces are likely to be increased, rather than reduced, as a result.

(Paras 18 - 21)

5. Point or (Limited Area) Defences of key military installations (including ICBM silos) would be of only limited relevance to SDI though some of the previous arguments apply. Its specific merits and drawbacks would require further consideration if Point Defence rather than comprehensive BMD were to be pursued by either side.

(Paras 22 - 24)

6. Financial Implications are impossible to assess precisely, given the range of variables. But, clearly, the eventual cost of a full BMD system would be enormous, perhaps $1000 billion over say 30 years. The US could afford this, but the expense would cut into defence and other programmes, particularly conventional forces. Overall, the diversion of US resources into BMD is unlikely to be helpful for conventional defence of Europe. The Soviet Union could if necessary also find the resources for BMD.

(Paras 25 - 30)

7. Arms Control. Risks: significant further BMD development would require wholesale changes in the present arms control regime. It would tend to undermine the 1972 ABM Treaty (important to East/West security), worsen wider East/West relations, harm the prospects for arms control in other areas, make the future of the NPT more precarious, and increase the danger of a new arms race. Given present uncertainties it is hard to construct an arms control regime, but there are arguments in favour of some

limitations even now. Opportunities: Negotiations over BMD could spread into offensive nuclear systems which might help to break the present US-Soviet impasse.

(Paras 31 - 40)

8. Special UK Interests. If the SDI provoked increased Soviet BMD deployments, there could be serious implications for the UK's national deterrent. Although these might be overcome by means of a countermeasures programme, BMD considerations may start to affect the domestic and political debate over Trident. Spaced-based BMD weapons could threaten satellites and might thus also have effects on intelligence capabilities. It will be important to handle the US with care to avoid unnecessary friction and damage to present co-operation in both areas. The implications of the SDI for the UK economy are unlikely to be helpful. There is also an unclear future US requirement for BMD bases in Europe, incuding perhaps the UK.

(Paras 41 - 55)

9. Political. The handling of the SDI issue with Americans is likely to become harder. It is a major election issue. There is a need to avoid gratuitous criticism of US efforts, while taking clear a position on substance. It will be important to use Congressional attitudes as a guideline.

(Paras 56 - 58)

10. Conclusions. There are good reasons to doubt that any comprehensive BMD system could be created, and equal grounds for scepticism that either comprehensive or partial BMD would be in British and Western interests. Alliance, financial, arms control and Trident interests could be damaged rather than furthered as a result. But there are some grounds for optimism in terms of the possibilities which exist for an arms control solution.

(Para 59)

11. Recommendations. Summarised in para 60, with suggested public line to take at Appendix 1.

12. Annex A: Responses to the SDI Political Background.
Annex B: Technical Aspects of BMD.
Annex C: Comparative US and Soviet BMD achievements and capabilities.
Annex D: Civil Uses of Outer Space.

BALLISTIC MISSILE DEFENCE (BMD): IMPLICATIONS FOR UK POLICY TOWARDS THE US STRATEGIC DEFENCE INITIATIVE (SDI)

INTERIM REPORT BY OFFICIALS

CONTENTS

BALLISTIC MISSILE DEFENCE (BMD): IMPLICATIONS FOR POLICY TOWARDS THE US STRATEGIC DEFENCE INITIATIVE (SDI)

INTERIM REPORT BY OFFICIALS

A. INTRODUCTION

1. In his "Star Wars" speech of 23 March 1983 President Reagan announced a long-term research and development programme for a system of Ballistic Missile Defence (BMD) aimed at the "ultimate goal of eliminating the threat posed by strategic nuclear missiles", in order to render them "impotent and obsolete". He emphasised the link between the vital interests of the US and its Allies, and stressed that it would be the intention to destroy missiles before they reached the territory of either. In a message to the Prime Minister, President Reagan denied any US intention of retreating into a Fortress America stance, of violating in any way the 1972 ABM Treaty, departing from commitments to Allies, or seeking a first-strike capability.

2. Work in the US to flesh out the bones of the R&D programme outlined by the President has continued and intensified, under the title of the Strategic Defence Initiative (SDI). The long-term programme has become a subject of political and technical controversy in the US and, to a lesser extent, in Western Europe and the current state of the debate is set out in Annex A. In summary, public debate within the US has been stimulated first by the publication, this spring, of officially commissioned studies on SDI prospects, and then by criticism of the SDI in the press, in Congress and among US scientists. This has contributed to changes in the Administration's own attitudes, including a move away from the idea of a comprehensive, leakproof defence system towards imperfect defence or defence of specific targets; an increasing emphasis on Soviet activities as a justification for the SDI; and, most recently, an acceptance of the need for dialogue with the Russians. Allied reactions have meanwhile been characterised by increasing concern at the strategic, political, arms control and cost implications of the SDI. This has been reflected in public criticism of the SDI by French and German Ministers, and by the French proposals to limit directed-energy weapons.

3. A team of US officials visited European capitals in February in order to brief them on the latest SDI developments; another briefing for NATO was conducted in July. A further round of discussion with closest Allies was held in Washington later that month. There have also been informal contacts, at Ministerial and official level, between US representatives and their Allies. Other contacts have included a UK non-paper (reviewed by Ministers) which was passed to the Americans last December and posed a series of basic questions.

4. The present Report gives an interim assessment of the developments in and implications of BMD as far as they can be determined and is intended to enable Ministers to take decisions on HMG policy. Because it appears that the crucial components of a BMD system would have to be space based, the issues covered in this paper are inevitably relevant to the long-term question of the militarization and perhaps eventual control of outer space. This paper does not, however, directly address the important related topic of Anti-Satellite Weapons (ASATs). These were the subject of another recent MOD/FCO paper, and although there is an important overlap between ASAT and BMD systems, and ASATs might, moreover, prove a serious offensive countermeasure to a BMD network, the timescales of the two subjects are very far apart. The Soviets already possess an operational ASAT and the US is rapidly catching up; by contrast, comprehensive BMD systems, if ever possible, are at least two to three decades away. Finally, in order to give a comprehensive treatment of space-related issues, a discussion of the predicted civil uses of space is attached at Annex D to this paper.

5. Throughout the paper, it is assumed that the Soviet Union will endeavour to keep pace with the US in whatever new programmes are developed.

B. THE COMPREHENSIVE BMD CONCEPT

GENERAL

6. Since the late 1950s the prevention of war between the super-powers has rested upon the threat of mutual destruction, the key to

which has been the assured survival of sufficient nuclear forces, even following an enemy first strike, to inflict a counter-attack of such destructive proportions as to make an initial attack worthless and irrational. This situation of potential Mutual Assured Destruction (MAD) has been recognised since the 1960s, and was crucial to the evolution of NATO's flexible response strategy, formally adopted by the Alliance in 1967. It was reflected in the 1972 ABM Treaty which placed severe restraints on defensive systems, on the grounds that these would cast doubt on the credibility of second-strike forces and thereby jeopardise strategic stability.

7. The recent development of new technologies has allowed, for the first time, consideration of the possibility of comprehensive or "leakproof" BMD, in distinction to the traditional "limited area" ABM defence systems covered by the 1972 ABM Treaty and now deployed round Moscow. Annex B sets out a summary of the technical aspects - including vulnerability to countermeasures - of the BMD concept which the Americans are now considering. Their studies envisage a multi-layered system of defence against ballistic missiles, comprising the following elements (See Annex B, Figure 1):

a. attack against ballistic missiles in their boost phase, when it would be desirable and probably essential to neutralise the overwhelming majority of Soviet offensive ballistic missiles;

b. interception of surviving warheads in the post-boost and mid-course phases, picking off those re-entry vehicles as or after they have separated from the dispensing vehicle;

c. elimination of the remaining warheads in their terminal phase of descent into or just outside the atmosphere on their way towards their targets.

Methods for achieving these various aims range from current intercept capabilities (nuclear or non-nuclear land-based missiles to be employed in the terminal phase), through conventional or nuclear warheads employed in space in the mid-course and post-boost phases; to

advanced technology systems - directed energy weapons (DEWs) eg particle beam or laser - used to attack Soviet missiles in their crucial boost phase.

8. The President has directed that the US goal should be to eliminate the threat of ballistic missiles. Most of the present work is being devoted to the threat from the land-based, long-range version - the ICBM. There is no programme to eliminate the many forms of non-ballistic nuclear threats such as cruise missiles or strategic bombers (known as air-breathering systems). The Americans have suggested that technologies developed for advanced BMD might, at a later stage, be adopted to combat air-breathing systems. This paper does not consider the future vulnerability of air breathers.

ARGUMENTS EXPRESSED IN FAVOUR

9. Proponents of BMD argue that it would have the following positive features:

a. Ethical Merit

Successful BMD deployment would mean that weapons rather that people would be put under threat, populations could be defended rather than avenged, and the increasingly unpopular strategic posture deriving from Mutual Assured Destruction (MAD) could be replaced by one of Mutual Assured Survival;

b. Popularity with US Public

It is claimed that some US polls have shown up to 80% support for the BMD concept, and that this will inevitably translate into eventual political backing by leaders of both major parties. There is likely to be greater public willingness to spend huge sums of money on strategic defence rather than on new offensive systems to match the Soviet build-up. SDI may also attract support from those whose anxieties about nuclear war would otherwise lead them to favour calls for a freeze on the development and deployment of nuclear weapons;

c. Strengthening of the US Guarantee to Europe

American Presidents would no longer have to fear that strong military support for NATO Europe would, through escalation, risk the destruction of US cities by ICBMs. It is argued that this would add credibility to the US nuclear guarantee. In addition, the technical need to achieve interception of as many Soviet missiles as possible in their boost phase means that Europe's security would be enhanced, even if no dedicated terminal defences were built there: US BMD systems would have to attempt to destroy almost any ballistic missile launched by the Soviet Union before they could know where it was aimed;

d. New Crisis Management Options

As a deterrent to provocative behaviour in periods of tension, US Presidents could formally notify unfriendly states that the BMD system was being switched over to automatic, to achieve immediate interception and destruction of any missile launched from their territory;

e. Strengthening of Deterrence

A fully effective BMD system could nullify the risk of a disarming first strike by ICBMs, and thus remove the main incentive which has been put forward for a destabilizing nuclear move;

f. Damage Limitation if Deterrence Failed

If the increased strategic stability provided by BMD proved insufficient to avert a major East-West nuclear war, the number of casualties would be much reduced by eliminating large numbers of warheads. This might also prevent the nuclear winter climatic catastrophe which some experts predict would occur following an all-out nuclear exchange;

h. Incentives for Deep Cuts in Offensive Nuclear Systems

With efffective BMD there would be no need to insure against a disarming first strike by accumulating large numbers of ICBMs so that as large a number as possible would survive. Thus the US and USSR could safely

negotiate large reductions in ICBMs and warheads. In addition, the decreasing utility of non-penetrating missiles and warheads would logically encourage both sides to agree to reduce them, in theory to zero. There could be scope for greater concessions over verification since the consequences non-compliance would be less serious. Even the threat of US BMD deployment could provide leverage on the Soviet Union to reopen strategic arms limitation discussions;

i. Nullifying the Risk of Accidental Missile Launch
Were nuclear missiles to be launched accidently they could be destroyed in mid flight, with huge savings in human life and the reduction in risk of war. The importance of this might increase if less technologically competent states were to acquire nuclear ballistic missiles;

j. Avoidance of Nuclear Threats by Small Nuclear Powers
With a BMD system a superpower and its allies would not have to fear future nuclear blackmail by extremist states (eg Libya, Iran, Cuba) which managed to acquire a nuclear warhead and a ballistic missile (eg from an adapted satellite launcher);

k. The Need for a Prudent Hedge Against Soviet ABM/BMD Efforts
The Soviet Union has deployed round Moscow the world's only functioning ABM system and is known to be well advanced in DEWs and other research relevant to BMD. Although the Russians have not so far been assessed to have any immediate plans for evasion of or break-out from 1972 ABM Treaty limitations, this might rapidly change. It would be highly destabilising if the US were to fall behind in any race to deploy a BMD system as the Russians are well placed to take the immediate lead;

l. Improved Monitoring and Verification of Soviet Compliance with the 1972 Agreement
By carrying out BMD research the US would gain a better idea of which Soviet activities might indicate violation, or intention to violate the Treaty;

m. Comparative US Advantage in this Area of Military Competition
US superiority in high technology should mean that the Russians would have to divert a greater quantity of particularly scarce resources to compete in the BMD field. This would be likely to slow down the expansion of other Soviet military programmes and handicap the growth of their economy in general;

n. Achievement of a US Lead in 21st Century Weapon Systems and the Domination of Space
It would be historically unprecedented if, after 50 years of accelerating technical change, the nuclear tipped ballistic missile were to remain the single unchallengeable ultimate weapons into the early twenty first Century. BMD-relevant technology is likely to be crucial to the key weapons systems of the future, and the need to deploy it in space should give the US - and thus the West - an advantage in that increasingly important "High Frontier" area of military operations and economic competition. The alternative could be the inexorable attainment of a "Pax Sovietica", based on the domination of space, just as the "Pax Britannica" formerly rested on the control of the High Seas.

ARGUMENTS AGAINST

10. In opposition to BMD, critics have focussed on the following points:

a. The Enormous Technical Uncertainty of the Project
The sheer size and complexity of the research undertaking alone equals, in one official US estimate, 8 times that of the Manhattan Project, the original programme to build the atomic bomb. The need to ensure, if leakproof defence were to be achieved, confidence that it functioned perfectly first time (inevitably without ever undergoing a full system test) makes its eventual success not only highly dubious but the cost involved quite enormous. There is no evidence to suggest that, in the face of enemy countermeasures, the awesome technical problems can ever be overcome (Annex B);

b. The Relative Ease and Cheapness of Countermeasures

The attacker would have a number of options to complicate the defender's task. Again, these are discussed in detail in Annex B, but they would include new generation rockets with accelerated boost phases; increased use of chaff and decoys; thermal blinding of satellite sensors by nuclear explosions just before launch; insulation and rotation of rockets and re-entry vehicles to reduce DEW effects; direct ASAT attacks on orbiting BMD battlestations (including those by prepositioned orbiting "space mines", and from ground or space-based DEWs), and attacks on ground support systems, by saboteurs or by depressed-trajectory submarine-launched missiles. Even grouping ICBM sites in small areas would greatly increase the number of orbiting satellite battlestations needed to ensure that enough were over the launch sites at any one time to guarantee boost-phase intercept of the sufficient of the ICBMs from the site cluster. It seems likely that countermeasures could be both highly effective and cheaper for the attacker to develop and deploy than a BMD system;

c. The Risk of Saturation by Increased Numbers of Offensive Systems

A system designed to be near leakproof against, say, 6000 enemy warheads could be overwhelmed if the other side were to double its offensive inventory. A large increase of this kind, together with a vigorous counter-measures programme, would be one obvious Soviet response to US BMD deployment. Figure 2 of Annex B shows the estimated number of US urban fatalities which would occur with penetration of even small numbers of warheads. Unacceptable damage would thus almost certainly result from the minimal "leakage" of even a well-functioning BMD system;

d. Increased Dangers of Automatic Response Leading to War

The crucial ICBM boost phase lasts a maximum of a few minutes and potentially for a minimum of less

than a minute. The most technically efficient comprehensive BMD system would therefore almost certainly have to incorporate a hair-trigger response, dependent upon automatic, computer-driven decisions. A limited provision for human override before defences were committed to action might be incorporated, but any resultant delay would be at the cost of reduced certainty of interception. At best, it would probably allow a rapid "yes or no" response on whether to fire from the BMD's military commander, rather than a considered decision by the political leadership. Although the primary consequences of a mistaken decision would be the targeting of enemy rockets rather than enemy cities and populations, there would be an risk that, to defeat predicted offensive countermeasures, the integrated defence plan would need to have programmed into it pre-emptive attacks at least on other enemy space systems. With enemy reactions, the sequence of automatically driven responses could widen into a general conflict;

e. <u>The Danger of Strategic Destabilisation</u>

Assuming both sides deployed similar BMD systems, the temptation would be heightened to indulge in a pre-emptive first strike at a time of crisis, both against the other side's BMD system itself and its anti-BMD weapons. A first strike against what are likely to be relatively soft targets associated with BMD systems, including satellites, could nullify the effect of the intended defences, whilst the aggressor remained confident that his own defence system would be able to deal with the surviving forces from the other side. Conceivably those might be the only circumstances under which such confidence could be achieved.

f. <u>The Particular Dangers of Transition from Deterrence to Defence</u>

Even if a comprehensive defence system proved technically feasible, the transition to achieving it and extending it to Western Europe would take decades. If this were a negotiated process, guaranteeing continuation of the central strategic balance, based on good faith and confidence

between the superpowers, and starting in good time, the transition problems would theoretically be eased. More probably the transitional period would become an era of increasing international insecurity as one side periodically became concerned that the other was ahead in the race to achieve perfect BMD. With historically likely worst case assumptions governing the strategy of each, the temptation to threaten the use of offensive forces whilst they remained effective would be increased. The management of all major East/West crises in this period would accordingly tend to become more precarious;

g. Improbability of Accidental Nuclear Release

Accidental nuclear launches by established nuclear powers have not so far occurred and there is no reason to think that they will be more likely in the future;

h. Low Likelihood of Ballistic Missile Attack by Future Nuclear States

Future nuclear weapon states are unlikely to deploy sophisticated delivery systems such as ballistic missiles, at least in their first generation of weapons. Clandestine prepositioning of nuclear devices, or air delivery of primitive bombs, would probably be significantly greater threats, which would not be lessened by BMD;

i. The Worldwide Nuclear Threat Itself Would Still Remain

The superpowers could also resort to widespread clandestine pre-positioned nuclear devices in each others' territory. Furthermore, although not themselves capable of a first strike, air-breathing systems (nuclear-capable aircraft and cruise missiles) would remain largely unaffected by a BMD system. Aided by developments in Stealth Technology, they could fly low to avoid detection and remain effectively insulated from space-based DEWs by atmospheric absorption and turbulance. Ballistic missiles in depressed trajectories as well as nuclear-capable artillery could also continue to pose threats, depending on technological developments. A total elimination of the long-range ballistic missile threat could well lead to a massive increase in these

other systems, with the concomitant need to develop defences against them. Huge air defence (AD) systems would be needed to counter these other threats and the Russians currently enjoy a clear lead in this area. It is not possible at this stage to predict whether the non-ballistic missile threat could ever be eliminated by leakproof AD or what the strategic implications of this would be. (Three probabilities, however, suggest themselves: AD of Europe would be more difficult than that of the US because of the shorter distances and reaction times; the transitional dangers of pre-emptive attack would be even greater if one side appeared to be achieving an imminent total defence against non-ballistic as well as ballistic missile nuclear threats; and, even if both sides were eventually able to deploy defences against all outside nuclear attacks, the risk of conventional war might thereby be increased);

j. Stimulation of a New Arms Race

It would plainly be unacceptable for the Soviet Union to enjoy a monopoly in research on any defensive or offensive system. But there is a concomitant risk of BMD efforts on both sides having a synergistic effect, compelling both to pursue an arms spiral which in the end leaves them no more secure and possibly less so than when they started;

k. Arms Control

The effects on present and future arms control arrangements are considered in Paras 30-39 below;

l. No Hard Evidence of Soviet Intention to Break Out of the 1972 ABM Treaty

Despite extensive Soviet research into DEWs, and US claims of Soviet breaches of the 1972 ABM Treaty, it is by no means obvious that the Soviets would themselves choose to precipitate all the problems considered above by breaking out of the 1972 Treaty;

SPECIFIC EUROPEAN CONCERNS

GEOGRAPHICAL COVERAGE OF BMD

11. The US Administration have continually insisted that any comprehensive BMD system would have to cover not only US territory and assets but the whole of NATO as well. (They would presumably also wish to include Japan and other countries dependent upon the US nuclear umbrella, which, given the Chinese threat, would be an additional complication). Were such a system not to extend with the same effectiveness beyond US territory, US Allies would be more exposed to a continuing ballistic missile threat, in addition to the other threats identified in para 10(i) above. This would be likely since the short flight-times of ballistic missiles targeted on Europe would make it difficult to deploy the full panoply of defences against them which might exist to protect the continental US.

EFFECT ON THE US STRATEGIC GUARANTEE

12. NATO's strategy of flexible response rests on three levels of response in any conflict: non-nuclear warfare, use of short and intermediate-range nuclear weapons, and strategic employment of nuclear weapons. Assuming an effective BMD system were in place, the ultimate deterrent threat would be limited to air-breathing (bomber, cruise missile) systems. What impact, strategic and political, would this have on the overall cohesion of the Alliance and the security of Europe?

13. US arguments that BMD would strengthen the US guarantee to Europe have been set out in para 9(c) above. But, on the other hand, whether or not leakproof defences against all ballistic missiles could ever be achieved, US cities would remain significantly at risk, primarily from air-breathing systems. The risk might be lower than at present, but there would have to be a very large reduction before it ceased to be considered unacceptable. It is not therefore obvious that the crucial willingness of a US President to risk unprecedented death and destruction to his homeland would be changed through deployment of a BMD system, whether perfect or partial. Assuming, as one must, rough superpower symmetry in BMD development, the technical improvements which progressively plugged potential BMD leaks, and thus somewhat reduced the millions of casualties which America could expect in a strategic nuclear exchange,

would, as they were matched by the Russians, simultaneously be undercutting the effectiveness of the US ballistic missile deterrent. To the extent that numbers of air-breathing systems were multiplied on both sides to compensate, the deterrent balance prevailing today would persist. In terms of the theoretical balance of strategic advantage, therefore, it can be argued that the security of the US guarantee to Europe would be neither enhanced nor undermined by BMD.

EUROPEAN REACTIONS AND EFFECTS ON ALLIANCE COHESION

14. But the response of European publics would not be dictated by cold reasoning of this kind. They would believe that the balance of nuclear risk within the Alliance had tilted heavily to favour the US. Europe would remain exposed to a range of Soviet nuclear threats (aircraft, nuclear artillery and nuclear-armed cruise and short-range ballistic missiles); whereas the US would be freed from its 30-year old vulnerability to Soviet ICBM attack. There would undoubtedly be widespread apprehensions, not necessarily logically justified or even internally consistent, that the topmost rungs of the escalatory ladder were being removed, thus making lower-level (conventional and theatre nuclear) conflict more likely in Europe. There might be a fear that the Russians would be less deterred than they are today from threatening or embarking upon a conflict, which they might have greater hopes would remain conventional, and which their numerical superiority at the conventional level would allow them to win, once the strategic deterrent was limited to air-breathing systems.

15. Paradoxically, Europeans might at the same time become more worried that the Americans, imagined to be safe behind their BMD walls, might be more likely to begin a nuclear exchange at the risk of the wholesale destruction of Europe. INF deployment was intended to reaffirm the credibility of extended US deterrence, since the Russians insist that use of INF would lead them to make a strategic response against the US homeland. If this were felt to be negated by BMD covering principally the US (whatever the continuing threat from air-breathing systems), fears could grow in Europe of a limited nuclear war, confined to European soil. The net result of all these factors could be to

exacerbate intra-Alliance tensions (probably to a greater extent than the INF decision, which at least developed from a European initiative)without real strategic gain, and at the cost of provoking increased anti-Americanism. In addition, the diversion of American resources into BMD would tend to reduce those available for programmes of more direct benefit to European security, such as US in-theatre conventional forces (see Paras 28 and 29 below).

SOVIET OPPORTUNITIES

16. This situation would present the Soviet Union with many propaganda options. They would certainly intensify their campaign of allegations that the Americans planned to wage limited nuclear war in Europe while maintaining their own homeland as a sanctuary. They might even enhance the effect by openly offering the US an arrangement whereby Soviet offensive systems would not be used against America itself provided that US forward-based systems in Europe were not fired at targets in the USSR. Even if such a proposal were vigorously rejected by the US, doubts could linger in European minds about future US dependability.

EFFECT ON INDEPENDENT NUCLEAR POWERS

17. Even if comprehensive BMD against superpower-sized ballistic missile attacks proves in practice to be unattainable, the sheer size of the resources which might eventually be deployed on continental scales in pursuit of this goal would be likely to undermine the credibility of small independent national deterrents based on ballistic missiles (ie those of the UK, France and China). In the medium term, if the extreme American proponents of SDI were to be proven correct in their optimism over the speed and effectiveness with which BMD technologies could be introduced, and if such a pace could also be achieved by the Soviet Union, there could be significant implications for the UK's Trident programme. However for the reasons discussed in Para 10a and b above, and in Annex B, it is probably more realistic to assume that, if necessary at the cost of an extensive countermeasures programme, UK Trident's ability to penetrate Soviet defences could be maintained for the duration of its planned operational life. (This issue is more fully discussed in Paras 45 - 48 below). By that stage other delivery systems,

such as air-breathing cruise missiles, may offer alternative prospects for the next generation of independent national nuclear deterrent.

C. PARTIAL BMD SYSTEMS

INTRODUCTION

18. Given the very large technical uncertainties overhanging the comprehensive BMD concept, most of its proponents would concede that perfect "leakproof" defence is unattainable, but argue that there would still be merit in deploying a partial BMD system. Possible systems offering partial BMD divide into two categories:

a. Less-Than-Perfect Defence, allowing significant predicted leakage of attacking warheads;

b. Point (or Limited Area) Defence ie an extensive interception capability against the terminal phase of ballistic missiles targeted on high value sites - missile silos, other military bases, key command/ communications facilities etc - but perhaps leaving cities unprotected. Multiple point defence systems of this type would exceed the limits of the 1972 ABM Treaty.

LESS-THAN-PERFECT DEFENCE

POSSIBLE ADVANTAGES

19. Proponents of this variant use many of the same arguments as for comprehensive BMD, with some differences. They claim that such a defence system would enhance deterrence by reducing, though not eliminating, the certainty in the mind of the aggressor that his missiles would reach their targets. It would also inhibit the temptation to indulge in pre-emptive or limited nuclear strikes; it would contribute to saving human lives; it would help to shape a possible arms control agreement; it would provide protection against small accidental missile launches and the forces of minor nuclear powers; and it would be an essential reaction to current Soviet efforts in this field.

DISADVANTAGES

20. Most of the criticism detailed in paras 11 and 14-18 above applies equally to a less-than-perfect defence. The nuclear threat would remain; there would be dangers of decoupling Europe from the US nuclear umbrella; there would be a risk of reduced political control over decisions which could set off a conflict; the credibility of the UK national deterrent would be reduced (or, at least, an potentially expensive countermeasures programme might be required); and the temptation to launch a disarming first strike, though lessened, would remain a factor in Soviet strategic thinking.

21. In addition:

a. Proliferation of Offensive Systems

The incentives to increase offensive forces to overwhelm the defences by raising the volume of incoming warheads would increase as defences were perceived to be less than fully effective. Far from contributing to arms control, less-than-perfect defences are much more likely to lead to a proliferation of offensive systems. Indeeed in his report to Congress in April, Defence Secretary Weinberger explicitly acknowledged that "the immediate response" of the Russians would be "to press ahead with the further expansion and modernisation of their offence systems";

b. Switch to Counter-Value Targeting

Faced with fairly effective defences of military and other government targets, the Soviet Union could well switch more of its targeting to urban centres. If only between 10 and 50% of their warheads aimed at military targets such as missile silos were to penetrate US ballistic missile defence this could leave a larger number of US missiles intact on the ground than could be the case at present. But if 10-50% of Soviet warheads aimed against cities were to get through, this would remain a devastating action in war and therefore an effective threat in peacetime. According to official US projections, and depending upon the yield of warhead used, a 5% leak in US defences against a 10,000 warhead Soviet attack targeted on cities

could leave between 30 and 50% (40-60 million) of the US urban population dead (See Figure 2 of Annex B);

c. Facilitation of Offensive Countermeasures

Gaps in the defences could be increasingly exploited by effective countermeasures, whose technology would be developed at an equal or greater pace than the defences themselves.

POINT (OR LIMITED AREA) DEFENCE

GENERAL

22. Point (or Limited Area) Defence would be a major expansion of the terminal-phase defence already developed in the 1960s beyond the right codified in the ABM Treaty to a single such system. It is strictly speaking a separate issue from the sort of defences largely based in space which are under consideration in the context of the SDI, but it seems desirable, for the sake of completeness, to set out briefly the advantages and disadvantages of this concept.

POSSIBLE ADVANTAGES

23. Effective systems of this kind, covering US land-based ICBMs, would certainly protect them against a Soviet ballistic missile first strike. It might also be extended to protect US military targets and improve the survivability of Command, Communication and Control (C3) elements.

DISADVANTAGES

24. Civilian targets such as cities could not be safeguarded in this way against superpower attack and Point Defence by one side of even some of its missiles and key military facilities might be perceived by the other as an attempt to preserve a decisive capability for nuclear attack. This could heighten concern that the side deploying Point Defence might be less deterred from launching a first strike, secure in the knowledge that any of the other side's offensive forces which might survive the first strike would be incapable of mounting a credible retaliatory threat against the

attacker's remaining offensive forces inside their defence areas. These fears might in turn cause the Russians to try to forestall the creation of such US defences by fomenting a political crisis in Europe, or even to consider a pre-emptive first strike themselves. In addition, powerful arguments against pursuing the deployment of Poit or Limited Area Defence include the likely growth in the number of offensive missiles; increased counter-value targeting; the remaining irreducible threat to C3; the political implications of exposure of European military targets to Soviet threat while the threat to similar US targets was being reduced; the impact on the credibility of small national deterrents (see paras 45-48 for the effect on UK Trident), with the consequent effect upon public support for their maintenance in the countries concerned; and the inevitable reopening of the ABM Treaty. Moreover, this first step towards full-scale BMD would increase the temptation, as the strategic risks detailed above grew, to move into the next stage of less-than-perfect defence.

D. COSTS

UNCERTAINTY AND OVERALL SCALE

25. Many of the components of a potential BMD system are only at the earliest stages of research; in most cases they have not left the drawing board. It will be many years, if ever, before they can be seen to be effective. This makes an assessment of the eventual cost more than usually difficult. Estimates provided to the US Congress range from $200 billion using current technologies (with a $50 billion annual maintenance cost), to $1,000 billion. The final cost might well be very much more than this. In fact, it is perhaps harder to estimate in 1984 the total cost of a complete ABM system of the sort originally envisaged by the President than it would have been in 1945 to estimate the current cost of the US nuclear weapon programme and forces. The variables - types and numbers of systems, supporting equipment, ancillary technology, etc - are so wide as to make meaningful assessments at this stage unrealistic. The only point on which there is a general consensus is that a complete defence system would be prodigiously expensive, requiring hundreds of billions of dollars; and that it would inevitably

effect the Western ability to support defence expenditure on other areas.

26. The present Administration proposals for the SDI envisage expenditure of $26 billion over Fiscal Years 1985-89; FY 1984 funding came to $1.2 billion. They are seeking $2.0 billion for FY 1985, an increase of 25% over previous projection, but this figure is subject to proposed cuts by Congress. For FY 1986 they envisage $3.7 billion. They have not made available figures for the later years, but it seems inevitable that by the end of this decade at least $10 billion annually will be required. It can be argued than an average expenditure of some $5 billion over each of the next five years is not an excessive amount in order to demonstrate whether a real defensive system is feasible. Such expenditure would certainly be within the scope of the present trend of US defence budgets without exerting damaging pressure on other areas. However, the longer-term implications of this trend are also important.

LIKELIHOOD OF RESOURCES BEING FOUND

27. The history of US defence spending suggests that once programmes have been launched, albeit with minor funding, successive Congresses and Administrations have found it very difficult to cancel them. Given the investment that would have been made by the end of this decade, including the increased involvement of US industry, it cannot be assumed that funding for a continued SDI programme could then be radically reduced, even if this appeared to be the sensible course in the light of the results of the R&D programme. On the other hand both the scale and political visibility of the SDI programme will be unprecedented. These factors, together with its long gestation period, could therefore put it at risk of cancellation or deferment, despite the historical record of lesser projects, as a result of Presidential or Congressional reconsideration of either its technical feasibility or intrinsic politico-strategic desirability: it would have to survive around 8 presidencies and over 30 Congressional budget debates before completion. (The Soviet capacity to afford deployment of a comparable BMD system is considered in Annex C).

EFFECT ON OTHER US DEFENCE PROGRAMMES

28. Nevertheless, even if the projected cost of a complete defence system were to run into hundreds of billions of dollars, there is little doubt that, given sufficiently prolonged and consistent political will, the US would be able to supply the necessary funding. (Even if it were to total $1000 billion, this must be seen in the context of the current annual US Defence Budget of $300 billion and a likely timescale of around 30 years.) The key issue is the impact which such diversion of funds would have on other (especially conventional) areas of defence spending; and in particular on the US ability to maintain its present level of support for European defence. At a time when there are increasing strains on defence budgets throughout the Western world in order to provide for enhanced defence at the conventional level, and when these pressures are affecting national budget deficits especially in the US, there can be little doubt that an American decision to move substantially into SDI development will have a much wider impact on the defence of the West.

29. Throughout the transitional period towards the goal of leak-proof BMD, the US would need to keep its nuclear offensive forces in being; indeed, the requirement to develop the nuclear triad would increase. But the costs of these forces are considerably less than those of conventional forces. In the inevitable competition for resources, nuclear forces (which amount only to about 20% of the current US Defence Budget) could escape largely unscathed since they represent the highest US strategic priority. Cuts in conventional forces might then be needed to accommodate the new SDI demands and the existing resource competition would become even harder to resolve. Current attitudes in Congress towards the US military presence in Europe suggest NATO programmes are likely to bear at least a significant proportion of any cuts. (Notwithstanding present Congressional reservations about BMD, this tendency to question the conventional force commitment to Europe could paradoxically increase if Congress began to judge European attitudes towards the SDI as unjustifiably hostile.) This point is already recognised in Washington, particularly by the Joint Chiefs, whose reservations about space defences stem partly from their impact on other parts of Pentagon spending: the Chiefs continue to press for all SDI funding to be governed by a separate non-DOD budget.

30. Three other points are relevant:

a. to the cost of any BMD scheme, whether perfect or less than perfect, would be added the cost of the anti-BMD systems which would tend to be developed. A radical increase in the numbers of ballistic missiles against which the defences were ranged would not, so far as can be predicted at this stage, be enormously costly, and should certainly be cheaper than the BMD system itself. Any move away from the current emphasis on ballistic missiles towards more air-breathing systems, such as bombers and cruise missiles, with corresponding air defences, would carry new costs of its own. These would all produce an additional burden on defence spending;

b. were the Americans and/or the Russians to go for relatively simple Point or (Limited Area) Defences of their own strategic forces, the costs would be correspondingly less. Defence systems based on present capabilities eg land-based interceptors with ancillary radars, communications etc, would not prove an excessive burden. But as soon as defences incorporated advanced technology, especially in terms of space-based systems, there would be a quantum jump in the funding required;

c. Any development which led to a significant increase in Soviet ABM capability could generate considerable costs for the UK in maintaining the long-term credibility of Trident. This is discussed more fully in paras 45-48 below.

E. ARMS CONTROL FACTORS

CURRENT TREATY ARRANGEMENTS

31. At present military activities in outer space and defences elsewhere against ballistic missiles are constrained by four major treaties:

a. the 1972 Anti-Ballistic Missile US-Soviet Treaty (as amended) which allows the deployment around a national capital or at one missile site of a maximum of 100 interceptors, together with associated control radars. Only the Russians now exploit this allowance, by deploying an ABM system around Moscow;

b. the 1967 Outer Space Treaty which bans the deployment in space of nuclear and other mass destruction weapons;

c. the 1963 Partial Test Ban Treaty which prohibits nuclear testing in space; and

d. the SALT agreements which ban interference with satellites designed to monitor compliance with arms control agreements.

32. A full defensive system such as originally envisaged under the SDI would spell the end of this treaty regime. A Point (or Limited Area) Defence system, ie an extension of the present arrangements allowed under the ABM Treaty, need not be so damaging to the present corpus of international arrangements. Even so it would require substantial changes in the Treaty itself and might prove unnegotiable with the Russians, resulting in the collapse of the Treaty.

SIGNIFICANCE OF THE 1972 TREATY

33. The ABM Treaty is significant in two major respects. It codified the de facto acceptance by both sides of the principle of mutual deterrence: ie that they would live with the threat against themselves which stemmed from the negotiated limits on both offensive and defensive systems; and that they would not seek radically to shift the competition into defensive systems. Secondly, the ABM Treaty represents a significant political achievement in terms of East-West arms control. Decisions that required the abrogation or a major amendment of this keystone could have far-reaching political consequences in terms of future prospects for East/West relations. The ABM Treaty is subject to regular review but, unlike the SALT agreement it will last indefinitely unless terminated by one of the two parties.

EFFECT OF SDI ON OTHER ARMS CONTROL ARRANGEMENTS

34. There could also be direct consequences for other areas of arms control. Development of BMD systems which led to increases rather than reductions in offensive forces would destroy the basis not only of the present strategic arms constraints (SALT I etc), but also damage the prospects for further limitations. The likely political turbulence in Europe (discussed in Paras 11-16 above) which could result from BMD deployment might also complicate the already intractable problems in achieving some agreement with the Russians on INF.

35. The chances of preserving the Non-Proliferation Treaty (NPT) arrangements into the next decade and beyond would be jeopardized, with non-nuclear Parties less and less convinced of the good faith of the nuclear Parties to fulfil their commitment under the Treaty to reduce nuclear arms. The temptation to the near-nuclear states, particularly those not Parties to the Treaty, to use this excuse to take a domestically popular decision to acquire nuclear weapons, could become increasingly irresistible.

CONTROL OF THE OVERALL NUCLEAR BALANCE

36. In announcing the SDI President Reagan made no direct reference to a complementary arms control approach, which appears not to have been considered at the time. Arguably, the creation of a perfect BMD system - the President's declared objective - would in any case render limits on such systems via a negotiated agreement not only unnecessary but undesirable. However, (as noted in Para 9(h) above), SDI supporters do claim that defences will contribute to arms control by making existing high levels of offensive ballistic missiles redundant and thereby disposable. Pentagon projections foresee the SDI producing a better climate for arms control in some 15-20 years. The counter-arguments - that BMD/SDI will make arms control harder, not easier, by increasing the levels of offensive systems on both sides - were spelled out in Paras 10(c) and 21(a) above. Meanwhile, US statements continue to stress that the SDI is being conducted in compliance with the ABM Treaty and that there is no present intention of breaking or altering it. But there are increasing hints that, in the event of the SDI showing promise, the Treaty will have to be amended before long.

37. At the same time, US officials have argued that until such time as there is a clearer picture of the systems at issue, any attempt to construct a potential arms control regime would be premature and indeed fruitless. They also indicate that they intend to decide on options for development of hardware before tackling the possible arms control options which could then apply to that hardware. This would not be consistent with the increasingly emphasised public rationale that US SDI efforts are needed to counter Soviet activity. In that case, US interests would a priori be better served by early attempts to close off the prospective spiral of competition stimulated and led by the Russians, rather than to chase after them.

38. The further danger remains, as the history of arms control efforts demonstrates, that systems are developed in isolation and that the task of controlling them at a later stage is made immeasurably harder. The deployment in the 1970s of multiple, independently-targetted re-entry vehicles (MIRVs) is a case in point. US reluctance in 1969-70 to go for constraints, at a time when they led the Russians in the technology, eventually rebounded on them as the latter eventually overtook them and established the present threat to US ICBMs. There is now a general consensus (which includes Dr Kissinger) that the short-sighted US approach a decade ago, which made no provision for an arms control solution until it was almost too late, proved counter-productive. Given the variables involved, it is not easy to foresee how best an arms control regime could be constructed. For that reason further consideration of the current French proposal for a five-year renewable ban on SDI-capable weapons would seem desirable. An agreement of this kind would act as an interim measure while the longer-term picture cleared, and would prevent irrevocable steps. What is known of attitudes in Moscow (see Annex A, paras 9-13) continues to indicate that the Russians take seriously the possibility of new controls on defensive systems, and may well be prepared to negotiate in ernest with the US in this area.

LINKAGE BETWEEN OFFENSIVE AND DEFENSIVE CONTROLS

39. Despite current Soviet unwillingness to resume any negotiation similar to the START or INF talks, exchanges on defensive systems would inevitably, and within a short space of time, need to address the

concomitant problems of offensive nuclear forces. The catalyst necessary to resolve the present impasse in the nuclear negotiations could thereby be created. (Dr Kissinger has suggested privately that the SDI could have a certain value with the Russians in negotiating terms). An extension of this thesis, which has already won some acceptance among academics and US officials, is that space talks could be expanded not only to allow nuclear talks to be resumed but to provide the broader strategic setting in which agreement on asymmetries in both areas could eventually be reached. In other words, trade-offs could emerge between Soviet nuclear forces and future US technological superiority in BMD. The danger in pursuing such a linkage is that progress in each area could easily become dependent (or conditioned by either side) on the other. Opponents of negotiated results in one area would be able to block useful outcomes in the other, or could use the other side's alleged intransigence in the first field to justify their own in the second.

40. The Americans have not been slow to see the relevance of this link, in their response to the Soviet 29 June proposal. They have suggested in turn that the September talks in Vienna could deal not only with space issues but with ways in which the nuclear negotiations could be resumed. The immediate Soviet counter-reaction has been negative. But the link will be potentially important.

F. SPECIAL UK INTERESTS

THE UK AND STRATEGIC NUCLEAR DEFENCE: HISTORICAL BACKGROUND

41. The defence of the UK against any but the most limited nuclear attack by the Soviet Union has not been a practical proposition since the mid-1950s. Since then our defence policy has been based on the deterrent effect of NATO's ability to pose a strategic threat to the Soviet Union, coupled with the ability of the UK's national strategic force also to pose a credible last-resort deterrent.

42. The credibility of Britain's national strategic deterrent against Soviet defensive and offensive systems has thus been an issue of major importance for the UK since the inception of the UK's strategic deterrent in the 1950s. Our perception of the decreasing capability of the V bomber force to penetrate Soviet air defences, coupled with the increasing vulnerability of a UK land-based strategic

deterrent, and the US cancellation of the Skybolt Air-Launched Ballistic Missile, led to the decision in 1962 to acquire Polaris, as the most affordable and efficient way of providing a credible deterrent with the prospect of a reasonable in-service life.

43. Both the US and USSR devoted considerable resources to ABM development during the early 60s, leading to clear indications of Soviet intentions to deploy such a system in 1966. The 1972 ABM Treaty clarified the extent of the problem which Soviet defences round Moscow would pose to the credibility of the UK's Polaris force. Work already underway on improving Polaris' capability to penetrate such defences was accordingly accelerated, and subsequently developed into the Chevaline project. This improved capability became operational in 1982.

44. By the end of the 1970s studies were underway on the replacement for Polaris. The continued importance of being able to threaten Moscow as the central feature of the UK's deterrence criteria was confirmed. Gradual improvements in the capability of Moscow's ABM system, and related technological developments giving the prospect of significant further enhancements to them during the life of the successor system were significant factors in the decision in 1980 to acquire Trident, and have remained major considerations in the recent Ministerial decisions on the missile numbers and warhead configuration to be adopted.

IMPLICATIONS FOR TRIDENT

45. The size of the UK Trident force in terms of the number of submarines, missiles and warheads will be dictated by HMG's concept of minimum credible deterrence and the concomitant requirement that UK national deterrence criteria be met by one SSBN-load of missiles. Thus, on current assumptions, 16 UK Trident D5 missiles each capable of deploying a number of independently targetable re-entry vehicles, will be able to threaten a prescribed level of damage to the Soviet homeland in the face of ground-based ABM defences deployed within the limits of the 1972 ABM Treaty. Our continuing ability to meet the criteria is however contingent on there being no break-out from the ABM Treaty which resulted in a significant increase in the number of ground-based ABMs especially around Moscow. Thus

small nuclear powers such as the UK would be affected not only by eventual deployment of Soviet space-based BMD but, in the nearer term, by enlargement of current ABM defences, or early and limited development and application of new technologies such as ground-based DEWs.

46. The emergence, during the lifetime of the UK Trident force (1995-2020), of a Soviet space-based BMD system able to destroy incoming missiles during their boost phase, before re-entry vehicles had been dispersed, and deployed on a scale necessary to match the full weight of the American strategic ballistic missile inventory would unarguably have serious implications for UK Trident. A force as small as our own, acting independently in defence of wholly national interests, would represent a small fraction of that necessary either to swamp Soviet defences or to exploit effectively any inherent "leak" in the system. Opponents of the decision to acquire Trident have already begun to argue that it will be rendered obsolete by Soviet BMD developments (See Annex A, Para 19). The extreme and loudly voiced technical optimism of certain US SDI proponents about the rapid attainability of capable BMD systems may provide ready arguments for such critics. Whether these views are justified or not they are likely, therefore, to form an important focus of domestic political opposition to the UK Trident programme.

47. But given the uncertainty surrounding the development of comprehensive BMD systems and their likely timescales, Trident is likely to remain the most robust solution to the problem of providing a successor to the present UK deterrent force. In this context the JIC recently concluded (JIC(84)2) that "for the moment, the best assessment that can be made is that it is unlikely that exotic ABM defence will threaten the credibility of a Trident based deterrent over the next two or three decades and it may never do so."
It is worth noting that submarine-launched ballistic missiles (SLBMs) have distinct advantages over ground-launched systems. The launch platform is immune to pre-emptive attack; furthermore, the exact point of launch (and hence the precise missile trajectory during the boost phase) cannot be determined in advance by the defences. The time from the first SLBM launch to the last missile completing the boost phase could be as little as 5 minutes, which would compound the problem of timely detection and effective reaction by the defences.

48. A missile with the range and throw-weight capacity of Trident D5 offers considerable scope for the introduction of additional countermeasures such as penetrating decoys or manoeuvering re-entry vehicles. Such countermeasures could be expensive, even though their costs would be insignificant relative to the scale of investment needed for an even moderately effective space-based BMD system. The cost to the UK of a countermeasures programme would depend largely upon the degree to which the US was prepared to embark upon such a project to maintain the effectiveness of its own much greater Trident force, and to share the results of its work with the UK. On the other hand if it were felt by the Americans that we were opposing crucial US interests (among which SDI might come to rank) continued cooperation over Trident for which we are already critically dependent on the US, might be jeopardised.

IMPLICATIONS FOR UK INTELLIGENCE CAPABILITIES

49. Although research into SDI might not have immediate arms control implications, any actual deployment of SDI systems in space would be incompatible with a future Treaty banning ASATs, since weapons capable of destroying ICBMs would necessarily themselves have a high intrinsic anti-satellite capability. In consequence it is very likely that Soviet countermeasures to SDI would include improved ASATs to attack the SDI components in orbit, and that such ASATs could attack other Western satellites as well, including perhaps those in high or geosynchronous orbits. Intelligence gathering satellites, on which the West relies to a greater extent than the Soviet Union, may therefore become more vulnerable than at present as a result of SDI, though they would presumably remain intact and available during the critical warning period leading up to hostilities.

50. As has been stressed in the recent MOD/FCO paper on ASATs, the UK is largely dependent on the US for space-derived intelligence and a wide range of technical support. The same factors affecting US/UK cooperation on Trident could come to influence the extent of the information flow in the intelligence field. The resultant impact on our military capability might be serious, and it will thus be doubly important to minimise the probability of any such UK/US rift by careful handling of any approach to the Americans on SDI.

IMPLICATIONS FOR THE UK ECONOMY

51. If the US developed and deployed a full BMD system the sheer scale of the enterprise (see paras 10(a) and 25-26 above) would be likely to have significant worldwide economic implications. Its huge cost would tend to compound the problem of the US budgetary deficit. Industrially, on the other hand, if, as seems likely, the SDI remained an almost exclusively American project, it might give a huge boost to US technology, especially in the data-processing and certain weapons fields. Together with various spin-offs in the civilian sector, this could leave US corporations as the sole suppliers of some of the key weapons of the next century, thus increasing the disparity in production of ultra high value-added systems within NATO and accentuating intra-Alliance economic strains. For the UK economy major uncertainties about the scale, nature and timing of the SDI procurement programme and the degree of involvement by the UK mean that only the broadest speculations are possible.

52. If the US went ahead with this programme on its own but allowed foreign participation, UK firms could expect to be involved at best only as sub-contractors. The extent to which they should attempt to do this would primarily be a matter for their commerical judgement. Our technology base would probably allow us to act as additional suppliers in a number of areas: eg C^3, sensors, software, components and support for space and ground segments. The prize of a share in eventual production could be great but would be likely to be preceded by a lengthy phase when only research and feasibility studies were on offer. Firms would also need to weigh the risks to their technology lead in areas where they were ahead of the US.

53. From a UK economic standpoint there would be conflicting considerations. We would eventually stand to gain the benefits of additional sales to USA, and though the quality and quantity of work would be largely controlled by US security and industrial interests, it would nonetheless be likely to contribute to UK industry's expertise and competitiveness in technologies of key future military importance. On the other hand the programme would divert research assets from other programmes, and in particular those manpower skills in software and micro-electronics which are

already in seriously short supply in relation to our present military and civil programmes. Some advantages from spin-off to the civil economy might be gained, but overall the effect would be to increase the percentage of the UK's highest technology industrial capacity devoted to military work. This is already higher for the UK than for most of our Allies.

54. If HMG were to become a partner, either with the US or European countries, to any significant extent in a BMD programme, as certain lobbyists have began to propose, a much greater scale of UK investment especially in R & D would almost certainly be needed. This would tend to increase the size of the UK's total research efforts and tilt its balance even further towards defence and away from civil projects. Our share of the high-technology end of BMD business might be greater (though it would be unlikely to include the most lucrative and far-reaching components), but the drain on scarce resources and skills would be correspondingly higher. The adverse effects on both other military programmes and the development of the civil economy would seem likely to outweigh any benefits from spin-off.

POSSIBLE REQUIREMENT FOR BMD BASES IN THE UK

55. Dr Keyworth, the President's Scientific Adviser and a prominent SDI advocate, said in a recent interview that any BMD system 'is likely to require some bases in Europe'. It is unclear what he meant by this statement but the main alternatives would seem to be tracking stations, communications centres or terminal defence systems such as interceptor rockets or DEWs. Such a proposal, if it were in due course made formally by the US Government, could raise political difficulties for HMG. Much would depend upon the prevailing public attitude to the US BMD programme and to US policies generally. The type of facility would also be important in the extent to which it might be thought likely to attract Soviet attack in an attempt to knock out the support systems for the overall BMD network.

G. POLITICAL HANDLING

56. The politics of the SDI will probably become more tangled.

The issue is likely to be the subject of sharp US debate especially during the election campaign. Were a Democrat President to be elected this November, present US plans would be radically altered. But if President Reagan is re-elected, he may remain personally committed to the project. Our close links with the US require that we tread delicately in any criticism of their proposals. For political reasons we must be cautious about treating the project, whatever the US Administration in power, in a negative and unconstructive way, without ideas of our own to offer. We must also encourage our European partners to steer clear of the same trap.

57. Apart from the near-term problems that would arise if the Europeans were seen to be taking sides on a major campaign issue, there is a continuing risk that the US will counter European criticisms with the following arguments:

(a) for years the intra-Alliance debate on extended deterrence has cast doubt on the credibility of the US nuclear umbrella;

(b) with the SDI the US is honestly trying to enhance the apparent credibility of its commitment to Europe;

(c) the Europeans are still keeping their heads in the sand and insisting on a dangerous status quo.

There are, of course, reasonable answers to all these accusations, as shown in the analysis above. But if Europeans were drawn into pursuing the debate in too crude or generalised a way, and in particular bringing their doubt about the US nuclear guarantee too much into the open the effects could be destructive and could provide an unwelcome encouragement to neo-isolationist sentiment in the US.

58. It will therefore be important that the European Allies should not in future seek to express concerns or criticisms in terms stronger (or less rational or sophisticated) than those voiced by Congress, the US media or informed opinion. In the SDI debate, as in the 1960s over ABM, the role of Congress will be crucial to the future of the programme. European views should be made clear to the Congress at the same time as consultations continue with successive

Administrations. We should continue to study the scope for practical and realistic UK proposals.

H. CONCLUSIONS

59. From the above analysis a number of conclusions can be drawn; even though the UK is not in a position to make definitive technical and political judgements:

(a) President Reagan's proposal for SDI has raised important and potentially divisive issues for the Alliance, Western Europe and in particular the UK. These will have to be addressed in the short term whether or not SDI is ever implemented;

(b) there is very little chance that, in the face of likely Soviet countermeasures, a reliable system of leakproof defence against ballistic missiles, as envisaged in President Reagan's March 1983 speech, can be created;

(c) even if this were possible, the transition period between the present situation and total BMD would be a time of potentially grave instability. Nor would such a defence provide protection against non-ballistic missiles threats;

(d) BMD systems offering less-than-perfect protection would be open to the above and other objections, and would encourage the proliferation of offensive systems and increased counter-city targeting;

(e) the balance of advantage in Point (or Limited Area) Defence systems, which strictly speaking are separate from SDI, would require further analysis should the US or the Soviet Union move towards their deployment;

(f) the likelihood of a large-scale Air Defence programme to achieve a concomitant leakproof defence against non-ballistic missile threats lies beyond the scope of this Paper, but may be affected by BMD developments;

(g) after prodigious expenditure and periods of transitional strategic instability, development of BMD could well leave the fundamental nuclear balance between the US and Soviet Union unchanged. In theory there might thus be no effect on the major incentives influencing a US President to risk US cities in support of America's overseas Allies and interests;

(h) for Europe, on the other hand, the effect of US BMD deployment might, in the worst case, have far-reaching consequences for the continued cohesion of the Alliance and no strategic benefit;

(i) the enormous and increasing cost of BMD over a period of years is likely to have adverse effects on other US defence programmes, especially for conventional forces, of more direct importance to UK security concerns;

(j) dramatic expansion of the SDI programme would challenge a fundamental aspect of US-Soviet relations, with dangerous consequences in both the arms control field and for East/West relations generally, not least because of the inevitable impact on the ABM Treaty;

(k) conversely, early exploration of the arms control possibilities relevant to defensive systems could provide a way of breaking an expensive spiral of technological competition and provide a platform for improving US relations with the Soviet Union, as the ABM Treaty did in 1972. Conceivably it could also create an inducement for the Soviet Union to end the present impasse in negotiations on offensive nuclear forces;

(l) BMD developments could, in the longer term, have serious implications for the UK national deterrent. In military terms the effects on UK Trident might be sustainable but the necessary countermeasures could be expensive. In any event, political opposition in the UK to the preservation of this essential element in UK national defence could well be strengthened;

(m) opportunities for British industry to obtain BMD-related work are likely to be few. They would in any case be concentrated in a few already overloaded high-technology sectors. But a massive US BMD programme could give a competitive advantage to US industry in some key military and possibly civil technologies of the next century;

(n) because of our particular dependence on the US for our Trident programme and for satellite-derived intelligence, any approach to the Americans on the SDI must be careful to minimise the possibility of a rift which could have an impact on our wider military capability. On the other hand Soviet countermeasures against space-based US BMD could well mean that all satellites would eventually be put at greater risk;

(o) the SDI has caused friction within the Alliance, and is subject to growing scepticism in the US. Congressional sentiment appears to be moving against its implementation, and financial doubts among the US uniformed services seem to be be growing;

(p) despite the above, the US needs to maintain, in the form of a continued research programme, a prudent hedge against future Soviet BMD developments.

I. RECOMMENDATIONS

60. Ministers are invited:

(a) to take note of current US plans and intentions and what is known of Soviet programmes;

(b) to note the arguments expressed for and against continued development of BMD systems by the superpowers, and at the same time the particular grounds for UK reservations about such development;

(c) to note the positions already adopted by most of our European partners, notably the French and Germans;

(d) to agree that serious attention should be devoted to the apparent balance of advantage to be gained from practical measures of arms control in the BMD field;

(e) to agree to consider further the ways in which the above reservations could be suitably expressed and arms control measures further examined, taking care to distinguish between possible private approaches to the Americans and other Allies, and potential public positions to be adopted by HMG;

(f) to encourage the US Administration in the meantime to continue detailed consultations with their Allies, including further bilateral exchanges with the UK.

ANNEX A

RESPONSES TO THE US SDI

GENERAL

1. President Reagan's March 1983 speech came as a bomb-shell for the international community and almost all his own senior advisers, not least in the Pentagon. At one stroke, without any consultation of the Allies and with virtually none within the Administration, he had called for a radical change in strategic planning and doctrine. He had overturned the politico-military assumptions which had governed international strategy and Western defence structures since the early 1960s. Such a dramatic step was partly the result of the arguments put to the President by a small group of US scientists, predicting that in the distant future systems providing for the sort of defence he advocated might indeed be feasible. More important, the President himself on reviewing in January the recommendations from the Joint Chiefs of Staff for enhancing further the destructive power of US nuclear forces appears to have recoiled from the seemingly endless spiral of offensive technology. Added to this factor was his understandable reluctance to allow the survival of the United States and of the Western world to depend ultimately on the rationality of a group of Communist leaders in the Kremlin; and perhaps the innate attraction in the United States of an apparently desirable technological fix, to dissipate increasingly burdensome political problems.

THE DEBATE IN THE US

2. The President's March statement led to immediate critical comment from Europe, and in large measure from within the United States. Doubts were expressed about the technical feasibility of the SDI; its effect upon strategic stability; the financial implications; and, in Europe, the implications for the Alliance. (It has been a notable feature of the US domestic debate since then that the effects of SDI on the Allies have been largely ignored). Two weeks later the prestigious and bipartisan Scowcroft

Commission released its Report on Strategic Forces which included the judgement that "no ABM technologies appear to combine practicality, survivability, low cost and technical effectiveness sufficiently to justify proceeding beyond the stage of technology developments". Criticism was quick to die down, partly because the INF deployments dominated the strategic scene for the rest of 1983, and partly because many people still tended to dismiss the SDI as the "Star Wars" fantasy it had been labelled. As US officials set out their own aims in a non-paper passed to the UK: " we seek to minimize near-term negative reaction to SDI by keeping US discussion of the programme low key and by providing concerned audiences with information about Soviet activity in this area". The Administration commissioned two major studies on SDI prospects; the strategic implications (Hoffman Report) and the defence technologies available (Fletcher Report).

3. With the publication of these two Reports, the debate revived, stimulated by a spate of renewed criticism from non-official sources and leaks from within the Administration that the whole SDI concept was being re-thought. Two major reports, from the Union of Concerned Scientists and the Congressional Office of Technology Assessment (which the DOD are seeking to have withdrawn on the grounds of alleged technical inaccuracies), argued that the entire initiative was technically doomed, apart from the strategic drawbacks. While the creation of an SDI Task Force under General Abrahamson in the Pentagon in March 1984 underlined the determination of Secretary Weinberger and at least some of his senior colleagues that the initiative should be taken seriously, scepticism began to be more strongly reflected in the attitude taken within Congress.

4. At this stage Congressional doubts about the SDI are concentrated on the technical, strategic and financial aspects; little has so far been heard from the Hill about the impact on the Alliance. In contrast to its role during the strategic arguments of the late 1970s, Congress can now occupy a key position in the SDI debate. In the case of the former, the systems concerned were largely already developed and deployed, with the result that the chief leverage of Congress - control of the purse strings - was not effective. However in the case of the SDI, as with the MX development, Congress can exert a potent influence, possessing the ability to control the pace at which the Administration move down the development road, if at all. In other words, Congress

can now replay, in terms of influence, the role it adopted during the previous ABM debate which began in the mid-1960s; and Dr Henry Kissinger recently told the Foreign Secretary that in his view Congress would most probably kill the SDI.

5. These cross-currents of debate over the past 18 months have produced changes in the Administration's own attitudes, and public statements about the SDI. One point has, however, remained unaltered: the President's insistence that the SDI represents only a research and development effort, and that no decisions can or will be taken on the next stages until some years have passed. Meanwhile whatever is done will continue to be fully consistent with US obligations under the 1972 ABM Treaty.

6. In his speech the President acknowledged that "it may never be possible to achieve these aims" (of perfect defence). The major change has been in a wider acceptance within his Administration that a totally leak-proof system of defences may never be achievable. As the technical obstacles to approaching this goal, let alone achieving it, have become clearer, US officials have begun to talk in terms of the SDI producing a partial defence of US targets against Soviet ballistic missiles. The argument has begun to shift away from the implications of total defence towards the traditional arguments, widely debated in the 1960s, about the impact of partial defences (eg for missile silos) on strategic stability.

7. Another change in the Administrations's approach is reflected in the increasing emphasis on Soviet efforts in this field as the justification for the US enhanced research programme. It is striking that at the time of his March speech, which was largely devoted to criticism of increased Soviet military efforts, the President made no mention of Soviet work on BMD. This argument to justify the SDI only began to be developed in the autumn of 1983, as the Administration came under increasing criticism for pursuing their own programme. By February 1984 US officials were emphasizing that Soviet efforts alone were sufficient justification for the US continuing to pursue the SDI. The position is to some extent accepted even by their critics, who believe in the light of what is known about the Soviet programmes that the US cannot

sensibly refrain from pursuing some sort of efforts of their own as a prudent hedge against a sudden Soviet breakthrough. Within the Administration, however, there is little disposition to accept that just such an argument could be advanced with equal justification by proponents in Moscow of defence systems. The advantages of the "prudent hedge" are so far seen as applicable to the US alone.

8. A further twist in the political debate in Washington has been the increasingly willingness, (albeit grudging on the part of some officials) of the Administration to accept that some sort of dialogue with the Russians on this area can be pursued. Shortly after the March 1983 speech the Russians had privately offered talks between scientists on BMD research. The US had accepted these, provided these were held on a government-to-governement basis. But it was not until May 1984 (in a speech by Secretary Shultz) that the Administration went on the record as prepared to conduct such a dialogue. The 31 May NATO communique recorded (largely as a result of FRG insistence) the welcome given by the Allies to this "willingness of the United States to discuss with the Soviet Union research programmes on strategic defence". However, they continued to resist the long-standing Soviet proposals for formal negotiations on a treaty to ban the use of force in outer space and especially anti-satellite systems (ASATs), until they gave a swift and positive response to the Soviet proposal of 29 June for discussions in Vienna in September to cover all issues of militarisation of space, including both ASATs and anti-missile defences. The stage is now set for the next move in this hesitant dialogue, despite lingering doubts among some in Washington about the desirability of such a process.

SOVIET RESPONSES

9. In their public position the Russians have come a long way from 1967 when Mr Kosygin stated that "the defensive systems which prevent attack are not the cause of the arms race but constitute a factor preventing the death of people - maybe an anti-missile system is more expensive than an offensive system, but it is designed not to kill people but to preserve human lives." (This statement is close to the position now being advocated by some in Washington, but disavowed by official US statements). Despite having closed the ABM race in 1972 with a single deployment

of systems around Moscow, the Russians have continued research (as permitted) into defensive technology. In recent briefings for the Allies, US officials have hinted at far-reaching Soviet gains. UK assessments are less conclusive, and the evidence for US claims has yet to be fully established. The extent of Soviet progress in this field is more fully assessed in Annex C.

10. Expressions of Soviet concern at the increasing military competition in space has however become more vocal. As the Foreign Secretary said on his return from Moscow in July, it is possible to "detect in their minds a real anxiety about arms in outer space ... and an element of seriousness in what they say". Their own crude ASAT capability will shortly be outstripped by a more sophisticated US system. The history of the development of both civil and military capabilities in space suggests that in any technology-based competition there must be a risk that they will be outstripped by the Americans. It will not however be a race in the classic sense, just as the development of nuclear arms reflects competition and confrontation but not a race. In neither case is there likely to be an ultimate winner who, on reaching the finishing line, will have nullified all the efforts of his opponents. In the case of space systems, as nuclear arms, even if the Russians were to lag behind the Americans it is inconceivable that they would drop out of the competition altogether. And the history of MIRV development suggests that the technological edge of the US may well turn out to be less decisive than originally supposed.

11. Given these concerns it is not surprising that for the past three years the Russians have actively pressed for negotiations on new agreements limiting military deployments in space. These have been heavily slanted in the direction of Soviet interests, designed to rest upon unverifiable declarations and to foreclose military options which the Russians have either developed themselves already (in the case of ASATs) or in areas where they fear US superiority (as in the case of the Shuttle). The Soviet draft Treaties in 1981 and 1983, proposing severe restraints on anti-satellite systems and wider provisions for banning the use of force in space, have been the basis for the Soviet public platform. In recent months President Chernenko and a host of Soviet senior officials and commentators have harped upon the need to avoid the

militarisation of outer space, and have found an international response to this theme. The 29 June proposal is the latest and most comprehensive offer to seek ways to close off the military competition in space. The Soviet leaders no doubt see the SDI as a readily available and attractive propaganda stick with which to beat Washington; this became evident during the Foreign Secretary's visit to Moscow in July. But they may have misjudged its potential, and their ability to exploit it in the face of a skilful US response.

12. This approach need not on the other hand conceal genuine anxieties felt by Soviet leaders, on the grounds of self-interest alone, about the ultimate outcome of current US efforts. A Soviet study passed privately to UK officials last October set out in considerable detail the concerns, ostensibly felt by Soviet scientists, at the strategic, political and financial implications of the SDI.

13. For the Russians, the SDI represents a major challenge. At worst it could strike at the heart of their only real claim to superpower status. It would challenge their ability to find the necessary resources to maintain their status. The Russians will do what is necessary, but at great cost given the relative sizes of the two economies and the less well developed Soviet technological base. It is also a severe challenge to a central aspect of US/Soviet relations enshrined in the 1972 Mutual Relations Agreement: "The prerequisites for maintaining and strengthening peaceful relations between the USSR and USA are the recognition of the security interests of the parties based on the principle of equality and the renunciation of the use or threat of force."

WESTERN EUROPE

14. The initial reaction in Western Europe to the President's March 1983 statement was irritation at the failure even to attempt consultation before launching such a dramatic and far-reaching initiative and some incredulity that the Administration could seriously intend to move down this path. Since then, reaction to the President's plans throughout the rest of NATO has become increasingly critical and vocal. The FRG Government, with Woerner and Genscher in the lead, have made no secret either in private

or in public of their antagonism to the SDI. The French have also opposed US plans. They launched publicly (and without prior consultation) in June at the Geneva Conference on Disarmament (CD) a range of proposals for outer space arms control which included a renewable five-year ban on the development, testing and deployment of any directed energy weapons.

15. Other Allies have adopted much the same approach, criticising defence systems as potentially decoupling, destabilising, destructive of previous and still valid arms control agreements, and financially crippling. There seems to be a growing sentiment within the Ten that the Community as such should establish its own position towards arms control in outer space; by implication, this would differ from the present US approach. The French are also talking (despite the obvious difficulties this would raise for Alliance cohesion) about a revived WEU adopting space issues as one of the major subjects for its new range of discussions. Only the Japanese have been relatively equivocal in their attitude towards the US plans, an approach dictated perhaps by an interest in the industrial possibilities which a fully developed SDI may produce for Japanese industry, but perhaps more by a reluctance to oppose the Americans on a key security issue.

16. Despite US commitment to consultation within the Alliance and two briefings given to NATO, this has until recently been sparse and unsatisfactory. Prior to the ABM Treaty, senior UK and US officials held wide-ranging formal discussions in the mid-1960s about BMD issues. (The records of these exchanges are available if required; they indicate the wide range of subjects covered, the depth of UK concerns, and the similarity between the issues under debate twenty years ago and at present.) There has until now been no similar offer from the US side this time, but the Administration are apparently beginning to recognize the need to take at least their closest Allies into their confidence. The latest discussions, in Washington on 17/18 July, showed signs of developing into the sort of continuing dialogue which the Allies are seeking.

17. In the rest of the world, the space debate has yet to make much impact. At the Geneva CD and at the UN the Russians and the

radical non-aligned have won a number of easy but unimportant propaganda victories. At the 1983 General Assembly, 126 countries voted for a resolution calling for negotiations on space arms control, including ASATs; the only country to vote against was the US, and the only one to abstain (for reasons of solidarity with the US) was the UK. The non-aligned, insofar as they participate in the debate, favour a radical approach, namely the entire demilitarisation of outer space, a position they (and the Russians) advocate both in disarmament talks and in the UN meetings on the peaceful use of space. So far they have not been prepared to accept that this is totally unrealistic approach. In any case, their contribution to the real debate, as in the past, is unlikely to be substantial.

THE UNITED KINGDOM

18. HMG has welcomed in the NATO ministerial communique of May 1984 US-Soviet contacts on strategic defence and later the US acceptance of the Soviet proposal of 29 June on outer space arms control talks. HMG have not provided detailed comments in public on the SDI. Ministers have underlined our wish to conduct a serious study of all the issues; and on 28 June this year the Prime Minister confirmed in a Written Answer that "we remain anxious to prevent an arms race in outer space". The Foreign Secretary has welcomed the US response to the Soviet proposal for talks in Vienna, and urged the need for these to begin. In a speech at the Guildhall on 11 July, the Prime Minister spoke of "the new and urgent challenge of arms control in outer space" and the need to prevent space becoming a "new and terrible theatre of war" through "negotiation and mutual restraint".

19. The public debate in the UK has followed lines similar to that in Western Europe. The general approach in the media has echoed the words of the "Daily Telegraph" (21 June): "The SDI is an irresponsible and wasteful chimera which, as an answer to the dilemma of nuclear vulnerability; is on a par with the solution offered by the unilateral disarmers". Most informed opinion in this country, political and scientific, tends to dispute official US claims and arguments. There is growing interest in the range of issues within Parliament, with a number of MPs on both sides

of the House questioning US intentions. The Select Committee on Defence, in its Report on the 1984 White Paper, drew attention to the potential ability of a defence system to negate the UK deterrent based on Trident; other MPs have expressed similar disquiet. The Report expressed a preference for further international agreements in this area to replace superpower competition; and it urged the Government to make their concern known before the US Administration took any irrevocable decisions. Opposition parties, like the Democrats in the US, are committed to seeking "an end to the arms race in outer space" and are against the deployment of BMD.

ANNEX B

BALLISTIC MISSILE DEFENCE (BMD) - TECHNICAL ASPECTS

A. INTRODUCTION

1. In the past there have been no wholly affective technical means of defending against a strategic ballistic missile attack and strategic deterrence concepts have been based on the overwhelming advantages of an attacker and the concept of mutual assured destruction. ABM systems such as that currently deployed around Moscow would have some effectiveness against a limited attack but would almost certainly be very "leaky" and, in any case, unable to cope with the massive attack which could be mounted by a superpower. Although improved defences can be obtained by moving to layered defences (exemplified by the development of a two-layer defence around Moscow) to increase the number of opportunities for intercepting an incoming warhead and hence reduced "leakiness", or by increasing the number of ABMs (which would breach the existing ABM Treaty) the attacker could readily restore his advantage by the application of existing or feasible technolgies to provide improved penetration, and also by increasing the sheer number of warheads.

B. NEW DEVELOPMENTS

2. In recent years there have been marked advances in the development of directed energy devices such as lasers, particularly in power levels, which have moved them on from being merely interesting and useful devices in science and technology to the potential for forming the basis of weapon systems - so-called directed energy weapons (DEWs) - for use in all theatres of war including space. In principle it is now feasible to consider seriously the use of DEWs to destroy or disable strategic ballistic missiles or their dispersed re-entry vehicles at very long ranges, perhaps up to several thousand kilometres. The totally different characteristics of DEWs compared to those of "traditional" ABMs have allowed a fresh look at the problem of providing effective defence against strategic ballistic missiles and the "Star Wars" speech by President Reagan on 23 March 1983 has served to intensify studies in this area. A number of quite detailed technical

studies, official and unofficial have been carried out in the US and the essential arguments and conclusions have been published openly. Figure 1 shows schematically the type of comprehensive BMD system which seems to be emerging as feasible.

C. CONTINUING LIMITATIONS OF BMD

3. It should however be emphasised that, while the new technologies considered below may now begin to bring defences against ICBMs to the verge of feasibility, other nuclear delivery means such as air-breathing systems (cruise missiles and bombers), depressed-trajectory ballistic missiles, and nuclear artillery will remain difficult or impossible to counter with certainty. This is because of factors like short flight time, atmospheric attenuation of DEW effects, and new "stealth" technologies. Nor could a fully functioning SDI system provide protection against possible low-technology nuclear blackmail through devices hidden in embassies, terrorist safe houses, or ships in harbour.

DIRECTED ENERGY WEAPONS (DEW)

4. A directed energy weapon essentially consists of a narrow, nearly parallel, beam of pulsed or continuous electromagnetic radiation or atomic particles which can deliver concentrated and damaging energy to a target over long ranges in space at or near the velocity of light (300,000 km/sec). The effective range is limited by the inevitable divergence of the beam causing energy concentration to fall off with distance. Within the atmosphere effects of attentuation and distortion markedly reduce DEW performance.

5. Three main types of DEW have potential application to BMD.

a. A laser provides an intense focussed beam of electromagnetic radiation in the form of ultraviolet, visible or infra-red light. Laser beams can damage boosters in two ways, either by applying power for sufficient time to burn through the missile skin or by hitting the target with a very high energy pulse to cause shock damage. A special case is the x-ray laser, now in its infancy, which uses the concept of generating

from a nuclear explosion a directed single pulse which could be very damaging by means of the impulse imparted at the target.

b. A particle beam is formed by accelerating charged particles to velocities approaching the velocity of light by means of high voltage fields. Charged particle beams have unsatisfactory characteristics for direct use as damage weapons because of charge repulsion (causing divergence) and bending by the Earth's magnetic field. However by "charge stripping" a charged particle beam can be converted to a neutral particle beam having the required characteristics. A special case is an electron beam which, although charged, does have some potential for a short-range DEW eg for ground-based terminal defence. Particle beam weapons would cause damage to the target by a variety of mechanisms ranging from disruption of electronic components at lower levels of energy deposition to melting of structures at high levels.

c. In a radiofrequency weapon the power from a microwave source would be directed on to the target by a large radar-like antenna. However, the energy cannot be concentrated to the same extent as with lasers and particle beams, and would only be of use for damaging electronic systems. This, though, might in itself be an effective means of disabling a ballistic missile.

KINETIC ENERGY WEAPONS (KEWs)

6. The high-velocity kinetic energy projectile, a well proven concept, is capable of development to even higher velocities, say up to 200 km/sec by means of electric rail guns. This velocity is still relatively slow compared to that of light, and KEWs would therefore have a restricted range of interception for the boost phase (see para 8 below for the importance of this). KEWs may, however, have greater potential for mid-course intercept if fired from satellites. Some form of terminal guidance would probably be required and this could be provided only for relatively large and therefore slow projectiles. A direct KEW impact would produce an almost certain kill whatever the size of projectile.

OVERALL CONCEPT

7. The SDI goal is to eliminate the threat posed by nuclear ballistic missiles. It has been generally accepted that this could not be achieved by relying on interceptions during only one of the four phases of flight (see Figure 1). An effective defence would need to be based on interception during several phases with leakage being cumulatively reduced at each stage. Thus an integrated BMD system could well involve a combination of space and ground-based DEWs and more traditional ABMs. For example, during the boost phase, while the missile was in the upper atmosphere and entering the space environment, space-based DEWs could be used to attack it (Stage 1 in Figure 1). DEWs or missiles could then be used for post-boost or mid-course interception in space of the missile "bus" or any of its re-entry vehicles which had already been dispersed (Stage 2 and 3 in Figure 1). Later ground-based DEWs or ABMs could be used to attack re-entry vehicles or other threat bodies in the upper atmosphere, or lower down as last moment Point Defence of selected targets, eg missile launchers (Stage 4 in Figure 1). There would be a minimum height (a few kilometres) of useful intercept for protecting "soft" targets such as cities because incoming Re-entry Vehicles (RVs) might be "salvaged fused" so that their warheads would detonate on interception.

IMPORTANCE OF BOOST-PHASE INTERCEPT

8. The greatest potential for effective defence is in the destruction of the missile during the boost phase as this would, at one interception, remove all the nuclear-armed RVs and associated penetration aids which at later stages in the flight could constitute up to hundreds of credible threats each warranting separate interception. The Infra-Red signature of the rocket boosters also provides an exceptionally clear target for the BMD sensors to pick up. Preliminary research for the SDI has therefore highlighted the importance of DEWs as the only weapons realistically capable of achieving boost-phase interception.

D. ELEMENTS OF A BOOST-PHASE INTERCEPT SYSTEM

9. For boost-phase interception it is clear that the defensive system must be stationed in space in order to have a line-of-sight to the ballistic missile during the early stage of flight and to be capable of rapid response. It follows that the defensive system would need to use satellites, of which a sufficient number would have to be arranged to provide an adequate potential intercept capability over ballistic missile launch sites at all times. The number of satellite battle stations thus required would depend on the effective range of their DEWs. At the extreme, a small number of geostationary satellites could be used but these would necessarily involve a minimum range of about 36,000 kilometres - probably much too great for effective DEWs. It has also been suggested that it might be possible to station laser beam weapon generators on the ground, and redirect their beams on to their targets by mirrors in space. This, though, would introduce additional problems caused by atmospheric effects on beam propagation, and would still require a large part of the system, eg sensors, re-directing mirrors and control mechanisms, to be satellite-mounted.

10. Other key elements of a defensive system include the following:

a. Surveillance and target sensing/acquisition/tracking. The basis for the detection of the launch of a strategic ballistic missile could be sensing of the very hot rocket exhausts. However, much more precise methods would be required to define the missile positions sufficiently accurately to intercept with a DEW. Surveillance monitors could be stationed independently of the DEW satellites and might be mounted in geostationary satellites.

b. Aiming and Pointing the DEW. The DEW beam must be exceptionally stable if there is to be successful interception. Furthermore, even for a beam travelling at the speed of light, the missile target would move a significant distance during the time of passage of the beam, so the beam would need to be pointed at the correct distance ahead of the target and to be kept on target by "panning", eg about 10 metres at a range of 1000 km, at the correct angular velocity for

sufficient time to inflict lethal damage. It would also be necessary to incorporate means of correcting errors in aiming and pointing. The accuracy and stability requirements represent a most severe technical challenge, particularly if, as is likely, the DEW would need to be capable of switching rapidly from one target to the next.

c. Confirmation of Kill. It could be a very difficult problem to detect to what extent, if any, the target missile had been "wounded" and whether the damage was lethal, at least until it was too late to re-attack during the boost phase. This could be an important aspect where the damage could be too subtle, eg to internal electronics, to be readily observable from outside.

d. Power Sources. All SDI concepts involve the rapid generation of chemical, electrical or nuclear energy on command. The very large amounts of directed energy required, often by relatively inefficient conversion processes, could lead to correspondingly large power sources (including fuel requirements of several tons), probably much heavier than any single satellite that has yet been launched.

e. Reliability. Most of the defensive system, especially those elements based in space, would need to be passive, perhaps for many years, and yet able to move immediately into action on demand. This situation presents enormous problems of reliability and its assurance.

f. Survivability. The defensive system would need to be survivable in face of possible pre-emptive attacks by an enemy. Given the range of threats, including the use of anti-satellite weapons, it could be extremely difficult or impossible to provide assurance of survivability.

g. Battle Management. Automated management would have to ensure effective functioning of a enormously complex defensive system involving a multiplicity of sensors, weapons, targets, decoys, threats, and communication channels. It would have to provide complete confidence, in advance, that

it would operate effectively when needed "for real" even though no full "dress rehearsal" would ever have been possible. This unparalleled software generation and validation task presents perhaps the greatest obstacle to the achievement of an effective operational system.

E. COUNTERMEASURES

11. In considering the potential of new technologies to provide improved BMD systems it is necessary to give equal attention to potential technologies available for providing effective countermeasures.

ACTIVE COUNTERMEASURES

12. These would involve direct attacks on the BMD system itself. Satellites are very vulnerable to attack and, in general, any space-based BMD sub-system would be difficult to protect against ASATs, especially as they would have to include inherently soft elements such as sensors and mirrors. Pre-emptive nuclear bursts in space could produce widespread damage to sensors and communications. Ground-based elements would be vulnerable to attack by sabotage and by non-ICBM strategic delivery systems, eg cruise missiles and submarine-launched ballistic missiles (SLBMs) on depressed trajectories.

PASSIVE COUNTERMEASURES

13. A number of methods already exist within the capacity of existing technology, eg completion of boost phase within the atmosphere (to shorten the time available for BMD interception during this phase and to use the atmosphere as a shield against DEWs); rotation of the launch missile (to spread the deposited energy of the DEW beam and lower its effect on any point on the structure), provision of protective coatings to absorb DEW energy without damage to underlying structure, and deployment of decoys, including hot flares.

14. Changes to ICBM launch site locations (by construction of new fixed sites or concerted movements of mobile launchers) could

also be used to increase the scale of the defender's problems. Non-geosychronous satellites necessarily move round the whole of the earth's surface and cannot sit stationary over a single point such as an ICBM site. At any given moment, therefore a continuously circling network of orbiting battlestations would be need to provide DEW coverage of all potential launch sites, including the oceans with their SLBM threat. Regrouping ICBM launchers into a relatively dense cluster would mean that they would all have to be countered by the few satellites within range. The DEW firepower of the rest of the satellite network would become unavailable at the crucial moment (in technical terms, the "absentee ratio" would have worsened). The defence would thus need a large increase in satellite numbers or the capabilities of individual satellites to prevent the numbers of ICBMs being launched simultaneously from the ICBM cluster overwhelming the BMD system's boost-phase intercept capability.

FEASIBILITY

15. The feasibility of deploying operational BMD systems to meet the objectives of the SDI depends not on the scientific concepts themselves, which are founded on well-established physical principles, but on overcoming the enormous technology gaps which exist in critical areas, and the further "reactive" problems posed by likely anti-BMD countermeasures.

16. To achieve perfect or near-perfect defence against present levels of deployment of ICBMs alone a BMD system might need to comprise several hundred satellites, a large proportion carrying a DEW and associated power supply weighing possibly several hundred tons. Other satellites would have to carry pointing and tracking optical systems each of which would need to be larger, more stable and more accurately fabricated than the most powerful land-based astronomical telescopes now in existence. Additionally there would need to be deployed potentially hundreds of thousands of non-nuclear ABMs and up to a hundred ground-based large radars. It is unlikely that a fully integrated and functioning system of this kind could be deployed for another 30-40 years. However, taking into account the inherent vulnerability of a space-based system to ASATs which, together with all the other possible anti-

BMD countermeasures would also have had 4 decades to mature, it seems probable that even then the goal of perfect ballistic missile defence would remain unobtainable.

Figure 1 Schematic Representation of Multi-layered Ballistic Missile Defence System

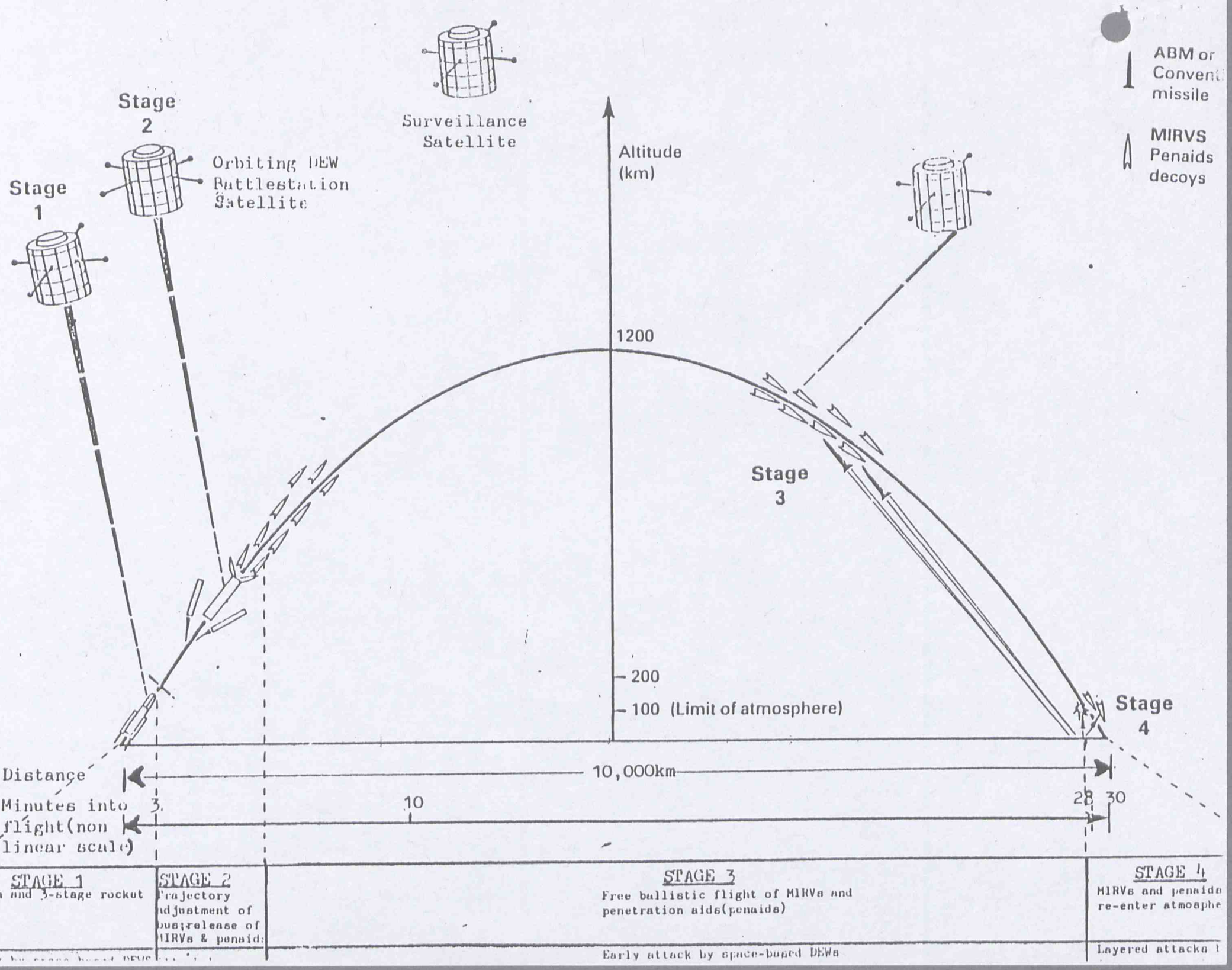
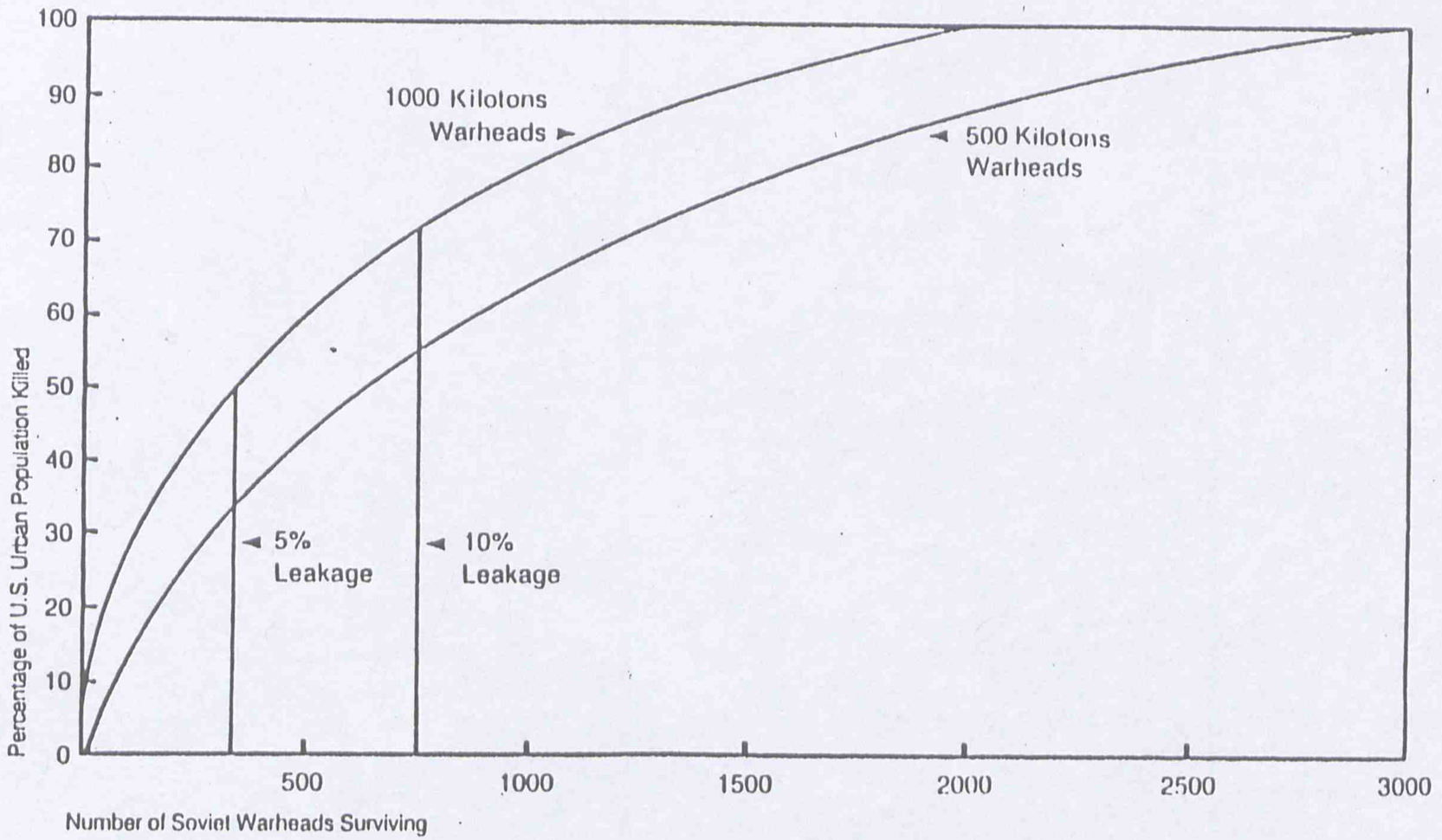


FIGURE 2-1

Effect of BMD Leakage on U.S. Urban Fatalities



Source: Adapted from Arms Control and Disarmament Agency, *U.S. Urban Population Vulnerability* (ACDA, 1979), quoted in Carter and Schwartz, eds., *Ballistic Missile Defense* (Brookings, 1984).

Note: Aimpoints chosen to maximize prompt human fatalities. Assumes current Soviet ICBM and SLBM warhead total of approx. 7500. Assumes U.S. urban population of 131 million, as in 1970 census.

ANNEX C

COMPARATIVE US AND SOVIET BMD ATTAINMENTS AND CAPABILITIES

A THE USA

ABM

1. The 1972 ABM Treaty allowed both the US and USSR each to deploy up to 100 ABM interceptors either round the national capital or an ICBM field. The Americans chose to defend the ICBMs at Grand Forks, North Dakota and built up an ABM complex there based upon the Safeguard system. This was, however, deactivated on grounds of cost effectiveness, soon after becoming operational in 1975, with the perimeter acquisition radar remaining in use as an early warning system. Research nevertheless continued throughout the 1970s and early 1980s on ABM-related technologies. By early 1983 before the Presidential launching of the SDI, Department of Defence and Department of Energy (DOE) expenditure of $1.75 billion was already being proposed for FY 1985 in areas such as:

a Infrared (IR) sensors for improved tactical warning of ICBM attack under the USAF's advanced warning system programme.

b Space-based IR sensor developments under the USAF's space-based surveillance system programme.

c The Defence Advanced Research Projects Agency (DARPA)'s Talon Gold programme: a space-based experiment to demonstrate pointing and tracking for space-based DEW concepts.

d Airborne optical system development as part of the US Army's BMD programme.

e The Army's Homing Overlay Experiment (HOE) for homing non-nuclear mid-course interceptors.

f The White Horse neutral particle beam test bed at Los Alamos.

g DARPA's ALPHA programme to demonstrate, initially on the ground, a megawatt-class chemical IR laser.

h DOE analyses of x-ray laser feasibility.

SDI

WORK TO DATE

2. President Reagan's speech of March 1983 led a further impetus to this work, which was brought together in the integrated Strategic Defence Initiative. Two studies on Strategy and Policy (the Hoffman Report) and Defensive Technologies (the Fletcher Report), were submitted to the President in October 1983. The Defensive Technologies study identified critical technical issues which would have to be resolved before a decision to move to full-scale development could be made. These were:

a Boost-Phase and Post-Boost-Phase Vehicle Intercept. (DEWs were identified as the most promising technology for this crucial task and the determination of their lethality against 'responsive' targets, which had been specifically designed to counter them, was given the highest priority of all.)

b Discrimination and tracking of numerous re-entry vehicles, decoys, and other material during midcourse and high re-entry.

c Survivability of space-based defensive assets when threatened with nuclear or "mirror-image" weapons.

d Inexpensive interceptors for non-nuclear midcourse and early re-entry kill.

e Automated preparation and testing of battle management software.

The study also emphasised that to discourage proliferation of offensive systems as a 'cheap' counter, the cost of destroying a warhead would have to be lower than corresponding offensive

system costs, and that this problem was closely tied to the ability to discriminate between targets and decoys in all phases.

FUTURE WORK AND TIMESCALE

3. The US Government suggests that the implementation of the SDI should be seen in terms of a progressive evolution away from today's sole dependence for deterrence on nuclear retaliation, in the following notional stages, for which the timescales, due to the huge technical uncertanties involved, are necessarily vague:

a The research phase: The period from the President's March 23 1983 speech to the early 1990s when a decision on whether to enter systems development could be made.

b The systems development (or full-scale engineering development) phase: assuming a decision to go ahead beginning in the early 1990s when prototypes of actual defensive system components are designed, built, and tested. It would be at this point (early to mid 1990s) that the US would have finally to abrogate the 1972 ABM Treaty (provided it had not already collapsed) if they were to begin testing the new technologies.

c The transition phase: of incremental, sequential deployment of defensive systems. The US intend that each added increment, in conjunction with effective and survivable offensive systems, should increase deterrence, and reduce the risk of nuclear war. During this period, as the US and USSR deploy defences against ballistic missiles that progressively reduce the value of such missiles, significant reductions in nuclear ballistic missiles might be negotiated and implemented.

d The final phase: during which deployments of highly effective multi-phased defensive systems are completed and during which ballistic missile force levels reach their negotiated nadir. This is the goal proposed in the President's March 23, 1983 speech, but seems unlikely to be reached before the first decade of the next century, if ever.

B THE SOVIET UNION

CURRENT ABM SYSTEM

4. The ABM treaty permits each side to deploy up to 100 launchers in defence of an ICBM field or the national capital. The Soviet Union currently possesses 16 above-ground launchers and 16 silo launchers as part of the Galosh ABM system around Moscow. Of these only the above-ground launchers are assessed to be operational. The Galosh system, now 20 years old, was designed to counter only simple threats (ie those without penetration aids such as chaff or decoys) and, in response to the development of more sophisticated weapons, the Soviet Union is developing and deploying the High Acceleration Vehicle (HAV) designed to counter missiles well inside the atmosphere. 66 HAV launchers are under construction and preparation is in hand to start another 2. Deployment of the HAV will thus give the Soviet Union a total of 100 HAV and Galosh launchers by 1989 thus giving a limited two-layer defence system around Moscow. These developments remain within the confines of the 1972 ABM Treaty and there is no hard evidence of a Soviet intention to abrogate this Treaty.

OVERALL R & D EFFORT

5. The Soviet Union appears to be following an extensive research and development programme which covers many of the elements required for more advanced multi-layered BMD systems, including possible space-based elements. However, there is no evidence of an intention to deploy an SDI system as such, nor of work on further ground-based BMD using existing technology. But the United States estimates that the Soviet Union is spending in the order of $1 billion a year on BMD-related directed-energy research alone. In addition, R & D on space continues at a very high level and essential developments such as large space booster and a re-usable orbiter are well advanced. R & D on the systems required to produce a new generation of BMD is, however, in general at such an early stage so highly vulnerable to the development of countermeasures, and so subject to unforeseeable technological development, that it is impossible to predict its outcome.

SPACE-BASED BMD DEVELOPMENTS

6. The Soviet Union has tested three types of laser considered suitable for space-borne BMD i.e. gas dynamic, chemical and iodine lasers. Research programmes exist on megawatt chemical lasers and power systems for electrically-driven gas lasers. Work on an x-ray laser based on the radiation from a nuclear explosion is probably at a much earlier stage. The Soviet Union is well advanced in particle beam research; work on an accelerator began in the 1960s. But while there is some evidence of testing an evaluation of a particle beam weapon concept, there is no indication that the problems of beam steering and control have been solved. The Soviets have also been working for many years on producing the very high powers needed for radiofrequency (RF) weapons, as a natural extension of the development of powerful radars and jamming equipment. There is however only limited knowledge of Soviet progress in this field and the importance they attach to the development of such weapons.

7. The effective use of DEWs as BMD weapons depends on very high accuracy target tracking and precision pointing of the beam. The required accuracy of at least 1 microradian (i.e. within a metre at a range of 1000 kms) is at least 10 times better than the best thought to be achieved by current Soviet ground-based systems. At present the Soviet Union makes use of research in the German Democratic Republic on target tracking in space where the performance achieved is comparable to that in the West. Soviet research has concentrated on laser design and mirror technology (for the beam directing mirror). The pointing and tracking experiments carried out so far in the SALYUT 7 spacecraft are, however, far too crude for the requirements of lasers. Together with the problems of compact power supplies and the miniaturization of command and control systems we believe it will take 20-30 years to produce an operational system, using existing technologies.

8. The Soviet Union has several operational space launch vehicles but none large enough to put a DEW system in space. However new large space boosters are under development with the payload capacity

adequate to support a laser weapon programme. One of these is assessed to have the ability to lift possibly up to 200 tonnes into low Earth orbit. A re-usable manned orbiter similar to the US Shuttle is also under development and should be operational by the late 1980s while a re-usable small space plane has been tested. The large dimensions and mass of space based BMD weapons imply fabrication in space. The Soviet Union has considerable experience from its manned space programme, but a vast amount of additional work would be required to reach a level of expertise adequate for assembling and maintaining space-based BMD.

GROUND-BASED BMD DEVELOPMENTS

9. The Soviets may be working on ground-based lasers for BMD. A project which started in the mid 1960's involves an iodine laser believed to be intended for use against re-entry vehicles in the terminal phase. Trials on the laser are carried out regularly at the weapons development centre at Sary Shagan. Particle Beam Weapons would not be effective as ground-based BMD weapons because of atmospheric absorption.

C. COMPARISON OF US AND SOVIET BMD CAPABILITIES AND POTENTIAL

TECHNICAL PROGRESS

10. It is impossible to be precise about the relative status of the Soviet and United States directed energy weapons programmes because of the wide range of potential weapons, the long lead times associated with the larger systems, the early stages reached in research for space-based BMD applications and, not least, the different approach to the problem taken by the two sides. In broad terms, the Soviet Union appears to be ahead in the development of high-power lasers, with the notable exception of chemical lasers, while the US is more advanced in the development of pointing and tracking and mirror technologies. In space-based systems neither country is advanced beyond R&D, but at this early stage the US has probably progressed further.

C CAPACITY TO AFFORD DEPLOYMENT

11. American ability to afford deployment of a comprehensive BMD system is discussed in Paras 25-30 of the main paper.

12. For the Russians, their BMD R&D programme must already be extremely expensive in both human and financial resources. Two leading research establishments are believed to be involved in the development of space-based lasers and their heavy-lift launch vehicles, both received massive investment during the late 1970's and early 1980's. R&D accounts for 20 per cent of Soviet military expenditure and was increasing at an average annual rate of 5 per cent between 1970 and 1982, making it the fastest growing category of military expenditure; it is not, however, possible to isolate the cost of individual programmes within the overall R&D budget.

13. The Soviet Union is unlikely to allow cost to restrain its development of SDI if it perceives the need to match the US programme. Such a decision would be based on strategic rather than financial considerations and the Russians, by their construction of an unparalleled air defence and ABM system have already proved their willingness to divert very considerable resources to limit the damage which might be inflicted on their homeland, and have consistently demonstrated the ability and willingness to match US developments in other fields.

14. A greater restraint than cost alone is likely to be the demands that a BMD system would place on certain key industries such as electronics where the United States still enjoys a considerable advantage over the Soviet Union. There is no doubt, however, that the Soviet Union is placing great emphasis on advanced technology and in developing its industrial base, particularly in the electronics industry.

15. While the pace and degree of success in these directions will be critical to the development of Soviet BMD, there are already indications that considerable resources are being allocated to space systems development, particularly large launch vehicles and large orbital platforms, and associated infrastructure.

In parallel with this effort work has begun on development of DEW components. Thus the indications are that technical and industrial resources for a BMD system would be found, although it is unclear what long-term effect the concentration of resources on this area may have on other parts of the defence sector. There is no doubt about the damaging effects that having to devote an even larger slice of the national economy to defence will have but equally no doubt that the leadership would consider this the lesser of the two evils if the choice were between disappointing consumer expectations and keeping up in an arms race in space with the US. Once begun, however, Soviet work on a full-scale counterpart to the American SDI would probably be much less subject to internal political change and turbulence than in the US.

ANNEX D

CIVIL USES OF OUTER SPACE

1. The main current and future civil uses of outer space are:

a. Telecommunications.
b. Broadcasting (direct television broadcasting by satellite).
c. Remote sensing of the earth and atmosphere.
d. Scientific research, especially astronomical observation.
e. Navigational satellites/search and rescue.
f. Possible near-term future industrial uses making use of the microgravity/vacuum environment in orbit.
g. Speculative longer-term prospects for solar power generation, space mining operations etc.

A. Telecommunications

2. Satellites, especially in geosynchronous orbit, have been used increasingly to provide a relatively cheap and flexible means of communications for telephone, telegraph, data transfer, and point-to-point television transmissions. Much international telephone traffic is now routed through the International Telecommunications Satellite Organisation (Intelsat) system and through the Soviet Bloc's Intersputnik equivalent. Intelsat capacity is also used for domestic communications especially in sparsely populated areas, and there are also domestic telecommunications satellites (eg in US, Indonesia) and regional ones (Europe); they are being used increasingly for shorter-distance communications.

3. Satellites are, and are expected to remain, largely complementary with submarine cables. Cables are expected to have much increased capacities with the introduction of fibre optics, but it is expected that the growth in civil telecommunications traffic will be such that there will be increased use of both satellite and cable in years to come.

4. Satellites are also used for ship-to-shore telecommunications, the International Maritime Satellite Organisation (Inmarsat) system. And there is the prospect of increased use of satellites for mobile

communications eg aircraft and possibly land mobiles (lorries).

B. Broadcasting

5. Although sound radio broadcasts can, by using the right frequencies, cover quite large areas of the globe, television broadcasts of reasonable quality need to be transmitted at a frequency which requires almost line-of-sight between transmitter and receiving aerial. Direct broadcasting by satellite, in which the signals are beamed up to a satellite in geosynchronous orbit, and then retransmitted to the selected area on earth, can provide good coverage without many repeater stations, though the viewer or cable-head receiver needs a special dish aerial. This use is just starting but may be expected to grow over the next 10 to 15 years.

C. Remote Sensing of the Earth and Atmosphere

6. By using sensors working on different frequencies of electromagnetic radiation (not just visible light), remote sensing of the earth from space (often from lower orbit) can, with suitable computer analysis of the results, give a wide variety of information ranging from meteorological cloud cover, sea state etc to indications of the natural resources in a region, including geological formations, the likely presence of certain minerals and the state of crops.

D. Scientific Uses

7. Many astronomical observations can be carried out much better in space than on the surface of the earth since the atmosphere is opaque to certain frequencies of radiation and distorts others. The UK has for example been involved in an astronomical satellite which scans the heavens in the infra-red. Scientific studies are also carried out, from various orbits, of the earth and its atmosphere, including upper atmosphere conditions. Missions to the Moon, the other planets and Halley's Comet are also of great interest, and There are also scientific uses which exploit the microgravity environment.

E. Navigational satellites

8. There are already many civil uses of US military navigational satellites, and ideas has been proposed for separate civil navigational systems. There is widespread use of such satellites by ships, and aircraft will increasingly benefit from them.

9. Small packages already exist on some satellites for picking up radio distress calls, with further possible uses of satellites in the search and rescue role.

F. Possible Near-Term Future Industrial Uses

10. The microgravity and vacuum environment encountered in orbit cannot be created on earth except for short periods of time. It allows the ultra high purification of certain high-value materials and the manufacture of composite materials with very interesting properties. Such uses of space have not been proved categorically to be economic, but proponents of the US Manned Space Station programme point to interest by several US firms in the idea. The Soviet Union has conducted a great deal of work in this field.

G. Longer-Term Prospects

11. As with all radical new technologies, it is particularly difficult to guess the longer-term prospects. In less than two decades, satellite communications have become an everyday fact of life. The US manned space station (planned for 1992) will open new possibilities in space, as may the European Columbus programme. The capacity to carry out sustained operations in space, with men present to make decisions and operate apparatus, and the availability of high power (over 100 KW) are likely to foster new scientific and industrial activities (see above). A space station will also enable the refuelling and repair of spacecraft, as well as the construction in space of large devices made up from individual launcher payloads.

12. Even further into the future, much more ambitious activities may be possible: for example the construction of very large solar power satellites converting the sun's rays into electrical energy

and beaming it down by microwave transmissions to receptors on earth, or the capture and mining of asteroids for rare minerals. The potential of space in the very long term is obviously enormous, but equally the eventual feasibility of such proposals is at present impossible to assess.

DEFENCE: Military Uses of laser technology in Space (Dec 79)

CONFIDENTIAL

file

26 July 1984

CONSULTATIONS WITH THE AMERICANS ON OUTER SPACE ARMS CONTROL

Thank you for your letter of 24 July. The Prime Minister has noted without comment Washington telegram number 2183 reporting the discussions held by an FCO/MOD team on ASATs and Ballistic Missile Defence.

Charles Powell

Colin Budd, Esq.,
Foreign and Commonwealth Office.

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Foreign and Commonwealth Office

London SW1A 2AH

24 July 1984

Prime Minister

CDP 24/7

Dear Charles,

Consultations with the Americans on Outer Space Arms Control

In your letter of 16 July to Richard Mottram you reported the outcome of the Prime Minister's meeting to discuss policy on limits on Anti-Satellite Systems (ASATs). The following day a FCO/MOD team participated in consultations in Washington with the Americans, French, Germans and Italians which covered the issues both of ASATs and Ballistic Missile Defence (BMD).

The outcome of this meeting was summarised in Washington telno 2183 of which I enclose a copy. We agree with Sir Oliver Wright's assessment that this represented a useful step forward, which can act as a basis for further consultations between the Americans and their Allies on both the bilateral and multilateral level.

Yours ever,

Colin Budd

(C R Budd)
Private Secretary

C D Powell Esq
10 Downing Street

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TELEGRAM NUMBER 2183 OF 18 JULY
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CONSULTATIONS WITH THE AMERICANS ON SPACE

1. WESTON, ACCOMPANIED BY ADMIRAL OSWALD, LED A SMALL FCO/MOD TEAM AT THE CONSULTATIONS ON SPACE AND THE STRATEGIC DEFENCE INITIATIVE (SDI) WHICH THE AMERICANS HAD ORGANISED HERE FOR CLOSE ALLIES ON 17/18 JULY (FULL REPORT BY BAG). THE FRENCH, GERMANS AND ITALIANS WERE LED RESPECTIVELY BY RENOUARD, RUTH AND DANOVI, ALSO WITH MINISTRY OF DEFENCE SUPPORT. IN ADDITION TO PLENARY SESSIONS AT THE PENTAGON AND STATE DEPARTMENT (AT EACH OF WHICH THE US SIDE HAD FULL INTER-AGENCY REPRESENTATION), HEADS OF DELEGATION HAD SEPARATE MEETINGS WITH IKLE (UNDER SECRETARY FOR POLICY, DOD) AND ARMACOST (UNDER SECRETARY FOR POLITICAL AFFAIRS, STATE). WESTON ALSO HAD BILATERALS WITH BURT AND (ACCOMPANIED BY OSWALD) WITH PERLE, COVERING BOTH ASATS AND SDI. THE FRENCH, WITH THEIR MORE FORMED POSITION ON SPACE ARMS CONTROL, HAD HELD A SET PIECE BILATERAL WITH THE AMERICANS FOR HALF A DAY BEFORE THE LARGER MEETING STARTED.

2. THESE TWO DAYS MARKED AN IMPORTANT ADVANCE ON AMERICAN PREPAREDNESS TO ENTER INTO A PROCESS OF INTENSIFIED POLITICAL CONSULTATION WITH KEY ALLIES ON MILITARY SPACE MATTERS. THEY APPEAR INCREASINGLY TO REALISE THE NEED TO CARRY WIDER ALLIANCE SUPPORT FOR UNITED STATES POLICY AS IT EVOLVES AND TO GRAPPLE MORE EFFECTIVELY WITH SOME OF THE PROBLEMS THAT THE DEBATE, PARTICULARLY ON SDI, IS STARTING TO EXPOSE BOTH IN THE UNITED STATES AND IN EUROPE. THEY MAY ALSO BE BEGINNING TO ACKNOWLEDGE THAT THE EMPHASIS ON THE RELEVANCE OF THE SDI TO THE DEFENCE OF THE ALLIANCE AS A WHOLE (NOT JUST THE CONTINENTAL UNITED STATES) CARRIES THE COROLLARY THAT THE CONCERNS OF, AND IMPLICATIONS FOR, EUROPE NEED TO BE TAKEN FULLY INTO ACCOUNT EVEN THOUGH THE SDI IS STILL AT AN EARLY PHASE OF RESEARCH AND FEASIBILITY STUDY. ALL THIS IS VERY WELCOME.

3. THE UK TEAM SOUGHT IN DISCUSSION TO STRIKE A NOTE OF CONSTRUCTIVE ENQUIRY, STRESSING THE CLOSE INTEREST OF SENIOR MINISTERS IN BOTH ASAT AND SDI, AND ALSO THE FACT THAT WE CERTAINLY DO NOT PRESUME TO KNOW ALL THE ANSWERS ON THESE COMPLEX ISSUES AND THEREFORE DO NOT APPROACH MATTERS WITH FIXED IDEAS. WESTON TOOK THE LINE THAT EVEN WITH SDI IN ITS EARLY STAGES POLICY IMPLICATIONS WERE BEGINNING TO PRESENT THEMSELVES IN THE SHORT TERM BOTH FOR INTER-ALLIANCE AFFAIRS AND FOR EAST/WEST RELATIONS. THEY KEY AREAS INCLUDED THE COUPLING/DECOUPLING IMPLICATIONS FOR EUROPE: THE IMPACT

ON NATO STRATEGY OF FLEXIBILITY RESPONSE AND ON EAST/WEST STABILITY: THE DEFENCE RESOURCES PROBLEM: AND THE IMPLICATIONS FOR ARMS CONTROL. TO BEGIN TO ADDRESS SUCH ISSUES EVEN NOW WOULD BE A VALUABLE EXERCISE IN MAINTAINING ALLIANCE SOLIDARITY AND IN SEEKING TO CONVINCE CRITICS THAT SDI WAS NOT MERELY A TECHNICAL DIVERSION FROM AN ESSENTIALLY POLITICAL PROBLEM. THIS LINE WAS ALSO REFLECTED BY OTHER ALLIES WHO APPROACHED THE DISCUSSIONS IN A SIMILAR OPEN-MINDED AND DELIBERATELY NON-ANTAGONISTIC STYLE WHILE NOT HIDING THEIR CONCERNS.

4. THE AMERICANS DID NOT ADD SIGNIFICANTLY TO OUR FACTUAL KNOWLEDGE ABOUT THE SDI OR ASAT. WHAT DID EMERGE WAS THE EXTENT TO WHICH THEY THEMSELVES HAVE NO SETTLED VIEW OR ANSWERS ON MANY OF THE QUESTIONS RAISED AND THAT THIS UNCERTAINTY IS NOT SIMPLY A FUNCTION OF THE FACT THAT THE SDI TECHNICAL FEASIBILITY STUDIES ARE SEVERAL YEARS FROM COMPLETION. THERE CLEARLY IS SCEPTICISM AMONG SOME SENIOR US OFFICIALS AS TO WHETHER A COMPREHENSIVE STRATEGIC DEFENCE SYSTEM WILL EVER BE DEPLOYED, IF ONLY FOR RESOURCE REASONS. EQUALLY THERE IS A FEELING THAT THERE MAY BE VALUABLE SPIN-OFF FROM THE RESEARCH ALONG THE WAY AND THAT THE SCALE AND EFFORT GOING INTO THE PRESIDENT'S INITIATIVE OF STRATEGIC DEFENCE HAS AT THE VERY LEAST MADE A STRONG IMPRESSION ON THE RUSSIANS, WHICH MAY BE NO BAD THING IN THE WIDER NEGOTIATING CONTEXT.

5. ON ASATS STRONG INTER-AGENCY DIFFERENCES PERSIST ABOUT HOW FAR THE VIENNA TALKS WILL REQUIRE THE ADMINISTRATION TO HAVE A SUBSTANTIVE NEGOTIATING POSITION AND WHAT IT SHOULD BE. THESE RANGE FROM THE CIVILIAN SIDE OF THE PENTAGON WHO SEE LITTLE NEED FOR ANY: THROUGH ACDA, WHO WANT A LARGELY COSMETIC POSITION: WHILE OTHERS INCLUDING IMPORTANT ELEMENTS IN THE STATE DEPARTMENT APPEAR TO FAVOUR ONE LOW LEVEL ASAT SYSTEM ON EACH SIDE, WITH A BAN ON THE TESTING AND DEPLOYMENT OF HIGH LEVEL ASATS,. THE POSITION OF THE JOINT CHIEFS IS OPAQUE, BUT THERE IS SOME EVIDENCE OF DOUBTS IN USAF AND NAVY CIRCLES ABOUT THE US F15 LOW LEVEL ASAT PROGRAMME, WHICH COULD LEAD THEM TO FAVOUR A MORATORIUM ON ALL FURTHER ASAT TESTING. THE SENIOR INTER-AGENCY GROUP WILL MEET TO LAY OUT ALL THE OPTIONS AT THE END OF THIS WEEK. THE PRESIDENT IS EXPECTED TO CHAIR THE NATIONAL SECURITY COUNCIL IN AUGUST TO DECIDE BETWEEN THEM. AS FOR THE PROJECTED US/SOVIET VIENNA TALKS ON 18 SEPTEMBER, THE AMERICANS JUDGE THAT THERE ARE BETTER THAN EVEN CHANCES OF RESOLVING THE AGENDA PROBLEM SO THAT BOTH SIDES TURN UP ON THE DAY. BUT IN ADDITION TO BEING READY TO DISCUSS NEGOTIATING APPROACHES ON ASATS AND THE LONGER TERM IMPLICATIONS OF THE SDI, THEY WILL CERTAINLY WISH TO RAISE THE RESUMPTION OF NEGOTIATIONS ON OFFENSIVE NUCLEAR FORCES, BECAUSE OF THE CLOSE CONNECTION BETWEEN THIS AND THE STRATEGIC DEFENSE ISSUE. THE AMERICANS ARE NOT CANVASSING SPECIFIC PRESCRIPTIONS FROM THEIR ALLIES AT THIS STAGE AS TO THEIR ASAT NEGOTIATING HAND, ALTHOUGH THEY REALISE THAT SOME ALLIES WILL HAVE

THEIR OWN VIEWS. THEY HAVE NOTED YOUR MESSAGE TO SHULTZ WITH ITS EMPHASIS ON THE NEED TO TRY TO ENCOURAGE THE RUSSIANS TO ENAGAGE SERIOUSLY ON SPACE AT VIENNA. THEY HAVE ALSO NOTED THE PRIME MINISTER'S GUILD HALL SPEECH WITH ITS EMPHASIS ON THE CHALLENGE OF ARMS CONTROL IN OUTER SPACE AND THE NEED FOR NEGOTIATIONS AND MUTUAL RESTRAINT.

6. IT SEEMS TO BE ACCEPTED THAT THE PROCESS BEGUN HERE OF CONSULTATIONS WITH KEY ALLIES ON SPACE SHOULD CONTINUE AT APPROPRIATE INTERVALS, PROVIDING IT IS NOT OVER-FORMALISED. THE AMERICANS WILL NOW TRY TO PREPARE SOME FURTHER WRITTEN MATERIAL FOR CIRCULATION THROUGH THE DIPLOMATIC CHANNEL AND AS A WAY OF ORGANISING AND FOCUSSING FUTURE DISCUSSION. THERE IS ALSO AN OPPORTUNITY FOR ALLIES TO CONTRIBUTE TO THIS PROCESS IF THEY WISH. THE INTENTION IS TO CONTINUE WITH THE PRESENT RESTRICTED GROUP OF KEY ALLIES, AT LEAST SO LONG AS ITS RELATIVE CONFIDENTIALITY MAKES THIS POSSIBLE. CONSULTATIONS IN THE WIDER NATO FORUM WILL IN ANY EVENT REMAIN NECESSARY AND THE AMERICANS ARE LIKELY TO ORGANISE A DISCUSSION IN THE FIRST HALF OF SEPTEMBER, WITH THE AIM OF ENSURING THAT THEY GO TO VIENNA WITH THE REQUIRED SUPPORT OF NATO AS A WHOLE. NONE OF THIS OF COURSE PRECLUDES THE FULLEST POSSIBLE USE OF OUR BILATERAL CHANNELS FOR CONSULTATION WITH THE AMERICANS ON MILITARY SPACE ISSUES, WHETHER THROUGH OUR REGULAR POLITICO-MILITARY TALKS OR ON SOME TAILOR-MADE OCCASION. WE NEED NOT IN MY VIEW BE AFRAID OF COMING TO OUR OWN CONCLUSIONS ABOUT ASATS AND SDI ON THE BASIS OF OUR OWN HOMEWORK, AND PUTTING THESE TO THE AMERICANS FOR DISCUSSION. PROVIDED WE CONTINUE TO DO THIS IN THE RIGHT SPIRIT THEY ARE LIKELY TO WELCOME AND VALUE IT AS A WAY OF TESTING THEIR THINKING AGAINST A RESPONSIBLE SECOND OPINION. EXPERIENCE OVER RECENT YEARS, ON BOTH INF AND THE MONTEBELLO DECISION TO REDUCE NATO SHORT RANGE NUCLEAR WEAPONS IN EUROPE, SHOWS HOW INFLUENTIAL A TIMELY WORD FROM US CAN BE.

U. PLEASE INCLUDE CARTLEDGE (CABINET OFFICE) AMONG ADVANCE COPY RECIPIENTS OF THIS TELEGRAM.

8. SEE MIFT.

WRIGHT

DEFENCE : Lows Tech
Dec 79

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10 DOWNING STREET

From the Private Secretary

16 July 1984

Dear Richard,

ANTI-SATELLITE SYSTEMS AND ARMS CONTROL

The Prime Minister held a meeting this afternoon to discuss the paper on Anti-Satellite Systems and Arms Control submitted under cover of the joint minute by the Defence Secretary and the Foreign and Commonwealth Secretary of 19 June. Those present were the Foreign and Commonwealth Secretary, the Defence Secretary, the Minister of State for the Armed Forces, Sir Antony Acland, Sir Percy Cradock and Mr Cartledge.

The Prime Minister said that while a great deal of the information and analysis in the joint FCO/MOD paper was of interest, she did not agree with a number of conclusions reached, in particular the statements that the ideal solution would be one in which ASATs were eliminated by the effective banning of both the orbital ASAT and the US MHV; and that an arms control regime on ASATs which hampered development of BMD on both sides would be in our national interest. Nor did she want to appear to be telling the Americans what to do in this field. They had a great deal more technical knowledge than the UK and we would risk annoying them needlessly.

In discussion of the first point, it was agreed that any negotiations must not prevent the Americans from reaching parity in low altitude ASATs. We should not get in

/ a position

a position of seeming to be a party to bringing pressure to bear on the US in this sense. As the Prime Minister had suggestd in her speech to the European Atlantic Group, the scope for negotiating restrictions lay with systems for deployment in deeper space. But such restrictions would have consequences for the Strategic Defence Initiative(SDI). These could be fully established only when we had more information on American intentions.

On this second point it was suggested that ASATs could not be seen in isolation and that there was an important link between them and the SDI. It could be argued, for instance, that it was the American announcement of the SDI which had brought the Russians to offer negotiations on ASATs. The threat posed to them by the SDI was thus a useful lever which should be used to full effect. Since orbital ASATs could not be limited without limiting the SDI, an ASATs treaty in isolation would in effect mean the end of the SDI. Against this, it was pointed out that the timescale for ASATs and the SDI were different and that constraints negotiated now on ASATs could if necessary be varied in the future if they hindered the development of the SDI option. The Americans appeared ready to talk to the Russians on ASATs which suggested that they regarded the risk as manageable. Moreover, if the unrestricted development of high level ASATs was allowed, the effect would be to push the Russians into their own SDI. This could in turn eventually degrade or nullify our own nuclear deterrent.

On the point about discussions with the Americans, it was noted that Secretary Shultz had recently written to seek our support and counsel. It was unlikely that there was yet a monolithic US view and we ought to be able to contribute to the debate within the US Administration.

Summing up the discussion, the Prime Minister said that

/ we should

we should talk to the Americans, find out how far they had got in their analysis of the problem of limitations on ASATs and whether they had thought through the political and strategic implications, in particular for their allies. But we should not give the impression that we had reached any conclusions. Nor should we try to push the Americans in any particular direction. We did not yet know enough about the subject to do this. We should ask not tell. Our own position could only be decided once we had a clear picture of American thinking.

I am sending copies of this letter to Len Appleyard (Foreign and Commonwealth Office) and Richard Hatfield (Cabinet Office).

Yours sincerely,

C D POWELL

Richard Mottram, Esq.,
Ministry of Defence

SECRET

19

Foreign and Commonwealth Office

London SW1A 2AH

Print Minister

13 July 1984

CDP 16/7.

CDP 147.

Dear Charles,

Anti-Satellite Systems (ASATs) and Arms Control

The Prime Minister is holding a meeting at 1700 on Monday 16 July to discuss with Sir Geoffrey Howe and Mr Heseltine the Joint Paper and covering minute which they sent to her on 19 June. In your letter of 2 July to Richard Mottram you indicated some of the Prime Minister's concerns and her desire for the restricted briefing which has now taken place. We have studied with great interest her comments on space arms control at the Guildhall on 11 July. In addition, there have been a number of other recent developments in terms of US-Soviet exchanges and in the context of Sir Geoffrey Howe's visit to Moscow. As further background for the 16 July meeting you may find it useful to have a brief summary of these.

As noted in para 35 of the Joint Paper and para 7 of the covering minute, the Russians have been on record for some years as favouring negotiations (on their terms) about ASAT controls. The Americans have been reluctant to negotiate on these, but earlier this year began to concede the possibility of informal discussions. President Reagan's Report to Congress in April stated that the US were continuing to study arms control possibilities. In a press conference in June he confirmed that, in the words of his Report, "the door is not closed" to negotiations on ASAT controls. Part of this US shift in policy was no doubt due to Congressional pressures. In May the House voted to block the further development of the US prototype ASAT unless the Russians resumed testing. The Senate laid less constraints on the US programme, but sought a Presidential commitment to negotiate with the Russians on ASATs. A compromise position has still to be settled between Congressional representatives.

On 29 June, just before Sir Geoffrey Howe left for Moscow, the Russians launched a formal proposal calling for negotiations in Vienna in September on measures to prevent "the militarisation of outer space". These they saw as including the banning of all anti-satellite and anti-missile defences, and of the use of force in any space-related manner.

/They also

They also offered a reciprocal moratorium on testing and deployment of such weapons which they invited other countries to join. The White House response the same day indicated US willingness to meet the Russians to discuss: (i) ways in which the nuclear negotiations could be resumed; and (ii) "feasible negotiating approaches" which could lead to ASAT controls. They were also ready to discuss any other arms control concerns or other matters of interest to both sides.

In subsequent exchanges the Americans confirmed that these two aspects of their response were not integrally linked, and that they were prepared to meet in Vienna without pre-conditions. Sir Geoffrey Howe emphasised this point on several occasions to the Soviet leaders in Moscow. The Americans are, however, still anxious that in any Vienna discussions they should remain free to raise the resumption of nuclear talks, even if the Russians are unwilling to discuss this. Moreover, it is still unclear whether the American approach includes a willingness to engage in negotiations proper or merely "talks about talks"; and whether these will comprise only ASATs or the whole gamut of space issues proposed by the Russians.

For their part, the latter are still insisting in their latest public (6 July) statement and in further private exchanges that only "space-attack" (i.e. ASAT and BMD) weapons should be discussed in Vienna. They also want agreement reached on an agenda before the talks begin. They may also press for a moratorium on ASAT testing, which would bite directly on current US plans, as another pre-condition for the talks. The Americans, who are continuing to pursue these points of difference privately, are likely to be flexible about whether or not there should be an agreed agenda. But they will want it either to include nuclear arms control or to allow both sides to raise issues of interest.

There still seems to be an even chance that the Vienna talks will get off the ground. While the Russians no doubt saw potential propaganda advantage in their original proposal, and will continue to exploit this where possible, there appears to be some genuine interest in Moscow in seeking arms control limitations in this area. This was the impression gained by Sir Geoffrey Howe during his talks there. Despite continuing Pentagon reservations, the swift White House response and subsequent statements suggest that there is also a new US interest in the possibilities. We understand that the internal review in Washington on arms control options is due to be completed by 1 August, and will then be submitted to the President for pre-September decisions.

/Sir Geoffrey

Sir Geoffrey Howe believes that it would be appropriate and timely for any Ministerial decisions reached as a result of the Prime Minister's meeting to be indicated to the US Administration as soon as possible, so that our views can be taken fully into account by the President and his officials before their own negotiating position becomes finally settled.

I am copying this letter to Richard Mottram (MOD) and Richard Hatfield (Cabinet Office).

(R B Bone)
Private Secretary

C D Powell Esq
10 Downing Street

SECRET

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Prime Minister

c DP 13/7.

CDP
16/7.

B.06798

PRIME MINISTER

c Sir Robert Armstrong

Anti-Satellite Systems and Arms Control
Meeting of Minister: 16 July at 5 p.m.

BACKGROUND

FLAG C

The joint minute to you of 19 June by the Foreign and Commonwealth Secretary and Defence Secretary covers a paper by officials which discusses the military advantages and disadvantages to the West of the development of anti-satellite systems (ASATS) and the implications of activities in this field for arms control. The main points to emerge from the paper are summarised in paragraph 2 of the joint minute.

2. As to the practical action to be taken, the Foreign and Commonwealth Secretary and Defence Secretary recommend (paragraph 6) that the Americans should be encouraged, in formulating their policy on ASATS and arms control, to adopt an approach which would place limits on low altitude ASATS and ban the testing, and therefore deployment, of high altitude ASATS. The judgement is that for military reasons, and because of problems of verification, the political market in the United States would not bear the adoption of a policy calling for a complete ban on all ASATS.

3. Since the joint minute was written, the United States have said that they are prepared to discuss with the Soviet Union approaches to arms control in space, including ASATS;

they would also like to raise at any talks other arms control issues, including nuclear missile reductions. The Soviet response has been that there must be formal agreement upon an Agenda before any talks can take place, and that missile reductions cannot be included. The Foreign and Commonwealth Secretary is sending you further advice, in advance of your meeting, describing the latest position in these exchanges.

HANDLING

4. You should invite the Foreign and Commonwealth Secretary to introduce the discussion. The essential point to establish is whether the meeting is agreed that the West has more to gain from assuring an ASAT arms control regime than the Russians, and that the Americans should therefore be encouraged to go down this road. Other points which might be covered are -

(a) If the West clearly stands to gain more from an ASAT arms control regime (because of its greater dependence on, and competence in, intelligence gathering by satellite), why are the Russians pushing the idea? Is it purely for propaganda purposes without the serious intention of reaching agreement? Or do they genuinely want one, perhaps regarding this as a technological competition which they cannot win? The Foreign and Commonwealth Secretary might be invited to comment.

(b) Is the development of an American low-level ASAT system sufficiently advanced to allow the United States to respond positively to a Soviet offer to negotiate a ban on all ASATS? Or will they have to spin matters out until their new system is operational? Will the Russians, in that case, feel impelled to improve on their own very rudimentary low-level system? The Defence Secretary might be invited to comment.

(c) Is the approach to the Americans suggested at Annex B to the paper by officials along the right lines? More generally, should the opportunity be taken to encourage the Americans to take their closer European Allies more into their confidence as their thinking develops on the subject?

(d) The Americans, particularly the Pentagon, may fear that an arms control regime on ASATS might hamper the eventual development of ballistic missile defence (BMD) as part of the President's Strategic Defence Initiative (SDI). Ministers will be invited to consider the SDI in detail at a later date, but a preliminary view is that an American move towards BMD which encouraged the Russians to develop a similar system would have serious implications for the credibility of the British national deterrent. Do Ministers agree that prima facie and irrespective of the intrinsic merits or demerits of BMD (which will be considered separately in a further paper by officials), this is a further reason for seeking to influence the Americans in favour of ASAT arms control?

CONCLUSION

5. Subject to the points made in discussion, you could guide the Meeting to endorse the proposed approach to the Americans set out in paragraph 6 of the joint minute by the Foreign and Commonwealth Secretary and Defence Secretary, and developed in detail in Annex B to the paper attached to that minute.

B G Cartledge

13 July 1984

SECRET

17 B

MR POWELL CDP 16/7

13 July 1984

ANTI-SATELLITE SYSTEMS AND ARMS CONTROL

1. In preparation for Monday's meeting I return the Prime Minister's copy of my minute, which she may like to keep by her.

2. She queries a point in paragraph 4. Perhaps this was not very clearly expressed. The reasoning is as follows. Given the present high numbers of offensive missiles, only large scale violations of an agreement on ceilings would matter. Verification could therefore be rough. But if there were deep cuts in offensive missiles numbers would start to matter more and even a few extra ICBMs on the other side could be crucial. It is difficult to monitor accurately numbers of such missiles, particularly with the existence of such new developments as cruise missiles and mobile ICBMs. Therefore there is considerable reluctance to make serious cuts in numbers. If, however, there were defensive missile systems, a few more offensive missiles would not matter, since to get through defensive screens a lot of such offensive missiles are needed. Given the existence of such defensive systems, cuts could be carried out in the numbers of offensive missiles even though verification remained rough and ready.

3. Having said all this I should add that this was merely an illustration and one of the arguments in what is a complex debate. My main point was to illustrate that there are arguments on each side, at least if the question is viewed from a purely US standpoint.

PERCY CRADOCK

JMHAAP

SECRET

SECRET

15

PRIME MINISTER

ASATs

There is a meeting with the Foreign and Commonwealth Secretary and the Defence Secretary on 16 July. The attached folder has (a) Cabinet Office brief (b) Sir Percy Cradock's note (c) the joint MOD/FCO paper (d) exchange of messages with Shultz.

The two judgements in the MOD/FCO paper with which you disagreed (page 3 of the covering minute) were:

(i) the ideal solution would be one in which ASATs were eliminated by the effective banning of both the Soviet orbital ASAT and the U.S. MHV (though the paper does not actually recommend this).

(ii) an arms control regime on ASATs which hampered the development of BMD on both sides would be in our national interest.

I am sure you are right on (i). It seems to me likely that the Russian interest in all this is to stop the development of MHV. We must not get in a position of seeming to be a party to bringing pressure to bear on the US in this sense.

Your speech stressed the importance of arms control in outer space.

CDP

13 July, 1984

SECRET

010.

D

SECRET

VA 15 CSPC

Foreign and Commonwealth Office

London SW1A 2AH

12 July, 1984

CDP 16/7.

Dear Charles,

Arms Control in Outer Space

I enclose a copy of a letter to the Secretary of State from Mr George Shultz which was received here today. It sets out the current US approach to the Soviet proposal for talks this September in Vienna on arms control in outer space. As you will see, Mr Shultz is not "highly optimistic" about the chances of these talks taking place or producing results. But the Americans are evidently determined to pursue them in a constructive and positive spirit.

In the light of Mr Shultz's letter, Sir Geoffrey Howe believes that it is desirable to register with the Americans our own interest in this new and potentially important area of the US-Soviet dialogue. I enclose a copy of the letter which he has sent to Mr Shultz in reply. Mr Shultz's reference to the importance attached in Washington to the support and counsel of HMG underlines the need for Ministers to reach an early collective view on the problems of anti-satellite systems (ASATs) and arms control, on the basis of the FCO/MOD paper to which you referred in your letter of 22 July to Richard Mottram. Against the background of the special briefing for Ministers conducted [on 10 July], Sir Geoffrey Howe hopes that it will be possible to reach such a view in the near future. Meanwhile, FCO and MOD officials are continuing work on a companion paper which will address the issues of ballistic missile defence in the context of the US strategic defence initiative. It is hoped to be able to provide this second paper to Ministers within the next few weeks.

I am sending copies of this letter to Richard Mottram (MOD) and to Richard Hatfield (Cabinet Office).

Yours ever,

Len Appleyard

(L V Appleyard)
Private Secretary

C D Powell Esq
10 Downing Street

SECRET

SECRET

Dear Geoffrey:

You will, I know, have been following closely the exchanges we have had over the past week with the USSR on arms control in space and on nuclear weapons, on which we have endeavored to keep you fully informed through normal diplomatic channels. While we await further Soviet reaction, I wanted to share with you my thoughts on how this situation could develop.

We have, as you are aware, accepted the Soviet proposal to meet in Vienna on September 18 to discuss arms control on weaponry in space, and we have further said that we will also want to discuss resumption of negotiations on offensive nuclear weapons. There are clear relationships between these issues, but we also sought in our response to the Soviet proposal last Friday to make the broader political point that it is they, not we, who are refusing to move ahead on arms control. At the same time, we have made clear to the Soviets, privately as well as publicly, that there are no preconditions attached to our willingness to attend these talks in September.

The Soviet reaction, both public and private, has to date been negative, but not conclusive. Soviet spokesmen claim there are unacceptable U.S. preconditions, but they have neither withdrawn their proposal for the September meeting, nor stated that they will not come. I remain hopeful that the Soviets will perceive their interest in the resumption of a meaningful bilateral arms control dialogue with the United States, and that they will seize upon the new opportunity offered by such a meeting in Vienna to begin that process.

As we move toward such discussions, we will want to work closely with your government and other allies. It is difficult, given recent Soviet performance, to be highly optimistic that this Vienna meeting will occur and produce results. As long as the prospect remains open, however, we will seek to encourage a positive Soviet response, and to prepare for a constructive encounter. Your support and your counsel will be most important to us.

SECRET

I am extremely grateful for the efforts you have already made to persuade the Soviet leaders to take advantage of this new opportunity. Surely they must be coming to realize the fruitlessness of their current course, and the impossibility of breaking the Alliance's solidarity on important issues. Your discussion in Moscow should certainly contribute to a more realistic Soviet appraisal of their future possibilities.

Sincerely,

/S/

George

From the Secretary of State

Foreign and Commonwealth Office

London SW1A 2AH

12 July 1984

Dear George

Many thanks for your welcome letter of 6 July, providing a useful up-date on your approach to possible discussions with the Russians on outer space and other arms control issues.

As you know from my meeting with Charlie Price immediately after my return from Moscow, I found that the Soviet leaders were seemingly unwilling to engage in a real dialogue on East/West issues. They appeared to be nonplussed by the swiftness and positive nature of your response to the proposal for talks in Vienna. I also detected some anxiety about military developments in space. To my mind, this indicated at least a degree of seriousness in their proposals for talks on limitations. At the same time, they are obviously determined to resist a return to the negotiating table on wider nuclear issues under the auspices of space talks.

I am convinced that the resumption of the nuclear negotiations must remain one of the Alliance's chief objectives. At the same time, as I told Charlie Price and the House of Commons on the same day, we are still anxious that the opportunity should not be lost for a September meeting in Vienna to take place. I am grateful for your proposal of further consultations between close Allies next week in Washington. We plan to respond soon with comments on how best to prepare in substance for a useful encounter in Vienna. Meanwhile, I wonder whether there would be advantage in making clear once more to the Soviet Union that, even if they are not prepared at present to

The Hon George Shultz /discuss

discuss arms control matters other than those affecting outer space, you are still ready to respond positively on the latter.

GEOFFREY HOWE

CONFIDENTIAL

MINISTRY OF DEFENCE
MAIN BUILDING WHITEHALL LONDON SW1
Telephone 01-~~930 7822~~ 218 2111/3

CDP 10/7

Prime Minister

MO 11/9/4

9th July 1984

Besides the briefing on US intelligence satellite systems, this will be a chance to raise any technical questions about US & Soviet capabilities on ASATs. Next week's meeting can then focus on policy.

Dear Charles. CDP 9/7.

This is simply to confirm the arrangements for tomorrow's presentation at 11am. It will be at TOP SECRET CODEWORD level and will be held in a special Conference Room in a Secure Area on the third floor of this building. We shall, of course, arrange for the Prime Minister to be met at the North Entrance to the Main Building (opposite Horse Guards).

The presentation will be given by the Director General of Intelligence, Vice Admiral Sir Roy Halliday and will provide details of satellite systems currently in use and those planned for the future, compare these with the equivalent Soviet systems, and cover briefly the significance of such systems for the verification of arms control treaties.

The Foreign and Commonwealth Secretary, the Defence Secretary and Mr Stanley intend to be present at the presentation. The following people from the MOD and other departments will also be present:

Field Marshal Sir Edwin Bramall - Chief of the Defence Staff

Mr Bryan Cartledge - Cabinet Office

Air Marshal Sir Michael Armitage - Deputy Chief of the Defence Staff (Intelligence)

Dr J Berry - Director of Scientific and Technical Intelligence

Rear Admiral J Oswald - Assistant Chief of the Defence Staff (Programmes)

C Powell Esq

Mr John Weston, Assistant Under Secretary (FCO)

Group Captain G Oxlee - Defence Intelligence Staff (Special Projects)

Mr D Fewtrell - Head of Defence Secretariat 17

Dr A M Fox - Head of Defence Intelligence Staff (Central Secretariat)

I am copying this letter to Roger Bone in the FCO and to Bryan Cartledge in the Cabinet Office.

Yours ever,

R. Mottram

(R C MOTTRAM)

10 DOWNING STREET

From the Private Secretary

CM.
N. Powell
Dare.
CR.

Prime Minister

For the meeting on ASATs next week, can we include John Stanley and Richard Luce, as well as Mr. ~~Hdd~~ Heseltine and Sir G. Howe? John Stanley has expressed an interest in attending.

MJ McCDP. 9/7.

SECRET

Mr. Barclay

CF 14

To note two meetings please.

DMB 3/7

10 DOWNING STREET

From the Private Secretary

2 July, 1984.

Confirm

Pre speak re X and Y.

DMB 3/7

Anti-Satellite Systems and Arms Control

The Prime Minister has considered the joint minute dated 19 June from your Secretary of State and the Foreign and Commonwealth Secretary on this subject, together with the accompanying paper. The Prime Minister is not convinced by some of the judgements reached, notably that an arms control regime on ASATs which hampered the development of BMD on both sides would be in our national interest; or that the ideal solution would be one in which ASATS were eliminated by the effective banning of both orbital ASATs and the US MHV. She would therefore like an early discussion with Mr. Heseltine and Sir Geoffrey Howe. But before this, she would like to have the restricted briefing mentioned in paragraph 14 of the accompanying paper. I should be grateful if you could make arrangements for this.

X Y

I am sending copies of this letter to Roger Bone (Foreign and Commonwealth Office) and to Richard Hatfield (Cabinet Office).

Charles Powell

Richard Mottram, Esq.,
Ministry of Defence.

SECRET

Y → 11.00. TUE 10 July

X → 1700 Monday 16 July

CR.
3/7.

SECRET

13

SIR PERCY CRADOCK

Anti-Satellite Systems and Arms Control

I return your minute to the Prime Minister on this subject from which you will see that she has some doubts about the conclusions of the joint FCO/MOD paper as well as of your own minute. I hope to arrange for an early discussion with Mr. Heseltine and Sir Geoffrey Howe, in which you should certainly take part, but the Prime Minister first wishes to have the special briefing offered in paragraph 14 of the paper.

C.D.P.

2 July, 1984.

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(4)

Prime Minister

12 CDP 28/6

MR POWELL

ANTI-SATELLITE SYSTEMS AND ARMS CONTROL.

PAPER BY THE FOREIGN AND DEFENCE SECRETARIES

1. This is an important paper. Although it concentrates on anti-satellite systems (ASATs) it opens up the question of UK and Western policy on the military uses of space. This has very wide implications inter alia for the East/West strategic balance, deterrence policy, European defence and the future of the UK deterrent. But we have not seriously addressed the issue so far. Whether or not the Prime Minister wishes to have a special briefing on certain aspects of space beforehand (paragraph 14 of the paper), I am sure it would be desirable to have a Ministerial discussion.

2. The questions in the paper fall broadly into two time frames: short-term (control of ASATs) and long-term (Star Wars or, as it is now called, the US Strategic Defence Initiative, SDI). But the two are related: for example acceptance of limits on ASATs could constrain development of the SDI option.

3. On ASATs, the paper argues the desirability of seeking a ban on testing high altitude ASATs. Neither the US nor the Soviet Union is yet involved in this sector and the problems of verification are probably not insuperable. Control over low altitude ASATs should wait until the US achieves parity with the Soviet Union by developing its Miniature Homing

SECRET

Vehicle (MHV), which should be in operational service in 1987. Thereafter a block on further developments in this field might be considered. This seems sensible as far as it goes. A check on high orbital capability would block off a new area of arms race competition and would accord with UK interests.

4. So far so good. But the longer-term issue, SDI, is much more diffuse and worrying. In essence it involves US research into the possibility of a multi-layered system of ballistic missile defence (BMD) capable of destroying incoming missiles at various points in their trajectory. It is highly speculative, would be horrendously expensive and it is hard to see how a flawless system providing 100% cover could be devised. It could also be highly destabilising in terms of the super power balance. Research and testing of a BMD system would eventually contravene the 1972 Anti-Ballistic Missile Treaty, which is the foundation for our present offensive-related deterrence (mutual assured destruction). Nevertheless the arguments from a purely US point of view may not be entirely against. There will be strong temptation to develop defences which could at least reduce the prospect of a total holocaust; the credibility of the present offensive-related deterrent is arguably suspect (would a US President really sacrifice Chicago for Hamburg?); and it has been argued that substantial cuts in offensive nuclear missiles could only be achieved in the presence of strong defensive systems on both sides. We may

?

Surely that would argue for more so that done = missiles would get through

be facing at least a limited move away from offensive deterrence to a more defensive-related balance.

5. But whatever attractions SDI may have for the United States, it would seem to have little for Western Europe.

a. We can take it as axiomatic that the Soviet Union, if compelled to, would strain every nerve to match US developments in ballistic missile defence. The US strategic threat, on which NATO at present depends, would have a distinctly lower deterrent effect in the presence of Soviet strategic defences.

b. If there were a defensive stalemate between the US and the Soviet Union, the latter might be more tempted to try to exploit its advantages in conventional arms.

c. Even if the US were able to achieve satisfactory cover by a system over continental America it is doubtful whether the "astrodome" would be extended over Westen Europe.

d. Even if it were, the Europeans by reason of their geography would still be vulnerable to conventional threats and to threats from tactical nuclear weapons.

e. Finally, BMD systems in the Soviet Union would degrade and eventually nullify the British and French deterrents.

I'm not sure about this

6. It is therefore in UK interests to promote control of ASATs both for its own sake and also since it would make it harder for the US to go too far down the SDI path. But, as pointed out in paragraph 4 above, there may be reluctance on the US side to abandon SDI research altogether; and they may wish for a time at least to have it both ways, continue some work on the SDI option while pursuing proposals for ASAT control.

7. Against this background the paper's recommendation of talks with the US to explore US intentions and push the Americans towards ASAT controls looks right. It may seem over-cautious, given the overwhelming balance of UK interest in favour of controls in space. But I think we should handle these discussions carefully, taking account of the vastly greater knowledge of this sector on the US side, their worries over verification of a ban on ASATs and our own dependence on US space-derived intelligence.

8. The Soviet attitude is worth noting. They have occupied the high propaganda ground with public statements about the need to check military development in space. They naturally wish to preserve their present superiority in low altitude ASATs. But there is also probably a genuine wish on their part to avoid the effect of all-out competition with the Americans in space. They may therefore prove receptive to an eventual US approach.

9. There is also a European aspect. The French launched a discussion on military development in space in WEU earlier this month and urged the need for the European allies to take a position on arms control options. We shall naturally wish to discuss this matter eventually with our European partners but it would be best not to get too involved with them before we have had quiet bilateral discussions with the Americans.

PERCY CRADOCK

28 June 1984

I should like to have the special briefing (same 14 of main paper) and then discussion with

10 DOWNING STREET

Prime Minister

You did not have time to read the detailed paper last week-end.

2. Discuss with Defence Secretary and FCS at same time as discussion of outstanding point on draft Agreement on Chemical Weapons?

C.D.P.

Put in box for 27/6 when received

SECRET

MO 11/9/4
19th June 1984

PRIME MINISTER

ANTI-SATELLITE SYSTEMS AND ARMS CONTROL

In his letter of 24th February, Mr Coles said that before you reached a view on the proposal to explore with the Americans the case for constraints on anti-satellite systems (ASATs), you wished to consider a full paper on the military advantages and disadvantages to the West of the development of such systems and the implications / of activities in this field for arms control. We attach a joint FCO/MOD paper covering present and future satellite activities in space, particularly those of the US and the Soviet Union, ASAT developments, the military balance in space, and (briefly) the relationship between ASATs and the US strategic defence initiative and the longer term implications for Britain's deterrent.

2. The main points which emerge from the attached paper, which is deliberately comprehensive, are that:

a. East and West vary significantly in their dependence on different satellite types: the West places more reliance on surveillance and communications satellites, the Russians on tactical reconnaissance for real-time targetting especially in Naval operations;

b. the Soviet Union already has an orbital ASAT of limited reliability and capability against targets in low altitude orbit. The US is developing a Miniature Homing Vehicle (MHV) fired from an F-15 aircraft which is planned to be operational by 1987. When fully deployed by 1994, this should give a significantly more effective ASAT capability also against low altitude targets than the Soviet Union now possesses with its orbital ASAT;

Prime Minister

The main paper is comprehensive and interesting & repays a close read.

Do you:
(a) want the special briefing on space related activities intelligence (see para. 14)?
(b) discussion with Defence Secretary and FCS?

C.D.P 21/6.

c. each side is likely to be reluctant to accept that they could lose their strategic, operational and tactical eyes and ears at the outset of hostilities or even in a serious crisis. The development of ASATs is likely therefore to lead to pressure to develop anti-ASATs;

d. a comprehensive ban on ASATs or perhaps even partial limitations could have implications in the longer term for other space based military activity such as ballistic missile defence (BMD) under the strategic defence initiative, but the timescales for ASAT and SDI-related development are different.

3. US domestic political imperatives point to the need to achieve at least equality with the Russians in this area. There are also military arguments in favour of the US acquiring the capability to threaten those low altitude Soviet satellites capable of targetting Western naval assets. But, beyond this, the West's own dependence on communications and surveillance satellites is such that we have a good deal to lose from a free for all in space. An unconstrained "ASAT race" is bound to be costly and new resources would also be required for the complementary twist in the technical spiral of anti-ASAT systems. The money might well be better spent from a defence point of view.

4. These resource concerns apply with much more force to the possible longer term development of systems with both ASAT/BMD capabilities. While it is of obvious importance that the Americans should keep the closest watch on Soviet BMD research and as part of this need their own research capability, the development and production of these systems would add a new dimension to the arms race (in both defensive systems and the likely impact on offensive systems) without holding out any clear prospect of enhancing Western security. A fully effective BMD system would not of itself eliminate the threat of nuclear attack since air-breathing platforms (aircraft and cruise missiles) would remain; if they in turn could be neutralised, the West would be left to deal with Soviet conventional capabilities by

conventional means alone. The period during which such systems were being deployed would be likely to be a highly dangerous one, because of fears on each side of the other exploiting any limited window of opportunity. However, the overwhelming weight of scientific opinion even in the US believes that a totally leakproof system will never be achievable. The likely steady-state outcome would be one in which both the US and the USSR deployed at great expense systems which were not wholly effective against the other superpower's nuclear inventory, but which reduced rather than enhanced strategic stability, and which posed real problems for other nuclear powers such as the United Kingdom. While, therefore, we have to take into account the linkage in US eyes between limits on ASATs and their interest in BMD, it would appear that an arms control regime on ASATs which hampered the development of BMD on both sides would be in our national interests.

5. We remain, therefore, of the view that it would serve our interests if the US Administration could be persuaded to take a more positive approach towards ASATs controls. From the point of view of not starting down the road of an arms race in space, the ideal solution would be one in which ASATs were eliminated by the effective banning of both the orbital ASAT and the US MHV. The longer term arms control attractions of this course would need to be set against the military disadvantage of giving up the chance to target Soviet satellites with the capability to guide Soviet naval and air forces to attack NATO's sea lines of communication. There is, moreover, the problem of verification of such a ban which is addressed in the paper. For both military and verification reasons it is clear that - whatever its merits - this approach is not practical politics in relation to the United States.

6. We therefore address in paragraph 46 of the attachment other options. Our first preference would be an approach which combines options one to four, that is would place limits on low altitude ASATs which would prevent further development of US/Soviet competition in this area together with an indefinite ban on the testing, and therefore the development, of high altitude ASATs. If a limited low altitude ban were not achievable, we would still see significant advantage in a high altitude ban.

7. Events since proposals were first put to you suggest that opinion in the United States, both within the Administration and outside it, is moving towards the need for controls in this area falling short of a comprehensive ban on ASATs. The Americans have explored bilaterally with the Russians the possibility of discussions on ASAT control but the latter have so far rejected these, insisting on full-scale negotiations on the basis of their own proposals. The Russian approach of pressing for the banning of the use of force and of certain military deployments in outer space represents a sound propaganda position for them and one to which both we and the Americans need to be able to respond in a positive way. There is also a growing interest amongst our European partners in these issues, and the French have recently gone public with proposals of their own.

8. We therefore believe that we should now open up a dialogue with the Americans on the case for controls falling short of a comprehensive ban. We believe that we need no longer be concerned that the US will react adversely to a reasoned approach.

9. We therefore hope that you will endorse the recommendations in the attached paper. You may however wish to hold a further discussion with us about this, once you have read the paper and perhaps taken up the option of the special briefing to which paragraph 14 refers.

10. A copy of this minute and the attachment goes to Sir Robert Armstrong.

MH GH

19th June 1984

Refence 12179
Lasers

SUMMARY OF JOINT MOD/FCO PAPER ON ANTI-SATELLITE SYSTEMS AND ARMS CONTROL

ASAT SATELLITE SYSTEMS AND ARMS CONTROL

INTRODUCTION

1. This paper considers the desirability of establishing controls on anti-satellite (ASAT) systems. It expands on the arguments set out by the Foreign Secretary and Secretary of State for Defence in (1), that UK and Western interests could be well served by encouraging the US Administration to take a more positive attitude towards arms control proposals affecting these systems. It sets out in some detail the military advantages and disadvantages, as they are known, of the development of ASAT systems and the implication of activities in this field for arms control to meet the Prime Minister's remit (2). It also takes account of wider developments in space, including the US Strategic Defence Initiative (SDI), and touches on the possible implications for Trident.

2. Following an examination (3) last year of the Way Ahead for MOD in Space, the Chiefs of Staff commissioned a number of studies (4) on space capabilities and will consider the resulting Report in the coming autumn. ASAT issues will be only one of a range of subjects covered by these studies, which will also deal with means of reducing vulnerability of Allied ships to Soviet radar satellites, passive methods of denying information to other satellite systems, and the balance of advantage in disrupting satellite communications. Their results will provide a more detailed basis for future policy. However, as a result of work already done and reflected in this paper, the conclusions and recommendation in paras 47-50 below are believed to be valid. In particular, the proposed approach to the US on the policy issues of ASAT development and controls will provide a useful opportunity to gather further details relevant to the MOD studies.

(1) PS/Foreign Secretary's letter to PS/Prime Minister dated 20 February 1984 and attachment.
(2) PS/Prime Minister dated 24 February 1984
(3) Attachment to COS(Misc) 190/938 dated 14 July 1983
(4) COS 20th Meeting/83 Item 4

PRESENT AND FUTURE SATELLITE ACTIVITIES IN SPACE

3. CHARACTERISTICS OF ORBITS. In terms of military significance satellite orbits may be grouped into four broad classes, low, high, geostationary and highly elliptical. The lowest practical circular orbital height is about 100 km (though at very low altitudes orbits are shortened by atmospheric friction) and the generally accepted upper limit of low orbits is around 2,000-3,000 km. Low orbits are used primarily for tasks which require the best possible resolution or angular discrimination from a sensor system. They are thus associated with satellites providing surveillance, reconnaissance, meteorological and oceanographic information. In the large tract of space between low and high orbit occur the Van Allen radiation belts which inhibit placement of satellites. The lower limit of high earth orbit is accepted as around 20,000 km with the upper limit at the transition to geostationary orbit at 36,000 km. High orbits have relatively few exclusively military applications. Their main use is in the coming generation of navigation systems which have dual military and civil functions. Geostationary orbits, in which the satellite remains stationary over a fixed equatorial point, are particularly well suited to communications requirements and certain forms of surveillance. Highly elliptical orbits are employed for tasks not readily achieveable from circular orbit, for example launch detection, abnormally low photo reconnaissance and communications at high latitudes. Elliptical orbits result in the satellite alternately dwelling over one hemisphere for long periods at high altitude, and skimming fast and low over the other hemisphere. For the purposes of this paper low orbit satellites are described as "low altitude" and all others as "high altitude".

SOVIET SATELLITE CAPABILITY

4. GENERAL. The large investment in the Soviet space programme, the number of satellites launched each year and the wide ranging scope of their functions all indicate that space is important to them, and this is supported by their writings. The scale of investment in space systems by the USSR is thought to exceed that of the rest of the world combined and has risen very steeply since

e 1970s. Some 80% of all their satellite launches have either specifically military or dual military and civilian applications.

5. MILITARY SATELLITE TYPES. Current military functions of Soviet satellites include surveillance, reconnaissance and intelligence gathering by photography (PHOTOSAT), Electronic Intelligence (ELINT, and, over the oceans, radar (RORSAT). The ELINT Ocean Reconnaissance Satellite (EORSAT) and RORSAT also have a near-real-time anti-ship targeting capability for suitably equipped missile-firing ships and submarines. Satellites are also used widely for communications (COMSAT), meteorology (METSAT) and navigation (NAVSAT). Early warning of US ICBM launch is provided by launch detection satellites (LDS), though they currently have no capability against submarine launched ballistic missiles (SLBM). Geodetic satellites provide detailed information for strategic missile guidance, and radar calibration satellites (RADSATS) provide data for testing their ABM system. Figure 1 shows the recent rates and types of Soviet Satellite launches and makes clear that almost all function at low altitude.

6. MILITARY VALUE. The Soviets obtain earlier warning of ICBM launches from their Launch Detection Satellites (LDS) than is obtainable from any ground based radar system. The LDS system is thus of major strategic importance to them even though at present it cannot detect SLBM launches. For tactical use in war at a level below strategic nuclear exchange the low orbiting ELINT, EORSAT and RORSAT are probably the most valuable Soviet satellite systems, although their capabilities can be degraded by counter-measures. Their loss would significantly degrade Soviet intelligence gathering and surveillance capability, and in the cases of EORSAT and RORSAT, remove an important element in their anti-ship targeting system. Nevertheless, the loss of these three systems would not have a critical impact on their combat capability especially on land and in the air. The PHOTOSATs are probably of almost equal importance in peacetime, but of much less importance in war, unless the conflict is protracted, owing to the relatively long delays between data collection and return to the USSR (typically 1-14 days) with the current systems. It is more difficult to assess the importance of COMSATs, METSATs, NAVSATs. In virtually all cases there are alternative methods available which, if less satisfactory,

y at least be adequate for most operational purposes.

7. FUTURE TRENDS. Significant developments in the Soviet space programme are expected over the next few years in line with the increase in Soviet resources devoted to space. Some new types of spacecraft are already in development, including a near-real-time PHOTOSAT. Space based R & D is also aimed at producing an improved radar satellite, and probably a new LDS system with a capability against SLBMs. We believe that experiments in Salyut 7 are aimed at detecting submerged submarines, though there is no indication of how successful they have been so far. Finally, the new 200 tonne payload heavy lift launch vehicle, the Space Plane, and the reusable orbiter, similar to the US Space Shuttle, offer a wide range of new possibilities, particularly in the area of space weaponry. It is too early to say what performance these new systems might achieve, or their importance to the USSR. However, it is clear that, when they mature, some of them could have a major impact on warfare in the future.

SOVIET ASAT CAPABILITY

8. THE ORBITAL ASAT. Current Soviet anti-satellite capability is provided by the orbital ASAT. It must be launched at a precise time and on an exact trajectory, so as to climb to intercept the target within two orbits. It is then exploded in close proximity to destroy or disable the target. Nine of the 15 tests of the operational variant, which uses a radar tracking and homing system, have been successful. It has been regarded as an operational system since 1971, although it has not been tested since June 1982. While the system is unique it has very serious limitations. It can only be used against a very limited range of targets in low altitude orbit. It has no capability against satellites in highly ellitical orbit, even at their lowest height, because of their very high speed at that point. It has not been tested against a target able to manoeuvre away from it and other counter measures may also be possible. Further weaknesses concern the lengthy response time and the limited availability of launch pads and launch vehicles: the launch pad can at present only be used four to six times in a 24 hour period and in wartime the orbital ASAT would have to compete with other Soviet satellite priorities. There is no evidence of any intention to overcome

present guidance and tracking limitations by using a nuclear warhead (which would contravene the 1967 Outer Space Treaty), or of attaining a capability against high or geostationary orbiting targets by using a bigger booster; it is not believed that the latter course would be cost-effective or sufficiently timely, and the US therefore do not assess the Russians as likely to pursue it.

9. OTHER CURRENT ASAT SYSTEMS. In addition to the orbital ASAT, Soviet anti-ballistic missiles could perhaps be used against satellites, but this is assessed to be unlikely. In the absence of prior testing to develop precision interception, nuclear warheads would have to be used and these would have unpredictable Electro Magnetic Pulse (EMP) effects on the Soviets' own satellites. Using ground based lasers, which have inherent failings in any space-related operation because they are affected by atmospheric attenuation and turbulence, the Soviets have probably had the capability since the early 1970s, given the right conditions, to degrade the electro-optic sensors of satellites. There is no evidence that tests of such a system in a weapon role have taken place.

10. ELECTRONIC COUNTER MEASURES (ECM). Satellites in high and geostationary orbits are not currently vulnerable to physical attack but their operation can be adversely affected by electronic warfare. There is no direct evidence of Soviet efforts though we would not expect to detect activity in this field. Satellite links are potentially vulnerable to jamming particularly at Ultra High Frequency (UHF) since they can be readily intercepted over a wide area of the earth. Jamming can be directed at the satellite (up-link) or the ground terminals (down-link). Satellites could also be affected by interception and deception. We know of no Soviet attempts at jamming but they put considerable emphasis upon Electronic Warfare in all other fields and have the capability to produce adequate radiated power in UHF and Super High Frequency (SHF) bands from land or ship based transmitters. Space based jammers which could readily be disguised as COMSATS are not likely before 2000. Airborne jammers could be developed, although this would be an expensive solution. On the other hand, protective measures against ECM are possible. Ground stations can be mobile to avoid down-link jamming, codes can mimimise dangers of intercept and

ception, and various signal techniques can reduce the effect of up-link jamming. Moving to the Extra High Frequency (EHF) band (eg the new US MILSTAR system) also reduces the risks of ECM. While the Soviets could develop suitable jamming equipment by the mid 1990s, counter measures are also likely to advance in sophistication.

11. FUTURE ASAT CAPABILITIES. There is no hard evidence of future Soviet plans with regard to anti-satellite systems, particularly those based in space. However, the new heavy lift launch vehicles currently under development will provide the Soviets with the means of deploying much larger and heavier satellites. When they become operational in the late 1980s, these could be used for weapon purposes perhaps to threaten satellites in higher orbits. In addition the Soviets have a vigorous R & D programme in technologies relevant to attacking objects in space, in particular high power lasers, particle beams and pointing and tracking systems, both space and ground based. Development of ASAT lasers capable of causing structural damage is however unlikely before 2005; rudimentary particle beam weapons are likely to take even longer. At the same time protective measures against ASATs, on which work is already in progress, will be further developed. Such measures as manoeuvring capability, hardening and shielding, orbiting spares and "shoot-back" ability, will give future satellite systems a degree of defensive capability, although at present no single measure is thought likely to be effective against all possible threats and all degrade satellites' primary mission to some extent.

WESTERN SATELLITE CAPABILITY

12. GENERAL. The Western Allies space capability is largely American. The only significant systems outside US hands are the UK Skynet communications satellites and those that are owned by France and NATO. The European Space Agency METSAT also provides information of military value but its availability during tension or war is doubtful. Similarly, US civil remote sensing satellites are of some military significance, but would probably be switched off during war.

13. Our detailed knowledge of current US military space systems

[redacted] scant and confined in the main to those systems whose output is shared with us. However that knowledge is controlled very closely by the appropriate US authorities. American reticence is partly due to the sensitivity of the technology and systems involved, and in lesser part to what is seen by some in Washington as premature enthusiasm about arms control in outer space on the part of some European Allies.

14. INTELLIGENCE COLLECTION. The USA routinely carries out photo-reconnaissance from low earth orbit. The USA has the advantage over the USSR in terms of resolution and timeliness of film returns. It can be assumed that the Americans have ELINT systems which are probably more advanced technologically than their Soviet equivalents. Full details of space related activities intelligence cannot be given within this paper's classification. A further restricted briefing on this area can be arranged if required, but the existence of additional systems affects neither the overall argument of this paper nor the conclusions and recommendation at paras 47-50.

15. COMMUNICATIONS. Communication satellites are playing an ever increasing role and NATO depends on them heavily. At present there are several systems of American communications satellites in geostationary orbit. They are sophisticated and very resistant to jamming but offer little excess capacity over the likely wartime requirement. These communication links would be prime targets in war time and if destroyed or incapacitated early in any future crisis would seriously degrade NATO's ability to coordinate its actions. In consequence a major improvement programme is underway to provide redundancy, hardening and greater survivability. The present US Defence Satellite Communication System (DSCS) with 7 satellites (4 located over the Atlantic, Indian Ocean, West Pacific and East Pacific, 2 in-orbit spares and 1 unserviceable) is to be upgraded by the DSCS III series providing SHF facilities, the first of which was launched in October 1982. UHF channels for control of strategic forces under the AFSATCOM programme are being provided on Satellite Data Systems (SDS) satellites in polar elliptical orbits with spare transponders carried on FLEETSATCOM (geostationary satellites providing naval strategic communications systems). EHF facilities, more resistant to jamming, are to be provided on FLEETSATCOM until the new MILSTAR communication satellites are ready.

16. SURVEILLANCE AND DETECTION. The US have LDS in geostationary orbit using infra red sensors with the capability to detect both land and sea launched missiles; the equivalent Soviet System has no capability against SLBMs. These satellites are also used to provide data relevant to arms control verification. New satellites are planned for the mid to late 80's with improved performance and survivability. Vulnerability of ground based data processing stations will be reduced with six mobile ground terminals.

17. METEOROLOGY AND NAVIGATION. There are three types of US meteorological satellite. Both the TIROS-N type of low earth polar orbiting satellite and the GOES geostationary satellite are freely accessible civil systems but could be switched off in war. The Defence Meteorological Satellite Programme is a USAF low orbiting system to which the RN and RAF have access in both peace and war. The current US navigation system employs Transit satellites and gives an accuracy of better than 200 metres. These satellites fly in a low earth orbit but the system is being superseded by the NAVSTAR Global Positioning System (GPS). NAVSTAR will provide a network of 18 satellites in high orbit to give highly accurate positions, velocity and time information to any user on or near Earth. Deployment of this worldwide 3 dimensional capability is expected to be completed by 1988. NAVSTAR is also planned to incorporate improved nuclear detonation detection sensors (IONDS) for accurate plotting of any nuclear explosion.

18. OTHER USES. There is no evidence that the US has a real-time satellite targeting capability against shipping comparable to the Soviet EORSAT and RORSAT. (The USN has chosen to rely so far on systems such as carrier based aircraft for this purpose.) Nor have the Americans any requirement for radar calibration satellites since they have not built an ABM system.

19. THE SHUTTLE. The use of the shuttle has given the US a clear lead and advantage in the flexible deployment of spacecraft even though they plan to procure only 4 shuttles which, with their long preparation times for launch, will constrain US satellite launching flexibility. The Soviet Union sees the shuttle as a major threat as they claim that it could be used to capture its satellites.

This is unlikely because satellites could easily be booby trapped with explosives. Other ASAT activities are perhaps more feasable, but the Americans deny that they would risk such valuable craft in this role. It is known that the US intends to carry out experiments in space using the shuttle as a test platform. Amongst those with a military role is the testing of lasers for communication purposes, and another experiment concerned with accurate pointing and tracking (TALON GOLD). Others have involved various optical and non optical sensors. Of 72 shuttle flights planned by 1987 some 27 (35 per cent) are reported to involve Department of Defence payloads.

20. ASATs. The US has no ASAT system currently deployed. The Miniature Homing Vehicle (MHV) currently under development is designed for two purposes; to place at risk certain Soviet satellites in low orbit; and to deter the Russians from using their own systems against US satellites. It consists of a 30 cm, 16 kilogramme device which tracks the target's IR emanations with its own sensors. Its on board computer guides it to collide with and destroy its target by kinetic energy rather than using a conventional explosive warhead. It attains its very high closing speed both by its own rocket motors and the use of a SRAM (Short Range Attack Missile) as a booster. The MHV is fired from an F15 fighter and is likely to be both accurate and flexible, with a maximum altitude of some 700 kms. Its capability against satellites in highly ellitical orbit is not yet known.

21. MHV had its first successful test in January 1984; Initial Operational Capability (IOC) is planned for 1987. By 1994 the Americans plan 112 MHVs to be available for firing from 40 specially modified F15s. These will be split between air bases on the US East and West coasts so as to allow greater operational flexibility, including the option of two attacks on a transiting satellite in quick succession. If the US chose to change their current plans by modifying air bases elsewhere in the world, or to adapt the system to operate with carrier based aircraft, their options would be still greater but costs would rise. Since they predict only some 46 key Soviet targets, all in low orbit, (EORSATs,RORSATs, next generation ELINT, future real-time PHOTOSATs, the military SALYUT manned space station and HI RES and MED RES PHOTOSATs of which

would be resident in orbit in peacetime and 26 would be replacement satellites launched in crisis or war) the Americans should achieve a significantly more effective ASAT capability than the Soviets now possess with their orbital ASAT. The US has no plans to modify the MHV to reach out to high or geostationary orbits, as a result of their present assessment of Soviet space capability.

22. FUTURE ASAT CAPABILITIES. As part of the Strategic Defence Initiative (SDI) discussed at paras 29 & 30 below, the US are researching into the feasibility of advanced Directed Energy Weapon (DEW) systems. This work includes 3 projects known as "The Triad": a chemical laser ('ALPHA'), a Large Optics Demonstration Project and an Acquisition Testing and Pointing Experiment ('TALON GOLD'). These or other developments may in the long term also give the US the ability to achieve the physical destruction of satellites in high or geostationary orbit.

23. ELECTRONIC COUNTER MEASURES. Little is known of US capability in this particularly sensitive area, but it can be assumed that they are devoting considerable efforts to electronic warfare both in the defensive and offensive modes.

THE MILITARY BALANCE IN SPACE

24. GENERAL. Any assessment of the broader military advantage in future ASAT controls must take account of:

a. the respective deployment of, and dependence upon, satellites by both sides;

b. the financial implications; and

c. the wider strategic factors governing the credibility and stability of deterrence.

25. DIFFERENTIAL SATELLITE DEPENDENCES. East and West vary significantly in their dependency on different satellite types. The data in the preceding section indicate that the West is more reliant than the East on Surveillance and Communications satellites. The Russians, on the other hand, rely more on satellites in the tactical reconnaissance real time targeting role, especially in

naval operations, where their anti shipping capability is a serious threat to NATO's Atlantic reinforcement route. Since the Soviet armed forces operate largely on or close to the European land mass they could use currently redundant land lines for command and control more easily than the Western forces who are widely dispersed over the globe and therefore depend more on the survival of geostationary COMSAT systems. Moreover NATO's posture as a defensive alliance means that, strategically it must depend more on surveillance (especially by satellites) to cancel out the advantage which an attacker would otherwise gain by surprise. Given that the impending US acquisition of the MHV may spur the Soviets to regain their present ASAT lead, there are thus good arguments for considering carefully whether it might be in the West's advantage to try to secure some protection for satellites rather than allowing a total free for all in space.

26. FINANCIAL IMPLICATIONS. The assessment of resources devoted to space does not lead to any firm conclusion on overall advantage. Although US cost estimates suggest that the Soviets spend more than the rest of the world put together, they do not necessarily achieve US levels of value for money. Their system of frequent launches is probably not economically optimal and their very expensive manned research programme seems to achieve little militarily that unmanned US satellites cannot. Although some protection of satellites can be achieved against ASATs (by means of manoeuvrability, redundancy, hardening or a "shoot back" capability) all these survivability measures tend to degrade the satellites' primary mission and could, in turn, be countered by more sophisticated ASAT devices. Protection for satellites by means of acceptable arms control arrangements must therefore be less expensive than such a process. The US currently plan expenditure of $143 million in FY 1985 on the MHV, which is not yet in full production. Any move forward from the present relatively crude systems, and particularly into joint ASAT/Ballistic Missile Defence (BMD) system, would involve massive increase in resources, with consequent impact on defence spending in other areas.

27. IMPLICATIONS FOR STRATEGIC EQUILIBRIUM. At a time of rising tension, strategic instability could be much increased by the development of effective ASAT capabilities, at both high and low orbits, by either side. A proven capability on one side to destroy the other's satellites would give rise to a great temptation to use it, especially if neither side could be confident that the

ther would resist temptation. The implications will worsen as satellites come to play an increasingly vital role in the future. A situation in which either the US or USSR could lose their strategic operational and tactical eyes and ears at the outset of hostilities, or even of a serious crisis, would not be acceptable to either. The development of ASATs would be likely therefore to lead (as it has done with other weapons systems) to the development of anti-ASATs and other means of satellite protection which would be open to the same objections, on grounds of cost and destabilisation, as the present generation.

28. OVERALL ADVANTAGE. It is difficult to conclude that either side has a clear overall advantage. The Soviets carry out many more satellite launches, but their satellites tend to be much simpler, less reliable, and shorter lived than those of the US and can carry out fewer tasks. They thus need large numbers of reconnaisance satellites to provide continuous coverage. On the other hand, the scarcity of Western satellites and launch capability means that the US probably enjoys less back up or redundancy, and could not achieve the same "surge capability" in their launch rate in time of war or crisis. In general US capability seems as least as good if not better than the Soviets' in all areas for which there is detailed information. Deployment of the MHV will more than compensate for the only obvious US inferiority: the ability to threaten satellites in low orbit. Figure 2 sets out in tabular form available comparative data on the US and Soviet programmes. In sum, the US maintain far fewer satellites than the Russians in low orbit, but each has a more important role to play than its Soviet equivalent. Those US satellites in high orbit are also more essential to the US defence capability than similar Soviet systems are to Moscow.

ASATs, DABM AND THE UK DETERRENT

29. US STRATEGIC DEFENCE INITIATIVE (SDI). A comprehensive ban on ASATs, and perhaps even partial limitations could have implications in the longer term for other space based military activity such as the system of Defence against Ballistic Missiles (DABM) proposed by President Reagan in his 'Star Wars' speech of March 1983. The SDI, as it is officially known, involves research into the feasibility of defence solely against BMs, based on multiple layers. An essential

[redacted]ole is envisaged for orbiting ABM satellites, probably employing DEWs to destroy enemy missiles, starting in their boost phase before their MIRVed warheads have separated off. If such systems could be successfully developed - and that prospect is far from clear - they would possess an intrinsic ASAT capability. Thus, in the longer term, the acceptance at this stage of limits on ASATs by the US could constrain the eventual development of elements of the SDI option.

30. On the other hand, it should be recognised that the time-scales for ASAT and DABM development are somewhat different. The former are now in the process of development and deployment; decisions by either the US or the Soviet Union to move beyond the research stage on DABMs are unlikely to be taken in this decade. DABMs options may not be ripe for full-scale development until the next century. If in the near future an agreement on ASAT constraints were reached which at a later stage proved to stand in the way of a decision to develop DABM potential, then it would be open to either side at that time to require appropriate changes in an ASAT agreement, in order to allow further DABM work to continue. For the latter to happen, changes would in any case be necessary to the 1972 ABM Treaty; amendments to any ASAT agreement would have to be made in the same context.

31. From a series of presentations that the US gave in early 1984 to its NATO allies on the SDI, it is clear that there are still widespread and significant doubts about the technical feasibility and vulnerability to counter measures of the DABM option, about its affordability and the impact it would have on other defence spending, and about the possibility of deploying an operational system within the next 20 years at the earliest. The politico-strategic implications of such a concept, which have already given rise to considerable concern on the part of the Allies, have also yet to be discussed in any detail with the Americans.

32. TRIDENT. It does however seem likely that, if both the US and the USSR were to move decisively towards the acquisition of a DABM system, there could, eventually, be an impact on the deterrent value of the UK's Trident force. Whether or not it proves

possible to create a DABM system which is close to leakproof against a strategic attack by another superpower, the capability deployed in pursuit of that goal would be a greater threat to the numerically smaller strategic forces of a secondary nuclear power such as the UK would remain even with Trident. Unless effective countermeasures can be developed, the long term credibility of the UK's independent nuclear deterrent might therefore eventually be threatened, though not until well beyond the turn of the next century, by deployment of a Soviet DABM system.

POSSIBILITIES FOR ARMS CONTROL

BACKGROUND FACTORS

33. MILITARY FACTORS. In any decisions on British policy towards arms control in space, the balance of military advantage discussed at paras 24 to 28 above must be the paramount factor. On the basis of this assessment, two points clearly emerge:

(a) It is a political and military imperative for the US at least to achieve parity in ASAT capability with the Soviet Union, by completing the current development programme of its own ASAT system, due to enter operational service by 1987; and,

(b) that some elements of controls on ASAT systems deserve serious study by the Alliance.

A total ban would be unacceptable to the US and would, moreover, remove the Western capability to enhance deterrence by placing at risk certain Soviet satellites at low-altitude which threaten naval assets. In considering further exchanges with the US Administration about arms control possibilities, it will therefore be appropriate to focus largely on the prospects for controls on high altitude ASATs, which neither side has yet shown any evidence of wishing to test or deploy.

[redacted]. OTHER FACTORS. In addition to the military factors broader considerations must be weighed in any judgement of the overall balance of advantage in arms control in this area. Two points are particularly relevant:

a. Timing. In the case of other military systems, a prime obstacle to arms control agreements has often been the current imbalances between the super-powers, and the reluctance of either to accept reductions in established arsenals, or to make concessions in areas where one has a significant lead over the other. However, as has been shown, development of ASAT technology is still at a fairly primitive stage. And provided the US present programme proceeds to the deployment stage, a rough similiarity in capabilities should exist in that neither extends beyond low orbit. On the other hand once high-altitude ASATs begin to be tested, protection for satellites by any form of verifiable agreement will become very much harder to achieve. Now, therefore, should be the moment when it could be in the self-interest of both super-powers to seek an agreement which could stabilise the competition and enhance their security.

b. Domestic Political Factors. In Parliamentary and other public statements the Government has publicly expressed support for measures to prevent an arms race in outer space. In addition, there is evidence of growing public interest in military activities in space. Parliament and the public might not understand if the Government seemed unwilling to explore possibilities for constraints which already have won the support of many of our Allies. Conversely, the uninhibited development of military capabilities in space risks adding to the distorted but not uncommon perception that governments are unable to keep a firm grip on the arms race. The impact of these could in turn influence the degree of public support for the government's defence policy and programmes, notably in the case of TRIDENT.

35. INTERNATIONAL AGREEMENTS AND PROPOSALS. There are no international conventions banning the development or deployment of ASATs. Current treaties prohibit: interference with satellites monitoring compliance with the SALT agreement; the testing or

deployment of nuclear weapons in outer space; and the development, testing or deployment of anti-ballistic missiles (ABM) systems in space. In 1983 the Soviet Union tabled a draft Treaty at the UN, proposing a ban on the use of force in outer space, the deployment of weapons there, and the abolition of current or projected ASAT capabilities; this Treaty has now been formally put to the Conference on Disarmament (CD) in Geneva for negotiation. Separately they have proposed a moratorium on ASAT activities. Of our Allies, all of whom apart from the US are on record as favouring controls on anti-satellite systems, the French, Germans, Italians, Dutch and Canadians have been active in arguing for various types of restraints.

36. US/UK RELATIONSHIP. The UK is largely dependent on the US for space derived intelligence and a wide range of technical support. If it were felt by the Americans that the UK were taking a hostile line to US interests in space, this information flow could be jeopardised. The resultant impact on our military capability would be serious. But the probability of such a UK/US rift could be minimised by careful handling of any approach to the Americans.

37. IMPLICATIONS FOR THE ALLIANCE. On the other hand, space issues and their relevance to arms control look set to cause considerable debate within the Alliance in coming years, irrespective of the position we ourselves may take. Other European countries have already been critical of US intentions and may become more so as public concern increases. Some US officials have shown signs of resentment at this. We may have a role to play in keeping those strains under control and steering the Alliance towards more constructive and cohesive positions.

38. US ADMINISTRATION VIEWS. On 2 April, President Reagan sent to Congress his required comprehensive Report on US policy towards ASAT controls. In summary, this stated that no such controls had yet been identified which would serve Western interests, mainly because of inherent verification problems, and the need to counter certain Soviet threats against Western forces. For that reason, the President ruled out near-term negotiations with the Soviet Union on such controls, but confirmed that the US would be ready to continue examination at the CD in Geneva of current space issues. The President also made it clear that the US would continue to study

Space arms control "in search of selected limits on specific types of space systems of activities in space". His Report concluded: "The door is not closed to effective ASAT arms control measures. The US will consider verifiable and equitable arms control measures that would ban or otherwise limit testing and deployment of specific weapon systems, should those measures be compatible with US national security." The Report focusses largely on the possibilities of a comprehensive ASAT ban and lays heavy emphasis on the verification problems in any such arrangement. It notes that "test bans for a more limited class of ASAT systems may be verifiable and these are being studied to determine if they are in our national interest." There is no direct evidence, according to the Report, of a Soviet programme for high-altitude ASATs, and no US plans to develop a high-altitude capability in their present ASAT programme.

US CONCERNS OVER ASAT ARMS CONTROL

39. US concerns over verification problems in any limits on ASATs, and worries about the continuing need to hold at risk certain Soviet threats to Western forces, have been evident for some time. American scepticism about control of ASATs needs to be carefully considered especially in view of their much greater familiarity with the technical problems involved. In addition, although it is not directly addressed in the President's report we believe there is apprehension among US officials about the possible consequences of arms control limitations on ASATs for the later development and deployment of space weapon systems required for the SDI. The following points, however, should also be borne in mind in considering these three issues. Firstly their concerns about verifiability are based on two factors: their belief that Soviet undertakings to eliminate their present ASAT capability could not be adequately verified; and the suggestion, mainly from Pentagon officials, that the Russians could develop without US detection, a future system capable of destroying US satellites, which they would then be able to produce and deploy rapidly, giving them a strategic lead through an arms control break out. The first concern must be treated particularly seriously, and is largely responsible for the present assessment that any controls on ASATs should for the moment be limited to high orbit systems. The US-Soviet negotiations of 1978-9 on an ASAT agreement indicated the difficulties of drawing

p a verification regime acceptable to both the Russians and the Americans which could guarantee the elimination of present capabilities.

40. VERIFICATION OF NEW SYSTEMS. However, while verifying the elimination or reduction of already deployed systems is extremely difficult, testing of new systems should be verifiable with adequate confidence. This assessment is shared by the US. New Soviet deployments without prior full system testing are inherently improbable, though not technically impossible. Annex A indicates the range of problems involved in verifying controls on space systems. (It makes clear that verification would be harder in the case of ground based laser systems, but the inherent weaknesses of such systems against space targets have already been noted in para 9). In this complex field there are differences of expert opinion, but we believe that verification problems may not be wholly insuperable, especially if the distinction between high and low orbiting systems can be preserved. Survivability measures could in any case be taken as an insurance against Soviet bad faith in the observance of any agreement. There is no doubt, however, of our need to secure more information on the technical issues involved.

41. THE RISKS OF BREAK OUT. There remains the risk, which some Americans have identified, that the Soviets might be able to evade verifiction measures by separately testing out individual sub-systems for an ASAT. This could enable them to assemble the tested components into a complete ASAT system which they would then have the capability of testing overall by openly breaking out of the arms control regime at any time and proceding to deployment. But although this would give a certain technical lead, it is unlikely that it would provide an immediately significant military advantage, since at the moment of open break out the complete system would not have been operationally tested and time would probably have to elapse before it could be proven and produced in numbers. An ASAT arms control break out in wartime would therefore be unlikely to influence that particular - conflict, and a peace time break out would warn the Americans that Soviet desire to achieve dominance in space was now stronger than their concern to observe Treaty obligations. As para 6 of Annex A suggests, the intensity of the US reaction in such circumstances is likely to be so great as to cancel out any advantage which the Soviets might hope eventually to gain by breaking out of an ASAT agreement.

42. LOW ORBIT SATELLITES; PROBLEM OF THE SDI. Secondly the continuing need to hold at risk Soviet low-altitude targeting satellites is recognised, but again is not relevant to consideration of controls on high-altitude ASAT systems. Thirdly the problems of the compatibility of the US SDI with ASAT constraints must be taken seriously. There would be a technical link between systems (of a more advanced nature than those at present in development) designed to destroy satellites and those with a role of defence against ballistic missile (DABM). Research and development of DABM related systems such as TALON GOLD might be difficult to distinguish from ASAT work. A sophisticated form of DABM would certainly be ASAT-capable, and, with the passage of time, the reverse could also be true. However, as noted above, long-term possibilities need not inhibit addressing the present ASAT problem now, if it should appear feasible to limit ASATs effectively in the Western interest for the coming decade. On the contrary, for the purposes of policy-making and in further exchanges with the Americans, it seems desirable to retain a distinction between the two issues.

43. OTHER US VIEWS. There is growing interest elsewhere in Washington in the possibilities of controlling ASATs and other space weapons. Congress has only authorised further funding for ASAT development in return for the detailed Report by the President on arms control prospects. Full ASAT testing will not be allowed to proceed until Congress has received a further account of the Administration's intentions on arms control. A joint Resolution of Congress, already passed unanimously by the Senate Foreign Relations Committee has called for the President to negotiate a treaty banning space weapons. Democratic candidates for President all strongly favour arms control in space, and specifically limits on ASATs. On the other hand there is also a vociferous space lobby, sometimes known as the "High Frontier" group, and mainly representing military and industrial interests, who oppose any restriction on US activity in space. They argue that it is there that the US can maximise its comparative advantage in high technology over the Soviet Union, and that space based activities can help revitalise the American economy.

44. OVERALL US POSITION. In recent months, and partly as a result of pressures from Congress and some Allies, the Administration's approach towards arms control has become more sympathetic. This change is reflected in the President's Report to Congress, and was a striking feature of the US presentation to NATO on 11 April of a comprehensive review of ASAT issues. They now acknowledge the potential benefits of certain measures of arms control, in contrast to the dismissive attitude which was prevalent for the past three years. While continuing to resist comprehensive restraints on the current generation of low orbit ASATs, for the military reasons described above, the US are now more firmly committed to consider specific controls on particular systems and especially those with a high altitude capability. The US will consider verifiable and equitable arms control measures that would ban or otherwise limit testing and deployment of specific weapon systems, should these measures be compatible with US national security." This new approach by the Americans is reflected in private contacts which we understand they have initiated with the Russians on the possibility of formal discussions about controls on ASATs and perhaps other aspects of military developments in space. It is still unclear whether such discussions will get off the ground, although both sides now appear disposed to pursue them. In these circumstances, a British approach in Washington along the lines recommended in para 50 below seems now much less likely to elicit negative US reaction.

45. ASSUMPTIONS. Policy options for HMG range from favouring the wholly unconstrained development of anti-satellite capabilities (at both low and high altitudes) to stringent controls on all types of systems and a series of declaratory measures. For reasons explored in para 32 above the former option does not appear likely to serve our national interests. In considering possible new arms control measures for ASATs, it is assumed that a total ban on all such systems can be discarded as it is both unrealistic (because of explicit US objections) and militarily undesirable (because of the need to retain a counter to certain Soviet low altitude systems). It is also assumed that Western interests will be served by US acquisition of a low-altitude ASAT system at least equal in capability to that already deployed operationally by the Soviet Union.

16. ALTERNATIVES. A list of possible new measures is attached at Annex B. Of these, the first four would be of real military and political significance; the remaining five would touch only marginally on the development of ASAT capabilities on both sides.

a. Option 1

An indefinite ban on testing, and therefore development of high-altitude ASATs would be a significant corner-stone for any future regime of arms control in outer space. It is believed to be one of the options currently under study by the US.

b. Options 2 and 3

Limits on low-altitude ASATs would prevent further development of US-Soviet competition in this area.

For the reasons given in paragraph 33 of the paper it is far from desirable to freeze the Americans in a position of inferiority by abandoning all work on low altitude systems. But once parity has been achieved, there could be considerable advantage in considering a block of further developments. Recent contacts in Washington indicate that US officials are thinking along similar lines.

c. Option 4

A regime of specific confidence building measures, to which US officials are already attracted, could be a useful adjunct to concrete constraints. But in itself it would not greatly enhance UK or Western security. In addition, sole reliance on such measures, especially of a declaratory nature, would be inconsistent with the Western requirement, well-established in other areas of arms control, for balanced and verifiable agreement with real military significance. In a field as important as the military development of outer space, it is arguable that we should not settle for what by comparison would be seen as less.

CONCLUSIONS

47. The available intelligence data and technological development indicate the increasing military importance of Space. The two Superpowers have large civil and military space programmes, with the Soviet Union devoting an apparently greater level of resources than the US.

48. In terms of military advantage, it is clearly in the Western interests for the US ASAT capability to catch up with that of the USSR. In terms of high orbit capability, however, there appears to be a good case for seeking further concrete constraints in the interests of Western security, of maintaining credible and stable deterrence, and of preventing further cost spirals for space weaponery.

49. In the long term an effective ASAT ban is likely to be incompatible with the DABM system envisaged in the US SDI. However there are many questions about the feasibility and desirability of the SDI. In any case the deployment of a DABM system is likely to be much further off than the need for a decision on control of ASATs.

RECOMMENDATION

50. Whilst being careful not to jeopardise the flow of technical data and space derived intelligence, it will serve UK interests to engage the US Administration in a substantive dialogue on ASAT issues, in order to;

a. Elicit from them more information (especially about their verification concerns) than they have so far made available;

b. Outline to them our reasons for favouring a more positive approach towards controls;

c. Explore further with them the basis of the President's remarks as highlighted in para 38 and the possible measures summarised at Annex B.

FIGURE 1

The functions of Soviet spacecraft launched in 1982 and 1983

Type	Numbers Launched 1982	1983	Orbit Type Altitude	Shape
Reconnaissance				
- Photographic	36	37	L	E,C
- ELINT	7	5	L	C
- EORSAT (1)	3	2	L	C
- RORSAT (2)	4	0	L	C
Communications	33	32	L,S,G	C,E,C
Navigation	10	13	L,H	C
ASAT				
- weapon	1	0	L	E
- target	1	0	L	E,C
Military Support				
- Radar Calibration	5	8	L	E,C
- Meterology Calibration	2	2	L	C
- ICBM Launch Detection	5	3	S	E
- Geodesy	1	1	L	C
Man-Related	9	7	L	C
Science, Interplanetary	0	6	all	all

Notes:

1. ELINT ocean Reconnaissance Satellite
2. Radar ocean Reconnaissance Satellite

C = near-circular
E = elliptical
G = geostationary : 36,000km
H = high : 20000km
L = low : below 2000km
S = semi-synchronous, highly elliptical

Fig - 1

FIGURE 2

COMPARISON OF US AND SOVIET MILITARY SPACE CAPABILITIES

	SOVIET			US		
TYPE	NAMES	NUMBER TYPICALLY IN ORBIT IN PEACETIME	CAPABILITIES	NAMES	NUMBER TYPICALLY IN ORBIT IN PEACETIME	CAPABILITIES
Photographic	HIRES MEDRES ERPHO	Up to 5	High and medium resolution, intermittent cover, no real-time downlink. Crisis surge capability. Also LANDSAT type systems.	KH 11 Big Bird	1-2	High and medium resolution frequent cover, real time transmission.
Elint	ELINT 2 ELINT 3	occasional 6	Detection of radar emissions frequent cover, periodic data down link when passing over ground station	?	?	? Some capability little information
Ocean Targetting	(a) RORSAT (b) EORSAT	Up to 2 Up to 2	Cover not continuous (a) Radar and (b) Elint radar detection of ships over 100m in length degraded by		-	So far as is know reliance on other systems

FIGURE 2

COMPARISON OF US AND SOVIET MILITARY SPACE CAPABILITIES

	SOVIET			US		
TYPE	NAMES	NUMBER TYPICALLY IN ORBIT IN PEACETIME	CAPABILITIES	NAMES	NUMBER TYPICALLY IN ORBIT IN PEACETIME	CAPABILITIES
Ocean Targetting (continued)			bad weather and rough seas. Both systems real time down link for targetting			
Communications	SPCS MPCS MOLNIYA I MOLNIYA EHKRAW RADUGA GORIZONT	3 + 5 16-24 8 4 1-3 4 (+ Spare) 3 (+ Spares)	7 Operational networks, wide coverage of government civil military comms. Spare capacity. 6 new geostationary systems planned	DSCS II DSCS III FLEETSATCOM FSATCOM	7 (+ Spares) 1-2 ?	Wide coverage of diplomatic military, strategic and tactical comms. Planned improvement with MILSTAR. Access to civil networks.
Navigation	NAVSAT 2 NAVSAT 3 GLONASS (experimental)	6 (+ Spares) 4 9 - 12	2 Operational systems for ships accuracy to 100m. GLONASS coming into service, similar to US Navstar	TRANSIT SYSTEM NAVSTAR	? 18 (under development)	Accuracy better then 200m. NAVSTAR/GPS system planned for completion 1987/88 to give accuracy better than 50m?

FIGURE 2

COMPARISON OF US AND SOVIET MILITARY SPACE CAPABILITIES

	SOVIET				US			
TYPE	NAMES		NUMBER TYPICALLY IN ORBIT IN PEACETIME	CAPABILITIES	NAMES		NUMBER TYPICALLY IN ORBIT IN PEACETIME	CAPABILITIES
Military Support	(a)	LDS	5-9	(a)ICBM launch-warning only (b) (c) Meteorology (d) geodetic mapping for ICBM targeting information and (e) radar calibration for ABM system	(a)	LDS	2	(a) ICBM and SLBM launch warning, new satellites planned Defence (b) meteorology satellites (c) and civil systems (d) radar calibration for space tracking
	(b)	METEOR 2	4-5		(b)	METSAT	?	
	(c)	METEOR-PRIRODA	1-2		(c)	TIROS-N		
	(d)	GEOSAT	0-1		(d)	Radar Calibration		
	(e)	RADSATS	?					
Manned Programmes	(a)	SALYUT		(a) Space station with several years life serviced by (b) unmanned cargo (c) and manned transport craft. (d) Additional space modules can be attached. Military experiments including laser tracking, and ASW undertaken.	(a)	Shuttle	0-1	Several flights a year limited duration, military related experiments and payloads 4 Shuttles currently being procured
	(b)	PROGRESS	0-1					
	(c)	SOYUZ	0-1					
	(d)	COSMOS 929	Type 0-1					

FIGURE 2

COMPARISON OF US AND SOVIET MILITARY SPACE CAPABILITIES

	SOVIET			US		
TYPE	NAMES	NUMBER TYPICALLY IN ORBIT IN PEACETIME	CAPABILITIES	NAMES	NUMBER TYPICALLY IN ORBIT IN PEACETIME	CAPABILITIES
ASAT	ORBITAL ASAT ?		Limited operational orbital system; ground based laser experiments, electronic warfare capability	F15 MHV ?	112 Planned on 40 aircraft	Operational system under development, flexible with fast response time, 10C 1987. Laser experiments and electronic warfare capability

ANNEX A

VERIFICATION AND IMPLICATIONS FOR EFFECTIVE ARMS CONTROL

1. GENERAL. In the context of a possible treaty controlling the development and deployment of ASATs, the problems posed by the need to ensure adequate verification depend strongly on the areas to which the treaty applies. In some cases, such as banning the development of a conventional orbital ASAT capable of attacking targets in geostationary orbit, adequate verification of compliance would appear to be relatively straightforward. Conversely, in other cases, including banning ground based laser ASAT weapons, the verification problems would seem to be very difficult indeed. These and other areas are discussed separately below.

TECHNICAL BASIS OF VERIFICATION

2. It is likely that any verification arrangements will depend largely on the continued observation of all satellite launches and in-orbit tests by both the USA and USSR, together with careful monitoring of launch sites and associated command and control facilities. So-called "National Technical Means (NTM)" will be used for these purposes; they include the following:

a. long range radars, such as the NORAD network operated by the USAF;

b. optical imaging equipment, including the US Ground-based Electro-Optical Deep Space Surveillance (GEODSS) System;

c. photo-reconnaissance satellites;

d. interception of telemetry from both attacking and target vehicles.

In all the above techniques, the US would appear to be better placed than the USSR, either because of superior technology or the possession of a more comprehensive world-wide network of facilities. Consequently, the Soviets may feel at a disadvantage, although

their deficiency may not be serious enough to prevent an agreement from being reached.

3. Using the techniques listed above, it should be possible to detect unambiguously any tests of complete ASAT systems depending on high explosive warheads or impact damage mechanisms. It will be less easy to discover any tests of laser weapons; the evidence for these is likely to depend mainly upon telemetry and, if damage is severe, perhaps on imaging. It may be very difficult to reach a conclusive verdict, and close-up inspections of targets, ground facilities and suspected orbital lasers may be essential. The deployments of "space mines", which could consist of apparently harmless satellites carrying nuclear or conventional explosives, activated in time of war to manoeuvre close to their target and explode, could not be discovered without close examination of every satellite.

4. It has been assumed so far that ASAT weapons would not be deployed without prior testing, on the basis that military commanders will not accept hardware upon which they must rely without adequate proof, under proper conditions, of effectiveness and reliability. Moreover, regular tests would probably be necessary, following deployment, to monitor performance and for training purposes.

5. <u>INCENTIVES TO NON COMPLIANCE AND BREAK OUT</u>. An alternative view has been proposed in connection with ASAT treaty verification. Some Americans are concerned that the Soviets might be content to develop and test separately the technologies required for an ASAT weapon, and would then be prepared to assume that the complete system would function as designed when used in war, without prior testing of it in integrated form. This is because of the disproportionate effect which even a few successfully functioning ASAT systems could have against the very limited numbers of NATO assets in space, especially in geosynchronous orbit. Given the undeniable military attraction of non compliance with an ASAT ban, it is difficult wholly to refute this idea, although it seems to be unlikely, especially considering the usual Soviet preference for thoroughness in testing and training.

6. There exists a further possibility that having covertly developed ASAT sub-systems, the Soviets might abrogate any ASAT Treaty, openly test the complete system, and use their resultant technological lead to achieve an Arms Control break out in which they might gain some years lead over the Americans. It is difficult to imagine however the peacetime circumstances in which this would be a rational option for them given the likely intensity of the American reaction.

7. INSURANCE MEASURES AGAINST ARMS CONTROL INFRINGEMENTS. The consequences of covert Soviet infringement revealed either in war or peacetime break out could be mitigated by providing redundant satellites or carrying out certain survivability (hardening and manoeuvrability etc) enhancements. These measures would of course be more expensive than total reliance on Soviet good faith but probably considerably less than the cost of unrestricted military competition in space.

8. MONITORING TECHNOLOGY DEVELOPMENT. In general, it must be accepted that it is very difficult to monitor the developments of the technologies relevant to ASAT applications, partly because such work is often far from obvious, but also because most of these technologies are required for other fully justified purposes. For example, precise pointing and tracking capabilities are vital to astronomical telescopes operating in all wave-length bands of interest, and the acquisition of and guided approach to an orbiting target is vital to spacecraft docking manoeuvres. Systems of power transmission between satellites and spacecraft and the ground may be developed using high energy lasers. Consequently, it does not seem to be feasible to ban the development of technology of potential use to ASATs, even if reliable monitoring was possible.

9. MONITORING ASAT TEST PROGRAMMES. It would appear to be feasible to verify compliance with a future ASAT treaty by monitoring space activity to check that ASAT tests are not being carried out. Confidence in being able to detect such tests will vary according to individual type, as discussed below.

10. TESTS OF PRESENT WEAPONS. If the present Soviet orbital ASAT was banned, any tests in the future would be immediately known. It is less certain that the Soviets would be able to detect, using their existing resources, tests of the US direct ascent weapon launched from the F-15 fighter, because this does not go into orbit. Of course, even if tests were not undertaken, stockpiles of both of these weapons could be maintained, and only intrusive on-site inspection could reveal this reliably. However, it is a matter for debate as to how useful such stockpiles would be without appropriate training, although modern computer simulation training may be a substitute for this to some extent.

11. FURTHER DEVELOPMENTS OF PRESENT WEAPONS. Any complete system tests to develop further the Soviet orbital ASAT would be detected immediately. It is less certain that additional US F-15 ASAT tests would be discovered, but the possibility would be sufficiently great to inhibit further development, should a ban be agreed. Consequently, the present generation of weapons would continue to have very restricted performance envelopes and would pose no threat to many important spacecraft systems on both sides.

12. HIGH ALTITUDE WEAPONS. The conclusions in para 9 apply, with more certainty, in the case of high altitude weapons. Thus a ban on these would almost certainly be fully verifiable (but not the dissenting view reported in para 5).

13. SPACE BASED WEAPON PLATFORMS. Weapons platforms equipped with conventional high velocity missiles or electromagnetic guns would provide viable ASAT capabilities. However, complete system tests would be observable, so compliance with any relevant treaty could be checked. A problem might arise if the weapons carried were defined as "defensive" only; this problem is due to the fact that the effective range of a missile in space is determined largely by its guidance system, so can be very large. It would therefore be prudent to include such missiles or guns when negotiating a treaty.

14. NUCLEAR WARHEADS. Nuclear warheads could be fitted to most of the vehicles discussed above, with a reasonable assurance that they would be effective against target satellites, owing to the very

large range of the particles and radiation emitted by a nuclear explosion in space. In addition, such warheads could be employed on many ICBMs and space boosters, with similar results. Tests would probably not be necessary and are, in any case, already banned by treaty. However, the long-range effects of such nuclear explosions might destroy or disable all satellites at ranges up to a few hundred kilometres, depending upon the extent to which they had been hardened against such an attack.

15. SPACE-BASED LASERS. Verification of a ban on space-based laser weapons-deployment of which is unlikely to happen in this century - would be very difficult, owing to their long range and to a possible absence of severe physical damage to the exterior of the target. In fact, identification of the target might prove to be a major problem. Intercepted telemetry might provide some assistance in monitoring tests of this kind, but it is more likely to require an agreement that satellites suspected of carrying laser weapons be subjected to in-orbit inspection from close range, using other spacecraft. This would, of course, add to the complexity of any treaty negotiations and may be entirely unacceptable to one or both sides.

16. GROUND BASED LASERS. From a verification point of view, ground-based lasers present special difficulties since they can be located well within the borders of the country in question, and can perhaps be disguised as astronomical telescopes. Adequate verification would require a search for all facilities with large diameter optical systems capable of tracking satellites, together with subsequent on-site inspections. Even these measures would not eliminate moderately high power laser systems claimed to be employed for ranging and tracking purposes. There would, however, be inherent problems in operating ground based laser systems in poor visibility.

17. CONCLUSIONS. Although the development of sub-system technologies relevant to ASAT systems cannot be monitored or controlled successfully, it should be possible to detect with adequate reliability tests of complete systems. This is most likely to be the case when dealing with current ASAT systems using conventional

high explosive warheads or the kinetic energy of impact to destroy a target. Laser weapons bases on the ground or in space would present more formidable difficulties, and reliable verification might then have to involve close inspection of satellites in orbit or of suspect ground facilities. In conclusion, adequate verification of an ASAT treaty depends, finally, upon whether the military authorities in the USA and USSR would be willing to rely upon a weapon system which had not been fully tested under realistic conditions. If they can be assumed to require complete system testing, a treaty should be verifiable, albeit with difficulty in some areas. Redundancy and survivability measures could be taken as an assurance against covert Treaty infringement or open break out.

ANNEX B

POSSIBLE NEW ARMS CONTROL MEASURES FOR ASATs

1. Indefinite ban on testing, and therefore development of high altitude ASATs.

2. Limit on low altitude ASATs to one system on each side (US/Soviet).

3. Indefinite ban on further (post-US deployment) testing or development of existing low altitude ASATs.

4. Confidence-building regime along CDE lines: prior notification of launches, and provision of details of satellites (launch time/site; physical characteristics; degree of manoeuvrability; satellite life-time; and orbital characteristics).

5. Direct communications links between US and Soviet master satellite control facilities.

6. Reaffirmation of commitments to ASAT-relevant elements of the ABM Treaty.

7. Declaratory measures on no-first attack on satellites in orbit and/or non-use of force against satellites.

8. Continuation of work in the Geneva Conference on Disarmament, reviewing international agreements governing satellites and the possible need for new ones.

9. Resumption of US-Soviet bilateral negotiations on ASATs.

Verification. Provision for adequate verification of any or all of the above measures will be an essential part of any arms control agreement; such provision might have to include an element of on-site inspection.

CONFIDENTIAL

10 DOWNING STREET

From the Private Secretary

18 June 1984

Military Developments in Outer Space

The Prime Minister has noted the Foreign and Commonwealth Secretary's minute of 14 June about the discussion at the Ministerial meeting of WEU of European attitudes towards military developments in outer space.

The Prime Minister has commented that this underlines the importance of having a paper on this subject circulated at the earliest possible date.

I am copying this letter to Richard Mottram (Ministry of Defence).

C.D. POWELL

Len Appleyard, Esq.,
Foreign and Commonwealth Office.

CONFIDENTIAL

(2)

Prime Minister

Further pressure on MoD re disgorge a paper. AJC is writing re item as his find act.

CDP
14/6

FCS/84/174

SECRETARY OF STATE FOR DEFENCE

Military Developments in Outer Space

1. You may find it helpful to have a brief account of the Ministerial meeting of WEU which I attended on Tuesday in Paris. This went well from our point of view. You will no doubt be pleased to learn that a number of warm tributes were paid to the recent work of the IEPG in which I know you have taken a close interest.

2. During the meeting Cheysson launched a discussion about European attitudes towards military developments in outer space, drawing on points which the French have made at the Conference on Disarmament in Geneva (your officials have details). In summary, he noted the dangers of a new arms race in space, welcomed the US readiness to discuss possible arms control measures with the Russians and expressed regret that the latter had rejected these. He then pointed to the need for the European Allies to take a position on arms control options, and noted French proposals to this effect which were being tabled in Geneva. These include a five-year renewable ban on testing and deployment of directed energy weapons with anti-satellite (ASAT) or ABM capability; severe restraints on other ASAT potential systems, especially those threatening high altitude satellites; an expanded data exchange on space objects; and extension by the super-powers to third country satellites of immunities already agreed bilaterally.

/3.

3. Genscher responded warmly to these French ideas but there were no other comments. For my part I would have been glad to contribute, along the lines which both you and I have been talking privately with other interlocutors. But I felt constrained from doing so by the fact that we have reached no collective position on the substance of these issues.

4. You will recognise that some of these French ideas on ASATs are very close to proposals which you and I put to the Prime Minister in February, with a view to further discussion of them with the Americans; and which have now been fleshed out in the joint paper prepared by our officials for submission to the Prime Minister at her request. I think it is important to circulate the paper as soon as possible.

5. I recognise that the ASATs issue is only one element in the wider complex of space problems. I welcome the fact that our officials are beginning work on an interim paper to Ministers on the latter, including the American proposals for the Strategic Defense Initiative. I think that it would be useful if we could take such a paper before the summer break, since military developments in outer space and arms control possibilities are becoming a subject of increasing interest throughout the Alliance and more widely. The issue has been raised in the Community, in the North Atlantic Council and in the bilateral meetings during the WEU. The Russians have made strenuous efforts since 1981 to seize the high propaganda ground in this area. When I visit Moscow next month I expect they will criticise and misrepresent US intentions and statements. I shall of course rebut such attacks. But US programmes are going ahead and the rest of our Allies are taking increasingly firm positions on the

/range

range of space issues. It is important for us to contribute in substance to this important and far-reaching debate, and to the formation of an acceptable policy for the West. I know you share my wish to press ahead with this aim in mind.

6. I am sending a copy of this minute to the Prime Minister.

(GEOFFREY HOWE)

Foreign and Commonwealth Office
14 June 1984

CONFIDENTIAL

10 DOWNING STREET

From the Private Secretary

14 June 1984

The Prime Minister has enquired insistently when she may expect the papers on controls on anti-satellite systems and on chemical weapons which the Defence Secretary has undertaken to produce. She recalls that it is now some months since both were commissioned and hopes that they can be available very shortly. I should be grateful if you would let Charles Powell know by when the Prime Minister may expect to receive them.

I am sending a copy of this letter to Len Appleyard (Foreign and Commonwealth Office).

A. J. COLES

Richard Mottram, Esq.,
Ministry of Defence.

CONFIDENTIAL

10 DOWNING STREET

From the Private Secretary

12 March 1984

Dear Nick,

Controls on Anti-Satellite Systems

This is just to confirm our conversation of today's date.

The Prime Minister still wishes to see the paper commissioned in my letter of 24 February and indeed hopes that it will now be made available very soon. Should you think it useful to supplement this paper with an oral presentation, I believe that the Prime Minister would welcome that idea.

I am copying this letter to Peter Ricketts (Foreign and Commonwealth Office) and Richard Hatfield (Cabinet Office).

A. J. COLES

Nick Evans Esq
Ministry of Defence.

SECRET

SECRET

10 DOWNING STREET

From the Private Secretary

24 February 1984

Controls on Anti-Satellite Systems

Thank you for your letter of 20 February. The Prime Minister has read both it and the accompanying paper.

Mrs Thatcher has commented that before we take a decision on whether to discuss the ideas in these documents with the Americans, a much more detailed technical appraisal on the implications of the development of anti-satellite systems is necessary.

Some of this ground was covered in the interim assessment of President Reagan's speech on defensive technology which Richard Mottram enclosed with his letter of 29 March, 1983. But the Prime Minister would now be grateful if a full paper could be prepared setting out in some detail (and with as much accompanying technical information as is necessary) the military advantages and disadvantages to the West of the development of anti-satellite systems and the implications of activities in this field for arms control. It may be that the Ministry of Defence are best placed to initiate this work.

I am copying this letter to Richard Mottram (Ministry of Defence) and Richard Hatfield (Cabinet Office).

A. J. COLES

P.F. Ricketts, Esq.,
Foreign and Commonwealth Office.

SECRET

10 DOWNING STREET

C/F.

Pl. see the P.M.'s comment.

Is there any evidence on our files that the MOD have been asked to prepare a paper?

A.J.C. 24/2.

AJC

MOD paper on Laser file.
Some FCO views on Arms Control file

Nicky 24/2

8

Prime Minister.

Agree that
(a) these ideas should be discussed with the Americans?
(b) that thereafter they should be discussed in OD(D).

A.J.C. 22/2.

Foreign and Commonwealth Office

London SW1A 2AH

20 February 1984

We need a lot more technical information before this is discussed. Somewhere up [illegible] for this from MOD. What happened to the document they were preparing? no

Dear John,

Controls on Anti-Satellite Systems (ASATs)

During her visit this month to Budapest the Prime Minister declared that "weapons that were fiction yesterday are fact today and will be overtaken tomorrow. There is a deep yearning amongst our peoples to halt and reverse this process, particularly in the nuclear field".

For some time HMG have been committed in principle to seeking further measures to prevent an arms race in outer space. Sir Geoffrey Howe and Mr Heseltine have therefore considered whether, in the spirit of the Prime Minister's remarks and as part of the further work on possible British arms control initiatives commissioned by OD(D) on 14 December, there would be advantage in encouraging the US Administration to take a more positive attitude towards possible controls on a related area of weapons technology, the development of anti-satellite systems. They believe that, for the purposes of near-term arms control, such systems can and should be kept separate from the wider issues of defences against ballistic missiles, known in Washington as the Strategic Defense Initiative (SDI). ?

They have concluded that on military, financial and political grounds British and Western interests could be well served by such controls. The arguments for these, and the background to current US and Soviet positions, are set out in the enclosed Annex.

Ministers recognise that the initial Administration reaction to any such approach on our part may not be sympathetic. Given our important interest in not risking any damage to our wider defence collaboration with the Americans, they believe that for the moment we should do no more than instruct our Embassy in Washington to explore with the Americans the ideas contained in the Annex; and to invite a considered US response. They have in mind the fact that recent statements by both President Reagan (on 16 January) and Mr Chernenko (when he met Mr Bush on 14 February) favouring active cooperation in the arms control

/field

field among others strengthen the case for initiating this approach now; and for arguing that a moment of opportunity is there to be seized. Ministers propose that in the light of the Americans' reponse they should, perhaps in OD(D), then review the position, with a view to deciding whether HMG should adopt a more positive, public policy of the sort which the rest of our Allies have espoused, and from which the Soviet Union has already reaped propaganda advantage.

Although no change in policy at this stage is intended, Sir Geoffrey Howe believes that given the Prime Minister's interest in this area of policy she would wish to be informed of what is proposed.

I am sending copies of this letter to Richard Mottram (MOD) and to David Goodall (Cabinet Office).

Yours ever,

Peter Ricketts

(P F Ricketts)
Private Secretary

A J Coles Esq
10 Downing Street

Arms Control and Anti-Satellite Systems (ASATs)

1. It is important to establish a firm British policy in this area of growing strategic importance and public interest. International attention on ASAT issues is increasing, with the Conference on Disarmament (CD) resuming its work this month in Geneva. At the moment the Government are on record as favouring measures of arms control in outer space. But this broad policy has yet to be translated into support for specific measures, in contrast to most of our Allies.

2. There are good grounds for believing that British and Western interests would be best served by agreement between the US and the Soviet Union (the only relevant countries at this stage) on a regime limiting each to a single low altitude (below 3,000 km) ASAT system, banning tests of ASATs at high altitude (around 36,000 km), and incorporating a series of confidence-building measures.

3. The strategic arguments in favour of such constraints are as follows:

(i) the extent of Western employment of satellites for surveillance and communications purposes, which is higher than Soviet dependence upon similar systems and contains less provision for compensation by other means, points to a greater advantage to the West in affording some protection to these than in allowing a free-for-all in space;

(ii) protection via arms control could well prove more dependable and less expensive than hardening or,

/building

building defensive capabilities into satellites, and/or providing for a high degree of redundancy;

(iii) the development of effective ASAT capabilities, at both low and high altitudes, by either side or both could provide for much greater strategic instability at a time of rising tension. The temptation to destroy the other side's satellites, given a proven capability of one's own, would be great, and especially so when neither side could be confident that the other would resist it;

(iv) given the vital role played now by satellites, which must increase in the future, neither the US nor the Soviet Union could contemplate living with a situation in which they could lose their strategic eyes and ears at the outset of hostilities, or even with the onset of a serious crisis. Failure to cap the development of ASATs would only result, therefore in the development of anti-ASATs and other costly and destabilising means of satellite protection - in other words, another spiral in weapons technology which would be most undesirable and could well be unnecessary.

4. There are also political arguments in favour of seeking new controls. Public interest in the military development of outer space, partly stimulated by President Reagan's "Star Wars" proposals, is on the rise. Parliament and broader public opinion would not easily understand it, at this difficult moment in East-West relations and when defence policy is a subject of increasing

/controversy,

controversy, if HMG appeared inactive, or even hostile towards the arms control possibilities. Most of the Allies, including the French, Germans, Italians and Canadians, have already moved much further in that direction. At this year's UNGA the UK was alone in abstaining on a Warsaw Pact/Non-Aligned Resolution advocating further measures of arms control, with only the US voting against; 125 countries voted in favour of it.

5. There is a public perception that Governments have started to lose control of the arms race. Uninhibited development of military capabilities in space risks adding to this distorted but commonly held view. At the least HMG should be better placed to counter the Soviet propaganda initiative reflected in their comprehensive draft Treaty for outer space, especially satellites. A greater benefit could well accrue. But these presentational gains cannot be the determining factor. A new British position would only be justified if strategic interests were properly served by the sort of constraints suggested.

6. One other factor argues in favour of a more forthcoming approach to controls. Where other defence systems are concerned, arms control agreements are hampered by imbalances between the super-powers, and the reluctance of both to accept reductions in established arsenals or to make concessions in areas where one is significantly ahead of the other. However, in the case of ASATs, the development of the technology is still at a fairly primitive stage. The Russians hold a temporary lead, by virtue of the crude system they have already shown capable of operational deployment. But even they appear to recognise that with the testing of the US

/F-15

F-15 related system, due to be completed by 1986, the Americans will achieve an important edge. Once high altitude ASATs begin to be tested, protection for satellites by any form of verifiable agreement will become very much harder to achieve. Now, if ever, should therefore be the moment when both sides should see a strong self-interest in an agreement which, by limiting them to one low altitude system only and banning further development, would stabilise the competition, and enhance rather than endanger their own security.

7. A major British initiative in this field, such as the tabling of a draft ASAT Treaty at the CD, would be an eye-catching move, with appeal in this country and elsewhere. But the reservations the Americans have about this whole area must be recognised. Furthermore, account must be taken of the direct importance to our entire range of defence and intelligence interests of our close collaboration with the Americans in space-related matters and more widely, and of the need not to risk damage to this collaboration by unnecessary confrontation over a single issue. Any new approach to Washington should therefore be conducted with discretion and with an eye on broader interests.

8. US reluctance to consider concrete measures for ASAT controls appears to stem from two main concerns:

(i) that they would become locked into a permanent inferiority to the Soviet Union, as a result of any agreement such as that proposed by the Russians. There can be no question of such a position being allowed to arise. It is both a military and a

/political

political imperative that the US should reach the current stage of the Russians ie operational capability for one low altitude ASAT system. But this, equally, would be guaranteed under the sort of arrangements outlined in paragraph 2 above.

(ii) that no ASAT agreement of any sort could be adequately verifiable. The difficulty in achieving this should not be underestimated. But the degree of progress made on an ASAT agreement during the earlier (1978-79) US-Soviet negotiations is not easily reconcilable with the idea that verification problems are in principle insoluble. UK officials take the view that, whereas verifying the elimination or reduction of already deployed systems is extremely difficult, testing of new systems can be verified with adequate confidence; and that new Soviet deployments without prior full system testing are inherently improbable.

9. A third US concern may be an important influence on current Washington attitudes. There is inevitably a technical link between systems (of a more advanced nature than those at present in development) designed to destroy satellites and those with a role of defence against ballistic missiles (DABM); with the passage of time, an ASAT could also become DABM-capable. Some of the US resistance to ASAT controls may therefore stem from a desire not to risk foreclosing on DABM options, although these may not be ripe for development until the next century. Such reservations would have to be taken seriously, and UK officials are already

/engaged

engaged in detailed exchanges with the Americans on the range of DABM issues. Should it be found desirable, probably in the next decade but no earlier, to develop the DABM potential, then some appropriate changes might have to be made to any ASAT agreement negotiated in the meantime (as would also be necessary with the present ABM Treaty). But it is unclear that this long-term possibility is sufficient grounds for ignoring the ASAT problem and its possible solutions within the next ten years. For the moment it should be possible and it is desirable to retain a distinction between the two subjects, for the purposes of policy-making and in any further exchanges with the Americans.

10. Despite these US concerns, the latest reports from Washington suggest that the Administration's mind is not closed towards some options for controls; and that some US officials are attracted towards a regime of confidence-building measures governing satellite deployments. If such measures were only of a declaratory nature, they could cause other problems. The West has always resisted Soviet and non-aligned proposals of this type on the grounds that they would add little of substance to security and could be actively damaging; we have insisted instead on seeking balanced and verifiable agreements with real military significance. Nonetheless the current trend in Washington may reflect an approach less totally negative than a few months ago.

11. Against this background, it appears desirable to engage the US Administration in a substantive dialogue about ASAT issues, with a view to eliciting from them more information (especially about their verification concerns than they have so far made

/available,

available, and to outlining to them the reasons for favouring a more positive approach to controls.

Foreign and Commonwealth Office

15 February 1984

IMMEDIATE SECRET

7

+ [redacted]
Mr Butler
Mr Wiles
PUS

MR

D E D I P
SECRET
FM WASHINGTON 272355Z SEP 83
TO IMMEDIATE FCO
TELEGRAM NUMBER 2792 OF 27 SEPTEMBER
AND TO IMMEDIATE: UKMIS NEW YORK (FOR SECRETARY OF STATE'S PARTY)

US ANTI-BALLISTIC MISSILE SYSTEMS

1. THE STATE DEPARTMENT HAVE TOLD US IN CONFIDENCE THAT, FOLLOWING PRESIDENT REAGAN'S SPEECH ON 24 MARCH ABOUT FUTURE ANTI-BALLISTIC MISSILE SYSTEMS (MY TELNO 739), THE INTER-AGENCY GROUP REVIEWING THE POSSIBILITIES HAS ALMOST COMPLETED ITS WORK. A REPORT WILL BE SUBMITTED TO THE WHITE HOUSE IN MID-OCTOBER. AS A RESULT OF THE PRESIDENT'S INITIATIVE AND THE ENTHUSIASM OF SOME OF THE SCIENTIFIC ADVISERS, THERE IS A GOOD DEAL OF MOMENTUM IN FAVOUR OF A SUBSTANTIALLY EXPANDED RESEARCH AND DEVELOPMENT PROGRAMME. THERE OBVIOUSLY WOULD BE VERY CONSIDERABLE LEAD TIMES IN RELATION TO THE EVENTUAL TESTING OF ANY SPACE-BASED SYSTEMS. EMPHASIS WOULD BE PLACED ON THE FACT THAT INCREASED RESEARCH AND DEVELOPMENT WOULD HAVE NO NEAR TERM IMPLICATIONS FOR THE ANTI-BALLISTIC MISSILE AND OUTER SPACE TREATIES.

2. WE HAVE BEEN IMPRESSING ON US OFFICIALS THE IMPLICATIONS PLANS OF THIS KIND COULD HAVE FOR BRITISH AND FRENCH SYSTEMS, AND THE NEED FOR CONSULTATION ABOUT THE TERMS OF ANY FURTHER ANNOUNCEMENT E.G. OF AN INTENSIFIED R AND D PROGRAMME. US OFFICIALS HAVE INDICATED PRIVATELY THAT IT WOULD BE HELPFUL IF THE PRIME MINISTER COULD TAKE THE OPPORTUNITY DURING HER TALK WITH THE PRESIDENT TO EMPHASIZE THAT US EXPLORATION OF THIS AREA OF TECHNOLOGY IS OF DIRECT CONCERN TO US: AND THE NEED FOR DUE CONSULTATION WITH US ABOUT THE ANNOUNCEMENT OF ANY FURTHER STEPS.

3. IF THE SECRETARY OF STATE AGREES, WE SHALL BRING THIS TO THE PRIME MINISTER'S ATTENTION ON HER ARRIVAL.

WRIGHT

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10 DOWNING STREET

From the Private Secretary

31 March 1983

PRESIDENT REAGAN'S SPEECH ON DEFENSIVE TECHNOLOGY

The Prime Minister was grateful for your letter of 29 March and the enclosed paper on the implications of President Reagan's speech of 23 March. She notes that the paper is your interim assessment.

As I explained to you on the telephone yesterday, the Prime Minister does not now wish to hold a meeting during the recess to discuss this matter. It is possible that she may revert to this idea after the recess.

I am copying this letter to Roger Bone (Foreign and Commonwealth Office) and Richard Hatfield (Cabinet Office).

A. J. COLES

Richard Mottram, Esq.,
Ministry of Defence.

CONFIDENTIAL

Defence

10 DOWNING STREET

Prime Minister

These are the papers which you have seen before on laser and particle beam technology.

A.J.C. 31/3.

SECRET

6

PRIME MINISTER

PRESIDENT REAGAN'S SPEECH ON DEFENSIVE TECHNOLOGY

I attach a paper prepared by the Ministry of Defence on the implications of the above speech. It draws heavily on the scientific advice available in the MOD.

We shall need to consider whether to give the Americans any comments on this speech but there is no hurry.

You told Mr. Heseltine yesterday that you would like to have a meeting with his scientists on lazer technology and perhaps other scientific advances with defence implications.

In the light of the attached paper, do you still want such a meeting?

If so, the possibilities during the Recess seem to be:

(a) On the morning of Tuesday 5 April (though you are having lunch with Mr. and Mrs. Atkins at 1245);

(b) On Wednesday, 6 April - though Mr. Heseltine is meeting General Creasey that morning and could not get to Chequers until lunchtime (I believe he very much wants to be present during the briefing).

There may be some difficulty in getting all the right people together next week. We could, if you like, try to fit in the briefing in the first week after the holiday.

Could you indicate when you would like a meeting.

A.J.C.

29 March 1983

SECRET

SECRET UK EYES A

cc/RJ 5

MINISTRY OF DEFENCE
MAIN BUILDING WHITEHALL LONDON SW1
Telephone 01-~~9387022~~ 218 2111/3

MO 11/9/4

29th March 1983

Prime

Dear John,

PRESIDENT REAGAN'S SPEECH ON DEFENSIVE TECHNOLOGY

In your letter of 25th March, you asked for a more considered account of the implications of President Reagan's speech on 23rd March on defensive technologies.

I attach a note by officials. President Reagan's speech raised issues of potentially crucial importance which the Defence Secretary will himself be considering in depth, and the attachment is very much an interim assessment. Mr Heseltine believes that we must take a cautious and non-committal line in public, which is reflected in the line to take which I have already sent to you with my earlier letter of today's date.

I am copying this letter and the attachment to Roger Bone (FCO) and Richard Hatfield (Cabinet Office).

Yours ever,

Richard Mottram

(R C MOTTRAM)

A J Coles Esq

SECRET UK EYES A

PRESIDENT REAGAN'S SPEECH ON DEFENSIVE TECHNOLOGY

1. The change of emphasis in the President's televised address may on closer examination prove to be more rhetorical than substantial. Indeed his speech, by concentrating on the increasing quantitative, qualitative and geographically dispersed threat from the Soviet Union, together with a shift of emphasis away from offensive strategic nuclear systems to defensive measures, holding out the promise of the eventual elimination of strategic missiles, appears primarily to be an attempt to take the edge off the current pressure in the House of Representatives on both defence spending generally and the nuclear 'freeze' resolution in particular. The US Administration has been notably more cautious in its assessment of the scope for the early introduction of comprehensive anti-ballistic missile systems than is readily apparent from the text of the President's speech, and there has been repeated confirmation that the present level of investment in new generation strategic systems (such as MX, Trident D5 and the B1 bomber) will continue unchanged. However, there was a strong personal commitment evident in the President's private message to the Prime Minister. The initiative may also reflect US assessments of Soviet advances both in high technology defensive systems and in the pre-launch survivability of their new generation ICBMs. It therefore deserves to be taken entirely seriously.

2. President Reagan's speech has been carefully drafted to take account of possible European sensitivities on the degree of American commitment to the defence of Europe and on the sincerity of US arms control policies. However, it provokes a number of questions which are likely to prove less than helpful in the context of maintaining public support for national and NATO nuclear policies, such as:

a. the questionable validity of the technical assumptions underlying the President's proposals, together with the suggestion that if implemented they would represent another twist to the arms race;

b. the shift of emphasis from deterrence to defence, with the possibility that any nuclear exchange would be confined exclusively to Europe while both superpowers remained immune behind the shield of their improved ABM defence;

c. the credibility of the United States' commitment to arms control, particularly in relation to the 1972 ABM Treaty;

d. the future of the British independent strategic nuclear deterrent.

These areas are explored in greater detail below.

Technical Feasibility/Risks of Escalation

3. The United States has invested considerable amounts of money in research and development for high technology ABM systems since the early 1970s. The FY 1984 defence budget now before Congress contains an allocation of $1 billion for research into new strategic defence technologies. The Administration has indicated that there will be no significant increases in this expenditure in the near term. The President has not committed the United States to any one particular technological solution; and indeed the Administration has been careful to say that any new systems could only result from a number of parallel advances in diverse areas of high technology.

4. As the note at Annex A from the Defence Scientific Staff makes clear there is nothing in the laws of physics to prevent the deployment of space-based directed energy weapons of the type probably envisaged by the United States. But it would probably take at least 10 years to define the requirements for such a system and at least another 20 to develop and deploy it. It would require considerable investment in an enhanced 'shuttle' programme to enable the weapons to be deployed and maintained in space. Once deployed, the weapons would be extremely vulnerable to Soviet

anti-satellite activity, and it would require considerable further investment to provide them with self-protection. They would also pose considerable command and control difficulties. Finally, countermeasures to protect ballistic missiles against the effects of directed energy weapons are already under development and are likely to be considerably cheaper than the weapons themselves.

5. The Soviet Union has always invested heavily in all aspects of strategic defence, and their progress in the application of advanced technologies is probably roughly equivalent to that of the United States. They are assessed as having the capability to respond in kind to any US developments.

6. Although the President has stated that the United States seeks 'neither military superiority nor political advantage', the fact that the United States is proceeding with a high investment defensive programme in addition to its investment in new offensive strategic systems is bound to lead to accusations of another twist in the arms race spiral. Indeed the Soviet Union could become vulnerable to a US 'first strike' unless they respond in kind to any US development.

Deterrence/Defence

7. Although the President clearly envisaged an ABM system which would defend Europe as well as North America from attack by ballistic missiles, his speech did not offer any promise of an effective defence against theatre nuclear weapons or atmospheric systems (i.e. nuclear artillery, nuclear capable aircraft and cruise missiles.) If a completely effective defence against strategic ballistic missile defences could be achieved, it would no longer be possible to deter exchanges within the European theatre by the threat of escalation to the strategic level. There is therefore a prospect of a nuclear exchange limited to Europe, with the territory of both the Soviet Union and the United States remaining immune from attack. Despite the President's assertions to the contrary, there is therefore likely to be considerable speculation that the United States is retreating into a 'Fortress America' mentality.

Arms Control

8. The President's speech contained a commitment to 'continue to pursue real reductions in nuclear arms, negotiating from a position of strength', and indicated that the successful development of defensive systems would enable arms control measures which would entirely eliminate strategic missiles. His speech also contained a promise of a further indication of Presidential thinking on the INF negotiations on Thursday, 31st March. The negative aspect of his proposals in arms control terms relates to the Anti-Ballistic Missile Treaty of 1972. Although this Treaty is open to a number of alternative interpretations (and a note by officials covering these and the related provisions of the 1967 Outer Space Treaty is attached at Annex B), and although the President has indicated that his proposals are consistent with US obligations under the ABM Treaty, it is clear that the US Administration recognise that if their proposals are to be taken beyond the research and initial development stage, there will be a need to negotiate a new treaty with the Soviet Union. The initial Soviet response to these proposals has been predictably hostile.

Trident

9. Any liberal interpretation of the existing Treaty by the Soviet Union, matching US advances, or renegotiation of the Treaty, could have profound consequences for the credibility of the British independent strategic nuclear deterrent. The effectiveness of the independent nuclear force depends on a policy shared by the two superpowers of deterrence rather than defence. Even a modest increase in Soviet ABM defences over levels permitted in the Treaty could degrade the effectiveness of the Trident force as currently envisaged and a comprehensive defence would negate its value entirely. But within the currently expected life of the Trident system (i.e. from the mid-1990s to the 2020s) Trident is unlikely to be rendered completely ineffective, for the following reasons:

a. high technology defensive systems are unlikely to be available to either side until 2010 onwards;

b. relatively low cost countermeasures to such defensive systems may be possible (and here the commonality of the Trident system with the US will be a distinct advantage).

However, the President's proposals place us in the awkward position of either refuting their feasibility or admitting that Trident will become redundant once comprehensive defensive systems are available. It remains in our interest to ensure that deterrence can be achieved at a minimum cost and we would therefore wish to oppose strongly any change in the current status of operational ABM systems.

10. In summary, President Reagan's proposals will be portrayed with some justice by the opponents of NATO's nuclear strategies as an attempt to provide a technological diversion from an essentially political problem. It presents particular difficulties for the United Kingdom as a European power maintaining an independent nuclear deterrent. Despite the careful drafting of the President's speech, it appears that the US Administration has taken insufficient account of our legitimate interests. The Prime Minister may therefore wish to consider whether a response should be made to Washington, either through diplomatic channels or by means of a reply to the President's personal message of 23rd March.

ANNEX A

DEFENCE AGAINST STRATEGIC NUCLEAR MISSILES: A TECHNICAL ASSESSMENT

The purpose of this note is to examine in outline the nature, feasibility and technical implications of the systems which the President must have in mind.

2. The Americans have been undertaking research and development on fixed land-based anti-ballistic missile (ABM) defence for well over two decades and, since 1972, have been working within the terms of the ABM Treaty. In the 1970s they abandoned a programme for the deployment of an operational system to defend some of their Minuteman silos but they have demonstrated all of of its sub-systems in an advanced engineering form.

3. It is clear that President Reagan was not referring to this type of defence, for protecting either cities, where it would be of very doubtful effectiveness, or missile silos, where it could have an operational value. He must have something else in mind to justify his rejection of "Fortress America" and his intention to defend those under 'NATO's nuclear umbrella' in his letter to the Prime Minister.

4. It is almost certain that the initiative is based on the exploitation of so-called "Directed Energy Weapons", on which the US have been working for some time, albeit primarily for tactical applications. These weapons fall broadly into two main classes; namely lasers and particle beam systems. The former generate high-powered electro-magnetic radiation usually in or near the visible spectrum which can be focussed very precisely. The latter generate beams of atomic or sub-atomic particles which are either electrically charged, eg electrons, protons, or electronically neutral, eg neutrons, hydrogen atoms. Charged particle beams are relatively easy to control but are deflected by the earth's magnetic field; neutral particles are much more difficult to control but suffer much smaller propagation distortions.

5. Directed energy weapons offer the great attraction of virtually zero flight time and hence promise to make possible the engagement of a large number of targets in a very short interval. This also means that more time is available to assess the situation before firing begins. However, the beams must be of very high power and, at least at the present time, cannot be propagated within the earth's atmosphere over more than a few kilometers. Thus, for large area strategic defence against ballistic missiles, they have to be stationed in space and consideration has to be given to orbitting satellites for the type of defence to which the President appeared to be referring.

6. Strategic ballistic missiles are most vulnerable to directed energy weapons during or at the end of their boost phase, before the deployment of the re-entry vehicles carrying the nuclear warheads. By attacking missiles at this point, a defence capability would be achieved irrespective of eventual targets of the missiles. To achieve these interceptions early in the missile flight, it would be necessary to station a large number, perhaps about 50, defensive satellites in low earth orbits. Even so, they would still need to have intercept ranges of perhaps a few thousand kilometers and, given the requirement that they would have to be able to engage a large number of missiles, they would likely weigh at least several hundred tons. In thoery they could be assembled in space from a relatively large number of smaller payloads.

7. There is nothing in the laws of science which says that a space based directed energy weapon system for ABM defence cannot be built. Many of the required technologies have already been demonstrated at small scale in the the laboratory and the US are seeking to demonstrate these small scale systems in satellites. However, to reach the scale required for an operational system there are very major hurdles to surmount, eg the prime power source, which would have to be either a massive amount of chemical fuel or a nuclear reactor; the laser or particle beam generator; the system for focussing and directing the beam to achieve the necessary damaging effect on the missile; the early warning and battle management sensors; the command and control arrangements. None of these are yet developed to a point where it would be possible to define the elements of a system. Indeed, it could take at least a decade merely to define a deployable system. Thereafter it is likely to take at least a further two decades to demonstrate engineering feasibility with perhaps deployment beginning towards the end of this period. It is almost impossible to estimate the possible cost of such a programme but it is clearly a greater challenge than the US project to land a man on the moon.

8. Apart from the question of engineering feasibility, there must be doubt about the operational viability of a space-based ABM system based on directed energy weapons. The command and control problems are formidable; the ABM satellites could be vulnerable to "pre-emptive" attack by anti-satellite systems; the energy beams could be degraded by the effects of nuclear explosions; ballistic missiles could be hardened to survive attack by directed energy weapons. Moreover the maintenance of serviceability of the satellites, including the need to boost them back into orbit to counter decay due to the tenuous atmosphere in which they would be flying, would pose yet further difficulties.

9. In conclusion, the President's initiative, far from leading to the impotence of offensive strategic nuclear ballistic missiles, is much more likely to stimulate the search for counter-measures to defensive directed energy weapons. As indicated above, such counter-measures are not difficult to seek and the signs are that the cost advantage will be heavily in favour of the offence. Furthermore, nothing has been said about countering other strategic nuclear delivery systems such as cruise missiles. Overall, the conclusion must be that this US announcement will simply initiate a new phase of technological competition between offence and defence in strategic systems to mirror that which has long existed in the conventional warfare field.

ANNEX B

ARMS CONTROL IN SPACE

1. The deployment of weapons in space is constrained by the following treaties:

a. 1963 Partial Test Ban Treaty prohibits nuclear explosions in space;

b. the 1967 Outer Space Treaty prohibits the stationing of any kind of weapon on a celestial body and the stationing of any weapon of mass destruction, specifically including nuclear weapons, in outer space;

c. 1972 SALT I and 1979 SALT II (unratified) prohibit the interference with satellites monitoring compliance with the agreements;

d. 1972 ABM Treaty prohibits the development, testing or deployment of anti-ballistic missile (ABM) systems or components which are sea,-air,-space-or mobile land-based.

2. Reagan's proposals are not prohibited by a. b. or c above. However, the position as regards the ABM Treaty is less clear. Weinberger is reported to have said that research and development of a space-based laser defence is not in breach of the Treaty. "ABM systems" are defined in the text as comprising interceptor missiles, launchers and radars. Weinberger acknowledged however, that the Treaty "might have to be amended". There is a specific commitment in the associated "agreed statements" to discuss limitations on systems and components based on physical principles other than these defined as above which might be created in the future. Some consultation would therefore be obligatory before any intended deployment. It is important to note that Research activity which falls short of "development" is not covered by the Treaty, whatever principles might be employed.

3. UK Participation in arms control in space. The UK has aimed to resist any unrealistic, sweeping demilitarization of space, which could work against our interests and those of NATO in general (prejudicing C^3 satellites, intelligence-gathering etc). We have declared that we are concerned at the development of anti-satellite (ASAT) techology and would like to see that restricted if possible. ABM matters are primarily for bilateral discussion US/USSR. The development of ABM systems in space could be highly detrimental to the effectiveness of the UK (and French) independent SLBM deterrents. We have continuosly reminded the US of our concerns. The European position in general is one of hostility towards arms deployments in space. The UK's role has been to attempt to reconcile the divergence of US and European views.

4. Current negotiations. The US has long resisted any discussions which will hamper their consideration of options for space-based weaponry. They have now however agreed to the establishment of a working group in the Committee on Disarmament in Geneva to discuss space arms control in general. They seek a restricted mandate which would avoid the commitment to negotiate. The UK, in its role as US/European mediator, has supported this approach, recognising that the first task of the Western Group is to define areas in which argument might be possible.

Defence

MINISTRY OF DEFENCE
MAIN BUILDING WHITEHALL LONDON SW1
Telephone 01-~~218 7822~~ 218 2111/3

MO 18/3/8

23rd December 1981

Prime Minister 2

CW 24/12

Dear John,

LASERS

I attach a copy of a recent article published in "Scientific American" on laser weapons, which Mr Nott has asked me to forward to you, to show to the Prime Minister. The article is very much in line with the advice which we have earlier given to you (my letter of 14th January 1981 to Michael Alexander) and is fully supported by Sir Ronald Mason, our Chief Scientific Adviser.

I am copying this letter to Francis Richards (FCO) and to David Wright (Cabinet Office).

Yours sincerely,

Jonathan Dawson

(J D S DAWSON)

J Coles Esq

Established 1845 SCIENTIFIC AMERICAN December 1981 · Volume 245 Number 6

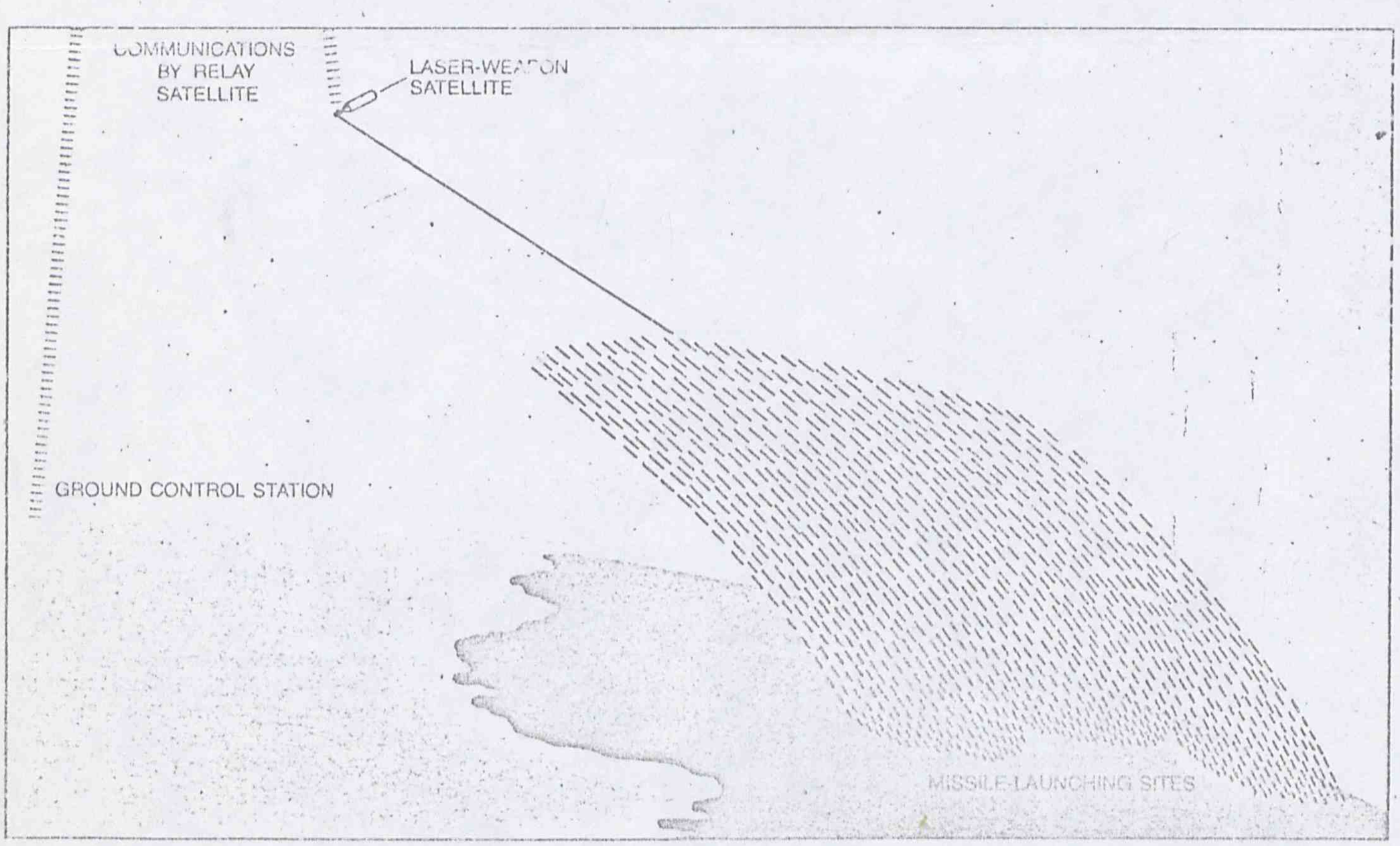
Laser Weapons

Could orbiting lasers defend a nation against missile attack? The technological obstacles are insurmountable; furthermore, such weapons would be vulnerable to simple countermeasures

by Kosta Tsipis

A high-energy laser can readily burn a hole through a metal plate of considerable thickness; indeed, the laser serves as a cutting tool in industry. This capability has naturally led to speculation that the laser might serve as a weapon of war. What is envisioned by some military planners is a weapon rather like the ray gun of science fiction. The laser beam would be pointed at an attacking missile or aircraft or at some other target and would almost instantly destroy it. Because the beam propagates with the speed of light there would be no possibility of outrunning or evading it. In preliminary tests under controlled conditions lasers have destroyed small, remotely guided aircraft.

Recently a small group of people in the U.S. Congress, the Department of Defense and the aerospace industry

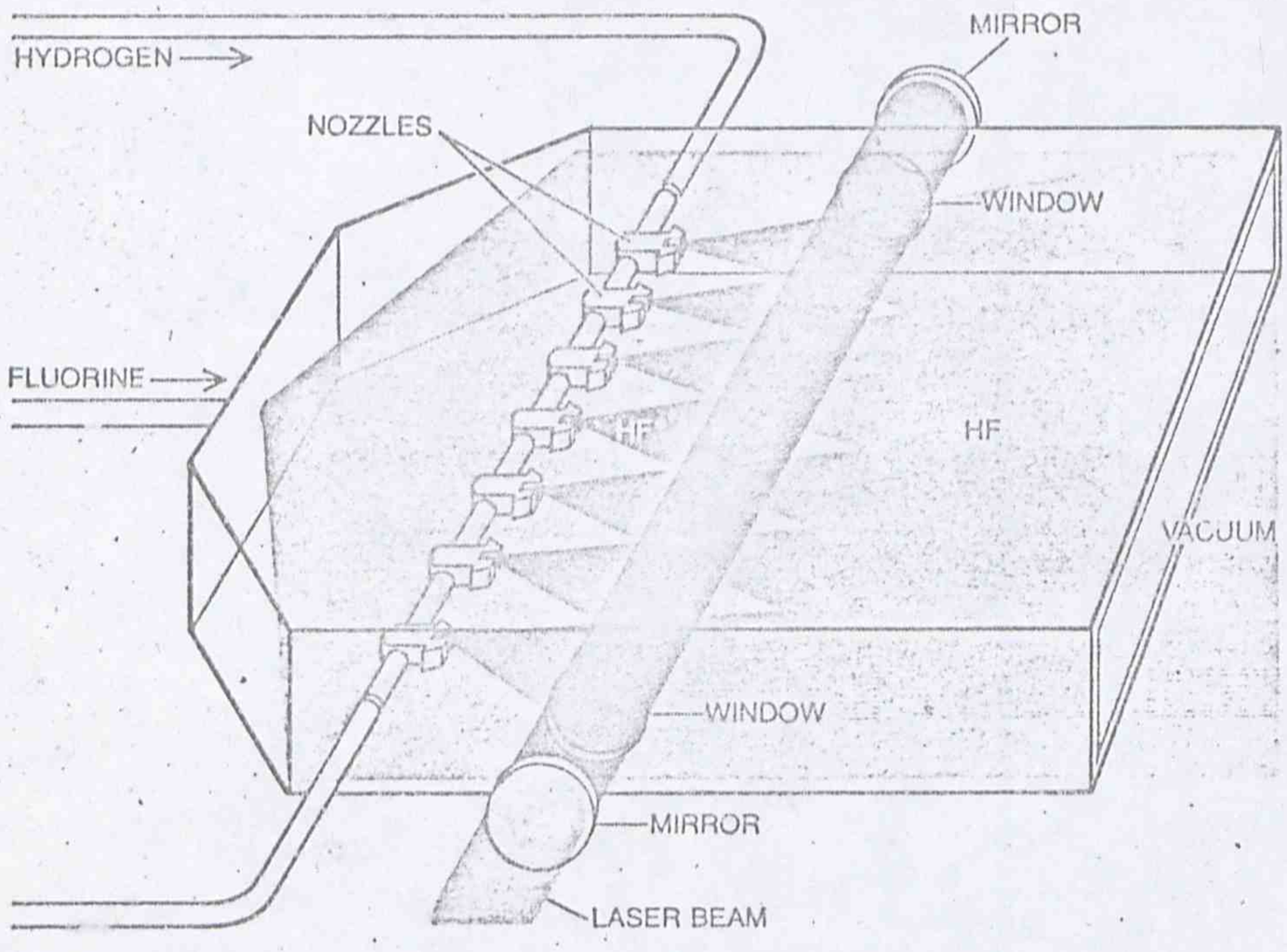


PROPOSED MISSION for a laser weapon is to defend a nation against intercontinental ballistic missiles. The laser would be mounted on a satellite in an orbit at least 1,000 kilometers above the earth. The missiles would be attacked during the boost stage of their flight, which lasts for about eight minutes. To ensure that at least one satellite would be in range of the missile-launching sites at all times about 50 satellites would be needed. Each satellite would have to be capable of dealing with as many as 1,000 missiles in the eight-minute period because all the other satellites would be over some other part of the earth. Infrared sensors or radar would detect and track the missiles. Additional sensors would measure the miss distance or assess the damage if the missile were hit by the beam. A relay satellite in a higher orbit would provide a communications link with the ground. No countermeasures that might be employed to overcome the laser weapon are shown here, but even under these conditions physical and technological constraints would make the weapon impractical.

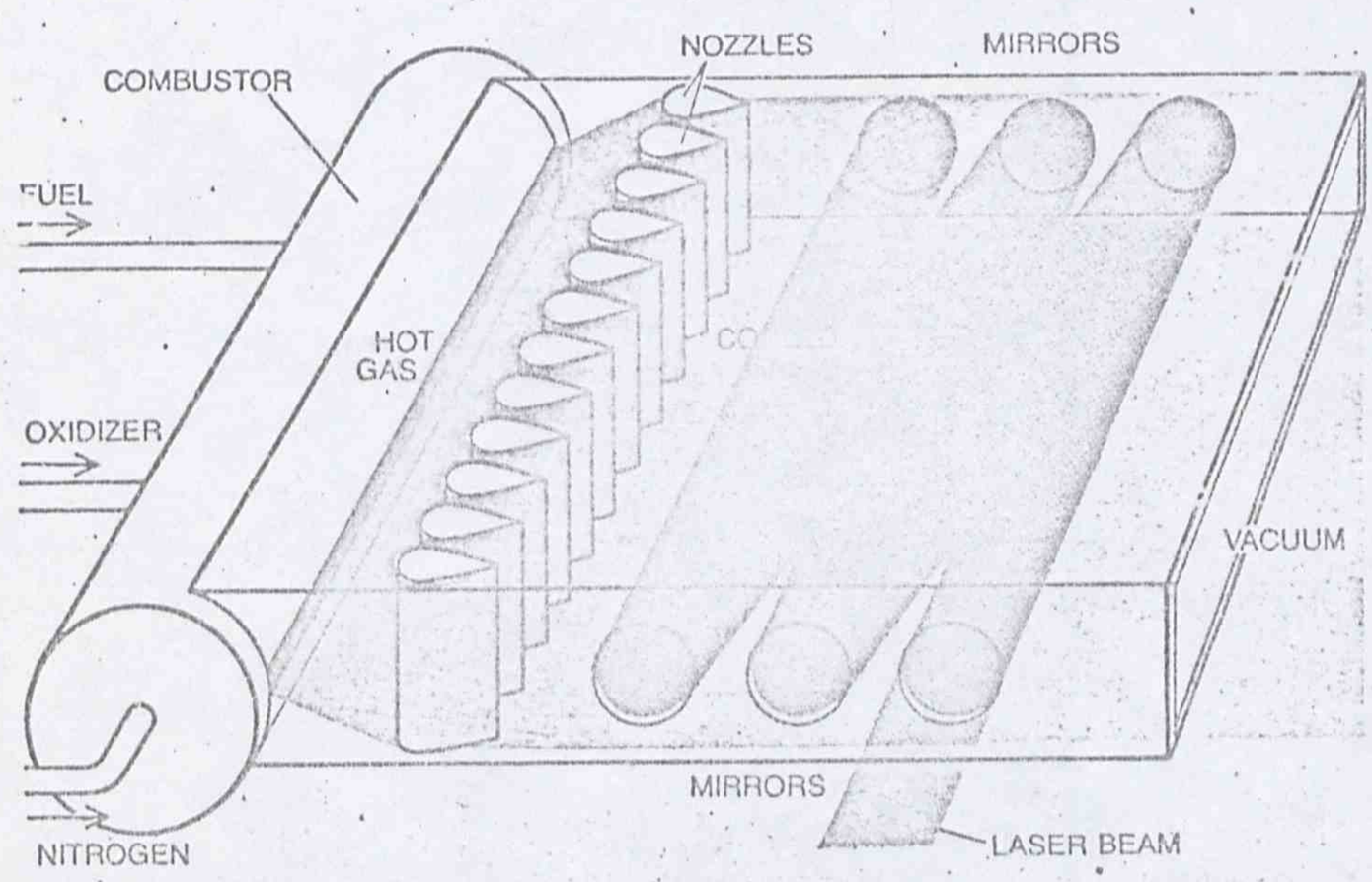
ha[illegible] contended that high-energy lasers have the potential for destroying intercontinental ballistic missiles in flight. Maintaining that the U.S.S.R. has already mounted a large effort to develop lasers as antimissile weapons and that the U.S. therefore confronts a "laser gap," these people are urging the Reagan Administration to greatly expand the U.S. laser-weapons program, which is now receiving about $300 million per year. The main objective would be to deploy a network of very large laser weapons in earth orbit within about 10 years. The orbiting weapons would have the mission of destroying Russian intercontinental missiles soon after they were launched. Another objective would be to develop laser weapons that would be fired from the ground to attack enemy satellites or to defend valuable targets against aircraft and tactical missiles.

The effects of such hypothetical weapons on the world military balance and on the prospects for nuclear-arms limitation might someday merit detailed appraisal. For now, however, a more fundamental question must be addressed: Is it technically feasible to build an effective laser-weapon system? I shall argue here that the objectives set forth for laser-weapons development could not possibly be achieved in 10 years. Indeed, unless a number of fundamental impediments to the use of lasers as weapons are overcome, the objectives could never be achieved. Several of the difficulties arise from the physics of the propagation of a laser beam over long distances. Other difficulties are technological and economic.

The potential of lasers as weapons has been assessed in a series of workshops organized by the Program in Science and Technology for International Security of the physics department of the Massachusetts Institute of Technology. Participants in the workshops have included some of my colleagues and me from M.I.T. and investigators from other universities, from industry and from the national weapons laboratories. We have concluded that lasers have little or no chance of succeeding as practical, cost-effective defensive weapons.



CHEMICAL LASER is one of three kinds of laser being considered as potential weapons. In each case the working medium is a gas in which many molecules are raised to an excited state, creating a "population inversion." Light is amplified as it passes through the medium repeatedly in an optical "cavity" formed by two mirrors. In the laser shown the chemical reaction between two gases creates the active medium. Fluorine and hydrogen issuing from a row of nozzles combine to create hydrogen fluoride molecules in an excited state (HF*). To prolong the lifetime of the excited molecules the density is kept low by exhausting the combustion products into a vacuum. Light is emitted as the HF* molecules return to their ground state (HF).



GAS DYNAMIC LASER achieves a population inversion by generating a hot gas and then cooling it abruptly. Fuel is burned with an oxidizer to form carbon dioxide at high temperature. Light emission in carbon dioxide results from transitions between two excited states. In the hot gas many molecules occupy the excited states, but laser action is not possible because the population of the upper laser energy level is not markedly greater than the population of the lower level; at high temperature the molecules in the lower level do not vacate it readily by cascading to the ground state. When the gas is rapidly cooled by being expanded through nozzles, the ground state becomes accessible and transitions from the upper laser level to the lower one become possible. Nitrogen added to the mixture transfers energy to the carbon dioxide molecules.

A laser generates an intense stream of electromagnetic waves, all of which have exactly the same frequency, phase and direction of motion; the waves are said to be coherent. The property of coherence is essential to weapons applications of the laser because in order to cause damage a beam of laser light must be intense and well collimated and the waves that make up the beam must be in phase. In principle the light intensity of a laser is unlimited; in practice it depends on the size of the laser and the properties of the material in which the coherent light is generated.

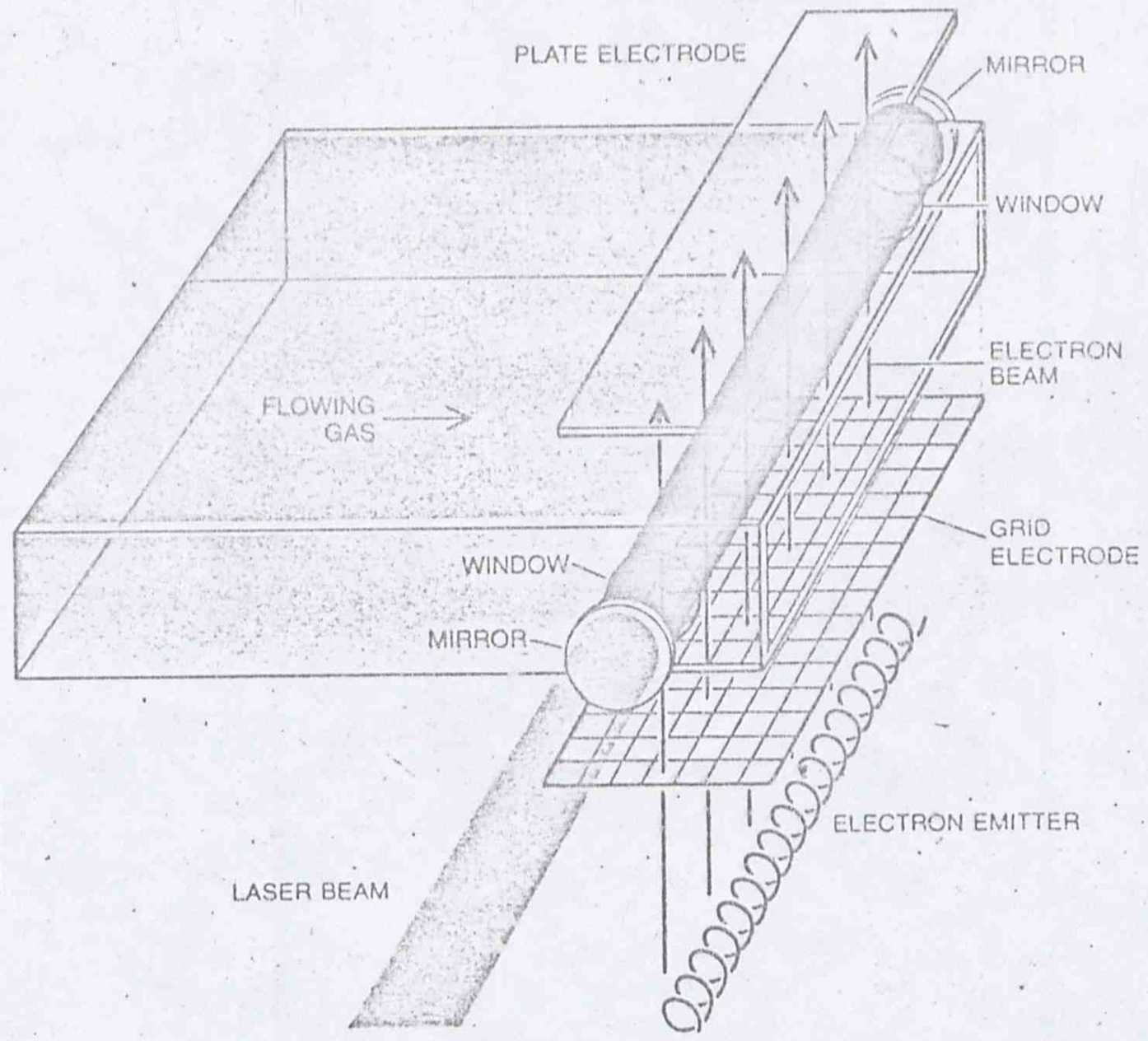
The working medium of a laser can be a solid, a liquid or a gas, but high-energy lasers generally employ a molecular gas. To initiate laser action external energy must be supplied to the molecules of the gas. A fraction of the energy increases the kinetic energy of the molecules and therefore simply heats the gas, but some of the energy is absorbed into the internal vibrational and rotational motions of the molecules. A molecule excited in this way leaves its lowest vibrational or rotational energy state (the ground state) and occupies a higher one. As a result the low energy states are depopulated and a significant number of mole-

culate an excited state. The condition is called a population inversion.

A molecule in an excited state can return to a state of lower energy by emitting a photon, or quantum of electromagnetic radiation. The frequency of the radiation is determined entirely by the difference in energy between the two states. The operation of a laser depends on a peculiarity of the interaction of photons with matter. When a photon emitted by one excited molecule impinges on another molecule in the same excited state, the photon can stimulate the second molecule to emit an additional photon of the same phase and frequency as the stimulating photon. Both photons can then stimulate similar emissions from other molecules, so that the number of identical photons moving through the collection of molecules grows exponentially. The nature of this process is suggested by the word laser, which was coined as an acronym for "light amplification by stimulated emission of radiation."

In a laser a collection of molecules subject to a population inversion is enclosed in an optical "cavity" with parallel mirrored surfaces at the ends. Photons emitted by the excited molecules travel back and forth through the laser medium, reflected by the two mirrors, and stimulate additional molecules to emit photons with the same frequency and phase. Because only the photons that follow a path exactly perpendicular to the mirrors remain in the cavity long enough to be amplified, the light is formed into a well-collimated beam. A portion of the beam can be allowed to leave the cavity by making one of the mirrors partially transparent.

A photon with a frequency in the visible region of the electromagnetic spectrum has little energy: less than 10^{-19} joule, or watt-second. Nevertheless, the energy output of a laser can be many thousands of joules, emitted in an exceedingly brief period, sometimes as short as a few millionths of a second. The reason is that enormous numbers of atoms (perhaps 10^{23}) can be stimulated to radiate many times during this short interval.



ELECTRON-DISCHARGE LASER achieves a population inversion in the molecules of the working gas by means of an electron beam. Collisions of electrons with molecules impart energy to the molecules, raising them to an excited state. The electrons are emitted by a hot filament or an electric discharge and are accelerated through the cavity by a pair of electrodes.

Three kinds of high-energy laser have been considered as potential weapons. They are classified according to the mechanism that creates the population inversion in the working medium. In the gas-dynamic laser a gas such as carbon dioxide is generated by combustion. The gas is formed at high temperature, with the result that most of the molecules are in excited states. Then the gas is cooled suddenly by expansion through a series of nozzles; the cooling is so rapid that the molecules occupying excited states do not have time to return to the ground state. A population inversion is thus created, and laser radiation is emitted immediately after the expansion.

An electron-discharge laser achieves a population inversion by means of an electron beam directed through the gaseous working medium. The electrons give up part of their energy through collisions with molecules of the gas, causing transitions to higher vibrational or rotational energy states. By this mechanism the population inversion can be sustained continuously.

In a chemical laser two elements or chemical compounds are combined to form molecules of a new compound; for example, the gases hydrogen and fluorine can be combined to form hydrogen fluoride. The molecules are created in an excited state, and by controlling their environment it is possible to achieve the stimulated emission of radiation before they return to the ground state by dissipating their energy as heat.

These three methods can generate a population inversion in a large collection of molecules with good efficiency. There are practical limits, however, to the size of an efficient optical cavity for a laser and to the amount of power it can handle. Much of the research and development now under way in the field of high-energy lasers has the aim of pushing back those limits.

A laser weapon would differ in three important ways from all weapons that have been deployed up to now. First, it would transport destructive energy to the target in the form of an intense beam of electromagnetic waves rather than in the form of an explosive charge carried in a missile or a shell. Second, the energy would move with the speed of light, roughly 300 million meters per second; a supersonic missile, in comparison, has a speed of between 1,000 and 2,000 meters per second. Third, the laser beam must actually strike the target in order to damage it, whereas an explosive warhead can be effective at a considerable distance. Hence for a laser weapon to destroy its target the position of the target must be known to within a distance equal to the shortest dimension of the target, and the laser must be pointed with the same precision.

Given these characteristics of a laser weapon, one can think of three kinds of mission it might perform. Mounted on a satellite orbiting the earth it could attack intercontinental ballistic missiles during their boost phase, which lasts for about eight minutes, or it could attack enemy satellites in their orbits. Mounted on the ground it could attack aircraft or enemy satellites as they passed overhead, or mounted on a naval ship it could defend against missiles homing on the vessel. A laser weapon mounted on an aircraft could attack enemy aircraft or missiles.

In any of these missions the laser-weapon system would have to complete

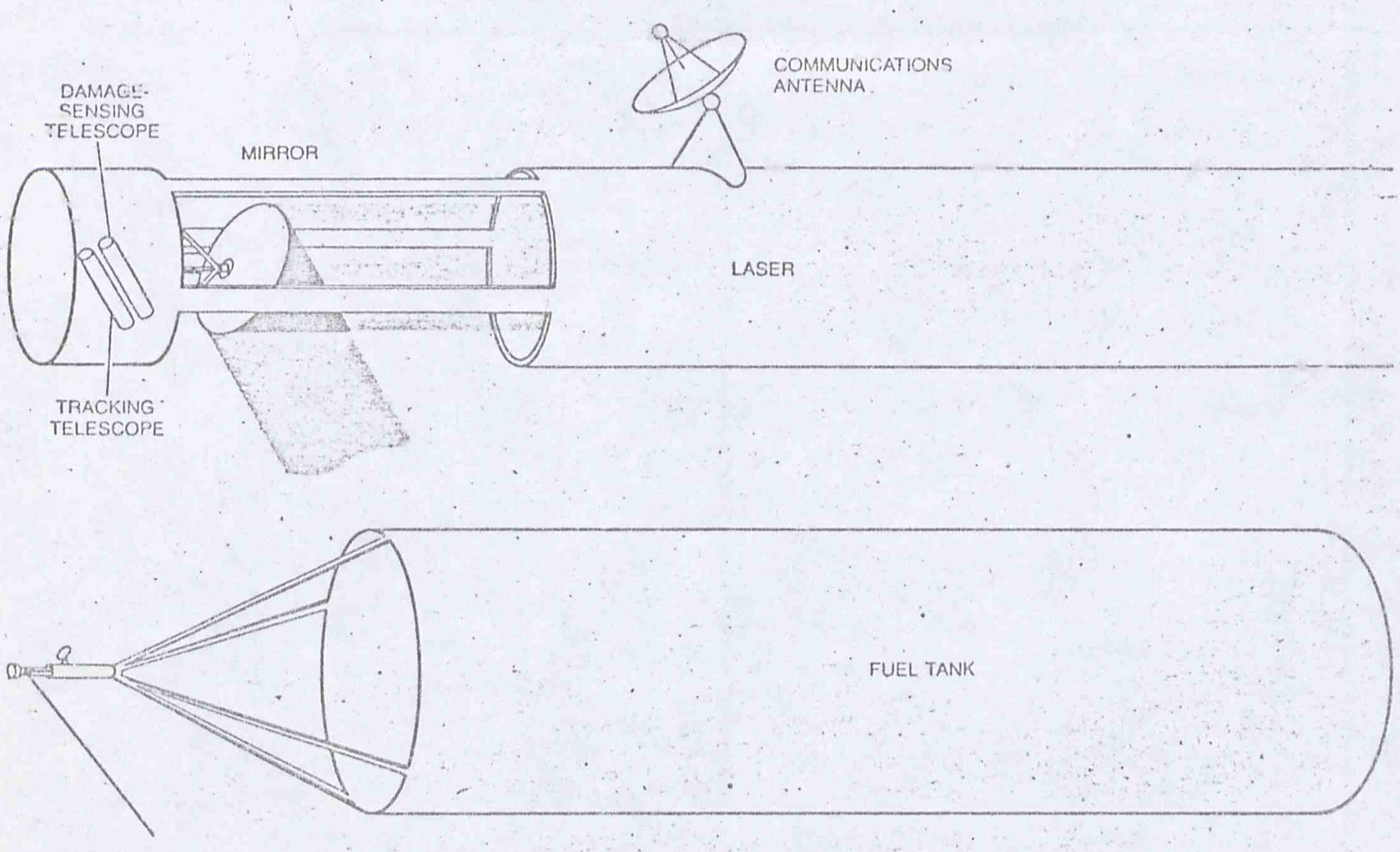
successfully an entire sequence of operations. The system would have to detect the target and distinguish it from possible decoys or other objects in the background. The system would have to point the laser beam at the target, follow its motion and fire the beam through the intervening medium. After each firing of the laser it would be necessary to determine whether or not the target was hit. In the case of a miss the system would have to determine by how much and in what direction the beam was misdirected, then correct the aim and fire again. After a hit the weapon system would have to determine whether or not the target had been destroyed; if it had not been, the aiming and firing would have to be repeated. Ultimately the system would have to communicate the results to a central command post and engage a new target if necessary.

To do these things the system would need several devices in addition to the laser. One device is a large mirror that could be moved under precise control to point the beam at the target. Another is a complement of sensors capable of detecting, identifying and determining the position of the target with the requisite precision and stability. Control devices would be needed to couple the output of the sensors to the aiming mirror. An additional, specialized set of sensors would be needed to assess the damage to the target or the distance by which the beam missed the target. Of course the system would also require a means of generating and storing energy and a mechanism for supplying the energy to the laser in intense pulses at the appropriate times.

A laser-weapon system operating in space and attacking targets that are also above the earth's atmosphere could send its beam over long distances, because light propagates without impediment in a vacuum. The beam would, however, diverge somewhat owing to diffraction, which is a consequence of the wave nature of light. Assuming that the mirror has a perfect surface and shape, the angle at which the beam diverges is inversely proportional to both the frequency of the laser light and the diameter of the mirror. Because one would want to keep the spreading of the beam to a minimum, a laser intended to serve as a weapon would work best if it generated light with a high frequency and if it were equipped with a large aiming mirror.

A laser beam traveling through the atmosphere is attenuated and dispersed by a number of processes. The molecules of the air and the particulate matter in it (dust, water droplets and smoke particles) both scatter and absorb light. An infrared beam from a carbon dioxide laser would lose half of its intensity after traveling four kilometers in cool, dry air or 1.5 kilometers in hot, humid air. Clouds, smoke, dust, fog or thick haze would absorb a beam almost completely. In short, the efficacy of a laser weapon operating in the atmosphere would depend on the weather. Such dependence is a serious drawback in any weapon, but it is particularly troublesome in a defensive weapon, which would have to respond to an attack launched at a time (and therefore in weather conditions) of the enemy's choice. Even in clear weather a laser beam can be deflected, dispersed or completely interrupted by atmospheric phenomena. Turbulence causes rapid local changes in the density of the air, which can deflect a beam of light or make it diverge. The twinkling of stars and distant lights is a manifestation of this effect.

A considerable fraction of the energy in a laser beam is absorbed by the atmosphere. As a result the air in the path of the beam is heated; the heated air expands, creating a channel of low-density air. Light waves bend away from the



SATELLITE-MOUNTED LASER WEAPON would require several components in addition to the laser itself. An infrared or optical telescope would detect and track a missile during the boost stage of its flight, and a hinged mirror would point the laser beam at the target. The mirror would have to be large, rugged, highly reflective and optically perfect. A control system would receive the signals from the tracking telescope and direct the beam by moving the mirror. Another system of telescopes and sensors would measure the miss distance or assess the damage to the target. A communications link with the ground would transmit information about the target and receive commands. By far the largest component of the laser weapon is a reserve of stored fuel and a system to manage it and supply it to the laser.

er, less dense regions of a medium, a[illegible]o the beam diverges. The phenomenon is called thermal blooming; it is a common reason for the defocusing and divergence of a laser beam in air.

A final difficulty in propagating a laser beam through the atmosphere is the risk of creating a plasma. Since light waves are a form of electromagnetic radiation, an intense light beam is accompanied by a strong electric field. At an intensity of about 10 million watts per square centimeter (the exact value depends on the frequency of the radiation) the field is so strong that it removes electrons from atoms in the air, thus ionizing the air and creating a plasma. The plasma absorbs the beam and interrupts its transmission. The effect sets an upper limit on the intensity of a beam of laser light that can propagate through the atmosphere.

A laser weapon would damage a target by overheating it, that is, by concentrating on it more thermal energy than it could withstand without malfunctioning. Damage arises only from the fraction of the energy that is absorbed by the surface of the target. For example, a target of shiny aluminum would absorb only 4 percent of the radiation from an infrared laser that reached the target. The rest would be reflected and would cause no damage.

The proportion of the laser energy that would be absorbed by a target depends on the frequency of the radiation, the material of the target and the condition of the target's surface. Visible and infrared radiation are mostly reflected from a polished metal surface, so that in general much less than 10 percent of the energy carried by the laser beam would be absorbed and cause damage. The absorption of ultraviolet radiation by a metallic surface is much higher; more than half of the ultraviolet energy reaching a target would cause damage.

Overheating might destroy or incapacitate a target such as a missile by any of several mechanisms. The amount of energy per unit area that would have to be delivered to the target in order to damage it would depend on the mechanism chosen and the vulnerability of the target to that mechanism. For example, the electronic circuits of an unprotected satellite would probably malfunction if the craft were illuminated continuously for several minutes by a laser beam with an intensity of about one watt per square centimeter. This is roughly 10 times the intensity of sunlight at the top of the atmosphere. The absorption of 1,000 watts per square centimeter for one second (a total absorbed energy of 1,000 joules per square centimeter) would melt a metal surface a few millimeters thick. To deposit that much energy, however, an infrared laser would have to provide about 20,000 joules per square centimeter, since most of the energy would be reflected by the target.

A laser that sends out its energy in brief but powerful pulses might reach an instantaneous intensity of a million watts per square centimeter, even though the average power would be much lower. The surface of a target struck by such pulses would rapidly lose its shininess, and the fraction of the beam's energy absorbed would increase with each pulse. It is therefore possible in principle to burn a hole in a target with a pulsed laser beam.

When the target is in the atmosphere, a beam intensity of roughly 10 million watts per square centimeter would cause the air immediately in front of the target to ionize, creating a layer of plasma where the beam strikes the surface. The plasma would absorb the energy of the beam and grow incandescently hot (to about 6,000 degrees Celsius). The plasma would rid itself of this energy in two ways: by emitting ultraviolet radiation and by expanding explosively. These two mechanisms could increase the proportion of the beam energy coupled to the target to about 30 percent and thereby reduce the amount of energy the laser would have to generate.

A pulsed beam of extreme intensity could evaporate the metal at the surface of the target. The evaporated metal would fly away from the surface at a high velocity, and its momentum would be balanced by an equal and opposite momentum impinging on the target. The impulse generated in this way could tear or crack a metallic target.

From the physics of these effects it is possible to arrive at a good estimate of the capabilities a laser weapon would need in order to carry out a particular mission. The mission I should like to consider in some detail is that of an orbiting laser weapon intended to destroy enemy intercontinental ballistic missiles during their boost stage. Although this mission is the most remote application of laser weapons in terms of development time and practicality, it is conceptually the most interesting mission. It is also the one most often mentioned in public discussions of laser weapons.

The missile-defense lasers would be deployed on satellites in orbits some 1,000 kilometers above the earth. At this altitude a satellite would be within striking distance of launching sites in the U.S.S.R. for only a short period during each orbit. To ensure that at least one satellite would be within range at all times the total force would have to include about 50 satellites. A single satellite would have to be capable of destroying an entire force of perhaps 1,000 missiles during the boost stage, which lasts for about eight minutes. Therefore the satellite could devote about half a second to each missile.

My colleagues and I have found that an efficient damage mechanism for a ballistic-missile interceptor would be to crack the surface of the missile by impulsive loading. Cracking would result from the absorption of about 1,000 joules per square centimeter during each of several brief pulses. The energy would be delivered by a beam with an intensity at the target of about a million watts per square centimeter and a pulse duration of a few hundred-millionths of a second. Laboratory experiments indicate that about 10 pulses would be needed to punch a hole in the missile.

How much energy must such a laser develop? Assume that the weapon is a pulsed hydrogen fluoride laser and its beam-directing mirror is optically perfect and measures one meter in diameter. Since only about 10 percent of the light that strikes the target is absorbed and contributes to the damage, the laser must deliver 10,000 joules per square centimeter per pulse at the target. The area covered by the beam 1,000 kilometers away would be about the same as the area of the mirror: almost 8,000 square centimeters. To achieve an energy flux of 10,000 joules per square centimeter over this area the total energy of the beam would have to be almost 80 million joules per pulse. If the pulses were to last for roughly 100 microseconds, the power of the laser would be almost a million megawatts, which is quite unattainable. (A large commercial power station has a generating capacity of a little more than 1,000 megawatts.)

A lesser amount of absorbed energy from a continuous laser beam might damage a distant target by melting a hole in its skin instead of fracturing the skin. For example, an aluminum skin two millimeters thick would melt when it had absorbed about 400 joules per square centimeter. If the reflectivity of aluminum is assumed to be 90 percent, a 100-megawatt carbon dioxide laser would need about 100 seconds to inflict such damage on a target 1,000 kilometers away. This rate of damage is clearly inadequate, since the laser weapon has only half a second at best in which to deal with each rising missile.

One way of alleviating these difficulties might be to enlarge the pointing mirror. With a mirror four meters in diameter a 100-megawatt hydrogen fluoride laser could damage the target by melting in about a second. Making such a mirror sufficiently rugged and of the necessary optical quality, however, is beyond the technical capabilities of the U.S. or any other nation. There are scant prospects for constructing an optically precise four-meter mirror.

The fuel requirements of a laser-weapon system represent another insurmountable obstacle. Even if the laser itself and its energy-staging system op-

ATMOSPHERIC INTERFERENCE could deflect or reduce the intensity of a laser beam being propagated through the air. The beam would be absorbed by particulate matter and scattered by dust, smoke and water droplets; even molecules of the air could absorb and scatter the beam. Thermal blooming results from heating of the air in the beam, creating a region of low density that causes the beam to diverge. Turbulence leads to local variations in both density and refractive index that would deflect and diffuse the beam unpredictably. Very intense laser light could ionize molecules of the air, creating a plasma that would absorb and thereby interrupt the beam.

erated with perfect efficiency, such a continuous-wave hydrogen fluoride laser would consume some 660 kilograms of fuel for each missile destroyed. In order to shoot down 1,000 missiles, then, each satellite would have to be supplied with 660 metric tons of fuel, which represents about 20 loads for the U.S. space shuttle. The 50 satellites needed to ensure continuous coverage of Russian launching sites would require 1,000 shuttle flights for their energy stores alone. Four shuttle craft, each making two trips per year, would take 125 years to deliver the fuel.

The assumptions that underlie this discussion of a hypothetical missile-defense system are unrealistically optimistic. It should be pointed out first that a 100-megawatt hydrogen fluoride laser does not exist, and there is no indication that such a device could be developed in the foreseeable future. Furthermore, the efficiency of the laser and of the energy-staging system will never approach 100 percent. The efficiency of existing lasers is a few percent, and it might someday attain 30 or 40 percent. An energy-staging system can at best reach 30 percent efficiency. Hence the total energy store for each satellite would have to be increased by a factor of at least 10 and more likely 30.

It is conceivable that a laser weapon suitable for deployment in space could eventually be constructed. Even so, I doubt that it could be exploited successfully because it would be vulnerable to a number of relatively simple and inexpensive countermeasures. During the long time it would take to assemble each platform in space the system would be extremely vulnerable to attack by an antisatellite weapon exploded nearby. Even a completed network could be temporarily incapacitated at crucial times by blinding its sensors, by jamming its communications or by confusing its detection and tracking system.

The other conceivable use of a space-based laser weapon is as an antisatellite system. The practicality of the concept is highly questionable. In the first place satellites in orbit are already vulnerable to explosive weapons, which can be placed accurately in space or even made to home in on a warm object in orbit. A

space-based antisatellite laser would itself be vulnerable to the same weapons. The laser system would also be complex and fragile and therefore expensive and difficult to maintain. It is highly unlikely that antisatellite lasers will ever become more cost-effective than mechanical satellite killers launched from the earth.

I turn now to the potential of high-energy lasers as weapons operating in the earth's atmosphere. Missions such as the protection of aircraft and ships from enemy missiles and the destruction of enemy aircraft might in principle be carried out by a laser weapon. Several weapon systems that can accomplish the same tasks already exist, however, including supersonic self-guided missiles and rapidly firing cannon. The question, then, is whether a laser would be a superior weapon. Could it provide such short-range protection more cheaply or more effectively?

The first thing to consider is the physics of the propagation of a laser beam in the atmosphere. I have already described blooming, absorption and atmospheric ionization. Blooming and absorption alone would reduce the intensity of an infrared laser beam by a factor of from 100 to 300 over a distance of five kilometers. If the size of the beam at the target is about equal to the size of the transmitter mirror, the intensity of the beam at the mirror would have to be from 100 to 300 times what it is required to be at the target. From this requirement another arises: if the laser light is to destroy the target without damaging the mirror, the mirror must be from 200 to 300 times more reflective than the target. If the opponent protected his missiles or aircraft with a reflective coating, however, the target would be almost as shiny as the mirror.

One could attempt to overcome this difficulty by building a large mirror that could focus the laser beam on a target a few kilometers away. The cross section of the beam at the target would then be smaller than the cross section at the mirror. This solution is impractical, however, because a mirror much larger than a meter in diameter is awkward to operate and point and is vulnerable to simple projectiles. Moreover, very large focusing mirrors would be ineffective because atmospheric turbulence would disturb and defocus a wide beam. An effort to build more reflective mirrors and to cool them could be countered by painting the target missiles with several coats of an ablative material that would burn off and carry away most of the incident energy from the laser beam. In a contest between improved lasers and countermeasures the laser is at an intrinsic disadvantage, since even in good weather the atmosphere works against it.

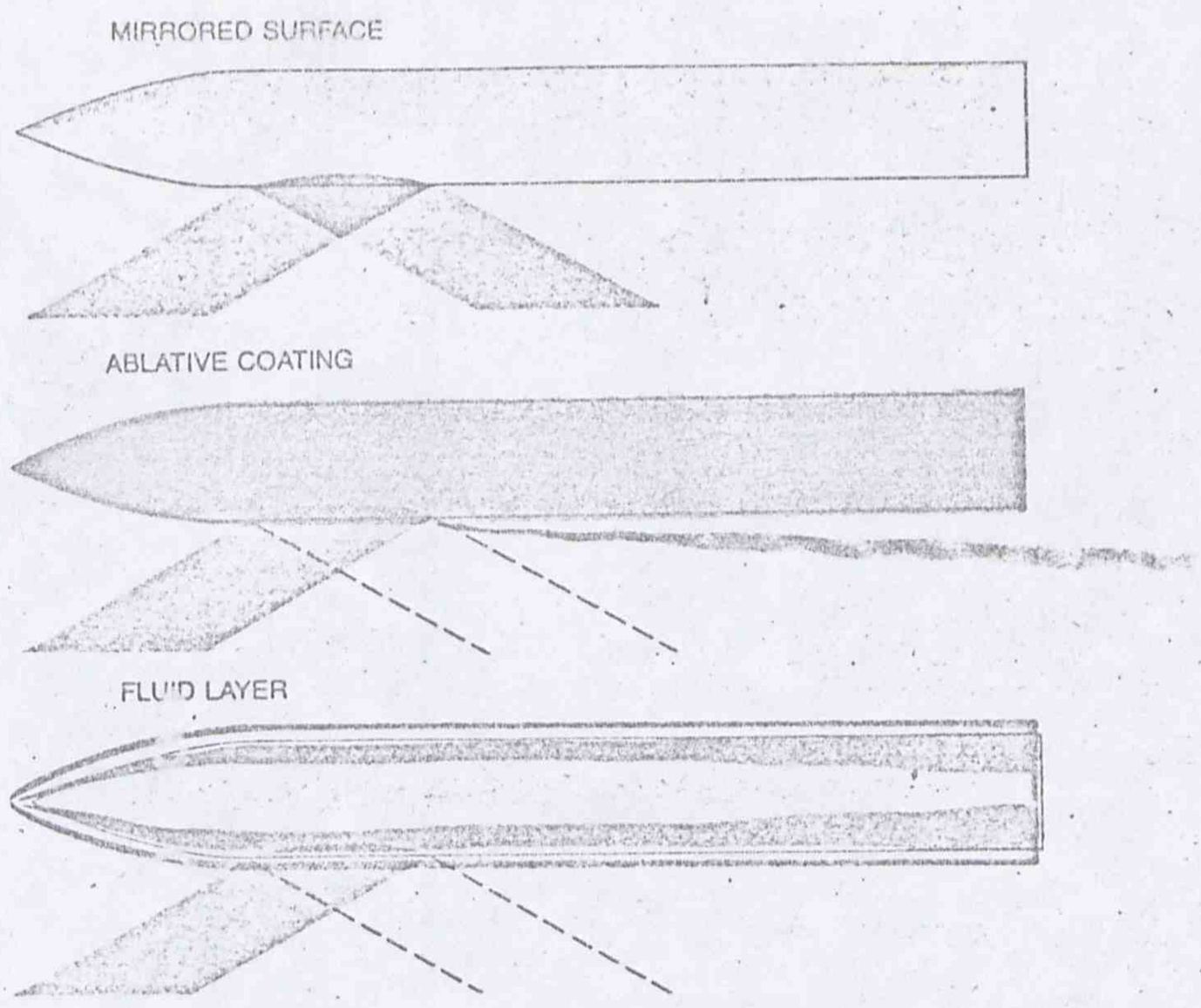
Another tactic for a laser weapon engaged in defense against missiles would be to wait until the target was only about a kilometer away before attacking it with a laser. The intensity of the beam would then be degraded by a factor of about 10 instead of 300, and a reasonably reflective mirror could perhaps withstand the energy flux required to destroy the target. The weakness of this plan is a lack of time. A missile approaching at, say, twice the speed of sound covers the last kilometer of its flight in about 1.5 seconds. A laser weapon would not have enough time to engage more than one attacking missile. In the same length of time a rapidly firing cannon could direct several explosive shells at the target.

Even though laser light travels almost a million times faster than an ordinary projectile, a laser weapon would have no intrinsic operational advantage over a fast-firing cannon for close-range protection from missiles. On the contrary, the laser has several disadvantages. An attacking missile can be protected from laser light (particularly a continuous-wave beam of low intensity) by a thin film of a substance that is constantly excreted at the nose of the missile to absorb the energy of the beam and carry off the heat. Another defense would be to make the missile rotate so that it spread out the heat over the entire surface area. Furthermore, even over a range of one kilometer bad weather can completely neutralize a laser weapon.

A final consideration is that the process of detecting and tracking a target is more demanding with a laser weapon than it is with other defensive weapons, since the beam must actually hit the target if it is to have an effect. The standard of accuracy for the tracking system of a cannon that fires projectiles is much less stringent, particularly if the projectiles carry an infrared seeker that enables them to home in on the target.

On balance, then, laser weapons operating in the atmosphere offer no clear advantage over existing weapons for close-range defense. In addition they can be impeded by weather, they cannot operate effectively beyond a range of a few kilometers, they are easier to neutralize by countermeasures than ordinary projectiles or supersonic missiles and they require a much better tracking system. Under these circumstances it is difficult to see how the development and deployment of such fragile, complex and expensive weapons would improve the military capability of a nation.

It does not necessarily follow that research on high-energy lasers has no worthwhile objectives. Although lasers are decidedly unpromising as weapon systems, they may have valuable applications in industry, particularly in chemical engineering and in energy systems based on nuclear fusion. For these reasons rather than for unrealizable military applications the U.S. would do well to continue research on the many aspects of the technology of high-energy lasers.



DEFENSIVE MEASURES could protect a missile from the effects of laser light at small cost. The most obvious approach is to make the surface of the missile highly reflective so that little of the light is absorbed. Alternatively the missile could be covered with an ablative coating, which would burn off and so carry away the energy of the laser radiation. A layer of fluid continuously secreted from the nose of the missile would have the same effect. The missile could also be made to spin, thereby spreading the energy of the beam over a larger area.

SECRET

10 DOWNING STREET

From the Private Secretary

19 January, 1981.

The Prime Minister has seen and taken note of your letter to me of 14 January about directed energy weapons.

I am sending a copy of this letter to David Wright (Cabinet Office).

M. O'D. B. ALEXANDER

Jonathan Dawson, Esq.,
Ministry of Defence.

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3

MINISTRY OF DEFENCE
MAIN BUILDING WHITEHALL LONDON SW1

Telephone 01-~~930 7022~~ 218 2111/3

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(2)

14th January 1981

Prime Minister

Sooner or later there will be a breakthrough in research on these weapons and it is important that we keep track of what is happening. The implications for e.g. Trident could be considerable. For the moment, however, nothing startling appears to be imminent.

MJ 15/1

Dear Michael,

You asked for further information about directed energy weapons in the light of recent press reports. We too had noted recent reports indicating that the incoming US Administration was likely to place greater emphasis on the possibilities of developing directed energy weapons and that plans were being prepared to spend more money to this end. For convenience I attach a copy of the report by Reuter's Washington Correspondent in The Times of 7th January and articles in the New Scientist of 1st and 8th January 1981. Our view remains essentially the same as already reported to you and there is little to add by way of detail or comment to the papers included with Brian Norbury's letter of 6th June 1980 and his earlier letter of 28th January. We can well understand why the Americans have become concerned, given the prospect of a Soviet First Strike capability against their Minutemen, and we can expect for some time to come that anyone with ideas on how to counter the Soviet threat will receive some attention, even if the ideas subsequently fail to stand up to examination. (In his letter of 28th January 1980 Brian Norbury has already referred to the important international treaty aspects to the deployment of such weapons, and I will not go over the ground again here).

You also asked for our detailed views on specific points mentioned in your letter of 16th April last year in addition to those already discussed in the earlier correspondence. Allowing for the difficulties of preparing the record which you mentioned, we believe that General Keegan himself may have mixed up some of his facts, especially in relating to accelerators for particle beam weapons. Certainly the description attributed to him of the "self-resonating collective generator" does not make complete sense.

M O'D B Alexander Esq
10 Downing Street

SECRET

It is true that the Lawrence Livermore Laboratory in California has for some time been engaged in accelerator development, first under Navy auspices and more recently using funds provided by the Defence Advanced Research Projects Agency (DARPA). The so-called "Chair-Heritage" programme was aimed at the demonstration of an auto-resonant collective accelerator which made use of a travelling-wave concept but did not embody lasers as a source of carrier waves or in any other way. Another possibility, (which was attributed to the USSR by Aviation Week and Space Technology on 28th July 1980) could be to use a carbon dioxide laser to 'burn a hole' through the atmosphere through which a charged particle beam might be propagated. (This is not, however, the usual concept of a carrier wave.) Other types of accelerator are being investigated at Livermore. They will all depend for their technical success on being able to project a beam of neutral particles and, contrary to General Keegan's view, they are likely to be of use only in outer space or other conditions where there is a very low atmospheric pressure, approaching conditions of vacuum.

At Los Alamos, under a Dr Knapp, research work is continuing on a space-based system. We believe that the energy/density striking a target could conceivably be worked up to values which would cause significant damage, but this would only be after many years of development and the expenditure of much more than the $50 million quoted by General Keegan.

It is also true that the US Department of Energy has an interest in developing technologies which would be suitable for particle beam weapons and there has indeed been a "task force" (rather than a committee of investigation) under the auspices of the US Department of Defense. The task force was led by a Dr Franken of the University of Arizona with the bulk of its membership drawn from Universities and Research Institutes.

As for the articles in New Scientist and in The Times, the first (in New Scientist dated 1st January) draws on the findings of a team at the Massachusetts Institute of Technology which has in the past examined the prospects for particle beam weapons - and with much the same conclusions as we have already drawn. (The title of the New Scientist article perhaps gives a misleading impression of the substance of the article.) The Times article of 6th January gives only part of the story about the proposed test of a pointing and tracking system for a laser damage weapon using the

Space Shuttle. If the US is ever to consider seriously deploying laser damage weapons in space, a successful demonstration of pointing and tracking is probably the most important single element. This test has been public knowledge for some time. An article in Aviation Week last summer referred to it and, equally important, explained that the laser to be used was of modest power - certainly not in the class required to destroy a hard target such as a ballistic missile. It is worth noting that the test has now slipped back from 1985/86 to 1986/87. Of more immediate interest is the series of trials due to start this month on an airborne laser mounted in a converted KC135 tanker aircraft.

As for the second New Scientist article (of 8th January) you might note the references to strategic risks and to pulling together the High Energy Laser research effort in the US Department of Defense. (You might also note, in the context of his role on the Congressional Sub-Committee on Science, Technology and Space, that Senator Harrison Schmitt has Los Alamos within his state).

Finally, I should tell you that Dr Richard Airey, a co-ordinator of a significant part of the US Department of Defense Laser Damage Weapon programme, visited the Ministry of Defence last October. He announced that no application had yet been found for laser damage weapons, although all the US Armed Services - the Navy and the Air Forces especially - continue to be very interested. For our part we continue to have an exchange of information with the United States on laser damage weapons technology. This excludes formal access to strategic considerations but we do from time to time pick up information which is valuable to us on an informal basis. Perhaps we could keep you posted of significant developments in this field.

I am copying this letter to David Wright (Cabinet Office).

Yours sincerely

(J D S DAWSON)
Private Secretary

THE TIMES 7 JANUARY 1981

US space shuttle to test laser weapons

From Christopher Hanson
Reuter Correspondent
Washington, Jan 6

An early mission for the United States space shuttle will be testing an aiming device for a space-based laser weapon that could be used to destroy Soviet nuclear missiles, sources close to the project said today.

Under a project code named "Talon Gold", the shuttle—a reusable space ship—will test a "pointing and tracking" system vital for the development of laser weapons in space.

The laser test is only one example of the military role for the shuttle, scheduled to make its first flight in March, informed congressional sources said.

The Defence Department wants to speed up research and development on space lasers after concluding that the Soviet Union is striving to perfect such weapons.

Congressional sources said President-elect Ronald Reagan's defence aides wanted even quicker deployment of the lasers. The sources said lasers appealed to Mr Reagan because they would give defence against a Soviet attack designed to knock out United States nuclear missiles before they get off the ground.

Tests on a "pointing and tracking" system were vital, according to technical literature on the subject, because the space-based laser must be able to attack missiles hundreds or thousands of miles distant. The laser ray would in theory bore a hole into a missile's hull, causing it to disintegrate in flight.

The Russians and the Americans are already testing laser weapons in the earth's atmosphere, according to government officials. But United States specialists were recently ordered to focus on laser deployment in space.

Some defence analysts believe that later versions of the stubby-winged shuttle, roughly the size of a DC9 airliner, will be armed with laser weapons to enable them to attack satellites or to engage in space battle.

The shuttle could also be used to construct laser-armed space battle platforms to protect satellites from enemy attack.

The Pentagon denies that the shuttle would be used against Soviet satellites.

Some defence analysts are worried that laser deployment could result in an attack on a surveillance satellite being misread as the prelude to a nuclear missile attack and lead to an all-out nuclear war.

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National Aeronautics and Space Administration (Nasa) officials are also concerned that the military is anxious to wrest control of the shuttle from the civilian administration.

Nasa sources said they were concerned at recent statements by defence officials criticizing Nasa for delays in the shuttle launch and suggestions that another government body should take over the shuttle.

The first space shuttle was removed from its storage hangar last week and moved to a launch pad at Cape Canaveral, Florida.

It is scheduled to blast into space with the aid of booster rockets, and reenter the earth's atmosphere piloted by astronauts who will land it on a runway.

This week

No future for laser weapons in space

Satellites blasting each other out of existence with high-energy lasers may be fine for *Star Wars*—but, says a report published just before Christmas, they are not technically feasible in the real world. The report—by M. Callaham and K. Tsipis from MIT—pours cold water on the idea that laser weapons on satellites could be a valuable addition to the armouries of the world's superpowers. However, the report is more sanguine about the chances of laser weapons mounted in aircraft or on the ground—even though these are likely to be very expensive and likely to go wrong.

According to Callaham and Tsipis, the US is spending $200 million a year on developing high-energy lasers as weapons. The USSR is also making substantial efforts in this area. They say that technical progress on several fronts—lasers, the optics needed to guide laser beams, tracking devices to follow targets and cheap space transport to launch the satellites—make laser weapons theoretically possible.

But the report is sceptical about the chances of laser weapons on satellites being deployed in the next few decades. "Many of the required systems are not technologically available now, nor would they be accessible in the next decade or two," say Callaham and Tsipis. "Even if eventually they could be developed, the cost of emplacing and supplying and maintaining them would be prohibitive, they would be fatally vulnerable during their embryonic stage, and even if emplaced and operational, most probably they could be defeated by the active and passive countermeaures and tactics of a determined opponent".

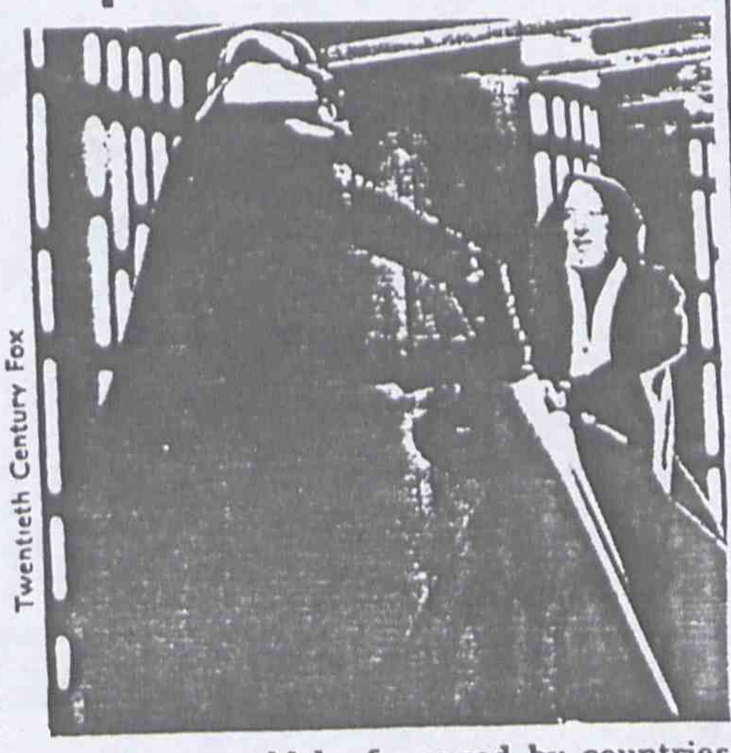
These frailties arise mainly because a country would have to lift huge amounts of equipment into space to build satellites carrying laser weapons. Vehicles similar to the space shuttle would have to carry at least 100 tonnes of equipment into space for each laser satellite. And any country serious about laser weapons would have to build several hundred such satellites. (Each satellite would cost as much as $12 000 million.) It is hardly likely that adversaries would not spot all this activity and do something about it.

Once in orbit, laser weapons could easily be jammed—for example, by blinding them with beams of laser light or by transmitting false instructions to them, telling them to fire at the wrong time or the wrong target.

Lasers on the ground and mounted in in aircraft are, however, different propositions. Lasers mounted on aircraft for shooting down enemy aeroplanes would be easier to develop because their targets are relatively slow moving. There are, however, two problems. Such lasers would be very expensive—more than $20 million each—and equipment for tracking targets is not yet good enough to be used with lasers.

Lasers fired from the ground—either at aircraft or missiles—could be relied on only in good weather. Clouds, dust or other molecules in the atmosphere deflect laser beams and make them unreliable over long distances. On the other hand, laser weapons on the ground are fairly secure from attack and easy to maintain and supply.

But the report points out that such



Twentieth Century Fox

weapons would be favoured by countries that want to attack without provocation—because only they can wait for good weather before striking. Thus: "The motives of those who advocate weather-dependent weapon systems should be questioned".

Laser weapons in space would, Callaham and Tsipis say, threaten the peaceful exploitation of space. For example, future solar power satellites, which would beam vast amounts of energy from the Sun to Earth (possibly by turning this energy into laser beams), may involve similar technologies to laser weapons. If the USSR feels that the US is investigating laser weapons, it will insist on inspecting peaceful space projects. □

This week

US report calls for research on laser weapons

Christopher Joyce, Washington DC

The United States should aggressively accelerate its research into the sizzling new realm of high-energy laser weaponry, according to science and defence analysts in Congress. Recent press accounts suggest that incoming President Ronald Reagan is all for the idea.

After compiling testimony from 27 scientists and military specialists, the Senate Commerce and Transportation Committee has concluded that lasers could move the superpowers into a "post-nuclear" era and dramatically shift the balance of power. But it adds in a brief but straightforward report that the US government isn't doing enough to bring "Buck Rogers" weaponry down to Earth. This report comes hot on the heels of a report from the Massachusetts Institute of Technology (MIT) claiming that laser weapons have no future in space (*New Scientist*, 1 January, p 3).

Low-power (less than 20 kW output) laser research since 1960 has contributed more than any other field to improving military hardware, the committee's report states. Low-energy lasers are now used for weapons guidance, laser radar, chemical and exhaust detection, and communications, to name just a few applications. But attention to high-power laser (more than 20 kW output) weaponry—that commonly and fancifully associated with duelling spaceships and crackling ray-guns—has lagged, in large part because the scientific community can't agree on whether such weapons are, first, feasible, and, secondly, worth the billions they undoubtedly will cost to develop.

Analysts on the committee's staff argue that no scientific principles stand in the way of lasers that can stop an ICBM, tactical missile, plane or satellite in its tracks. All that is needed is ▶

▶ enough money. The report notes that the US government is now spending less than $200 million a year on designing high-energy laser weapons, while the Soviet Union is reportedly spending three to five times that much.

According to press reports, President-elect Reagan has already expressed to Senator Harrison Schmitt a "strong interest" in developing a laser anti-ballistic system. Schmitt, a New Mexico Republican and former astronaut, will soon take control of the strategic congressional subcommittee on science, technology and space, and he joined in gathering the data for the committee's laser report.

Los Alamos is in N.M.

Past laser research efforts have been fragmented among the typically competitive branches of the armed services and the defence advanced projects agency, with no cohesive research and development strategy, says the report. It recommends doubling the budget for research on high-energy laser systems by 1983, establishing a single office with the defence establishment for laser weapons, and pursuing the technology at an "unrelenting" pace. The report observes that "the future strategic posture of the nation hangs in the balance. High-energy laser technology development and weaponisation could tip the balance in our favour."

Though given short shrift in the committee's report, satellites carrying lasers capable of shooting at other satellites or down at ICBM's are another part of the Defense Department's blueprint for space-age weaponry.

Deployment in space, however, raises strategic risks that might not be worth taking, according to the recent MIT study. The MIT report observes that a satellite laser system could cost up to $100 billion and would be a sucker for "decoy" launchings of ballistic missiles. It would probably also be subject to immediate attack, and might provoke an all-out-war should it be seen as an offensive weapon. □

SECRET

VLB

FILE

Defence 2

5 February 1980

Military Uses of Laser Technology in Space

The Prime Minister has read your letter to me of 28 January on this subject. She has made no comment.

I am sending copies of this letter to George Walden (FCO) and David Wright (Cabinet Office).

M ALEXANDER

B. M. Norbury, Esq.,
Ministry of Defence.

SECRET

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MINISTRY OF DEFENCE
MAIN BUILDING WHITEHALL LONDON SW1

Telephone 01-~~930 7022~~ 218 2111/3

MO 18/3/8

28 January 1980

(This arose from a reference in 'Transatlantic Security'.)

Dear Minister,

MILITARY USES OF LASER TECHNOLOGY IN SPACE

In your letter of 28th December, to which I am sorry not to have sent an earlier reply, you asked for assessments of the likelihood that lasers could be used in space, specifically in an ABM role; and of the present state of Soviet research.

From the work done so far on high powered lasers in the western world we know that a laser of adequate power can be made to operate on an experimental basis and can be pointed with sufficient accuracy at short ranges for long enough to cause damage to the most vulnerable parts of a guided weapon. There are, however, major practical difficulties to be overcome before such a system could be developed as an effective weapon, and while the possible use of such a laser in space in an ABM role is not ruled out, the earliest application we see is for self defence by naval vessels against air attack. Another would be to defend ground targets such as airfields.

In favourable weather the range of a Laser Damage Weapon at ground or sea level would be about 10 kilometres. Adverse weather such as fog and cloud can reduce this range by scattering the beam. High standards of engineering would be needed to ensure accurate aiming of the laser beam for the 2 or 3 seconds necessary to achieve significant damage to the guidance system of the attacking weapon. Also, because Laser Damage Weapons are not very efficient users of energy, large quantities of heat, of the order of a megawatt or more, and waste gases would have to be dissipated while a Laser Damage Weapon is operating. A naval ship or a stationary ground-based installation could be designed to do this, but it is as yet far from clear to Western eyes that such a weapon would be cost effective or offer any significant advantage. An installation in space would be more complex and probably highly vulnerable but because losses during propagation of the beam would be much reduced, it is possible to envisage an increase in operating range to perhaps 1000 kilometres. Again it is too early to say that such a system has any significant advantage to offer.

/The

M O'D B Alexander Esq
10 Downing Street

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The Soviet Union has been engaged for about 10 years in a research and development programme on Laser Damage Weapons. This work, funded on a scale comparable with the United States programme (which now runs at about $300M per year) has met with some success, particularly in developing high powered lasers. We are less certain about Soviet ability to track targets and to point and aim the laser beams with the accuracy recently demonstrated by the United States. The Russians are regarded as less advanced in techniques for reducing the size and weight of their high powered lasers, but against this we have to acknowledge their willingness and ability to engineer their equipment on a large scale if necessary.

We believe that most of the Soviet research and development work has been directed towards the use of Laser Damage Weapons for self defence by ships, large aircraft and important ground installations against air attack. A ground-based high powered laser system might also be used by the Soviets in an ABM role. We have some uncorroborated evidence that they have been examining the feasibility of locally heating part of the re-entry vehicle of a ballistic missile just before it re-enters the atmosphere, so as to m ake it unstable during re-entry and to miss the intended target. A ground-based laser system exists which might be intended for use in such a role but again I have to emphasise that there is a fair amount of uncertainty and speculation in this.

The most likely uses the Russians will have for high powered lasers in space are believed to be against satellites. There is already some supporting evidence but we are unlikely to see any substantial realisation of such a Laser Damage Weapon for the Soviet R & D programme before the 1990s.

The FCO may wish to offer comment, but I should add that the use of lasers in an anti-satellite or ABM role is limited by arms control agreements. The use of high energy lasers against satellites would contravene the 1967 Outer Space Treaty, while the ban in SALT I on interference with national technical means of verification would be violated by any action against satellites monitoring compliance with that agreement. Since 1978, the US and USSR have been engaged in bilateral negotiations to ban anti-satellite warfare. Under the ABM Treaty, the deployment of lasers in an ABM role (but not their development) is banned. Before lasers could be deployed for ABM purposes, the Parties would be obliged to consult and would probably have to amend the Treaty.

I am sending copies of this letter to George Walden (FCO) and David Wright (Cabinet Office).

Yours ever

Brian Norbury

(B M NORBURY)

CONFIDENTIAL

FCO
Defence
FCO (Arms Control + Disarmament Dept)
CW2 8AJ

10 DOWNING STREET

From the Private Secretary

28 December 1979

Dear Brian,

Military uses of laser technology in space

The Prime Minister has seen one or two references recently to the possible military use of lasers in space, specifically in an ABM role. I would be grateful if you could let me have an assessment of the likelihood that lasers can be used in this way and of the present state of Soviet research into the question.

I am sending a copy of this letter to Martin Vile (Cabinet Office).

Yours ever

Richard Alexander

Brian Norbury, Esq.,
Ministry of Defence.

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10 DOWNING STREET

Michael

Do you put this in? I think it from the publication "Transnational Security".

Steve

24/12/79

revival of IRD, in whatever form may be judged necessary and pending a resurgence of American will, is thus a necessity no less urgent than the acquisition of new weapons of mass destruction.

Please ask Professor Navias (MoD) about this ref →

Soviet pressures

2. Lasers in space

The alarming run-down of America's defences in recent years has given the Soviet Union a commanding lead in space lasers. Unless the US develops the will and allocates the resources to make up for lost time, America's retaliatory capacity against a Soviet first strike may well be neutralised in the 198Os.

Specifically, the Soviets are in the process of creating a prototype space laser capable of knocking out any land- or sea-launched ballistic missiles (ICBMs and SLBMs, respectively) or similar devices that rise to more than 5O,OOO feet. American scientists consider the coming breakthrough in laser technology to be as important as were the development of atomic and nuclear weapons and of ballistic missiles in their day.

In simple terms, the space laser is a high energy beam produced by chemical means which, in the vacuum of space, avoids the problems associated with the "closed" atmosphere. A central element in the technology is the use of highly polished mirrors finished by computer. Production of such mirrors is minuscule, and has indeed been described as virtually a "cottage industry". Recently, the Soviets are known to have bought mirrors of this type, some six metres in diameter, from France. The United States is working with much smaller mirrors.

When it is operational, the Soviet space laser is expected to have the capacity to deflect, pierce or explode missiles shortly

after they leave the atmosphere to enter into space; by then, they have reached a temperature of several thousand degrees.

Soviet advances in laser technology lend significance to the wording of Article IX of the SALT II draft treaty, under which the parties undertake not to develop, test or deploy, inter alia, "systems for placing into Earth orbit nuclear weapons or any other kind of weapons of mass destruction, including fractional orbital missiles" (sub-section c). A space laser (the death ray of science fiction) is not a weapon of mass destruction.

The Soviet space laser programme is due to become operational in the mid-198Os; the American programme lags about a decade behind on present indications. A major aspect of the Soviet lead is that it is going to make the American concept of Mutual Assured Destruction (the apt acronym for which is MAD) technologically obsolete in that space lasers will destroy the retaliatory capacity of the United States (or any other nation) to respond to a Soviet first strike. (Philosophically, the validity of MAD was short-lived anyway in that Soviet military theorists do not, as American theorists have done throughout the SALT talks, reject nuclear war on the ground that it is unacceptably destructive to both protagonists.)

Cruise myth soon obsolete and this not.

The myth of the invulnerability of the cruise missile will shortly be shattered, in that the Soviet SA-1O (a SAM ground-to-air missile) and an AWAC system of "look-down see-down" Radar, together with the MiG-25 Foxbat, will give the Soviets a capability of destroying a fair percentage of any American cruise missiles on their way to Soviet targets.