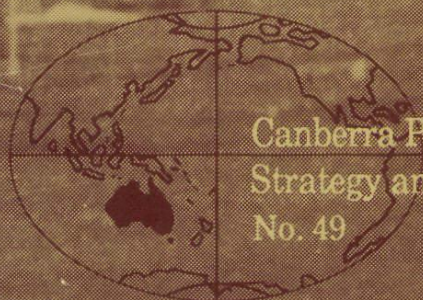


Australia and the Global Strategic Balance

Desmond Ball



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STRATEGY AND DEFENCE NO. 49**

AUSTRALIA AND THE GLOBAL STRATEGIC BALANCE

Desmond Ball

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ABSTRACT

This monograph provides a comprehensive account of the global strategic relationship between the United States and the Soviet Union and Australia's connections to this relationship. It describes the basic US and Soviet strategic nuclear policies and doctrines; assesses the current state of the strategic balance and provides some assessment of the likely state of the balance in the mid-1990s, as projected according to current trends and as it might look under some START regime; and provides a critique of Australia's involvement in the global balance.

(An earlier version of this monograph was prepared for a Conference on *Australia and the World: Prologue and Prospects*, organised by the Strategic and Defence Studies Centre, The Australian National University, Canberra, 6-9 December 1988.)

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CHAPTER 1

INTRODUCTION

The global strategic relationship between the United States and the Soviet Union, commonly referred to as the strategic balance, is fundamentally characterised by complexity, change and uncertainty. Change in the political dimension tends to be somewhat cyclical, with periods of detente and constructive dialogue interspersed with periods of tension, distrust and hostile rhetoric. With respect to the technological dimension, change has been continuous since 1945, albeit with variations in pace, direction, and net impact on strategic stability.

Within the Soviet Union, the political, economic and social reforms instituted by General Secretary Mikhail Gorbachev promise changes more fundamental in scope and implication than anything since Stalin's betrayal of the Lenin/Trotsky revolution half a century ago. The likely consequences of Gorbachev's efforts for the global strategic relationship are impossible to foretell. Should they succeed - and success is far from assured - they could produce a Soviet Union more satisfied with its place in the world, more concerned about the rectification of internal problems and inequities, and more interested in competing with the West in terms of economic and technological achievements rather than military prowess. Alternatively, a more robust economy and technological infrastructure could support a strategic challenge to the West which is more balanced and more difficult to contest.

In the United States, the George Bush Administration will pursue many of the policies instituted by the Reagan Administration but the necessity to confront the budget deficit will require substantial adjustments in trade policies and government expenditures. Significant real growth in US defence expenditure is unlikely through the next decade or so.

It is likely that the Strategic Arms Limitation Talks (START) between the United States and the Soviet Union will produce a major reduction in strategic nuclear delivery vehicles (SNDVs) and warheads of a scale and character quite unprecedented in the history of the US-Soviet nuclear competition. It is possible that arms control and

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disarmament with respect to nuclear weapons will proceed beyond the 50% reductions in certain categories already accepted in START, and perhaps even proceed to address nuclear weapons in other categories and theatres.

Technological research and development during the 1980s has been extraordinarily dynamic and fecund.¹ In the field of engines, propellants and power plants, advances range from small but highly efficient turbofan engines such as the 66 kg engine capable of carrying US cruise missiles with 170 kt warheads over distances of more than 3,000 km, to new fast-burn rocket propellants which enable large (around 200,000 kg) two- or three-stage ballistic missiles to burn out and deploy their re-entry vehicles (RVs) before leaving the atmosphere, to space-borne nuclear reactors capable of generating hundreds of kilowatts or even several megawatts of power. In the field of guidance and navigation systems, the Advanced Inertial Reference Sphere installed on the MX ICBM is currently capable of achieving a CEP of some 100 metres over a range of 11,000 km and promises a CEP of 75 metres by the mid-1990s, while long-range cruise missiles equipped with Terrain Contour Matching (TERCOM) and Global Positioning Satellite (GPS) systems should be able to achieve CEPs of less than 10 metres by the late 1990s. In the case of nuclear warheads, so-called third generation weapons are being developed which selectively enhance certain types of energy, such as electromagnetic pulses (EMP), neutrons, or microwaves,² as well as 'earth penetrating' warheads designed to penetrate several tens of metres of rock before detonating in order to destroy hardened underground missile silos, bunkers and command posts.³ New

1 See Desmond Ball, 'Technology and Geopolitics', in Ciro E. Zoppo and Charles Zorgbibe (eds), *On Geopolitics: Classical and Nuclear*, (Published in cooperation with the NATO Scientific Affairs Division by Martinus Nijhoff Publishers, Dordrecht, Boston, and Lancaster, 1985), pp.171-199.

2 Theodore B. Taylor, 'Third-Generation Nuclear Weapons', *Scientific American*, (Vol.256, No.4), April 1987, pp.22-31.

3 Warren Strobel, 'U.S. To Make Nuclear Bomb That Burrows', *Washington Times*, 12 September 1988, p.1; and Tim Carrington, 'Carlucci Orders Move for Development of "Earth-Penetrating" Nuclear Weapon', *Wall Street Journal*, 13 September 1988, p.5.

command, control, communications and intelligence (C³I) systems include communications systems operating at both the extremely low frequency (ELF) and extremely high frequency (EHF) ends of the radio spectrum; various mobile command posts (MCPs) and satellite ground terminals (MGTs); and more sophisticated real-time digital imaging electro-optical satellite photographic intelligence systems (such as the KH-12 Ikon) and geostationary signals intelligence (SIGINT) satellite systems (such as the MAGNUM and MENTOR satellites), and new radar satellites (such as the recently-launched LACROSSE system). With respect to strategic defence technologies, the US Strategic Defense Initiative (SDI) has failed to realize President Reagan's vision of making ballistic missile obsolete,⁴ but it has prompted the more rapid development of various new directed energy and kinetic energy weapons techniques, very high speed data processing systems, and ground- and space-based sensor systems, as well as enhancing anti-satellite (ASAT) capabilities.

Australia's security is inevitably affected by these developments in the global strategic relationship. Our somewhat remote and isolated position on the globe notwithstanding, we have an interest in the stability of the strategic balance and the prevention of strategic nuclear war. And our move to a more self-reliant defence posture notwithstanding, we remain part of the Western alliance. More directly, the US communications, early warning and SIGINT satellite ground control facilities in Australia have a significant role with respect to the global strategic balance; these facilities would be likely nuclear targets in the event of a strategic nuclear exchange; and, at least according to some arguments, the hosting of these facilities provides Australia with some leverage over US strategic policies.

This monograph describes the basic US and Soviet strategic nuclear policies and doctrines; assesses the current state of the strategic balance and provides some assessment of the likely state of the balance in the mid-1990s, as projected according to current trends and as it might look under some START regime; and provides a critique of Australia's involvement in the global balance.

⁴ President Reagan, 'Eliminating The Threat From Ballistic Missiles', National Security Decision Directive No.85 (NSDD-85), 25 March 1983.

CHAPTER 2

SOVIET STRATEGIC NUCLEAR POLICY AND DOCTRINE

The most fundamental objective of Soviet strategic policy, as of US strategic policy, is the deterrence of nuclear war:

War with the employment of nuclear weapons can undermine the very foundation for the existence of human society and inflict tremendous damage to its progressive development. Therefore, the most important requirement for progress in our time is the prevention of a new world war.¹

However, unlike US strategic policy, the Soviet view of deterrence involves neither the notion of 'assured destruction' or 'unacceptable damage', nor that of limited or controlled nuclear options.² Rather, deterrence of nuclear attack is best achieved by the ability to successfully wage a nuclear war - the better the Soviet forces are equipped and trained to fight a nuclear war, the more effective they will be as a deterrent to a nuclear attack on the USSR. If deterrence fails, these forces will then be used purposefully and massively for military victory.³

1 B. Byely (ed.), *Marxism-Leninism on War and Army*, (Translated and published under the auspices of the United States Air Force, U.S. Government Printing Office, Washington, D.C., 1974), pp.9-10.

2 See Desmond Ball, 'Soviet Strategic Planning and the Control of Nuclear War', in Roman Kolkowicz and Ellen Propper Mickiewicz (eds.), *The Soviet Calculus of Nuclear War*, (Lexington Books, D.C. Heath and Company, Lexington, Massachusetts, 1986), pp.49-67.

3 For fuller discussion of Soviet strategic doctrine, see Benjamin S. Lambeth, 'The Sources of Soviet Military Doctrine', in F.B. Horton, A.C. Rogerson, and E.L. Warner (eds.), *Comparative Defense Policy*, (Johns Hopkins University Press, Baltimore, 1974), pp.200-216; Benjamin S. Lambeth, *Selective Nuclear*

Soviet discussions of nuclear war invariably stress the importance of the initial nuclear strikes and of seizing the initiative in those strikes. As Marshal Moskalenko wrote in 1969:

In view of the immense destructive force of nuclear weapons and the extremely limited time available to take effective countermeasures after an enemy launches its missiles, the launching of the first massed nuclear attack acquires decisive importance for achieving the objectives of war.⁴

During the 1960s and 1970s the notion of anticipating and pre-empting the attack was pervasive throughout the Soviet literature. For example, a Soviet military text on *Marxism-Leninism on War and Army* stated that:

Mass nuclear missile strikes at the armed forces of the opponent and at his key economic and political objectives can determine the victory of one side and the defeat of the other at the very beginning of the war. Therefore, a correct estimate of the elements of the supremacy over the opponent and the ability to use them before the opponent does, are the key to victory in such a war.⁵

Another Soviet text on *Scientific-Technical Progress and the Revolution in Military Affairs* stated that:

One of the decisive conditions for success in an operation is the anticipating of the enemy in making

Options in American and Soviet Strategic Policy, (The RAND Corporation, Santa Monica, R-2034-DDR & E, December 1976); Benjamin S. Lambeth, *The Elements of Soviet Strategic Policy*, (The RAND Corporation, Santa Monica, P-6389, September 1979); and Benjamin S. Lambeth, 'Contemporary Soviet Military Policy', in Kolkowicz and Mickiewicz (eds.), *The Soviet Calculus of Nuclear War*, pp.25-48.

⁴ Cited in Joseph D. Douglass, Jr and Amoretta M. Hoeber, *Soviet Strategy for Nuclear War*, (Hoover Institution Press, Stanford, California, 1979), p.36.

⁵ Byely (ed.), *Marxism-Leninism on War and Army*, p.217.

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nuclear strikes, particularly against the enemy's nuclear missile weapons.⁶

It is clear, however, that Soviet political and military leaders must have been uneasy about reliance on preemption. Although the vulnerability of the Soviet strategic forces allowed the leadership little choice in the matter, the forces and the strategic C³I system which supported them were quite ill-suited to a preemptive posture. During the 1950s and 1960s, the KGB maintained physical custody of Soviet warheads and kept them separate from the delivery vehicles.⁷ The warheads and launchers were not mated even during the Cuban Missile Crisis in October 1962. Until the late 1970s, only a very small proportion of Soviet strategic nuclear delivery vehicles were held on alert - perhaps 25% of the ICBM force, 10% of the SLBMs, and none of the Soviet strategic bombers, or about 17% of the total number of Soviet SNDVs. Further, technical considerations - including missile fuelling procedures and the use of spin-axis ball-bearings in missile guidance systems⁸ - meant that the forces could not be held on alert 'for more than a short period of time' and hence the Soviets would 'have been reluctant to place their forces on alert unless they were certain a war was coming'.⁹ Yet until the 1980s, the Soviet Union lacked a reliable tactical warning and attack assessment system. The

6 Col.-Gen. N.A. Lomov (ed.), *Scientific-Technical Progress and the Revolution in Military Affairs*, (Translated and published under the auspices of the United States Air Force, U.S. Government Printing Office, Washington, D.C., 1974), p.147.

7 Stephen M. Meyer, 'Soviet Nuclear Operations', in Ashton B. Carter, John D. Steinbruner and Charles A. Zraket (eds.), *Managing Nuclear Operations*, (The Brookings Institution, Washington, D.C., 1987), pp.487-489; and Kurt Gottfried and Bruce G. Blair (eds.), *Crisis Stability and Nuclear War*, (Oxford University Press, New York and Oxford, 1988), pp.128-132, and 154.

8 Donald MacKenzie, 'The Soviet Union and Strategic Missile Guidance', *International Security*, (Vol.13, No.2), Fall 1988, p.36.

9 Marc Trachtenberg, 'The Influence of Nuclear Weapons in the Cuban Missile Crisis', *International Security*, (Vol.10, No.1), Summer 1985, p.158.

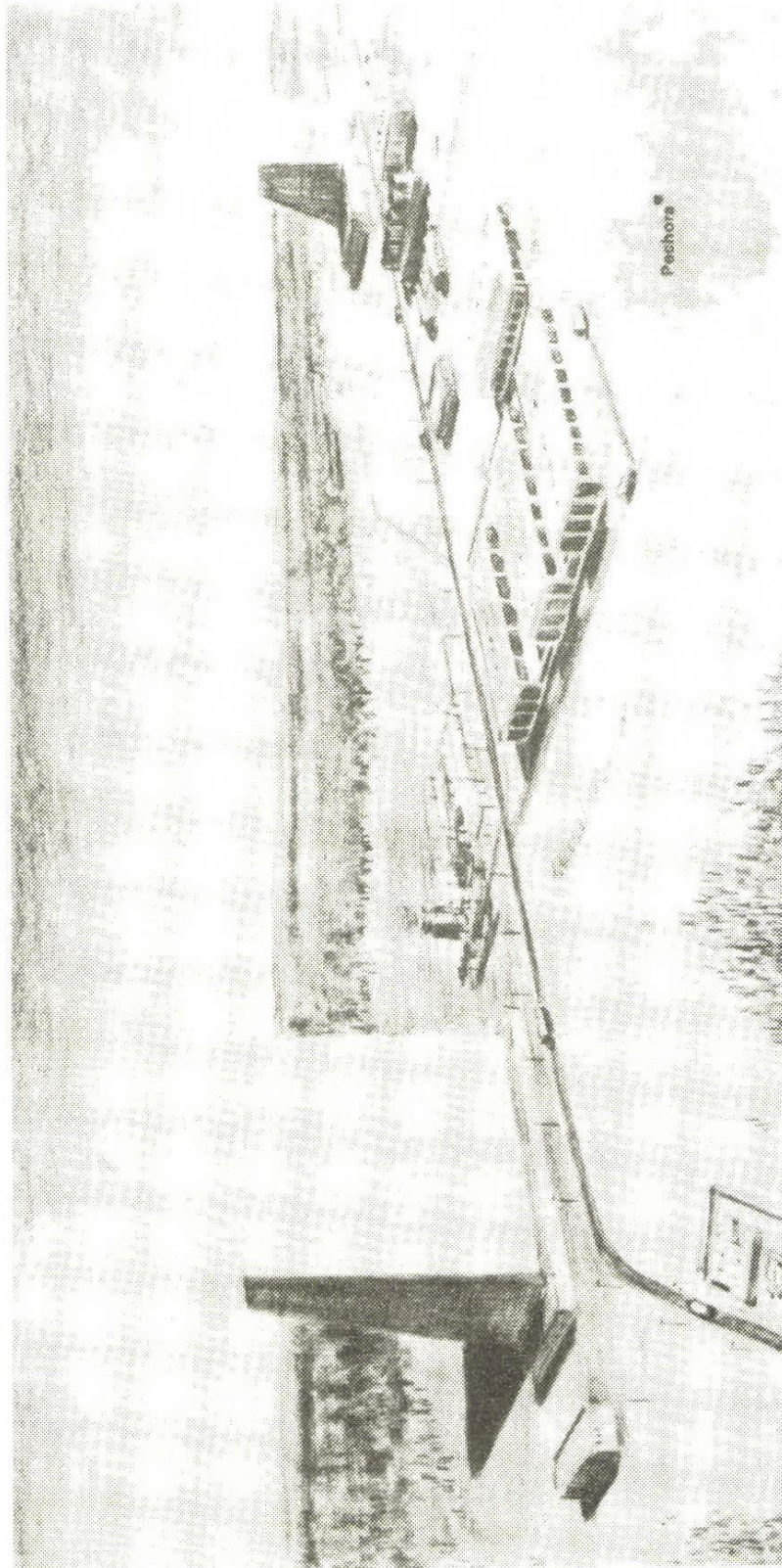
Soviet leadership was dependent upon strategic warning - and principally human intelligence (HUMINT) and signals intelligence (SIGINT) - for foreknowledge that war was imminent, but it could have had little confidence that these sources could have provided the assured, reliable, unequivocal and timely warning that would have been necessary for the Soviet forces to have been successfully employed preemptively.

Major changes to the Soviet strategic nuclear posture have been instituted since the mid-1970s, providing the Soviet leadership with further options beyond preemption. The day-to-day alert levels of the Soviet ICBMs and SLBMs have increased dramatically. Today, more than 80% of Soviet ICBMs, carrying more than 95% of Soviet ICBM-based warheads, and some 30-40% of Soviet SLBMs - or a total of some 7,200 warheads, or 65% of the total Soviet strategic nuclear warheads - are ready to be launched within a few minutes of a decision by the Soviet leadership.¹⁰ The Soviet tactical warning and attack assessment system has also been markedly enhanced. Three over-the-horizon (OTH) radars were built in the 1970s and a fourth has recently become operational, three of which are designed to provide 30 minutes' warning time of US ICBM launches. (The other one is designed to provide warning of Chinese ICBM launches.) In 1976, the Soviet Union began to deploy infra-red early warning satellites. An extensive network of modern large phased-array radars (LPARs) has also been deployed.¹¹ Although the attack characterisation and attack assessment capability of this system remains rather weak compared to that of the US strategic C³I system, there is little doubt about its capability to support massive launches in a Launch on Warning (LOW) or Launch Under Attack (LUA) mode. Moreover, a large segment of the Soviet ICBM force has been very extensively hardened since the mid-1970s. More than 800 ICBM silos (i.e. those housing the 139 SS-17s, 308 SS-18s and 360 SS-19s operational as at December 1987)

¹⁰ Meyer, 'Soviet Nuclear Operations', p.494.

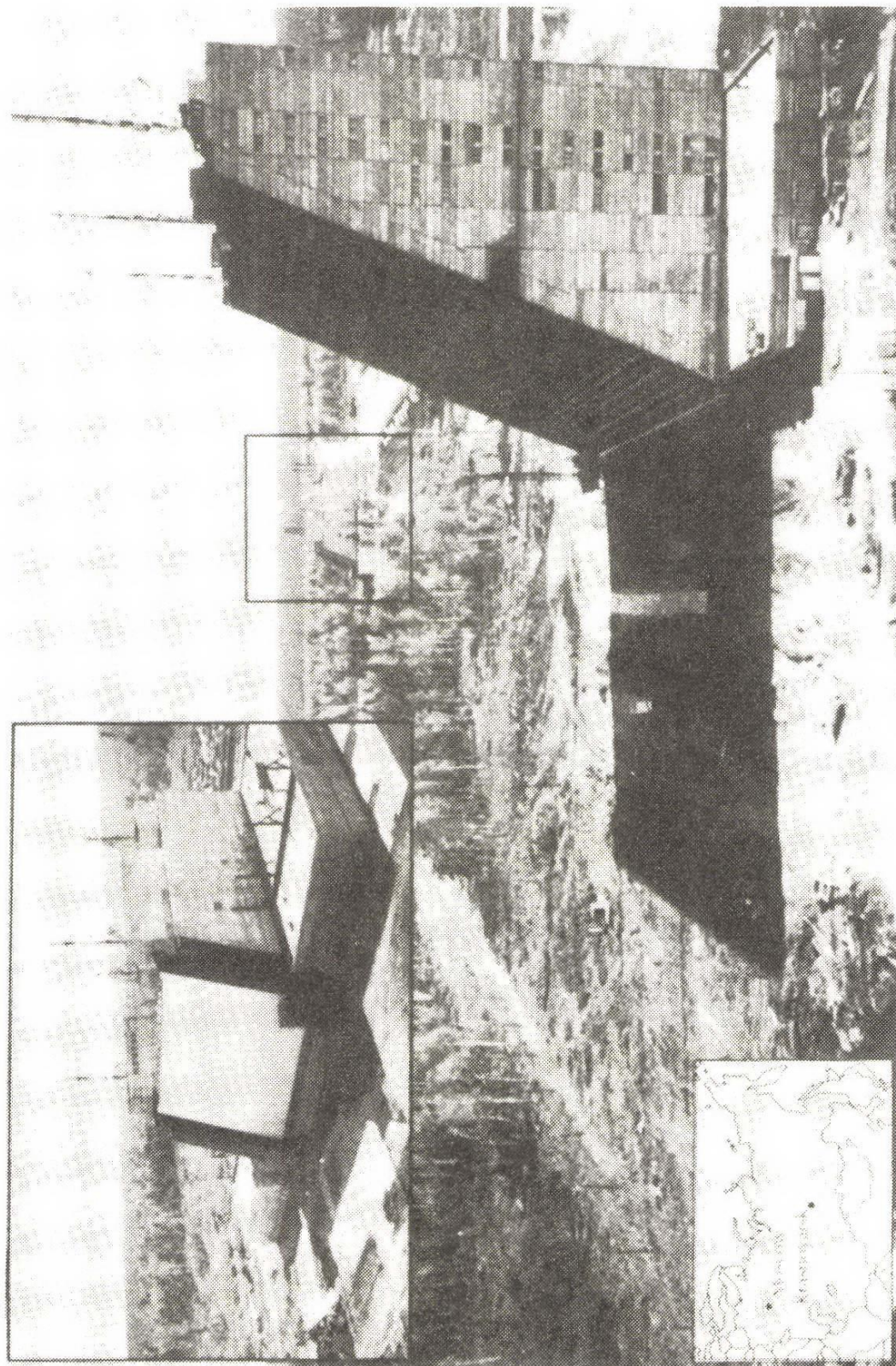
¹¹ See Desmond Ball, 'The Soviet Strategic C³I System', in Fred D. Byers (ed.), *The C³I Handbook*, (EW Communications, Inc., Palo Alto, California, First Edition, 1986), pp.206-216.

FIGURE 1
LARGE PHASED-ARRAY RADAR (LPAR), PECHORA



Source: US Department of Defense.

FIGURE 2
LARGE PHASED-ARRAY RADAR (LPAR), ABALAKOVA, NEAR
KRASNOYARSK



Source: US Department of Defense.

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have been rebuilt since 1972, and 'fully one-half of these silos have been totally reconstructed and hardened since 1980'.¹² It is likely that the 400 or so silos rebuilt during the 1970s can withstand some 4000 pounds per square inch (psi) of blast overpressure, while those rebuilt in the 1980s can withstand some 6000-7200 psi - or about three times that of US Minuteman ICBM silos.¹³ This represents an extraordinary investment, amounting to more than \$20 billion. Further investment has been expended on the development of the road-mobile SS-25 ICBM system and the rail-mobile SS-24 ICBM system, as well as on the construction of hardened pens for those ballistic missile submarines not on station in the protected bastions in the waters near Murmansk and in the Sea of Okhotsk. These investments would not be necessary if the Soviet leadership were prepared to rely only on preemption and/or LOW/LUA options. The Soviet leadership now has the option of allowing a large segment of its strategic forces to 'ride out' a limited US counterforce attack involving many hundreds of warheads.

In stark comparison to the United States, the Soviet Union has placed great emphasis on ensuring the survivability of the Soviet leadership during a nuclear exchange - not just of the Soviet National Command Authority (NCA) and armed forces at the national level, but also of the military, political and economic leadership throughout the entire country. Soviet defensive measures include active programs such as anti-ballistic missile (ABM) and anti-aircraft deployments, and

12 US Department of Defense, *Soviet Military Power: An Assessment of the Threat*, 1988, (U.S. Government Printing Office, Washington, D.C., April 1988), p.46.

13 'Soviets' Nuclear Arsenal Continues to Proliferate', *Aviation Week and Space Technology*, 16 June 1980, p.67; Clarence A. Robinson, 'Soviets Testing New Generation of ICBMs', *Aviation Week and Space Technology*, 3 November 1980, p.28; and 'Navy to Develop New Trident Warhead', *Aviation Week and Space Technology*, 17 January 1983, p.26.

Most of the US Minuteman ICBM silos are hardened to withstand about 2000 psi. See Secretary Weinberger's testimony to the Senate Armed Services Committee of 5 October 1981, in *Survival*, (Vol.XXIV, No.1), January/February 1982, p.31.

passive measures such as shelter construction and leadership relocation programs.¹⁴

The Soviets maintain around Moscow the world's only operational ABM system. The original system, designated ABM-IB, consisted of 64 **Galosh** interceptor missiles deployed in four complexes, six **Try Add** missile guidance and engagement radars at each complex, and the **Dog House** and **Cat House** target-tracking radars south of Moscow. Since 1980 a major up-grading of the system has been underway, with new launchers being deployed for modified **Golosh** interceptors designed to engage targets outside the atmosphere and for new **Gazelle** high-acceleration interceptors designed to engage targets within the atmosphere; associated engagement and missile guidance radars; and a new **Pill Box** large phased-array radar (LPAR) at Pushkino, northeast of Moscow, designed to control ABM engagements. The new ABM system is expected to be fully operational in 1989.¹⁵

Moscow is also well-protected by extensive strategic and tactical air defence deployments. The first Soviet surface-to-air missile (SAM) defences - based on the SA-1 **Guild** SAM and Yo-Yo radar system - were deployed around Moscow in 1956. Moscow is the centre of the heaviest concentration of SAM-5 **Gammon** missiles, which until recently were the most advanced Soviet SAM. The SAM-5 is designed for long-range, high altitude interception and may also have some antiballistic missile capability.¹⁶ In 1980, the Soviet Union began deployment of the new SA-10 SAM, which is designed to intercept targets with a small radar cross-section, such as cruise missiles. More than half the sites so far constructed are located near Moscow.¹⁷ According to the Department of Defense, 'this emphasis on Moscow and the patterns noted for the other SA-10 sites suggest a first priority

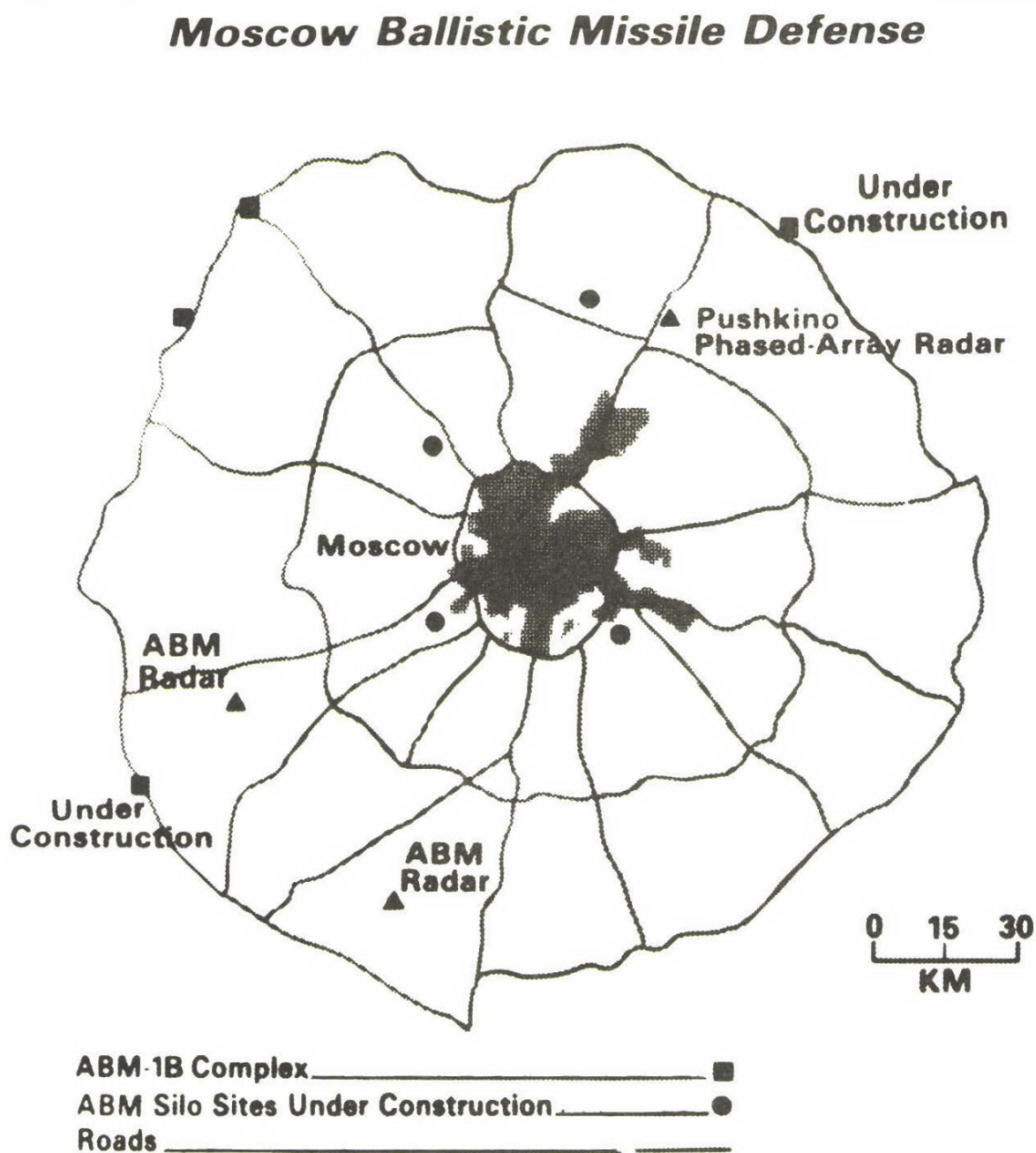
¹⁴ See Desmond Ball, 'The Soviet Strategic C³I System', pp.207-208; and US Department of Defense, *Soviet Military Power: An Assessment of the Threat*, 1988, pp.55-62.

¹⁵ *Ibid.*, p.55.

¹⁶ Ray Bonds (ed.), *The Soviet War Machine*, (Salamander Books Limited, London, 1980), p.55.

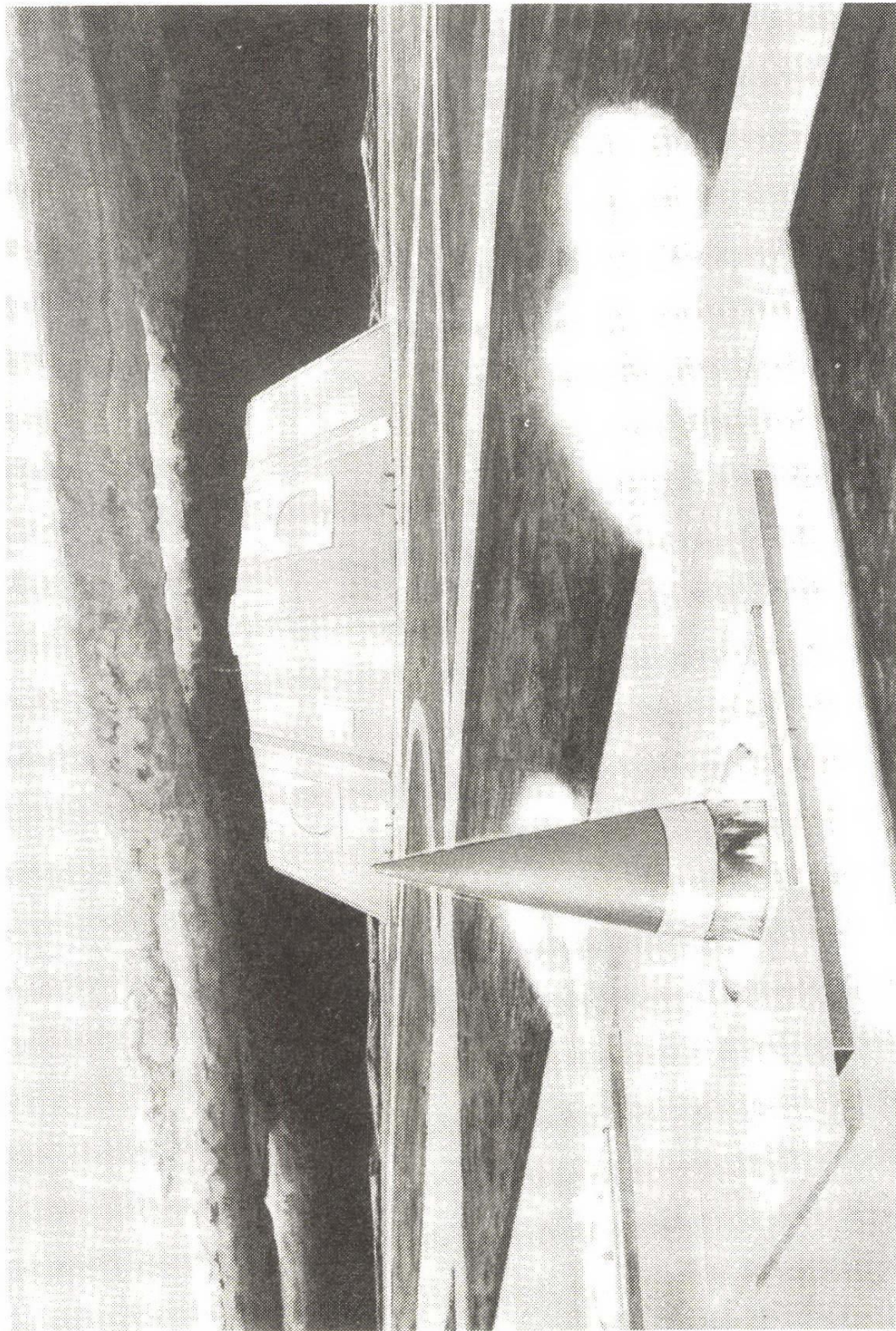
¹⁷ US Department of Defense, *Soviet Military Power 1985*, (U.S. Government Printing Office, Washington, D.C., 1985), p.50.

FIGURE 3
MOSCOW ANTI-BALLISTIC MISSILE (ABM) SYSTEM



Source: US Department of Defense.

FIGURE 4
GAZELLE INTERCEPTOR AND PILL BOX LPAR, PUSHKINO,
NORTHEAST OF MOSCOW



Source: US Department of Defense.

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on terminal defense of wartime command and control, military and key industrial complexes'.¹⁸

With respect to passive measures,

Soviet commanders and managers at all levels of the Party and government are provided hardened alternate command posts located well away from urban centres. This comprehensive and redundant system, composed of more than 1,500 hardened facilities with special communications, is patterned after similar capabilities afforded the Armed Forces. More than 175,000 key personnel throughout the system are believed to be equipped with such alternate facilities in addition to the many deep bunkers and blast shelters in Soviet cities.¹⁹

This represents an increase in protective facilities corresponding to some 10,000 additional leadership personnel each year over the past decade. According to the US Department of Defense, the cost of construction and equipment for these leadership relocation sites over the past 25 years is between 8 and 16 billion rubles, or \$28-56 billion if acquired in the United States.²⁰

According to testimony of the then Chairman of the Joint Chiefs of Staff, General George S. Brown in 1977, 'the first echelon command-control-communications centers of the Soviet government and armed forces at a national level are dispersed and hardened within an 80-mile radius of Moscow'.²¹ This includes some 75 underground command posts within Moscow itself. Some of these structures are several hundred metres deep and are capable of withstanding 1,000 psi of blast overpressure.

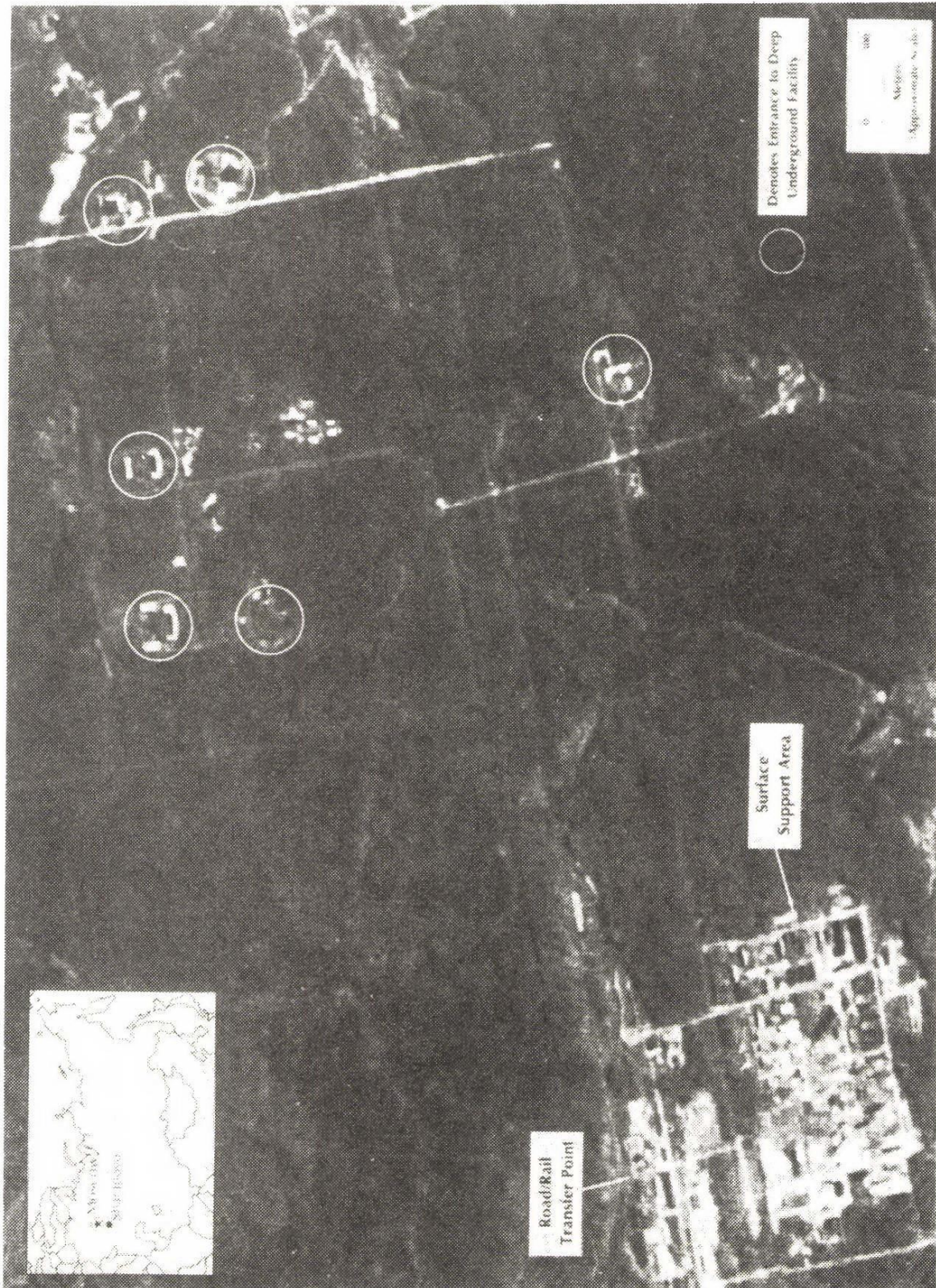
18 *Ibid.*

19 *Ibid.*, p.52.

20 *Ibid.*, pp.52-53.

21 Letter from General Brown to Senator William Proxmire, 3 February 1977, reprinted in *Survival*, (Vol.XIX, No.2), March/April 1977, p.77; and US Department of Defense, *Soviet Military Power: An Assessment of the Threat*, 1988, pp.59-62.

FIGURE 5
SOVIET UNDERGROUND NATIONAL COMMAND CENTRE,
SHARAPOVA, SOUTH OF MOSCOW



Source: US Department of Defense.

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Although the Soviet leadership now has the options of employing the Soviet strategic nuclear forces in preemptive, LOW/LUA and retaliatory modes, there is little evidence of any Soviet plans or efforts concerning the possibility of limited or controlled employment of these forces. Soviet military doctrine remains to seize the initiative, either preemptively or promptly in the case of a US limited counterforce attack, and then to move to control events through the period of the conflict. Massive blows against US military, economic-industrial and political-administrative resources and facilities would frustrate or at least degrade US military operations, thus minimising damage to the Soviet Union, and would stun the United States into incapacity and eventual surrender.

Soviet strategic policy and targeting doctrine, together with some quite explicit pronouncements, is to the effect that any nuclear exchange would involve simultaneous and unconstrained attacks on a wide range of targets, which would certainly not exclude C³I systems.

Soviet strategic forces would be used massively rather than sequentially, and against a wide range of nuclear and conventional military targets, command-and-control facilities, centres of political and administrative leadership, economic and industrial facilities, power supplies, etc., rather than more selectively. Urban areas would not be attacked in pursuit of some arbitrary minimum level of fatalities, but neither would they be avoided if they were near military, political or industrial targets.

The breadth of Soviet strategic targeting is shown in the following quotations:

The Strategic Missile Forces, which form the basis of the combat might of our Armed Forces, are intended for the destruction of the enemy's means of nuclear attack, his large troop formations and military bases, the destruction of the aggressor's defense industry, the disorganization of [his] state and military command and control, and of the operations of his rear and transportation.²²

22 Marshal A.A. Grechko, cited in Leon Gouré, Foy D. Kohler and Mose L. Harvey, *The Role of Nuclear Forces in Current Soviet*

Very important strategic missions of the armed forces can be the destruction of the largest industrial and administrative-political centers, power systems, and stocks of strategic raw materials; disorganization of the system of state and military control; destruction of the main transport centers; and destruction of the main groupings of troops, especially of the means of nuclear attack.²³

For the achievement of victory in a present-day nuclear war, if it is unleashed by the imperialists, not only the enemy's armed forces, but also the sources of his military power, the important economic centers, points of military and state control, as well as the areas where different branches of armed forces are based, will be subjected to simultaneous destruction.²⁴

Although this wide range of targets would be subject to massive and simultaneous attacks, there are some definite priorities regarding the destruction of particular elements of the US military forces, including most particularly the opposing strategic nuclear forces. As Major-General Dzhelaikhov wrote in 1966, 'strategic rockets are regarded as the most important strategic objectives'.²⁵ Also in the primary category are strategic bomber bases, FBM submarine bases and support facilities, nuclear stockpiles, and strategic command-and-control centres.²⁶ The second target category consists of theatre nuclear weapons and associated systems, including tactical

Strategy, (Center for Advanced International Studies, University of Miami, Coral Gables, Florida, 1974), p.107.

23 Major-General V. Zemskov, cited in Douglass and Hoeber, *Soviet Strategy for Nuclear War*, p.16.

24 Colonel M. Shirokov, cited in Leon Gouré and Michael J. Deane, 'The Soviet Strategic View', *Strategic Review*, (Vol.VIII, No.1), Winter 1980, p.81.

25 Cited in Douglass and Hoeber, *Soviet Strategy for Nuclear War*, p.75.

26 See Joseph D. Douglass, Jr., *Soviet Military Strategy in Europe*, (Pergamon Press, New York, 1980), p.74.

TABLE 1
ALLOCATION OF SOVIET RISOP WARHEADS TO
TARGET CATEGORIES IN GENERATED AND NON-
GENERATED SITUATIONS
DECEMBER 1987

	Generated	Non-Generated
Baseline force	11,184	11,184
Weapons deliverable to target	7,221	5,977
Target Category		
1 Strategic C ³ I targets	700	700
2 US SIOP forces	2,198	2,198
3 Theatre nuclear forces capable of hitting the Soviet Union	80	80
4 US/NATO conventional/power projection forces	750	500
5 US/NATO administrative/governmental targets	450	300
6 US/NATO economic/industrial (E/I), war supporting and economic recovery targets	1,843	1,249
Reserve warheads (including warheads allocated to targets in China)	1,000	750

and carrier aviation, cruise missiles, tactical missiles, airfields, and tactical command-and-control systems. The third category consists of other military targets, such as large ground troop formations, tank concentrations, reserve forces, storehouses of arms and munitions, equipment and fuel, naval bases, interceptor airfields, anti-aircraft artillery and missiles, and associated command-and-control systems and facilities. The fourth category consists of political-administrative targets, such as governmental centres and areas where the political leadership is concentrated. Finally, the fifth category consists of a wide range of economic-industrial facilities - including power stations (perhaps the single most important non-military targets in Soviet war planning), stocks of strategic raw materials, oil refineries and storage sites, metallurgical plants, chemical industries, and transport operations (such as 'rail centres and marshalling yards, bridges, tunnels, train ferries and trains on land, and ports and vessels on the water').²⁷

On the basis of these target sets, and the priorities attached to their destruction, it is possible to construct a notional Soviet equivalent of the US Single Integrated Operations Plan (SIOP) - the Russian (or Red) Integrated Strategic Operational Plan (RISOP). The most recent version of RISOP-6, which involves the allocation of about 11,200 strategic warheads and bombs to these target categories in generated and non-generated situations (i.e. where the Soviet forces are on a normal day-to-day level of alert), looks something like that shown in Table 1.

²⁷ Colonel Shirokov, cited in Gouré and Deane, 'The Soviet Strategic View', pp.81-83.

CHAPTER 3

US STRATEGIC NUCLEAR POLICY AND DOCTRINE

The United States shares with the Soviet Union a commitment to deterrence as a 'major objective' of national security policy. As President Reagan recently stated,

America's defense policy throughout the postwar period has been aimed at deterring aggression against the United States and its allies. Deterrence works by persuading potential adversaries that the costs of their aggression will exceed any probable gains. Deterrence is the basis of our military strategy.¹

Similarly, despite periodic statements of declaratory policy to the contrary, the United States has always accepted that a viable policy of deterrence could not be based on the mere possession of an 'assured destruction capability' but requires an effective 'war fighting' strategy and capability.² As President Reagan reiterated in January 1988, 'only by being prepared to wage war successfully can we deter it'.³ And, again like the Soviet Union, the US strategy in the event that deterrence fails is to limit damage to its military forces and economic and governmental structure. As President Reagan also stated in January 1988,

The United States, ... should deterrence fail, must be prepared to repel or defeat any military attack and end the conflict on terms favourable to the United States, its interests, and its allies.⁴

1 President Ronald Reagan, *National Security Strategy of the United States*, (The White House, Washington, D.C., January 1988), p.13.

2 See Desmond Ball, 'The Development of the SIOP, 1960-1983', in Desmond Ball and Jeffrey Richelson (eds.), *Strategic Nuclear Targeting*, (Cornell University Press, Ithaca and London, 1986), pp.57-83.

3 Reagan, *National Security Strategy of the United States*, p.13.

4 *Ibid.*, p.3.

Although the objectives of Soviet and US strategic nuclear policy are superficially similar at this most general level - viz: deterrence, war fighting, and damage limitation - there are some very important differences in the employment policies and force postures which each has developed in pursuit of these objectives. Central to these differences is the fact that whereas Soviet strategic planners believe that the best approach to limiting damage to the Soviet Union is the rapid and wholesale destruction of the ability of the United States and its allies to wage nuclear war, US strategic planners believe that limitation of damage can best be achieved by controlling escalation at the lowest possible levels while ensuring that the outcomes are favourable to the US.

The notion of 'controlled response' was developed by the Kennedy/McNamara Administration in 1961-62 and governed the design of SIOP-63, the Single Integrated Operational Plan or the plan for general nuclear war which came into effect on 1 August 1962.⁵ In March 1961, Secretary of Defense McNamara requested the Joint Chiefs of Staff to 'prepare a "Doctrine" which ... would permit controlled response and negotiating pauses in the event of thermonuclear war', and President Kennedy informed Congress that the US strategic nuclear posture would be restructured to provide him with a capability 'to exercise discrimination and control should nuclear conflict come'.⁶ In the planning which proceeded during 1961-62, it was decided that Soviet strategic nuclear and other military forces would be separated from Soviet cities in the National Strategic Target List (NSTL); that strategic reserves would be held by the United States; that US command and control systems would be protected to allow 'controlled response'; and that Soviet command and control would be preserved, at least in the initial stages of any nuclear exchange. SIOP-63 was given five 'options', as well as various 'sub-options', with US

⁵ Scott D. Sagan, 'SIOP-62: The Nuclear War Plan Briefing to President Kennedy', *International Security*, (Vol.12, No.1), Summer 1987, pp.37-39.

⁶ For a more comprehensive discussion of US strategic nuclear policy during the Kennedy/McNamara Administration, see Desmond Ball, *Politics and Force Levels: The Strategic Missile Program of the Kennedy Administration*, (University of California Press, Berkeley, 1980), pp.186-195.

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attacks against the Soviet Union to proceed along the following spectrum:

- 1 Soviet strategic nuclear delivery forces, including missile sites, bomber bases and submarine tenders.
- 2 Other elements of Soviet military forces and military resources, located away from cities - for example, air defences covering US bomber routes.
- 3 Soviet military forces and military resources near cities.
- 4 Soviet command and control centres and systems.
- 5 If necessary, all-out urban-industrial attack.

Although each of these major options would have entailed the use of thousands of nuclear weapons, other plans were developed for the use of much smaller 'packages'. There was also provision that the counterforce options be exercised in pre-emptive fashion in response to unequivocal strategic warning of an impending major Sino-Soviet Bloc attack on the US or its allies.⁷

The notion of 'controlled response' was further refined but in all essential respects maintained in the concept of 'escalation control' embodied in US strategic nuclear planning in the 1970s. From 1969 through 1973, the Nixon Administration undertook several studies and analyses which pointed to the utility of a range of Limited Nuclear Options (LNOs) in escalation control.⁸ These led to the promulgation of National Security Decision Memorandum (NSDM) 242, signed by President Nixon on 17 January 1974, which began as follows:

⁷ See Alfred Goldberg, *A Brief Survey of the Evolution of Ideas About Counterforce*, (The RAND Corporation, Santa Monica, California, RM-05431-PR, October 1967), p.25.

⁸ See Desmond Ball, *Deja Vu: The Return to Counterforce in the Nixon Administration*, (California Seminar On Arms Control and Foreign Policy, Santa Monica, California, December 1974); and Desmond Ball, 'The Development of the SIOP, 1960-1983', pp.70-75.

I have reached the following decisions on United States policy regarding planning for nuclear weapons employment. These decisions do not constitute a major new departure in US nuclear strategy; rather, they are an elaboration of existing policy. The decisions reflect both existing political and military realities and my desire for a more flexible nuclear posture.

... The fundamental mission of US nuclear forces is to deter nuclear war and plans for the employment of US nuclear forces should support this mission.⁹

The Memorandum directed that further plans 'for limited employment options which enable the United States to conduct selected nuclear operations' be developed and formally incorporated into the SIOP. Much of the public debate on NSDM-242 was concerned with the re-emphasis in these plans on the targeting of a wide range of Soviet military forces and installations, from hardened command and control facilities and ICBM silos to airfields and Army camps.¹⁰ This re-emphasis, however, was much more declaratory than substantive since the SIOP had, at least since 1962 and including the period from 1965 to 1968 when Assured Destruction was avowed policy, contained most of these counterforce targets. A more novel aspect of the Memorandum was the notion of targeting those Soviet assets which would be critical to Soviet post-war recovery and power. NSDM-242 directed that an objective of US targeting doctrine should be the 'destruction of the political, economic and military resources critical to the enemy's post-war power, influence and ability to recover ... as a major power'.¹¹

⁹ Jack Anderson, 'Not-So-New Nuclear Strategy', *Washington Post*, 12 October 1980, p.C-7.

¹⁰ See for example, US Congress, Senate Foreign Relations Committee, *US-USSR Strategic Policies*, (Top Secret hearing held on 4 March 1974; sanitized and made public on 4 April 1974), pp.18-19.

¹¹ Jack Anderson, 'Not-So-New Nuclear Strategy', *Washington Post*, 12 October 1980, p.C-7.

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The concept of 'escalation control' was central to the policy outlined. It was essential that the NCA be provided with the ability to execute their options in a deliberate and controlled fashion throughout the progress of a strategic nuclear exchange. The Memorandum directed that the US must have the potential to 'hold some vital enemy targets hostage to subsequent destruction' and to control 'the timing and pace of attack execution, in order to provide the enemy opportunities to consider his actions', so that 'the best possible outcome' might be obtained for the US and its allies. NSDM-242 introduced the notion of 'withholds' or 'non-targets', i.e. things that would be preserved from destruction. Some of these, such as 'population per se', have now been exempted absolutely from targeting; others, such as the centres of political leadership and control, were exempted only for the purpose of intra-war deterrence and intra-war bargaining, and strategic reserve forces (SRF) were to be maintained to allow their eventual destruction if necessary.¹²

Finally, NSDM-242 authorised the Secretary of Defense to promulgate the Policy Guidance for the Employment of Nuclear Weapons and the associated Nuclear Weapons Employment Policy (NUWEP), signed by Secretary Schlesinger on 4 April 1974 and subsequently known as NUWEP-1.¹³ The first SIOP prepared under the new guidance was SIOP-5, which was formally approved in December 1975 and took effect on 1 January 1976.¹⁴

¹² *Ibid.*

¹³ US Congress, Senate Armed Services Committee, *Department of Defense Authorization for Fiscal Year 1979*, (U.S. Government Printing Office, Washington, D.C., 1978), Part 8, p.6280; and US Congress, House Armed Services Committee, *Hearings on Military Posture and H.R. 1872 (H.R.4040)*, (U.S. Government Printing Office, Washington, D.C., 1979), Part 3, Book 1, pp.6-26.

¹⁴ US Congress, Senate Armed Services Committee, *Fiscal Year 1977 Authorization for Military Procurement, Research and Development, and Active Duty, Selected Reserve and Civil Personnel Strengths*, (U.S. Government Printing Office, Washington, D.C., 1976), Part II, p.6422; US Congress, House Appropriations Committee, *Department of Defense Appropriations for 1977* (U.S. Government Printing Office,

In 1977-79, the Carter Administration undertook a Nuclear Targeting Policy Review (NTPR), which reached several important conclusions.¹⁵ The primary systems acquisition requirement identified was that the C³I system that controlled the SIOP forces should have greater endurance than the present system. It also suggested that more options should be added to the SIOP to give the strategic forces 'greater flexibility in targeting than they presently have'.¹⁶ More specifically, it suggested that there be relatively less emphasis accorded to the destruction of the Soviet economic and industrial base and that greater attention 'be directed toward improving the effectiveness of our attacks against military targets'.¹⁷ It also suggested that there be some modification of the SIOP to reflect better

Washington, D.C., 1976), Part 8, p.30; US Congress, House Appropriations Committee, *Department of Defense Appropriations for 1980* (U.S. Government Printing Office, Washington, D.C., 1979), Part 3, p.878; and US Congress, House Armed Services Committee, *Hearings on Military Posture and H.R. 1872 (H.R.4040)*, Part 3, Book 1, pp.6-26.

15 For a more comprehensive account of the development of US strategic nuclear policy during the Carter Administration, see Desmond Ball, *Developments in US Strategic Nuclear Policy Under the Carter Administration*, (ACIS Working Paper No.21, Center for International and Strategic Affairs, UCLA, Los Angeles, February 1980); and Desmond Ball, 'The Development of the SIOP, 1960-1983', pp.75-79.

16 See testimony of Dr William J. Perry, US Congress, Senate Armed Services Committee, *Department of Defense Authorization for Appropriations for Fiscal Year 1980*, (U.S. Government Printing Office, Washington, D.C., 1979), Part 1, pp.2988-9; and US Congress, House Appropriations Committee, *Defense Appropriations for 1980*, Part 3, pp.116-7.

17 Testimony of Dr Perry, US Congress, Senate Armed Services Committee, *Department of Defense Authorization for Appropriations for Fiscal Year 1980*, Part 1, p.407. See also Peter Hughes, 'SALT and the Emerging Strategic Threat', *Air Force Magazine*, (Vol.62, No.3), March 1979, p.52; and Statement of Harold Brown on the Defense Budget Before the Senate Foreign Relations Committee, 19 September 1979, (mimeo), pp.19, 20.

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the political aspects of nuclear targeting. As one White House official stated at the time:

In the past nuclear targeting has been done by military planners who have basically emphasized the efficient destruction of targets. But targeting should not be done in a political vacuum.

Some targets are of greater psychological importance to Moscow than others, and we should begin thinking of how to use our strategic forces to play on these concerns.¹⁸

Hence, there were some changes to the targeting guidance so as to exploit potential Soviet fears, such as threatening the Soviet food supply and making a target of Soviet troops and military facilities in the Far East so that the USSR would be more vulnerable to attack from China; and some consideration was given to the adaptation of targeting to the dismemberment and regionalisation of the USSR, enhancing the prospects for regional insurrection during and after a nuclear exchange. The NTPR also led to the development of a highly complex matrix of targeting 'packages' or 'building block' options that could be flexibly combined or 'tailored' to suit particular situations.¹⁹

The NTPR formed the basis of Presidential Directive (PD)-59, signed by President Carter on 25 July 1980.²⁰ As Secretary of Defense Harold Brown emphasised at the time,

PD-59 is not a new strategic doctrine; it is not a radical departure from US strategic policy over the past decade or so. It is, in fact, a refinement, a codification of previous statements of our strategic policy. PD-59 takes the same essential strategic doctrine, and restates

¹⁸ See Richard Burt, 'Pentagon Reviewing Nuclear War Plans', *New York Times*, 16 December 1977, p.5.

¹⁹ US Congress, Senate Foreign Relations Committee, *Nuclear War Strategy*, (U.S. Government Printing Office, Washington, D.C., 1981), p.16.

²⁰ See Desmond Ball, 'The Development of the SIOP, 1960-1983', p.77.

it more clearly, more cogently, in the light of current conditions and current capabilities.²¹

Although PD-59 represented no major changes to the targeting guidance as previously set out in NSDM-242 and NUWEP-1, there were at least three noteworthy features of the Carter Directive. First, within the area of economic targeting, the Directive de-emphasised the concept of targeting to impede Soviet economic recovery in favour of greater emphasis on targeting the Soviet economic war-supporting infrastructure.

Second, PD-59 emphasised that the pre-planned target packages in the SIOP should be supplemented by the ability to find new targets and destroy them during the course of a nuclear exchange. While Soviet strategic nuclear installations and economic and industrial facilities would remain essentially fixed during wartime, there would be much movement of Soviet conventional military forces (including second echelon formations) and much of the Soviet political and military leadership would presumably be relocated. PD-59 required the development of new reconnaissance satellites and SIGINT systems to provide the real-time intelligence capabilities that would be necessary to effect this rapid retargeting.²²

Third, PD-59 recognised that the current US C³ system was inadequate to support any policy of extended nuclear war-fighting, and stated that the strategy embodied in the Directive:

imposes requirements in the strategic command, control and communications system, and ... improvements in our forces must be accompanied by improvements to that system. The needed improvements lie in the areas of increased flexibility

21 Harold Brown, 'The Objective of US Strategic Forces', Address to the Naval War College, Washington, D.C., 22 August 1980, (Official text, US International Communication Agency), p.5.

22 Michael Getler, 'Carter Directive Modifies Strategy for a Nuclear War', *Washington Post*, 6 August 1980, p.A-10; and Richard Burt, 'Carter Said to Back A Plan For Limiting Any Nuclear War', *New York Times*, 6 August 1980, pp.A1, A6.

and higher assurance of command-and-control survivability and long-term endurance.²³

PD-59 also authorised the Secretary of Defense, Harold Brown, to issue a new Nuclear Weapons Employment Policy, variously referred to as NUWEP-2 or NUWEP-80, and issued by Secretary Brown in October 1980.²⁴ The precepts of PD-59 and NUWEP-2 were formally introduced into the SIOP with SIOP-5F, which took effect on 1 October 1981.

A new review of targeting policy was begun by the Reagan Administration in the spring of 1981. In a conscious effort to improve the integration of nuclear weapons employment policy with other elements of US strategic nuclear policy, the Reagan Administration produced a Nuclear Weapons Employment and Acquisition Master Plan.²⁵ This was closely followed, in October 1981, by National Security Decision Directive (NSDD)-13, prepared as a successor to PD-59. Finally, in July 1982, Secretary of Defense Caspar Weinberger issued a new NUWEP, designated NUWEP-82. The guidance contained in these documents was then used to develop a new SIOP, in which increased attention was accorded the requirements of nuclear weapons employment in a situation of prolonged or protracted nuclear conflict.²⁶ This new SIOP, formally designated SIOP-6, took effect on 1 October 1983.

The targets in the SIOP are divided into four principal groups, each of which in turn contains a wide range of target types. The four principal groups are the Soviet nuclear forces, the general purpose forces, the Soviet military and political leadership centres, and the Soviet economic and industrial base.

23 US Congress, Senate Armed Services Committee, *Department of Defense Authorization for Appropriations for Fiscal Year 1982*, (U.S. Government Printing Office, Washington, D.C., 1981), Part 7, p.4210.

24 US Congress, Senate Foreign Relations Committee, *Nuclear War Strategy*, pp.15-16.

25 'Why C3I is the Pentagon's Top Priority', *Government Executive*, January 1982, p.14.

26 Robert Sheer, *With Enough Shovels: Reagan, Bush and Nuclear War*, (Random House, New York, 1982), p.12.

Examples of targets within each category were given by the Defense Department to the Senate Armed Services Committee in March 1980:²⁷

- 1 Soviet nuclear forces:
ICBMs and IRBMs, together with their launch facilities (LFs) and launch command centres (LCCs);
nuclear weapons storage sites;
airfields supporting nuclear-capable aircraft;
nuclear ballistic-missile submarine (SSBN) bases;
- 2 Conventional military forces:
barracks;
supply depots;
marshalling points;
conventional airfields;
ammunition storage facilities;
tank and vehicle storage yards;
- 3 Military and political leadership:
command posts;
key communications facilities;
- 4 Economic and industrial targets:
 - (a) war-supporting industry:
ammunition factories;
tank and armoured personnel carrier factories;
petroleum refineries;
railway yards and repair facilities;
 - (b) industry that contributes to economic recovery:
coal;
basic steel;
basic aluminium;
cement;
electric power.

²⁷ US Congress, Senate Armed Services Committee, *Department of Defense Authorization for Appropriations for Fiscal Year 1981*, (U.S. Government Printing Office, Washington, D.C., 1980), Part 5, pp.2721.

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As at December 1987, the US had some 13,446 strategic nuclear weapons. The actual number of these which would be available for employment depends on the assumptions made regarding alert levels - whether the forces are in a normal 'day-to-day' posture or whether they are fully generated. These alternatives are reflected in a basic division of the SIOP into an Alert Response Plan and a Generated Operations Plan. Table 2 shows an allocation of warheads to target categories in both the alert and generated situations as would have obtained in December 1987.

From SIOP-6 to SIOP-7

Since 1985, the US Department of Defense and other agencies with responsibilities in the area of national security affairs have undertaken a wide range of studies and analyses of new targeting issues which led to the preparation of a new National Security Decision Directive (NSDD) and Nuclear Weapons Employment Policy (NUWEP) in late 1987 - which have led in turn to SIOP-7, which should be ready to go into effect in 1989.²⁸ SIOP-7 represents the most radical change in both the structure and substance of the US strategic nuclear war plan since the preparation of SIOP-63 in 1961-62.

The basic policy of 'targeting those assets which are essential to Soviet warmaking capability and political control' was described by President Reagan in January 1988 as follows:

Our strategic forces and associated targeting policy must, by any calculation, be perceived as making nuclear warfare a totally unacceptable and unrewarding proposition for the Soviet leadership. Accordingly, our targeting policy:

- Denies the Soviets the ability to achieve essential military objectives by holding at risk Soviet warmaking capabilities, including both

²⁸ Peter Adams, 'Planners Draft New Nuclear War Tactics', *Defense News*, (Vol.3, No.25), 20 June 1988, pp.1, 28; and Richard Halloran, 'Strategic Air Command Revises Its Nuclear War Plan to Meet A New Age', *New York Times*, 2 November 1988, p.A6.

TABLE 2
ALLOCATION OF US SIOP WARHEADS TO TARGET
CATEGORIES IN ALERT AND GENERATED
SITUATIONS
DECEMBER 1987

	Generated	Alert
Baseline force	13,446	13,446
Weapons deliverable to target	8,119	5,528
Target Category		
1 Soviet nuclear forces	2,512	2,512
2 Other military forces	1,650	950
3 Military and political leadership	850	600
4 Economic/industrial (E/I) targets	2,107	866
Reserve warheads	1,000	600

the full range of Soviet military forces and the war-supporting industry which provides the foundation for Soviet military power and supports its capability to conduct a protracted conflict; and

- Places at risk those political entities the Soviet leadership values most: the mechanisms for ensuring survival of the Communist Party and its leadership cadres, and for retention of the Party's control over the Soviet and Soviet-bloc peoples.²⁹

The new targeting policy and SIOP reflects a much greater emphasis by the Reagan Administration on the ability to destroy the Soviet political and military command and control system at any point in the strategic nuclear exchange; the development of new Soviet capabilities, and most particularly mobile or relocatable systems; changes in the US force structure, such as the introduction of new bombers and cruise missiles, as well as new warhead designs and new sensor systems for locating Soviet targets; and new computer capabilities which permit rapid retargeting of the US strategic nuclear forces.

The requirement to target the Soviet leadership and its command and control system is not itself novel. Indeed, a major attack option has been dedicated to this target set since SIOP-63. Until now, however, this target set has been regarded as a 'withhold' - i.e. an option to be reserved until the later phases of a strategic nuclear exchange in order to enhance escalation control, both by preserving the Soviet ability to conduct discriminate and controlled nuclear strikes as well as allowing the possibility of negotiating war termination between the US and Soviet national command authorities. The new plan, however, provides the option for prompt attack of the Soviet command and control system at the outset of a strategic nuclear exchange.

The emphasis accorded counter-leadership and counter-command and control capabilities is also new. The destruction of

underground leadership bunkers and command sites is a prime objective of the MX ICBM and the Trident II D-5 SLBM. The large, 9MT B-53 warhead has been reactivated for the specific purpose of destroying deeply buried command centres.³⁰ In September 1988, the Secretary of Defense formally authorised the development of new earth-penetrator warheads which could be deployed on both MX ICBMs for prompt attacks against underground bunkers and command facilities as well as on cruise missiles for 'follow-on' attacks.³¹ New ballistic missile penetration aids (penaids) are also under development to ensure that the ABM system around Moscow cannot prevent destruction of leadership and command facilities in the Moscow area.³² And new sensor systems (including airborne and satellite SIGINT systems) are under development to provide a capability to locate Soviet leadership and C³I facilities that are not used in peacetime but are designed to begin functioning during a nuclear exchange.

US target planners have become particularly concerned about the proliferation of mobile or relocatable targets (RTs) in the Soviet Union. In 1984, there were more than 4,000 mobile targets in the National Strategic Target List (NSTL).³³ With the deployment of the land-mobile SS-25 and rail-mobile SS-24 ICBMs and new mobile command and communications facilities, not only has this target set increased but it also includes several hundred weapons and facilities which have the highest priority in the SIOP. In December 1986, the Director of Central Intelligence Mobile Missile Task Force Intelligence

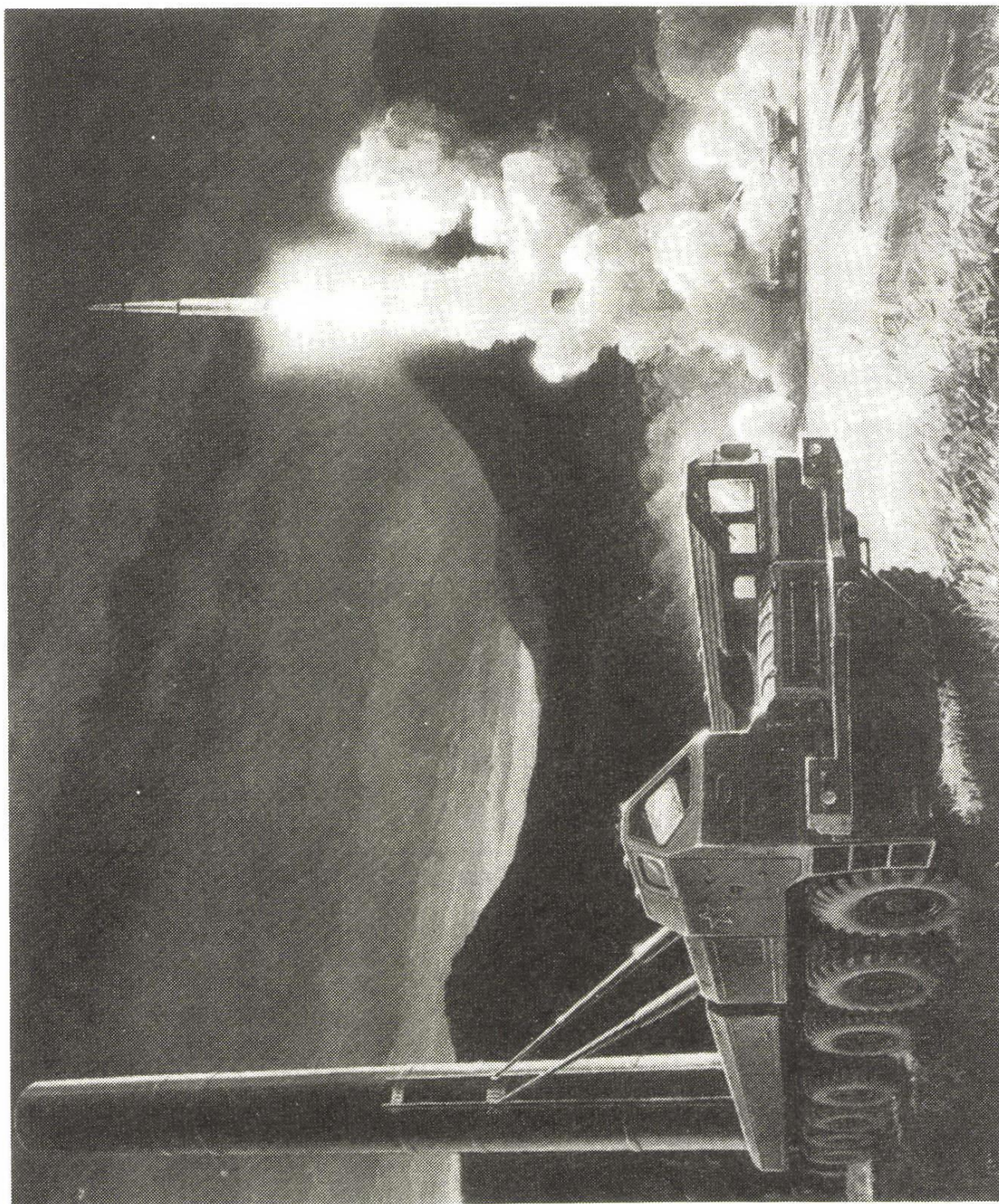
30 'Last of the Titans', *Bulletin of the Atomic Scientists*, September 1987, p.62.

31 Warren Strobel, 'U.S. To Make Nuclear Bomb That Burrows', *Washington Times*, 12 September 1988, p.1; 'U.S. To Build Nuclear Missile That Burrows', *Washington Post*, 13 September 1988, p.A16; and Tim Carrington, 'Carlucci Orders Move for Development of "Earth-Penetrating" Nuclear Weapon', *Wall Street Journal*, 13 September 1988, p.5.

32 'Countering Star Warski', *Bulletin of the Atomic Scientists*, (Vol. 43, No.9), November 1987, p.55; 'Industry Observer', *Aviation Week and Space Technology*, 28 September 1987, p.17.

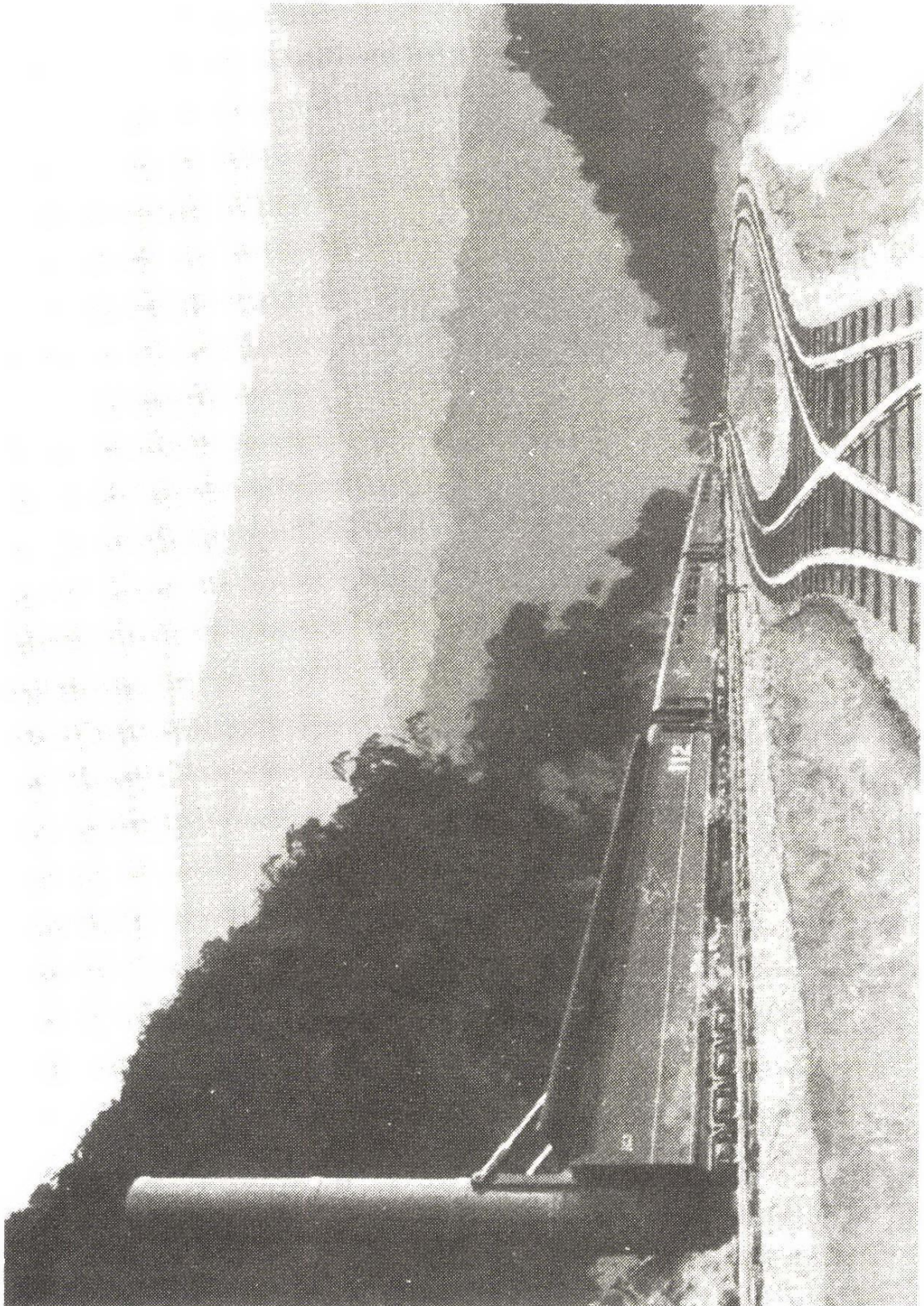
33 Edgar Ulsamer, 'Soviet Arms Cheating Revealed', *Air Force Magazine*, (Vol.67, No.12), December 1984, p.23.

FIGURE 6
SOVIET MOBILE SS-25 ICBM



Source: US Department of Defense.

FIGURE 7
SOVIET RAIL-MOBILE SS-24 ICBM



Source: US Department of Defense.

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Requirements and Analysis Working Group reported that new capabilities were required to deal with these mobile targets:

Our current capability to meet adequately the demands placed upon our limited resources, to address effectively the mobile missile problem, is limited.

A true capability to locate, identify and track mobile missiles for the purpose of targetting is evolutionary.

[It] will require significant enhancement of our present capabilities.³⁴

In 1986-87, the US Air Force developed a *Strategic Relocatable Target Capability Program* that was later incorporated in a Defense Department-wide *Master Plan for Relocatable Targets* that 'is keyed to the development of sensors, C³I architectures, and force structure necessary to put at risk these Soviet targets in the future'.³⁵

The requirement to locate RTs immediately prior to and during a nuclear exchange has led to the development of new sensor systems, including the *Aurora* Mach-5 Stealth reconnaissance aircraft;³⁶ more advanced geostationary SIGINT satellites such as the *Magnum* launched in January 1985 and the new *Mentor*; the KH-12 *Ikon* real-time digital imaging satellite;³⁷ and the *Lacrosse* radar satellite system.

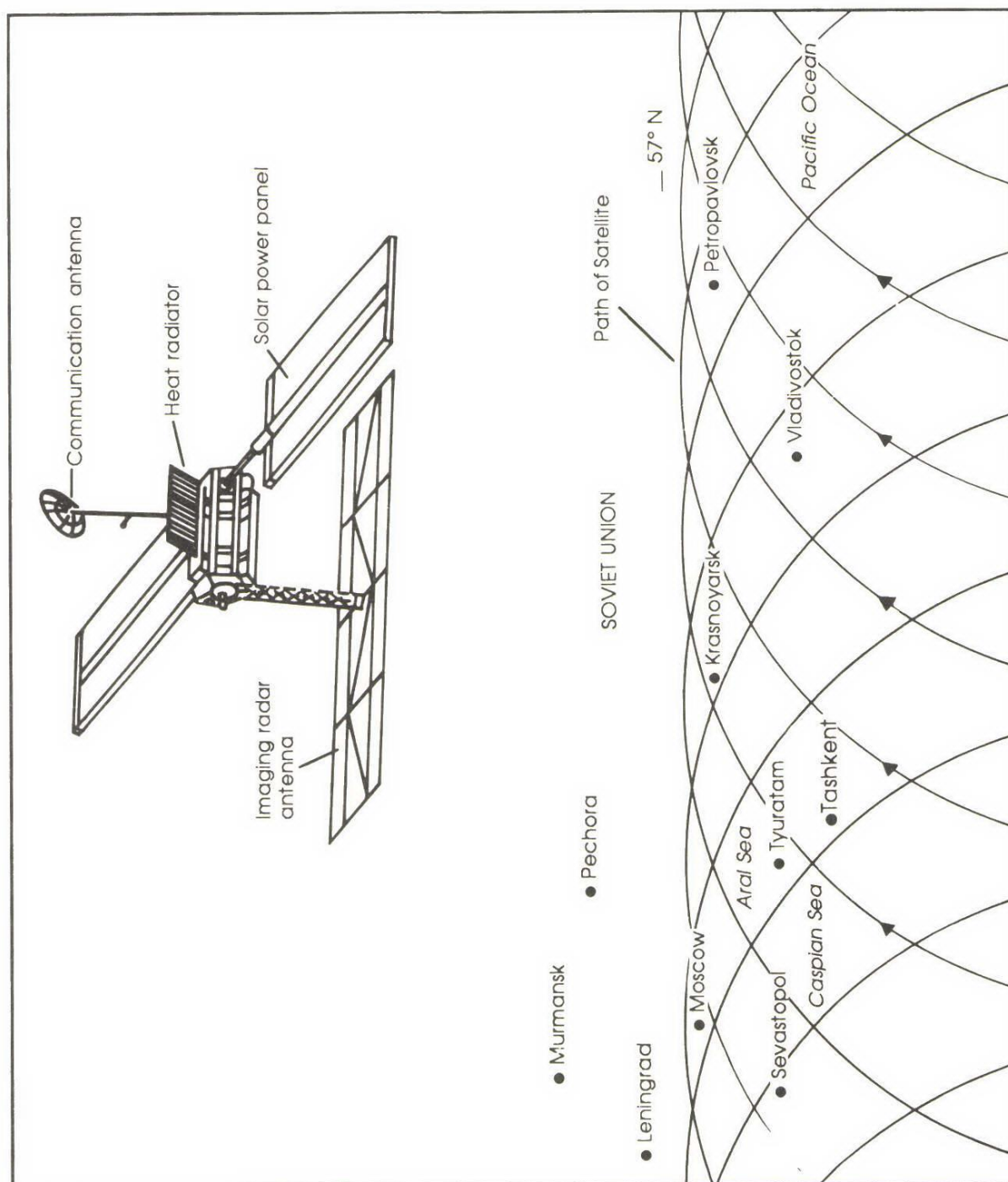
³⁴ Cited in Gregory A. Fossedal, 'U.S. Said to be Unable to Verify Missile Ban', *Washington Times*, 18 November 1987, p.6; and Rowland Evans and Robert Novak, 'What About the Hidden SS-20s?', *Washington Post*, 18 November 1987, p.25.

³⁵ Edgar Ulsamer, 'Missiles and Targets', *Air Force Magazine*, (Vol.70, No.7), July 1987, p.69; and *Aviation Week and Space Technology*, 7 March 1988, p.15.

³⁶ See T.A. Heppenheimer, 'Revealed! Mach 5 Spy Plane', *Popular Science*, November 1988, pp.70-73, 114-116.

³⁷ 'Tracking Mobile Soviet Weapons Seen as KH-12 Task', *Aerospace Daily*, 17 April 1985, p.269.

FIGURE 8
LACROSSE RADAR IMAGING SATELLITE



Source: John Pike, Federation of American Scientists.

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The requirement to destroy these mobile targets has greatly enhanced the importance of new bombers in the US triad. As General John T. Chain, the Commander in Chief of the Strategic Air Command (CINCSAC) asserted in July 1987:

The capability of the manned bomber to penetrate enemy airspace and search out and destroy relocatable targets, particularly the highly threatening mobile ICBMs, is essential.³⁸

And as the US Air Force has argued,

Because of the increased Soviet emphasis on mobile ICBM delivery systems and command centres, the manned bomber's real-time potential for locating and destroying relocatable systems is vital to the maintenance of a viable triad.³⁹

According to Thomas E. Cooper, Assistant Secretary of the Air Force for Research, Development and Logistics, consideration has been given to modification of the B-1B bomber so that it can accept operational tasking against some relocatable targets.⁴⁰ However, while the use of the B-1B for this purpose remains problematical, it is clear that locating and destroying RTs is a prime objective of the B-2 Advanced Technology Bomber. As General Chain noted in July 1987,

The highly flexible Advanced Technology Bomber, with a low-observable design, will penetrate enemy airspace and hold all types of targets, both fixed and relocatable, at risk. This is tremendously important given the growing portion of the Soviet target base that will be relocatable in the next decade.⁴¹

And as US Air Force officials recently stated,

38 General John T. Chain, 'Strategic Fundamentals', *Air Force Magazine*, (Vol.70, No.7), July 1987, p.67.

39 Cited in James W. Canan, 'The Issues That Count', *Air Force Magazine*, (Vol.69, No.10), October 1986, p.49.

40 'Countering Mobile Targets a B-1B Task?', *Defense Electronics*, March 1986, p.18.

41 General Chain, 'Strategic Fundamentals', p.67.

With its projected capability to dash into the Soviet Union undetected, ... the B-2 [will] be able to roam the strongholds of the mobile Soviet missiles and look for targets.⁴²

In addition, rapid retargeting concepts and techniques have been developed to permit the use of Minuteman ICBMs and Tomahawk Land Attack SLCMs 'to place and keep Soviet mobile target systems at risk'.⁴³ Finally, new 'soft kill' weapons, utilising enhanced electromagnetic pulse (EMP) and microwave emissions designed to destroy the electronic mechanisms in above-ground mobile missile and command and control systems, are also under development.⁴⁴

The most significant change in the structure of the SIOP is that, instead of being an essentially static plan consisting principally of preplanned options, an adaptive planning process will be instituted in which retargeting will be a continuous, real-time process. As Major General Richard B. Goetze, Deputy Chief of Staff for Strategic Planning and Analysis, Strategic Air Command, has reported,

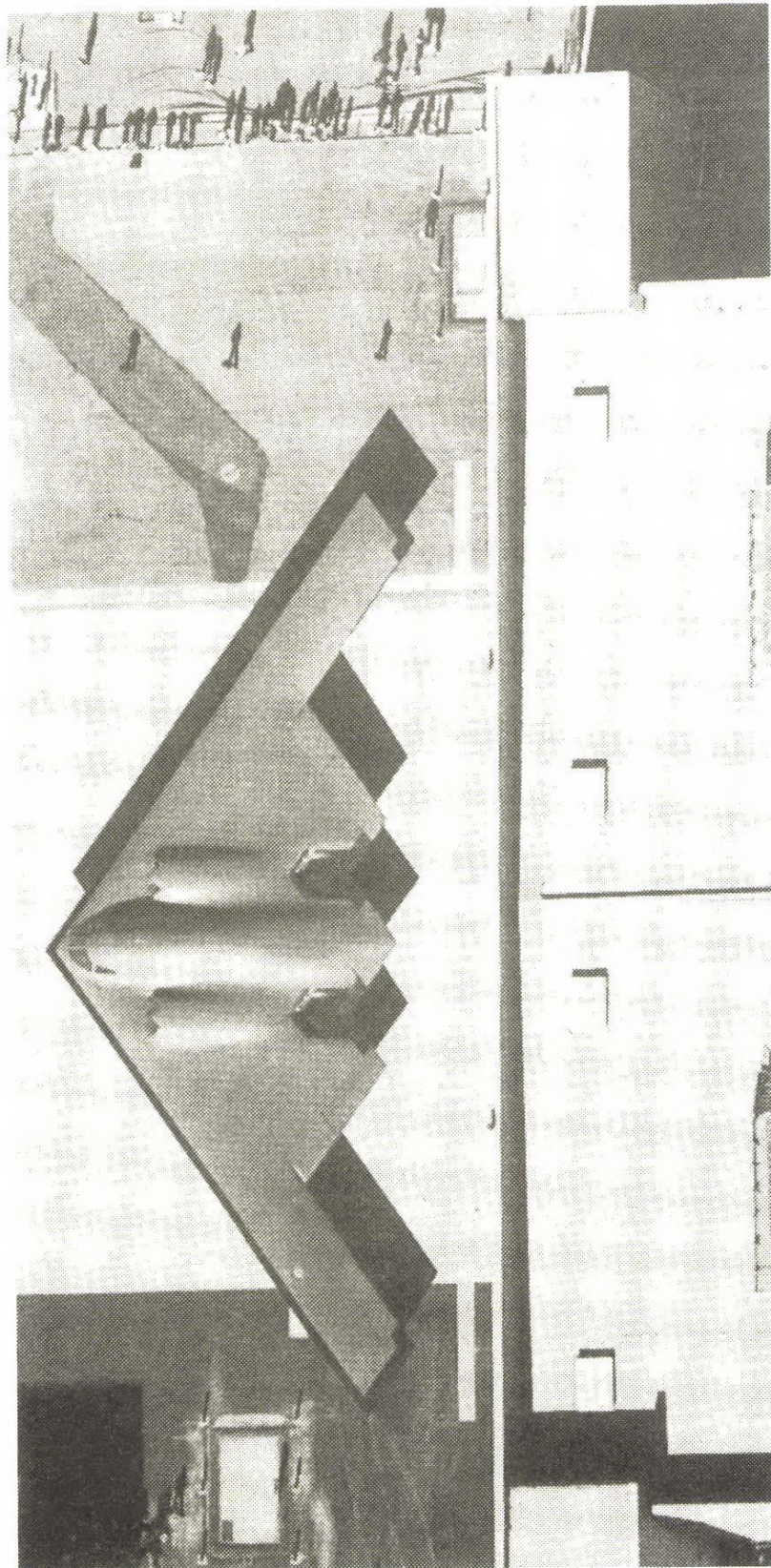
We are pursuing adaptive planning capabilities - capabilities which will allow future planning systems

⁴² Cited in R.S. Dudney, 'Strategic Forces At The Brink of START', *Air Force Magazine*, (Vol.71, No.2), February 1988, p.43.

⁴³ Defense Nuclear Agency, *Fiscal Year 1986, Program Document: Research, Development, Test and Evaluation, Defense Agencies*, (Supporting Data for DNA Fiscal Year 1986 Budget Estimates, Submitted to Congress January 1985), p.409; Defense Nuclear Agency, *Fiscal Year 1987, Program Document: Research, Development, Test and Evaluation, Defense Agencies*, (Supporting Data for DNA Fiscal Year 1987 Budget Estimates, Submitted to Congress February 1986), p.67; and 'Fast Targeting For Minuteman', *Defense Week*, 18 March 1985, p.5.

⁴⁴ Theodore B. Taylor, 'Third-Generation Nuclear Weapons', *Scientific American*, (Vol.256, No.4), April 1987, pp.22-31; 'A Third Generation of Nukes', *Time*, 25 May 1987, p.36; and H. Keith Florig, 'The Future Battlefield: A Blast of Gigawatts?', *IEEE Spectrum*, (Vol.25, No.3), March 1988, pp.50-54.

FIGURE 9
US AIR FORCE B-2 ADVANCED TECHNOLOGY BOMBER (ATB)



Source: *Aviation Week and Space Technology*, 28 November 1988, p.21.

to respond on a real-time basis to changes in policy, threat, and forces. Numerous initiatives are underway to reduce the time required to build the SIOP or modify it during a crisis. Innovative planning systems and procedures that will maximize force effectiveness are currently being brought on-board. As we enter the 1990s, the time required to build the SIOP can be expected to be reduced from months to weeks or even days. The time required to retarget sorties in a conflict will be reduced from a few days to a few hours, and in some cases, to a few minutes. This will have a substantial impact on our operational units. Unit planners must be prepared to perform sortie maintenance or respond to retargeting orders on a daily basis. Aircrews, for example, may be required to react to changes in targeting information or intelligence updates about changes in enemy defenses while enroute to the target area. This is particularly important given the dynamic nature of the evolving threat, e.g. the SS-25. The bottom line is that we can expect today's rigid preplanned SIOP, requiring months to build and change, to be a thing of the past.⁴⁵

As General Goetze observed, deterrence based on 'a warfighting plan' has now been instituted in US strategic nuclear policy to the extent that the technical capabilities of the late 1980s permit.⁴⁶

⁴⁵ Major General Richard B. Goetze, 'SIOP - A Plan For Peace', *Combat Crew*, January 1987, p.15.

⁴⁶ *Ibid.*, p.13.

CHAPTER 4

THE STRATEGIC NUCLEAR BALANCE

During the 1970s, the Strategic Arms Limitation Talks (SALT) - notwithstanding their deficiencies - provided an effective means of managing the superpower strategic competition. SALT confirmed a situation of approximate parity or 'essential equivalence' in the strategic nuclear balance, placed ceilings on some strategic capabilities and hence removed these from the arena of competition, and established a forum - the Standing Consultative Commission (SCC) - for clarification and discussion of relevant strategic developments of concern to either side.

Unfortunately, however, the Strategic Arms Limitation agreements did not presage the transformation in international behaviour 'from rather rigid hostilities ... [to] restraint and creativity', which Henry Kissinger had announced in Moscow in May 1972.¹ It was another seven years before the SALT II Treaty was signed, in Vienna on 18 June 1979, and then, of course, the ratification procedures were aborted by President Carter in December 1979 when it had become apparent that the consent of the Senate was unlikely to be forthcoming.

Despite the failure to ratify the SALT II Treaty, both the United States and the Soviet Union have by and large continued to abide by its constraints. However, these constraints are far from comprehensive. They apply generally to quantitative rather than qualitative developments in the strategic balance and to only a portion of the nuclear forces in the American and Soviet arsenals. The firmest limits were placed only on the numbers of long-range ballistic missiles - intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs). Indirect, conditional, and rather looser constraints were placed on the payloads these ICBMs and SLBMs can carry, and on the numbers of long-range strategic bombers and their payloads. The constraints do not apply to delivery systems with ranges

¹ Hedrick Smith, 'Nixon and Brezhnev Close Talks With Joint Declaration of Peace', *New York Times*, 30 May 1972, p.18.

less than 5,500 km. And the agreements did not address qualitative developments relating to the long-range ballistic missile forces, such as the replacement of older systems with more capable modern ones and improvements in the accuracy with which missile warheads can be delivered - the single most important variable in determining the lethality of a weapon. However, it is with respect to developments in these very areas - missile accuracy and weapons systems of less than intercontinental range - that technology is currently the most dynamic and the implications for the stability of the strategic balance most disturbing.

A concern expressed at the highest levels in the United States in the early 1980s was that, primarily as a result of the continuing improvement of its SS-18 and SS-19 ICBMs, the Soviet Union had achieved strategic superiority over the United States - a superiority amounting to a dangerous 'window of vulnerability'. On 31 March 1982, for example, President Reagan claimed that 'on balance, the Soviet Union does have a definite margin of superiority' in nuclear weapons; and, somewhat less categorically, Secretary of Defense Caspar Weinberger said on 16 April 1982 that 'the Soviets have begun to build an edge of superiority'.² These claims could not be substantiated by any objective analysis; they were explicitly disavowed by two of Weinberger's predecessors, James Schlesinger and Harold Brown, and implicitly by the then Chairman of the Joint Chiefs of Staff, General David C. Jones, who testified that he would not trade US military strength for that of the Soviet Union.³ In April 1983, the President's Commission on Strategic Forces, headed by Lt.-Gen. Brent Scowcroft, effectively 'closed' the 'window of vulnerability' by concluding that the issue had been 'miscast', and that the vulnerability

² George C. Wilson, 'Weinberger Trims Reagan's Claim', *Washington Post*, 17 April 1982, p.A11.

³ George C. Wilson, 'Dissenter on Defense Spending Bill Contends Reagan the One Out of Step', *Washington Post*, 3 April 1982, p.A7; and Charles Mohr, 'Soviet Nuclear Superiority Disputed', *New York Times*, 1 May 1982, p.3.

of silo-based ICBMs was quite manageable when considered in the context of the US 'triad of forces' - the ICBMs, SLBMs and bombers.⁴

Because of asymmetries in the respective Soviet and US strategic nuclear forces, the Soviet Union is ahead in terms of some measures of capability and the United States is ahead in others. In the most critical areas, however, the United States retains significant superiority. Tables 3 and 4 provide a quantitative characterisation of US and Soviet strategic nuclear capabilities as at December 1987.

Overall, the US strategic nuclear force posture remains better balanced than the Soviet posture. The Soviet ICBM force contains more than 60 per cent of the total throw-weight of the Soviet strategic nuclear forces and more than 60 per cent of the total weapons fielded by those forces. On the other hand, the US ICBM force contains only a quarter of the total US throw-weight and only 17 per cent of the total US weapons, with SLBMs carrying one-third of the throw-weight and more than 40 per cent of the weapons, and the long-range bombers the rest.

Although the Soviet Union has more strategic nuclear delivery vehicles (SNDVs) than the United States - 2,475 compared with 2001 - the larger number of weapons carried by the American vehicles gives the United States a lead in total number of weapons of about 20 per cent - some 13,450 compared with some 11,180. Moreover, US warheads and bombs are generally more accurate than their Soviet counterparts. Some versions of the SS-18 and SS-19 ICBMs have been tested with a guidance system which provides an accuracy measured in terms of Circular Error Probable (CEP) as good as that of the INS-20 on the Minuteman III ICBMs (i.e., about 600 feet), but this guidance system has yet to be deployed on operational missiles. In the case of SLBMs and bomber-delivered weapons, the CEPs of the US systems are generally smaller than those of the Soviet Union by factors of two to five, and more than an order of magnitude in the case of air-launched cruise missiles (ALCMs). The one measure where the US lags is that of megatonnage, where the Soviet Union has a lead of about 35 per cent (some 5,465 MT compared with 4,028 MT), but it

⁴ See 'Report of the President's Commission on Strategic Forces (Excerpts), 11 April 1983', in *Survival*, (Vol.XXV, No.4), July/August 1983, pp.177-186.

TABLE 3
US STRATEGIC NUCLEAR FORCES,
DECEMBER 1987

	Number of Delivery Vehicles (SNDVs)	Number of Warheads (N)	Yield per Warhead (Y)	EMT per Warhead	CEP (feet)	CMP per Warhead	Total Number Warheads (N)	Total MT (NY)	Total EMT	Total CMP
ICBMs										
Minuteman II	450	1	1.20	1.1	1200	0.78	450	540	495	351
Minuteman III (Mark 12)	220	3	0.17	0.31	600	0.67	660	112.2	204.6	442.2
Minuteman III (Mark 12A)	300	3	0.335	0.48	600	1.34	900	301.5	432	1206
MX (Silo)	30	10	0.35	0.5	325	4.7	300	105	150	1410
Sub-Total	1000 (50)						2310 (17.2)	1058.7 (26.3)	1281.6 (24.1)	3409.2 (6.7)
SLBMs										
Poseidon C-3	256	10	0.04	0.12	1450	0.04	2560	102.4	307.2	102.4
Trident I C-4	384	8	0.1	0.22	1450	0.08	3072	307.2	675.84	245.76
Sub-total	640 (32)						5632 (41.9)	409.6 (10.2)	983.04 (18.5)	348.16 (0.7)
BOMBERS										
B-52 G (Penetration)	61	4 bombs	1	1	600	2.78	244	244	244	678.32
B-52G	90	4 bombs	1	0.31	1200	0.17	244	41.48	75.64	41.48
(Penetration and Standoff)		4 SRAMs	0.17	0.31	600	2.78	360	360	360	1000.8
B-52H	70	12 ALCMs	0.17	0.31	1200	0.17	360	61.2	111.6	61.2
(Penetration)		4 bombs	1	1	100	24.23	1080	183.6	334.8	26168.4
B-52H	20	4 SRAMs	0.17	0.31	600	2.78	280	280	280	778.4
(Penetration and Standoff)		4 bombs	1	0.31	1200	0.17	280	47.6	86.8	47.6
FB-111	56	12 ALCMs	0.17	0.31	600	2.78	80	80	80	222.4
B-1B (Penetration)	32	12 bombs	1	0.31	1200	0.17	80	13.6	24.8	13.6
B-1B (Penetration and Standoff)	32	2 SRAMs	0.17	0.31	100	24.23	240	40.8	74.4	5815.2
		12 SRAMs	0.17	0.31	600	2.78	224	224	224	622.72
		12 SRAMs	0.17	0.31	1200	0.17	112	19.04	34.72	19.04
		12 SRAMs	0.17	0.31	600	2.78	384	384	384	1067.52
		12 SRAMs	0.17	0.31	1200	0.17	384	65.28	119.04	65.28
		12 SRAMs	0.17	0.31	600	2.78	384	384	384	1067.52
		12 SRAMs	0.17	0.31	1200	0.17	384	65.28	119.04	65.28
		12 ALCMs	0.17	0.31	100	24.23	384	65.28	119.04	9304.32
Sub-total	361 (18)						5504 (40.9)	2559.2 (63.5)	3055.88 (57.4)	47039.08 (92.6)
TOTAL	2001						13446	4027.5	5320.52	50796.44

TABLE 4
SOVIET STRATEGIC NUCLEAR FORCES,
DECEMBER 1987

	Number of Delivery Vehicles (SNDVs)	Number of Warheads (N)	Yield per Warhead (Y)	EMT per Warhead	CBP (feet)	CBP per Warhead	Total Number Warheads (N)	Total MT (NY)	Total EMT	Total CMP
ICBMs										
SS-11 Sego M2	184	1	1	1	3750	0.07	184	184	184	13.88
SS-11 Sego M3	210	3	0.25	0.4	3750	0.03	630	157.5	252	18.9
SS-13 Savage M2	60	1	0.75	0.83	6000	0.02	60	45	49.8	1.2
SS-17 Sparker M3	139	4	0.75	0.83	1300	0.49	556	417	461.48	272.44
SS-18 Satan M4	308	10	0.55	0.67	800	1.05	3080	1694	2063.6	3234
SS-19 Stiletto M3	360	6	0.55	0.67	1000	0.67	2160	1188	1447.2	1447.2
SS-24 Scalpel	5	10	0.1	0.22	650	0.38	50	5	11	19
SS-25 Sickle	126	1	0.55	0.67	650	1.59	126	69.3	84.42	200.34
Sub-total	1392 (56.2)						6846 (61.2)	3759.8 (68.8)	4553.5 (67.7)	5205.96 (93)
SLBMs										
SS-N-6 Serb	272	2	0.375	0.52	4250	0.03	544	204	282.88	16.32
SS-N-8 Sawfly	292	1	1.0	1	3000	0.11	292	292	292	32.12
SS-N-17 Snipe	12	1	1.0	1	3500	0.08	12	12	12	0.96
SS-N-18 Stingray	224	7	0.2	0.34	2000	0.09	1568	313.6	533.12	141.12
SS-N-20 Sturgeon	80	7	0.1	0.22	1650	0.06	560	56	123.2	33.6
SS-N-23 Skiff	48	4	0.1	0.22	1650	0.06	192	19.2	42.24	11.52
Sub-total	928 (37.5)						3168 (28.3)	896.8 (16.4)	1285.44 (4.2)	235.64 (4.2)
BOMBERS										
Bear A	30	4 bombs	1	1	3000	0.11	120	120	120	13.2
Bear B/C	30	5 bombs	1	1	3000	1.11	150	150	150	16.5
Bear G	40	4 bombs	1	1	3000	0.11	160	160	160	17.6
		2 SRAMs	0.6	0.71	3000	0.08	80	48	56.8	6.4
Bear H	55	4 bombs	1	1	3000	0.11	220	220	220	24.2
		8 ALCMs	0.25	0.4	1500	0.18	440	110	176	79.2
Sub-total	155 (6.3)						1170 (10.5)	808 (14.8)	882.8 (13.1)	157.1 (2.8)
TOTAL	2475						11184	5464.6	6721.74	5598.7

should be noted that the Soviet advantage in megatonnage, which was a factor of two in the early 1980s, has diminished through the decade as the large, single 20-24 MT warheads on the SS-18 Mod 1 and Mod 3 ICBMs were replaced by much smaller (.55 MT) multiple warheads.

A wide range of indices have been developed for assessing the strategic balance, but all of them have deficiencies of greater or lesser significance. The two indices of greater general utility are equivalent megatonnage (EMT) and counter-military potential (CMP).

EMT is the most meaningful index of destructive capability against 'soft' or 'area' targets such as urban-industrial areas. Since destructive power does not increase proportionally with an increase in weapon yield, it is necessary to apply scaling factors to the nominal megatonnage of the various weapons in the US and Soviet strategic arsenals. Whenever the yield is equal to or less than one megaton, it is appropriate to raise it to the two-thirds power, reflecting the fact that a nuclear explosion occurs in three-dimensional space, whereas its damaging effects occur only along the dimensions of length and width. Even this discounting will tend to overvalue the destructive capability of large weapons as against combinations of relatively smaller weapons where the destructive capability can be more effectively distributed, so that yield should be raised to the 0.5 power in the case of weapons larger than one megaton.⁵

$$\begin{aligned} \text{EMT} &= Y^{2/3} \text{ where } Y \leq 1 \text{ MT} \\ \text{EMT} &= Y^{1/2} \text{ where } Y > 1 \text{ MT} \end{aligned}$$

According to this index, the Soviet Union has a total destructive capability against soft targets which is some 25 per cent greater than that of the US forces (6720 equivalent megatons compared with 5320). However, the strategic significance of this lead is problematical, since there is only a finite number of soft targets in both the Soviet Union and the United States. (In the Soviet Union, for example, more than

⁵ See Jeffrey T. Richelson, 'Evaluating the Strategic Balance', *American Journal of Political Science*, (Vol.24, No.4), November 1980, pp.795-819.

one-third of the population and nearly three-quarters of industrial production is concentrated in three hundred cities.⁶)

CMP is a useful gross index of the destructive capability of nuclear weapons against 'hard' or 'point' targets such as ICBM silos or underground command and control centres, although there are several important qualifications to its application in assessment of dissimilar force structures. It is a combined index of the explosive power of these weapons (discounted by an appropriate yield-scaling factor) and the accuracy with which they are expected to be delivered. For weapons with yield equal to or greater than 0.2 MT, the yield should be raised to the two-thirds power. However, in the case of lower yield weapons in a hard target context, the use of 0.66 scaling for yield leads to consistent overestimation of damage probabilities, and hence a scaling factor of 0.8 is used for weapons of less than 0.2 MT.⁷

$$\text{CMP} = \frac{Y^{2/3}}{(\text{CEP})^2} \quad \text{where } Y \geq 0.2 \text{ MT}$$

$$\text{CMP} = \frac{Y^{0.3}}{(\text{CEP})^2} \quad \text{where } Y < 0.2 \text{ MT}$$

The total CMP of the US strategic nuclear forces is currently some nine times greater than that of the Soviet forces. However, it must be noted that some 92 per cent of the US total CMP resides in the bomber force - which could take as long as 6-8 hours to reach its targets in the Soviet Union. In stark contrast, some 93 per cent of Soviet CMP resides in the ICBM force. If CMP is to be used effectively, at least against ICBM silos, or against submarine pens and bomber bases from which the submarines and bombers can quickly be put to sea or relocated to secondary airfields, then only prompt CMP - or the CMP of the respective ICBM forces - is of practical import. The prompt/ICBM CMP of the Soviet strategic nuclear force today is just over 50 per cent greater than that of the US force.

6 Secretary of Defense Harold Brown, *Department of Defense Annual Report Fiscal Year 1981*, (U.S. Government Printing Office, Washington, D.C., 1980), p.79.

7 See W.A. Barbieri, *Counter military Potential: A Measure of Strategic Offensive Force Capability*, (The RAND Corporation, Santa Monica, California, R-1314-PR, December 1973), pp.5-6.

Further, the effectiveness of a given amount of CMP depends on the hardness or blast resistance of the notional targets. In general, Soviet targets are rather harder than their US counterparts. Except for the NORAD headquarters under Cheyenne Mountain in Colorado and perhaps a handful of other underground command and control centres, the hardest sites in the United States are the Minuteman silos, most of which are hardened to about 2,000 psi. By far the great majority of other military targets (OMT), economic/industrial installations, and governmental/administrative centres in the United States have no special protection and would be destroyed by less than 25 psi blast overpressure. On the other hand, as noted above, some 30 per cent of Soviet ICBM silos are hardened to 6000-7200 psi, and another 30 per cent to about 4000 psi. Thousands of Soviet leadership relocation bunkers, military command posts, communications stations and associated control facilities have been hardened to greater than 600 psi, and more than 100 to greater than 1000 psi. The Soviet Union has also undertaken a program of hardening and dispersing key industrial facilities, to the point where significant counterforce capability must now be devoted to the destruction of the Soviet economic/industrial target set.

It is also important to note that today the Soviet Union maintains at least as many strategic nuclear weapons on alert as does the United States - about 7,200 warheads (even assuming that no Soviet bombers are kept on alert, whereas some 30 per cent of the US bomber force is on day-to-day alert).

With respect to the future of the strategic balance, there are essentially two basic possibilities. The first is that the current rates and patterns of US and Soviet strategic force deployments will continue, subject to the broad constraints established by SALT in the 1970s. This possibility is exemplified for 1995 in Tables 5 and 6, where projections have been made from current trends, informed by recent decisions and reasonable assumptions about decisions likely to be made in the next few years. In the US case (Table 5), it is assumed that deployment of the MX ICBM will have been completed (with 50 based in former Minuteman II silos and 50 operating in a rail-mobile mode); that regardless of any decision to proceed with deployment of a new small ICBM (SICBM), it would not be operational by 1995; that the Trident II D-5 SLBM will be operational aboard 19 Ohio-class submarines; that production of the B-1 bomber will be completed; and that some 60 B-2

TABLE 5
U.S. STRATEGIC NUCLEAR FORCES, 1995

	Number of Delivery Vehicles (SNDVs)	Number of Warheads (N)	Yield per Warhead (Y)	EMT per Warhead	CEP (feet)	CMP per Warhead	Total Number Warheads (N)	Total MT (NY)	Total EMT	Total CMP
ICBMs										
Minuteman II	450	1	1.2	1.1	1100	0.93	450	540	495	418.5
Minuteman III (Mark 12)	200	3	0.17	0.31	550	0.8	600	102	186	480
Minuteman III (Mark 12A)	300	3	0.335	0.48	550	1.59	900	301.5	432	1431
MX (Silo)	50	10	0.35	0.5	250	7.95	500	175	250	3975
MX (Rail)	50	10	0.35	0.5	250	7.95	500	175	250	3975
Sub-Total (%)	1050 (47.9)						2950 (18.8)	1293.5 (19.9)	1513 (19.7)	10279.5 (7.8)
SLBMs										
Trident I C-4	264	8	0.1	0.22	1200	0.11	2112	211.2	464.64	232.32
Trident II D-5	456	8	0.475	0.61	600	1.69	3648	1732.8	2225.28	6165.12
Sub-total (%)	720 (32.8)						5760 (36.6)	1944 (29.9)	2689.92 (32.8)	6397.44 (4.9)
BOMBERS										
B-52G (Penetration)	45	4 bombs	1	1	500	4	180	180	180	720
B-52G (Penetration)	75	4 SRAMs	0.17	0.31	1000	0.24	180	30.6	55.8	43.2
B-52G (Penetration and Standoff)		4 bombs	1	1	500	4	300	300	300	1200
B-52H (Penetration)	75	12 SRAMs	0.17	0.31	70	0.24	300	51	93	72
B-52H (Penetration and Standoff)		12 ALCMs	0.17	0.31	70	49.45	900	153	279	44505
B-52H (Penetration)	30	4 bombs	1	1	500	4	300	300	300	1200
B-52H (Penetration and Standoff)		4 SRAMs	0.17	0.31	1000	0.24	300	51	93	72
B-52H (Penetration and Standoff)		4 bombs	1	1	500	4	120	120	120	480
B-52H (Penetration and Standoff)		4 SRAMs	0.17	0.31	1000	0.24	120	20.4	37.2	28.8
B-52H (Penetration and Standoff)		12 ALCMs	0.17	0.31	70	49.45	360	61.2	111.6	17802
B-52H (Penetration and Standoff)		4 bombs	1	1	500	4	152	152	152	608
B-52H (Penetration and Standoff)		2 SRAMs	0.17	0.31	1000	0.24	76	12.92	23.56	18.24
B-52H (Penetration and Standoff)		12 bombs	1	1	500	4	600	600	600	2400
B-52H (Penetration and Standoff)		12 SRAMs	0.17	0.31	1000	0.24	600	102	186	144
B-52H (Penetration and Standoff)		12 bombs	1	1	500	4	600	600	600	2400
B-52H (Penetration and Standoff)		12 SRAMs	0.17	0.31	1000	0.24	600	102	186	144
B-52H (Penetration and Standoff)		12 ALCMs	0.17	0.31	70	49.45	600	102	186	2967
B-52H (Penetration and Standoff)		4 bombs	1	1	500	4	240	240	240	960
B-52H (Penetration and Standoff)		4 SRAMs	0.17	0.31	1000	0.24	240	40.8	74.4	57.6
B-52H (Penetration and Standoff)		4 ALCMs	0.17	0.31	70	49.45	240	40.8	74.4	11868
Sub-total (%)	423 (19.3)						7008 (44.6)	3259.7 (50.2)	3891.96 (47.5)	114392.8 (87.3)
TOTAL	2193						15718	6497.2	8194.88	131069.8

TABLE 6
SOVIET STRATEGIC NUCLEAR FORCES, 1995

	Number of Delivery Vehicles (SNDVs)	Number of Warheads (N)	Yield per Warhead (Y)	EMT per Warhead	CEP (feet)	CMF per Warhead	Total Number Warheads (N)	Total MT (NY)	Total EMT	Total CMF
ICBMs										
SS-11 Sego M2	65	1	1	1	3500	0.08	65	65	65	5.2
SS-11 Sego M3	95	3	0.25	0.4	3500	0.03	285	71.25	114	8.55
SS-18 Satan M4	128	10	0.55	0.67	600	1.86	1280	704	857.6	2380.8
SS-18 Satan M5	180	10	0.75	0.83	600	2.29	1800	1350	1494	4122
SS-19 Stiletto M3	266	6	0.55	0.67	800	1.05	1596	877.8	1069.32	1675.8
SS-24 Scalpel	185	10	0.1	0.22	400	0.99	1850	185	407	1831.5
SS-25 Sickle	425	1	0.55	0.67	400	4.2	425	233.75	284.75	1785
Sub-total	1344 (50.4)						7301 (43.7)	3486.8 (46.7)	4291.67 (46.6)	11808.85 (85.4)
SLBMs										
SS-N-8 Sawfly	292	1	1	1	2800	0.13	292	292	292	37.96
SS-N-17 Snipe	12	1	1	1	3300	0.09	12	12	12	1.08
SS-N-18 Stingray	224	7	0.2	0.34	1500	0.15	1568	313.6	533.12	2355.2
SS-N-20	240	7	0.1	0.22	1250	0.1	1680	168	369.6	168
SS-N-23 Skiff	192	4	0.1	0.22	1250	0.1	768	76.8	168.96	76.8
Sub-total	960 (36)						4320 (25.9)	862.4 (11.6)	1375.68 (3.8)	519.04 (3.8)
BOMBERS										
Bear G	70	4 bombs	1.0	1	2000	0.25	280	280	280	70
		2 SRAMs	0.6	0.71	2000	0.18	140	84	99.4	25.2
Bear H	175	4 bombs	1.0	1	2000	0.25	700	700	700	175
		8 ALCMs	0.25	0.4	1000	0.4	1400	350	560	560
Blackjack	40	8 bombs	1	1	2000	0.25	320	320	320	80
(Penetration)		8 SRAMs	0.6	0.71	2000	0.18	192	192	227.2	57.6
Blackjack	80	8 bombs	1	1	2000	0.25	640	640	640	160
(Penetration)		8 SRAMs	0.6	0.71	2000	0.18	384	384	454.4	115.2
and Standoff)		8 ALCMs	0.25	0.4	1000	0.4	640	160	256	256
Sub-total	365 (13.7)						5080 (30.4)	3110 (41.7)	3537 (38.4)	1499 (10.8)
TOTAL	2669						16701	7459.2	9204.35	13826.89

Advanced Technology Bombers (ATBs) will be in service. On the Soviet side (Table 6), it is assumed that deployment of the SS-25 Sickle land-mobile ICBM will continue at the present rate of 50 per year, matched by a compensatory phase-out of obsolete SS-11 and SS-13 ICBMs; that deployment of the large SS-24 Scalpel ICBM will proceed at a rate of about 30 per year, matched by a compensatory phase-out of the SS-17 force; and that production of the Bear H and Blackjack bombers will proceed at a rate of approximately 20 per year. The most noteworthy conclusions are that while both the US and the Soviet Union will enjoy net increases in their numbers of SNDVs and warheads, the Soviet Union will retain its lead in SNDVs and will, for the first time ever, surpass the US in numbers of strategic nuclear warheads and bombs; that the Soviet Union will remain ahead with respect to both megatonnage and EMT; and that, while both the US and Soviet CMP totals increase markedly, nearly 90 per cent of the US figure continues to reside in its bomber force while some 85 per cent of the Soviet figure will reside in its ICBM force, maintaining a Soviet advantage in prompt counter-military potential. Further, about 8,650 US warheads would be maintained on alert, as compared to some 8,290 Soviet ICBM and SLBM warheads, or more than 9,800 Soviet warheads if it is assumed that the Soviets move to place some 30 per cent of their bomber force on alert as well.

The second possibility for the 1990s is that there will be some agreement on 'deep cuts' in US and Soviet strategic nuclear forces, along the lines of the so-called 50 per cent cuts discussed and in part agreed in the Strategic Arms Reduction Talks (START) in 1987. This possibility is exemplified in Tables 7 and 8.

There are several important points to note about the strategic balance under a 50 per cent START regime. To begin with, the respective US and Soviet force structures would not be simply a truncated version of those that would obtain in the absence of START. The sub-ceiling of 4,900 warheads on ICBMs and SLBMs agreed at the summit meeting in December 1987 will require extensive changes in both the Soviet and US force structures, while the proposed counting equipped with ALCMs will be charged with 10 ALCMs regardless of the number actually carried. Hence, although the B-52G, B-1B and Blackjack bombers could be used as both penetrating bombers and as

TABLE 7
US STRATEGIC NUCLEAR FORCES, 50% START

	Number of Delivery Vehicles (SNDVs)	Number of Warheads (N)	Yield per Warhead (Y)	EMT per Warhead	CEP (feet)	CMP per Warhead	Total Warheads (N)	Total MT (NY)	Total EMT	Total CMP
ICBMs										
Minuteman III	148	3	0.335	0.48	600	1.34	444	148.74	213.12	594.96
MX Rail	50	10	0.35	0.5	325	4.7	500	175	250	2350
MX Silo	50	10	0.35	0.5	325	4.7	500	175	250	2350
Sub-total (%)	248 (23.5)						1444 (13.5)	498.74 (9.5)	713.12 (11.2)	5294.96 (7.4)
SLBMs										
Trident II D-5	432	8	0.475	0.61	600	1.69	3456	1641.6	2108.16	5840.64
Sub-total (%)	432 (40.9)						3456 (32.3)	1641.6 (31.2)	2108.16 (33)	5840.64 (8.1)
BOMBERS										
B-52G	60	4 bombs	1	1	500	4	240	240	240	960
		4 SRAMs	0.17	0.31	1000	0.24	240	40.8	74.4	57.6
B-52H	84	4 bombs	1	1	500	4	336	336	336	1344
		12 ALCMs	0.17	0.31	70	49.45	1008	171.36	312.48	49845.6
B-1B	100	12 bombs	1	1	500	4	1200	1200	1200	4800
		12 SRAMs	0.17	0.31	1000	0.24	1200	204	372	288
B-2	132	6 bombs	1	1	500	4	792	792	792	3168
		6 SRAMs	0.17	0.31	1000	0.24	792	134.64	245.52	190.08
Sub-total (%)	376 (35.6)						5808 (54.2)	3118.8 (59.3)	3572.4 (55.9)	60653.28 (84.5)
TOTAL	1056						10708	5259.1	6393.68	71788.88

TABLE 8
SOVIET STRATEGIC NUCLEAR FORCES, 50% START

	Number of Delivery Vehicles (SNDVs)	Number of Warheads (N)	Yield per Warhead (Y)	EMT per Warhead	CEP (feet)	CMF per Warhead	Total Number Warheads (N)	Total MT (NY)	Total EMT	Total CMP
ICBMs										
SS-18 Satan MS	154	10	0.75	0.83	600	2.29	1540	1155	1278.2	3526.6
SS-24 Scalpel (Rail)	100	10	0.1	0.22	400	0.99	1000	100	220	990
SS-25 Sickle (Land)	248	1	0.55	0.67	400	4.2	248	136.4	166.16	1041.6
Sub-total (%)	512 (47.1)						2788 (31)	1391.4 (29.5)	1664.36 (30)	5558.2 (81.4)
SILBMs										
Typhoon SS-N-20	80	10	0.1	0.22	1250	0.1	800	80	176	80
Delta III SS-N-18	160	7	0.2	0.34	1500	0.15	1120	224	380.8	168
Delta IV SS-N-23	48	4	0.1	0.22	1250	0.1	192	19.2	42.24	19.2
Sub-total (%)	288 (27)						2112 (23.5)	323.2 (6.8)	599.04 (3.9)	267.2 (3.9)
BOMBERS										
Bear H	75	4 bombs	1	1	2000	0.25	300	300	300	75
		8 ALCMs	0.25	0.4	1000	0.4	600	150	240	240
Blackjack	200	8 bombs	1	1	2000	0.25	1600	1600	1600	400
		8 SRAMs	0.6	0.71	2000	0.18	1600	960	1136	288
Sub-total (%)	275 (25.8)						4100 (45.6)	3010 (63.7)	3276 (59.1)	1003 (14.7)
TOTAL	1065						9000	4724.6	5539.4	6828.4

ALCM carriers, there is a strong incentive to configure them solely as penetrating bombers in order to maximize the number of weapons that can be carried.⁸

Second, although there is a common perception that the objective of START is 50 per cent reductions in strategic nuclear forces - or reductions to a common ceiling of 6,000 strategic weapons - it is clear that because the START counting rules significantly undercount deployed weapons, the actual number of weapons that each side will maintain will be much greater than 6,000.⁹ According to the counting rules proposed by the US, for example, a B-1B bomber equipped with 24 weapons and a Blackjack bomber equipped with 16 weapons, if configured for penetration rather than ALCM missions, would each count for only one weapon. Hence, the total number of warheads likely to be maintained by the US and the Soviet Union is around 10,700 and 9,000 respectively - or only 20 per cent fewer than those maintained in December 1987, and in fact no less than those in the US and Soviet strategic nuclear arsenals when the 'deep cuts' were first proposed by President Reagan in May 1982!

Third, although there is a common perception that START is supposed to enhance the stability of the global strategic balance, in fact the postures likely to result from the START process will have intrinsic problems with respect to stability, and the process of transition from current numbers to the postulated START levels could well give rise to further disturbing possibilities. For example, START does nothing to help the survivability of silo-based ICBMs. As at December 1987, the US had 1,000 ICBM silos, threatened by some 5,972 SS-17, SS-18, SS-19, SS-24 and SS-25 warheads - i.e. about six warheads per silo. START would reduce the number of US ICBM silos to some 198, with a further 50 MX ICBMs deployed on 25 trains, which would be threatened by some 2,788 SS-18, SS-24 and SS-25 warheads - i.e. some 12.5 warheads per silo and train!

⁸ US Congress, House Committee on Armed Services, Defense Policy Panel, *Breakout, Verification and Force Structure: Dealing With The Full Implications of START*, (U.S. Government Printing Office, Washington, D.C., 1988), pp.21-23.

⁹ *Ibid.*, p.24.

A similar situation pertains with respect to the SLBM forces.¹⁰ As at December 1987, the Soviet Union maintained 61 SSBNs with 928 SLBMs and 3,168 warheads, while the US had 36 SSBNs with 640 SLBMs and 5,632 warheads. It is likely that START will reduce these numbers to some 17 SSBNs with 2,112 warheads in the Soviet case and perhaps 18 SSBNs with 3,456 warheads in the US case. Given that something like these numbers eventuate, then the anti-submarine warfare (ASW) resources devoted to each SSBN will be increased dramatically - by a factor of two in the case of US SSBNs and a factor of about 3.5 in the case of Soviet SSBNs!

This could well represent the greatest increment in counter-SSBN ASW capability since SSBNs were first deployed more than a quarter of a century ago - comparable to the long-feared but always improbable technological breakthrough that would greatly reduce SSBN invulnerability and hence greatly reduce strategic stability based on the assured destructive capability of SSBN forces.

And, fourth, the US and Soviet force postures that are likely to emerge from the current START process pose significant problems for verification and increase the potential for 'breakout' from the Treaty limits.¹¹ There are, to begin with, major uncertainties with respect to the number of Soviet ICBMs, SLBMs and bomber weapons that have actually been produced, as opposed to those currently deployed. This could amount to several thousand weapons above and beyond those included in START. In addition, the START counting rules understate the potential weapons loadings for several strategic systems. The SS-18 ICBM, for example, could be loaded with 14 warheads rather than the 10 it is assigned, and this would be virtually impossible to detect through satellite coverage. Similarly, the SS-N-23 Skiff SLBM can be equipped with 10 warheads rather than the four it is assigned. Numerous additional ALCMs could also be produced for subsequent deployment on the Blackjack bombers or on large transport planes. As

¹⁰ See Desmond Ball, 'Some Implications of Fifty Per Cent Reductions in Strategic Nuclear Forces for Sea-Based Systems', in Sverre Lodgaard (ed.), *Naval Forces: Arms Restraint and Confidence Building*, (Sage Publications, forthcoming, 1989).

¹¹ See US Congress, House Armed Services Committee, Defense Policy Panel, *Breakout, Verification and Force Structure: Dealing With The Full Implications of START*.

the Defense Policy Panel of the US House Armed Services Committee has noted,

In a worst case scenario ..., the Soviet Union could generate 4,200 additional ICBM warheads, 4,600 SLBM warheads, and 2,000 additional ALCMs, for a breakout total of about 10,800 additional weapons. While such figures are high [indeed, they would exceed the permitted START total], they are not out of the question and should not be ruled out in planning for U.S. security.¹²

CHAPTER 5

AUSTRALIA AND THE GLOBAL STRATEGIC BALANCE

Although the consequences of a global nuclear war would be very much less severe for the southern than for the northern hemisphere, Australia could not but be profoundly affected. It would be an event so horrific that the psychological consequences would match the physical destruction. There would be little security in the aftermath of a global nuclear war.

Just as Australia could not escape the consequences of global nuclear war, neither can it avoid a role in seeking to ensure that nuclear war remains a remote possibility. So long as deterrence provides the only means to this end, Australia has a responsibility to dedicate meaningful effort to the design of a more stable global strategic balance. As the Prime Minister, Mr Hawke, stated on 6 June 1984,

The risk of nuclear war [is] remote and improbable, provided effective deterrence is maintained.

Australians cannot claim the full protection of that deterrence without being willing to make some contribution to its effectiveness.¹

For the longer term, Australia has a responsibility to contribute to the design and implementation of arms control and disarmament efforts not just at ensuring a more stable balance but also of reducing nuclear stockpiles to levels where, should nuclear war nevertheless occur, the global consequences would be much less horrendous than those which would presently obtain. Radical but realistic reductions in nuclear arsenals is a reasonable goal for the 1990s.

¹ Mr R.J. Hawke, 'Ministerial Statement: Arms Control and Disarmament', *Hansard (House of Representatives)*, 6 June 1984, p.2987.

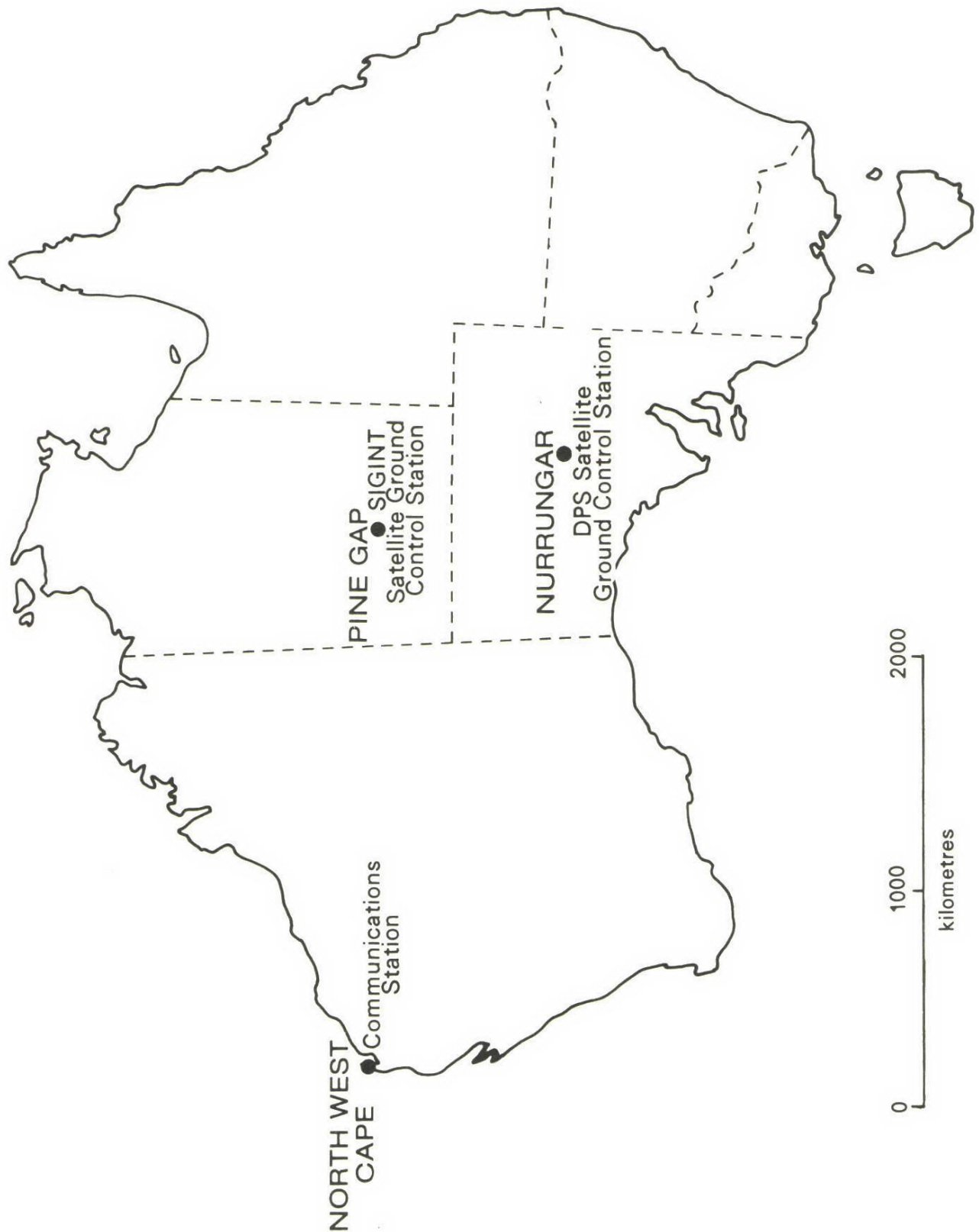
Australia has a direct connection to the global strategic balance through the infrastructure support and services which it provides to the United States. Most importantly, Australia hosts various facilities which provide substantial support to the US strategic nuclear posture, including:

- the communications station at North West Cape, W.A., which was originally established to provide communications for US FBM submarines operating in the western Pacific, but which now provides more general communications support for the US Department of Defense and Services, as well as the Royal Australian Navy (RAN).
- The satellite ground control station at Pine Gap, near Alice Springs, N.T., which controls US geostationary SIGINT satellites designed to monitor signals emanating from the Soviet Union - including signals associated with the development of advanced weapons systems by the Soviet Union. The collection and analysis of these signals is a primary means of verification of Soviet compliance with arms control agreements.²
- the satellite ground station at Nurrungar, S.A., which controls US Defense Support Program (DSP) satellites stationed over the eastern hemisphere (DSP-E) to provide early warning of Soviet ballistic missile launches and to monitor nuclear detonations (NUDETs).³
- other lesser facilities, which provide information for the US Ocean Surveillance Information System (OSIS); support the US navigation and geodetic satellite programs; monitor underground nuclear detonations; and provide other support services.

² See Desmond Ball, *Pine Gap: Australia and the US Geostationary Signals Intelligence Satellite Program*, (Allen & Unwin, Sydney, 1988).

³ See Desmond Ball, *A Base For Debate: The US Satellite Station at Nurrungar*, (Allen & Unwin, Sydney, 1987).

FIGURE 10
US FACILITIES IN AUSTRALIA



These connections and contributions raise a variety of extremely important issues which should be addressed in any discussion of Australia and the global strategic balance, including the nature of and requirements for effective deterrence; the conditions for the achievement of meaningful arms control; and the extent and nature of the Australian commitment to deterrence and arms control.

Warfighting and Deterrence

The Australian Labor Government supports a system of mutual deterrence between the United States and the Soviet Union based on the concept of 'assured destruction', whereby 'each side must be quite certain that if it attacks first, it will surely be destroyed by a retaliation from the other side'.⁴ The Australian Labor Government opposes nuclear war-fighting and limited nuclear war doctrines and capabilities, primarily on the ground that 'to prepare to fight a limited nuclear war, or to prepare to fight and win a war, is in fact to make nuclear war more thinkable and therefore more possible'. And it has urged both the United States and the Soviet Union to reject 'the idea of nuclear war-fighting in the way they go about deploying their weapons and in the new technologies they are developing'.⁵

The Government's particular formulation of deterrence has several quite debilitating problems. In the first place, it is unrealistic. Neither the Soviet Union nor the United States has ever accepted 'assured destruction' as a basis for deterrence, notwithstanding some periodic US declarations, and neither are they ever likely to - for good and sound reasons. At least since the 1950s, each have targeted the other's military capabilities much more than their economic and industrial infrastructure. Each has sought to be able to limit damage in the event of a strategic nuclear exchange, albeit through different strategies. The Government's formulation has placed it in uneasy opposition to the central themes of US strategic nuclear policy which for political reasons it must support. And it has made at least part of

⁴ Bill Hayden, Minister for Foreign Affairs, *Uranium, The Joint Facilities, Disarmament and Peace*, (Australian Government Publishing Service, Canberra, 1984), p.12.

⁵ *Ibid.*, pp.12-13.

its justification for hosting the US facilities, which have undeniable warfighting characteristics, untenable.

At least since 1950, when first priority in US targeting policy was given to 'the destruction of known targets affecting the Soviet capability to deliver atomic bombs', US strategy has been overwhelmingly counterforce in character.⁶ There has never been a time when more than 40 per cent of US targets have been economic/industrial targets. Even SLBMs, which have typically lacked the yield, accuracy and command and control requirements for hard-target counterforce operations, have generally been directed at military targets - whether ports, airfields, or the 'softer' portion of the spectrum of Soviet ICBM silos. And for more than a quarter of a century, the prime mission of US attack submarines - which still receive communications from North West Cape - has been the destruction of Soviet missile-carrying submarines.

US strategic planners have not been reluctant to characterise their war plans as essentially 'warfighting'. For example, General Bennie L. Davis, Commander-in-Chief Strategic Air Command (CINCSAC) testified before the US Senate Committee on Armed Services in February 1982 as follows:

We [are going] from a strategy of assured destruction to one which stresses war fighting capability (that is, the priority targeting of military and leadership targets).

...

[Question:] What is our strategic policy called now, in place of mutually assured destruction?

Counterforce..., or 'war fighting', the two are synonymous.⁷

⁶ See Desmond Ball, *Targeting for Strategic Deterrence*, (Adelphi Papers No.185, International Institute for Strategic Studies, London, Summer 1983), p.6.

⁷ US Congress, Senate Armed Services Committee, *Department of Defense Authorization for Appropriations for Fiscal Year 1983*, (U.S. Government Printing Office, Washington, D.C., 1982), Part 7, pp.4159, 4241.

And as General Goetze has stated with respect to the SIOP,

The SIOP... is a war plan - a warfighting plan.⁸

And other US strategic planners have stated quite specifically, on various occasions, that some of the C³I systems with which Australia is involved are concerned with 'warfighting'.

This is particularly the case with regard to the DSP system for which Nurrungar is the primary Overseas Ground Station (OGS).⁹ The DSP system supports nuclear warfighting strategies in several important respects. In the first place, the DSP infrared system is capable not just of detecting that ICBMs have been launched (i.e. of providing early warning of missile attacks), but also of identifying the locations of particular launch sites and hence of providing information which the US can use to re-target its own ICBMs away from the empty holes to the remaining Soviet ICBMs. Second, the DSP infrared system is designed to provide an assessment of the scale and purpose of a Soviet attack which is not required for the purposes of 'assured destruction' but which permits the US to formulate commensurate responses. And, third, the nuclear detonation (NUDET) detection sensors aboard the DSP satellites are able to provide real-time information on the location of US detonations over the Soviet Union in order to assess the impact of US nuclear strikes and inform subsequent retargeting. In testimony to Congress on 10 March 1982, General Bernard P. Randolph (the Director of Space Systems and Command, Control and Communications Research in the US Air Force) was quite unequivocal in his description of this capability of the NUDET detection sensors:

[It] is very critical for the force management in the sense of making efficient use of our forces....

When we try to destroy hard targets in the Soviet Union, we are able to demonstrate or to understand our success in destroying those hard targets and, therefore, not have to go back to re-strike

⁸ Major General Richard B. Goetze, 'SIOP - a Plan For Peace', *Combat Crew*, January 1987, p.13.

⁹ See Ball, *A Base For Debate*, pp.70-74.

those targets, and we can re-target in near real-time...
It is a war-fighting capability.¹⁰ [Emphasis added.]

And, more generally, General James V. Hartinger, then Commander of the US Air Force Space Command, stated in an address to the US Air Force Association on 18 November 1983 that 'the [DSP] satellite early warning system ... is tied formally into the warfighting structure'.¹¹

The point is not just that some aspects of the facilities in Australia support warfighting. It is that, given the realities of nuclear strategy, it would be absurd to expect that they did not. The real issues for consideration are whether or not these particular warfighting attributes enhance or undermine deterrence, and whether or not, in the event that deterrence fails, these capabilities might be useful in controlling escalation before it proceeds to an all-out strategic nuclear exchange.

There are sound strategic reasons why US nuclear employment policies and plans should contain limited options and should accord priority to counterforce operations. To begin with, given the realities of Soviet war-fighting doctrine, the ability to deny Soviet military objectives through the destruction of Soviet military forces and war-fighting capabilities must be an essential ingredient of a deterrence policy. Second, a strategic posture which could do nothing other than threaten the Soviet urban-industrial base would lack credibility, and ensure that the United States would be self-deterred, in most of the more realistic nuclear contingencies. And, third, notwithstanding the rhetoric of 'assured destruction' as the guarantor of the nuclear peace, it would be irresponsible for US policy-makers to deny themselves the capacity to limit damage to the United States in the event that nuclear war nevertheless occurs. Moreover, the ability of the US to emerge from a nuclear exchange with less damage

¹⁰ US Congress, Senate Armed Services Committee, *Department of Defense Authorization for Appropriations for Fiscal Year 1983*, (U.S. Government Printing Office, Washington, D.C., 1982), pp.4624-4625.

¹¹ Cited in Edgar Ulsamer, 'The Threat in Space', *Air Force Magazine*, (Vol.67, No.3), March 1984, p.128.

FIGURE 11
US AIR FORCE DEFENSE SUPPORT PROGRAM (DSP) EARLY
WARNING SATELLITE

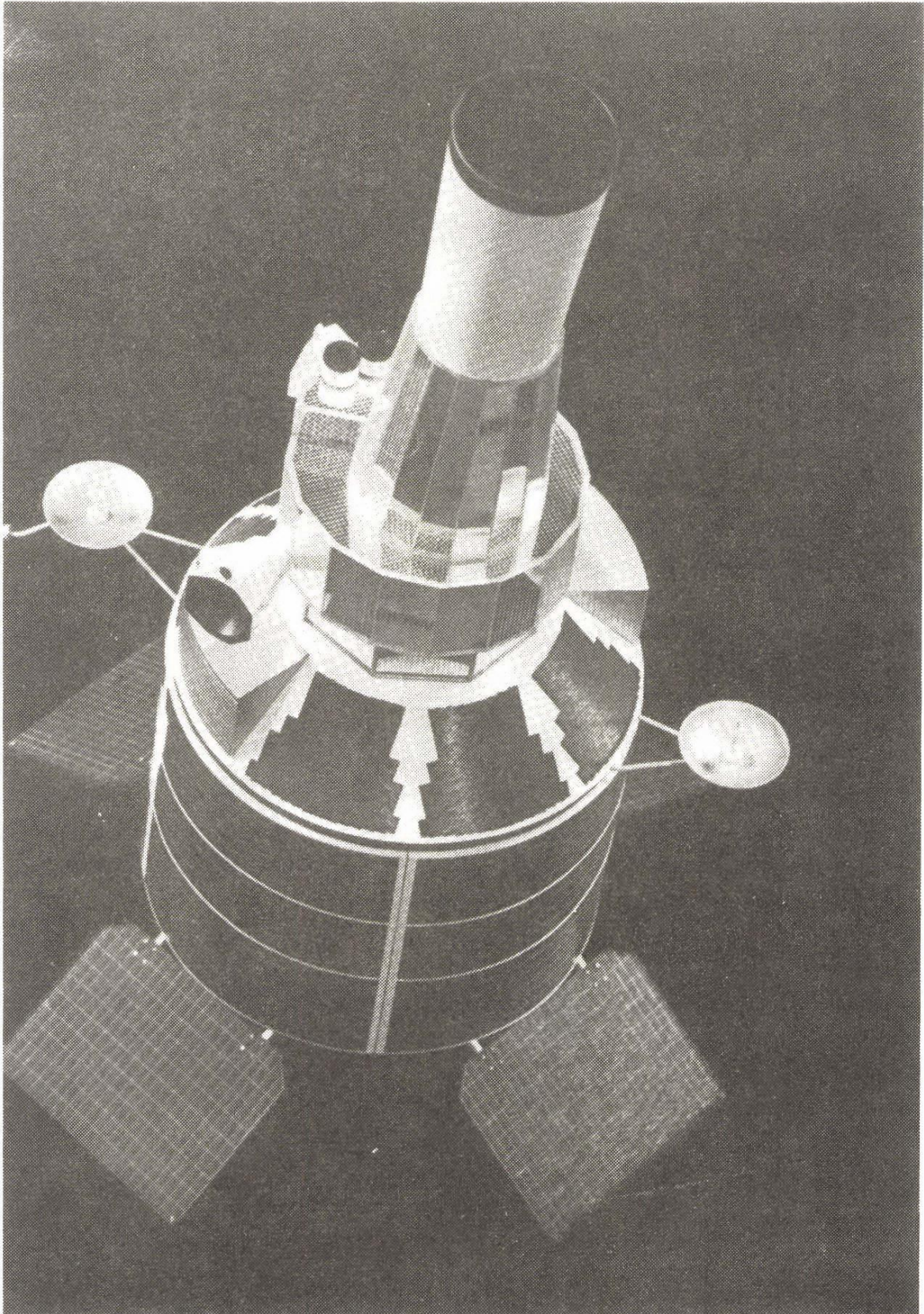


FIGURE 12
US AIR FORCE DEFENSE SUPPORT PROGRAM (DSP) GROUND
SEGMENT

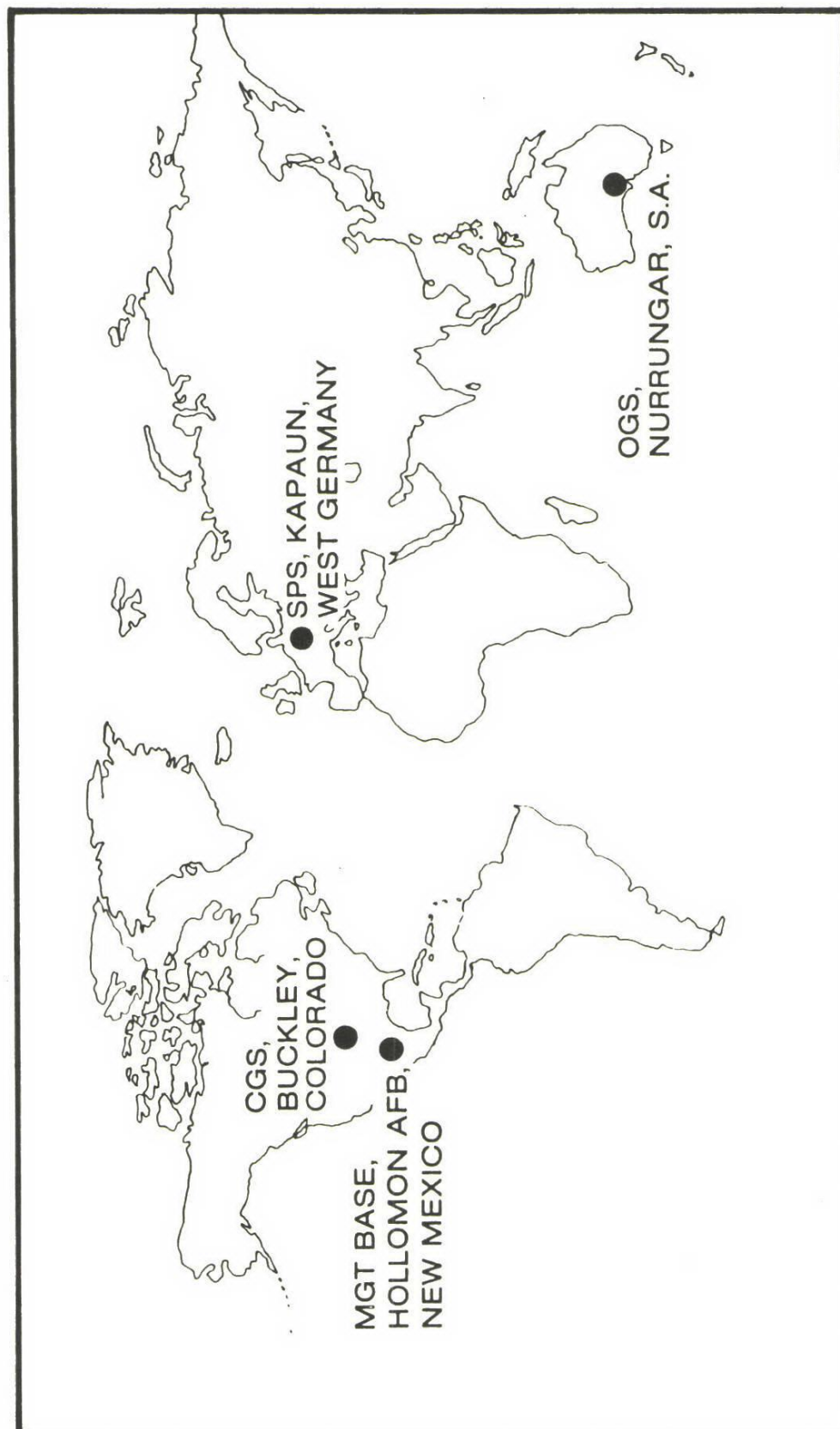


FIGURE 13
US AIR FORCE DEFENSE SUPPORT PROGRAM (DSP) GROUND
SEGMENT

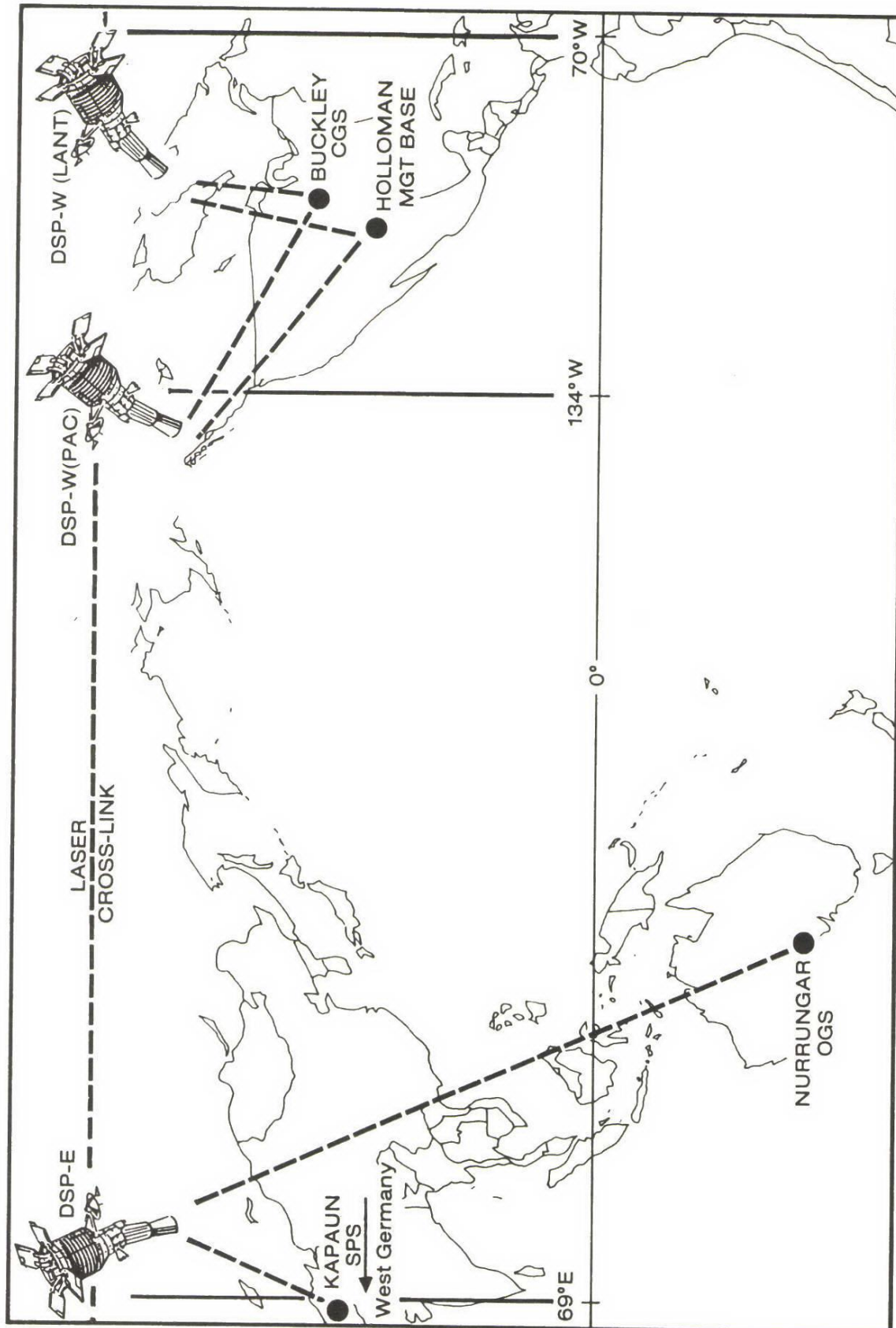
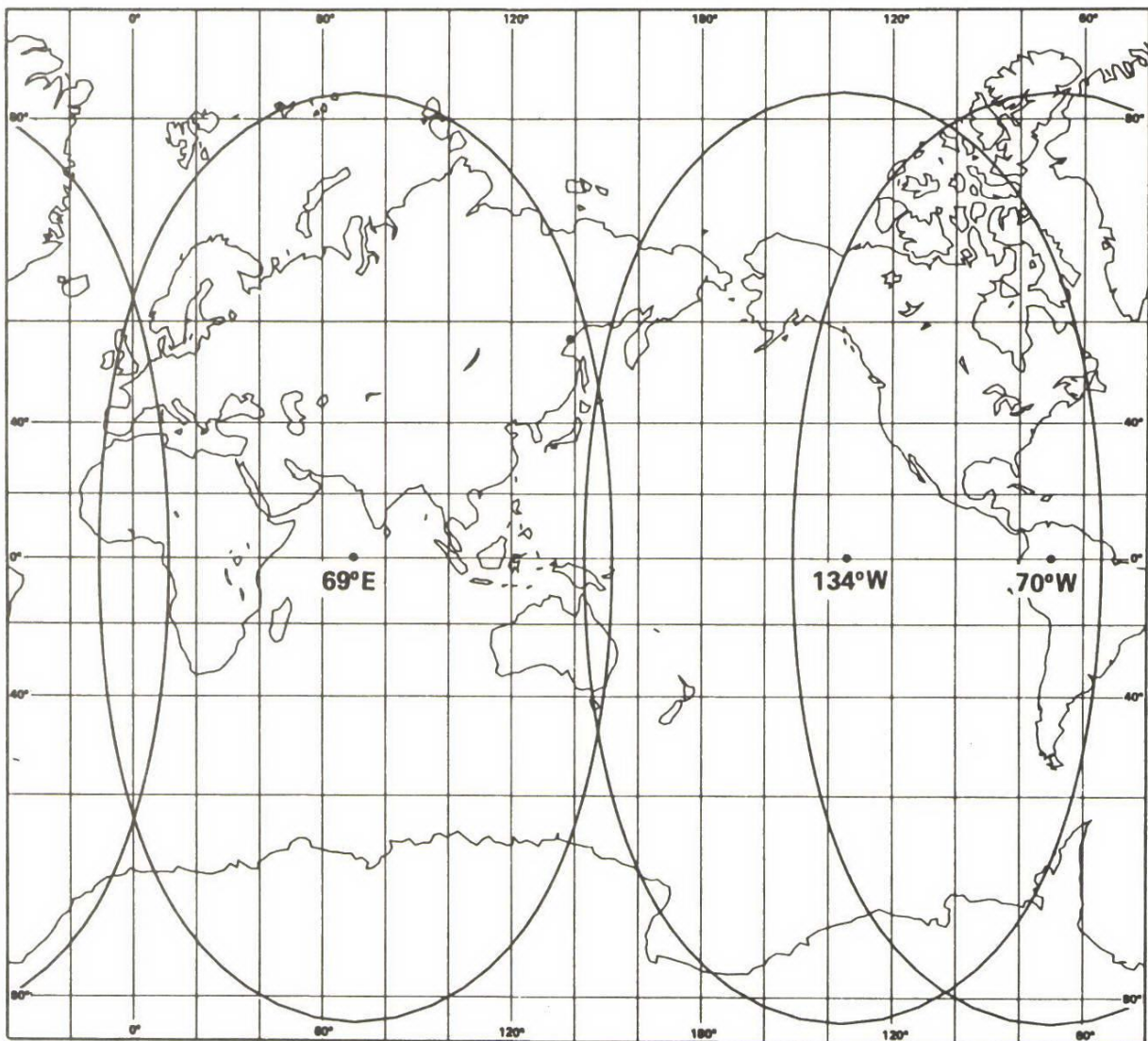


FIGURE 14
US AIR FORCE DSP OVERSEAS GROUND STATION (OGS),
NURRUNGAR, SOUTH AUSTRALIA



Source: Australian Department of Defence.

FIGURE 15
US AIR FORCE DEFENSE SUPPORT PROGRAM (DSP)
SATELLITE COVERAGE. THE DSP-E SATELLITE STATIONED
AT 69°E IS CONTROLLED FROM NURRUNGAR, SOUTH
AUSTRALIA



than the Soviet Union would itself provide a powerful deterrent to Soviet initiation of such an exchange.

Many aspects of recent developments in US warfighting plans and capabilities are profoundly disturbing. The Government is correct in calling attention to the fact that some aspects of warfighting policies make nuclear war more possible. But some aspects also support deterrence. The issue for debate is not 'deterrence versus warfighting', but which warfighting capabilities should be criticised and which should be endorsed. It is where to draw the line within the spectrum of warfighting capabilities.

Arms Control Verification

None of the US facilities in Australia were established to support the arms control and disarmament process. However, some of them were designed to collect intelligence on particular weapons developments which subsequently became subject to bilateral US-Soviet or international arms control agreements, and their capabilities became important elements of the verification systems required to monitor compliance with these agreements. For example, the Joint Geological and Geophysical Research Station (JGGRS) at Alice Springs was originally established under a secret agreement with the United States in 1954-55 'as a part of a world-wide system designed to observe the Soviet atomic test program'.¹² It subsequently became an important seismic station for monitoring compliance with the Limited Test Ban Treaty (LTBT) of 1963, the Non-Proliferation Treaty (NPT) of 1970, and the Threshold Test Ban Treaty (TTBT) of 1974, and would have an important verification role in any future Comprehensive Test Ban (CTB).¹³

¹² Note from the Australian Department of External Affairs to the American Embassy, 2 June 1955, in Desmond Ball, *A Suitable Piece of Real Estate: American Installations in Australia*, (Hale & Iremonger, Sydney, 1980), Annex D, p.171. See also pp.83-90.

¹³ See Desmond Ball, 'The Comprehensive Test Ban (CTB) Treaty: A Role for Australia', in Desmond Ball and Andrew Mack (eds.), *The Future of Arms Control*, (Australian National University Press, Sydney, 1987), pp.234-235.

The most important facilities in Australia with respect to verification of arms control and disarmament agreements are the satellite ground stations at Pine Gap and Nurrungar. In July 1984, Mr Bill Hayden, the then Foreign Minister, stated that:

Pine Gap and Nurrungar are irreplaceable for this purpose. It's highly unlikely that some major arms control agreements between the Superpowers would have been reached if it had not been for these two facilities.¹⁴

And, more recently, on 22 November 1988, the Prime Minister, Mr Hawke, told Parliament that it was an 'undoubted fact' that, without Pine Gap and Nurrungar, 'the INF [Intermediate-range Nuclear Forces] Treaty could not have been signed and the START process would not have 'got underway'.¹⁵

There is considerable hyperbole in these statements. The two facilities differ significantly with respect to both the particular arms control agreements and provisions they monitor and also the extent to which alternative monitoring capabilities exist or could be established as well as the possibilities for their relocation.

The DSP system is involved in verification as a secondary mission to its primary early warning purpose. As the Government has noted, the nuclear detonation (NUDET) detection sensors aboard the DSP satellites provide 'information about the occurrence of nuclear explosions, which assists in nuclear test ban monitoring and supports nuclear non-proliferation measures'.¹⁶ It should also be noted that the NUDET sensors are in fact able to detect more than a hundred detonations a second, indicating that they were really designed for warfighting situations rather than to monitor individual nuclear

¹⁴ Bill Hayden, 'Uranium, Joint Facilities, Disarmament and Peace', (Address to the National Press Club, Canberra, 4 July 1984), Transcript, p.8.

¹⁵ R.J. Hawke, 'Parliamentary Statement by the Prime Minister on the Joint Defence Facilities', 22 November 1988, (Mimeo), p.3.

¹⁶ R.J. Hawke, 'Ministerial Statement: Arms Control and Disarmament', *Hansard (House of Representatives)*, 6 June 1984, p.2987.

tests.¹⁷ Moreover, the NUDET sensors aboard the DSP satellites are less capable in several ways than those currently being deployed aboard the Global Positioning System (GPS) satellites. The GPS NUDET Detection System (NDS) will provide complete global coverage, whereas the DSP satellites have large gaps of coverage over the polar areas, the Norwegian Sea, and parts of the south Pacific and south Atlantic Oceans. The GPS/NDS system will also be more accurate than the DSP system. And since the GPS satellites will be able to communicate with each other by means of a UHF data crosslink, there will be no need (as there is in the case of the present DSP/NUDET detection system) for an Overseas Ground Station like Nurrungar for data readout purposes. In other words, by the early 1990s when the GPS/NDS system is fully operational, the Australian Government will no longer be able to argue that Nurrungar plays a critical role in supporting the test ban and non-proliferation arms control regimes.¹⁸

Nurrungar had a clear role in monitoring Soviet compliance with the Treaty on the Elimination of Intermediate-range and Shorter-range Missiles, more commonly known as the INF Treaty, signed on 8 December 1987, under which the Soviet Union agreed to destroy its complete arsenal of 1,836 deployed and stored intermediate-range and shorter-range missiles (and the US its 867 equivalent missiles). Article X, Section 5 of the Treaty provided that 'each Party, shall have the right [by 1 December 1988] ... to eliminate by means of launching no more than 100 of its intermediate-range missiles'.¹⁹ The Soviets chose to eliminate 72 SS-20 IRBMs by this means, launching them from bases

17 Glenn Sorpette, 'Monitoring the Tests', *IEEE Spectrum*, (Vol.23, No.7), July 1986, p.64.

18 See Andrew Mack, 'Arms Control and the Joint US/Australian Defence Facilities', in Desmond Ball and Andrew Mack (eds.), *The Future of Arms Control*, Chapter 10.

19 Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles, 8 December 1987, Article X, Section 5.

at Kansk (near Krasnoyarsk) and Drovyanaya (near Chita).²⁰ The 'live destruction' of these 72 missiles was monitored by the DSP-E satellite controlled from Nurrungar. However, it was not necessary for these missiles to be destroyed in this way. There was no necessary reason why these 72 missiles could not have been destroyed by the same means that the other 1,764 missiles were destroyed.

Nurrungar would also have a role in any future arms control agreement that intends to prohibit development and testing of new missiles and testing of old missiles, since the DSP infrared sensors would be able to indicate that new or different propellants were being used or that prohibited missiles were being tested.

However, Nurrungar is not irreplaceable for this purpose, since the DSP system does not require a ground station in Australia. The ground station for the DSP-E satellites could be located anywhere in the area between about 10°W to about 150°E. In the late 1960s, when the DSP architecture was being designed, consideration was given to establishing the Overseas Ground Station (OGS) at Andersen Air Force Base in Guam. And, in fact, an alternative ground station to Nurrungar was established at Kapaun in West Germany in 1982.²¹ A satellite-to-satellite laser communications crosslink has also been developed to enable data from the DSP-E satellite to be transmitted back to the United States via the DSP satellite stationed over the Pacific, thus obviating the need for any ground station in this region.²²

The satellite ground station at Pine Gap is a different matter. The unique ability of US geostationary SIGINT satellites to continuously monitor the telemetry transmitted during Soviet ballistic missile tests, from launch through to re-entry, is essential to verification of the SALT limitations and would be equally essential to any START regime. The ability of the satellites to monitor radar emissions has also been critical to verification of the Anti-ballistic Missile (ABM) Treaty of 1972. These satellites would certainly also be involved in monitoring compliance with any future ban on the

²⁰ Theresa M. Foley, 'INF Missile Destruction Accelerates in U.S., Europe', *Aviation Week and Space Technology*, 24 October 1988, p.22.

²¹ See Ball, *A Base For Debate*, pp.59-62, 90-91.

²² *Ibid.*, pp.90-91.

FIGURE 16
US GEOSTATIONARY SIGNALS INTELLIGENCE (SIGINT)
SATELLITE

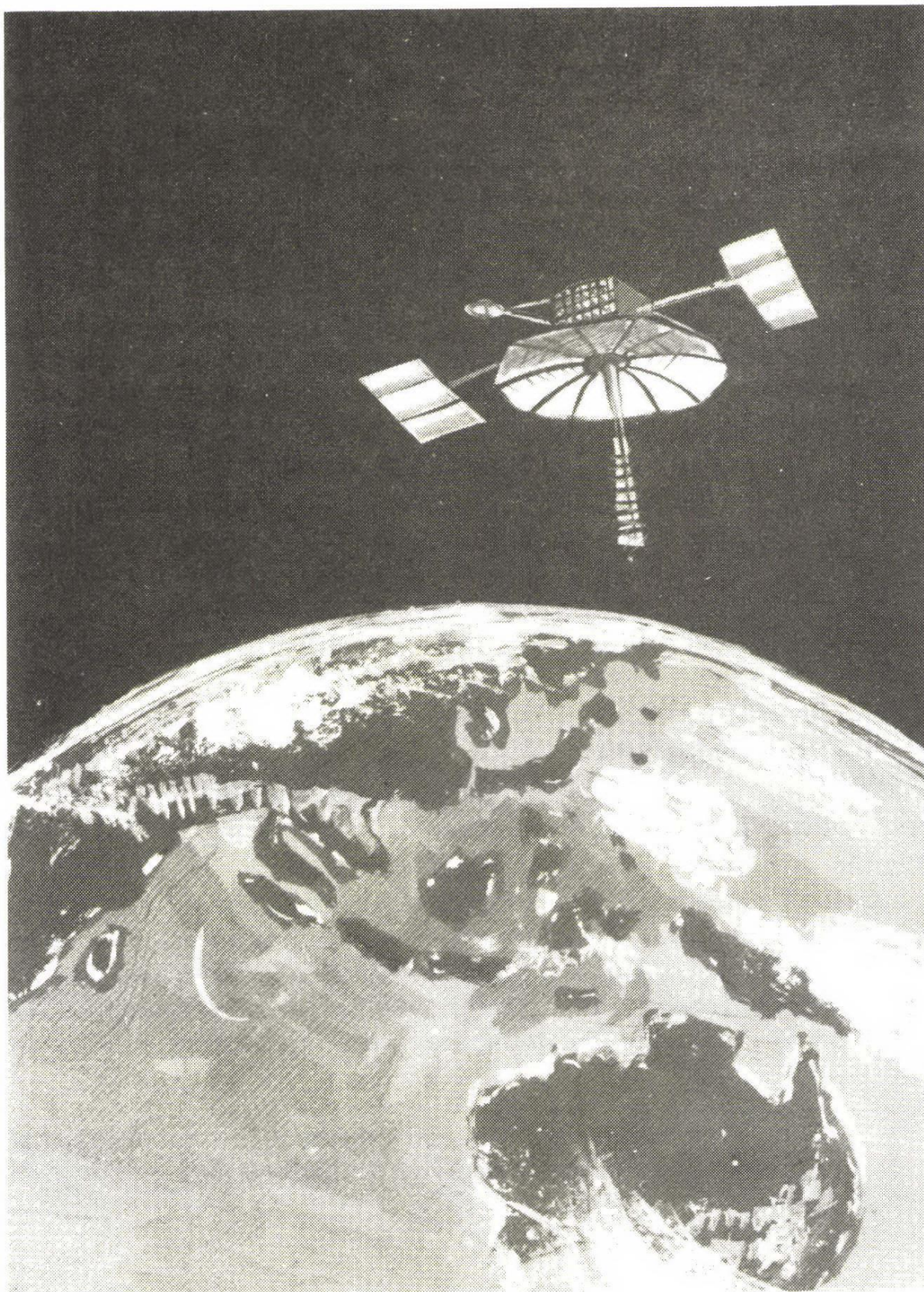


FIGURE 17
US GEOSTATIONARY SIGINT SATELLITE COVERAGE

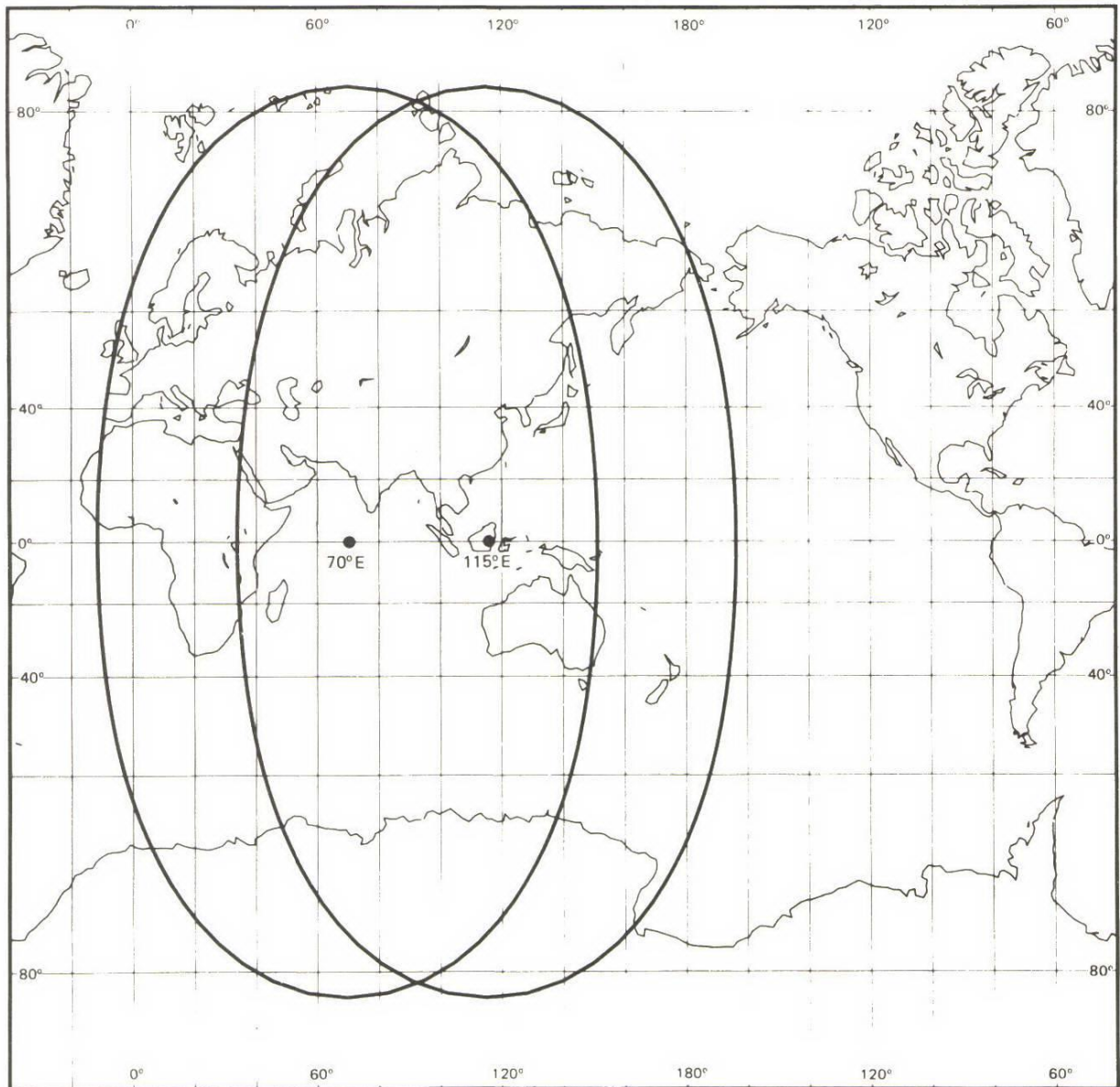


FIGURE 18
US GEOSTATIONARY SIGINT SATELLITE GROUND CONTROL
STATION, PINE GAP, NORTHERN TERRITORY



Source: Australian Department of Defence.

development and deployment of anti-satellite (ASAT) systems. Moreover, it is essential for the effective and efficient operation of the US geostationary SIGINT satellite program that the ground control station be located in Australia. Pine Gap is therefore irreplaceable for arms control verification. It is simply not possible to seriously support arms control and disarmament and at the same time argue for the closure of the Pine Gap station.²³

Arms Control, Disarmament and Stability

The classic goals of arms control are three-fold: first, to reduce the risks of war; second, to reduce the costs of war; and, third, to limit the burden of defence expenditure. These are not easy to achieve simultaneously. For example, policies and postures which reduce the costs of war could tend to make war 'more thinkable and therefore more possible'.²⁴ And some measures designed to secure a more stable strategic balance could well involve the development of expensive new weapons systems. The debate about arms control and disarmament in Australia has generally proceeded without reference to these dilemmas.

The agreement to eliminate intermediate-range and shorter-range missiles was almost universally applauded in Australia. For the first time, the US and the Soviet Union agreed to the elimination of a whole class of nuclear weapons systems and to 'not have such systems thereafter'²⁵ - although the numbers of weapons amounted to only about five per cent of the total nuclear weapons in the US and Soviet arsenals, and there is no assurance that the warheads and/or the fissile material will not be salvaged for use in new weapons production. The agreement also included unprecedented verification provisions, including totally new procedures for intrusive on-site inspections of missile production plants, operating bases and support facilities. On

²³ See Ball, *Pine Gap*, pp.29-50, 90-95.

²⁴ Bill Hayden, *Uranium, The Joint Facilities, Disarmament and Peace*, p.13.

²⁵ Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles, 8 December 1987, Article 1.

the other hand, national technical means of verification (NTMV) remain the most important means of monitoring compliance. More generally, however, it is doubtful whether the security of Europe - the theatre where the intermediate- and shorter-range missiles were primarily deployed - has been significantly enhanced by the elimination of these missiles. For one thing, many of the targets previously covered by these missiles have now been covered by other missiles - such as SS-N-6 SLBMs aboard Yankee submarines and variable-range SS-25 ICBMs. Second, the US intermediate-range forces were strategically the most useful of all the nuclear weapons in Europe. They provided the most visible 'coupling' of European with US security, as well as the most direct contribution to deterrence within the theatre. And, third, the elimination of these systems is likely to make more difficult the elimination of the short-range battlefield nuclear weapons, which contribute little to deterrence and are a dangerous source of crisis instability.²⁶ In my view, the removal of these weapons should have been the prior objective.

The START proposals have also been generally endorsed by Australia. Some aspects of them are quite positive - in particular, the sub-limit which has been agreed on the heavy Soviet ICBMs, which provide the bulk of Soviet prompt hard-target counter-military capability. On the other hand, the actual scale of the reductions likely to be effected is much less than is commonly perceived; the stability of the global strategic balance is unlikely to be enhanced and could well be lessened; and there will be no reduction in expenditures on strategic forces. Indeed, the respective US and Soviet postures likely to emerge from the START process will include large-scale deployments of expensive new weapons systems. Moreover, substantial appropriations will be required to provide new satellite verification systems to monitor compliance with the Treaty. This could amount to as much as \$5-6 billion per year.

There is a requirement for much more sober study and analysis of these issues, and for more informed public debate in this country, before we decide the extent and strength of our endorsement of current arms control proposals.

²⁶ See Desmond Ball, *Controlling Theater Nuclear War*, (Working Paper No.138, Strategic and Defence Studies Centre, Australian National University, Canberra, 1987).

Other Arms Control Possibilities

There are several other arms control areas where Australian initiatives could well have some impact in Washington. One, for example, is that relating to a proposed agreement limiting the US and Soviet naval presence in the Indian Ocean. Negotiations between the US and the Soviet Union concerning such a proposal were suspended in 1978-79, but Australia could play a useful role in pressing for the resumption of those negotiations. Second, there are currently no negotiations concerning arms control and confidence-building in the Pacific comparable to those currently underway in Europe. It would be quite legitimate for Australia to take the initiative with the preparation of an agenda to institute such negotiations in this region. Third, Australia could further increase its efforts and monitoring capabilities in support of a Comprehensive Test Ban (CTB).

A Public Debate on Australia and the Global Strategic Balance

The stability of the global strategic balance, and Australia's connections to it, should be subjects of lively and informed Australian public policy debate. The issues are critical to the security and well-being of all Australians. How likely is global nuclear war? What can Australia do to reduce the possibility? What can Australia do to reduce the economic and psychological burdens of the global nuclear competition? These issues have moral and political as well as strategic and security dimensions. They are extremely complex. There are no easy answers.

Unfortunately, the public debate on these subjects has been very unsatisfactory. It has tended to focus almost entirely on the US facilities rather than address the more fundamental strategic issues. It has been characterised much more by political assertions than by objective study and analysis. It has also been characterised by misinformation, wishful thinking and half-truths.

The primary responsibility for the unsatisfactory state of the public debate lies with the Australian Government. Only once - in June-July 1984 - has the Government attempted to publicly articulate its position concerning deterrence and strategic stability, and even this

attempt amounted to less than half a dozen paragraphs and was superficial and simplistic.²⁷ There has been no official discussion of the requirements of deterrence or the conditions for meaningful arms control. With respect to the US facilities themselves, successive governments, for more than three decades, have treated the public with disdain, presumption and paternalism. The establishment of the facilities in Australia and their subsequent operations proceeded under an official cover of extraordinary secrecy, evasion, and deception.

The Hawke Labor Government has moved some significant distance in correcting this situation. In June 1984 it disclosed, officially for the first time, that 'among the functions performed [at Pine Gap and Nurrungar] are the provision of early warning by receiving from space satellites information about missile launches, and the provision of information about the occurrence of nuclear explosions'.²⁸ This was an implicit admission of Australia's involvement in the US Defense Support Program (DSP). But it was only implicit; moreover, it did not address the warfighting attributes of the DSP system; and the statement ignored the function and capabilities of the Pine Gap station. In March 1987, the White Paper on *The Defence of Australia* presented to Parliament by the Minister for Defence, Mr Beazley, acknowledged that 'the most important part of the US early warning system with which we are involved is known as the Defense Support Program [DSP]'.²⁹ Finally, on 22 November 1988, the Prime Minister acknowledged that Nurrungar was in fact the satellite ground station used for controlling DSP satellites, while Pine Gap is 'a satellite ground

27 See R.J. Hawke, 'Ministerial Statement: Arms Control and Disarmament', *Hansard (House of Representatives)*, 6 June 1984, pp.2982-2989; and Bill Hayden, *Uranium, The Joint Facilities, Disarmament and Peace*, pp.11-13.

28 R.J. Hawke, 'Ministerial Statement: Arms Control and Disarmament', *Hansard (House of Representatives)*, 6 June 1984, p.2987.

29 Kim C. Beazley, Minister for Defence, *The Defence of Australia 1987*, (Australian Government Publishing Service, Canberra, 1987), p.12.

station whose function is to collect intelligence data'.³⁰ This statement clarifies, officially for the first time, the particular roles of Pine Gap and Nurrungar. However, it falls far short of the amount of authoritative information about the facilities and their functions which is known to the Soviet Union, and, at least in the case of Nurrungar and the DSP system, far short of information officially released in the United States. More importantly, it falls short of the amount of official information required to support an informed public debate in this country on the facilities, their operations, and their implications.

There is, however, now no impediment to the Government proceeding to a comprehensive and thorough statement on Australia and the global strategic balance. The essential elements for such a debate have now been placed on the public record. The Government should now move to prepare and publish a Policy Discussion Paper which would serve as the basis for lively and informed public debate on the whole question of Australia and the global strategic balance.

³⁰ R.J. Hawke, 'Parliamentary Statement by the Prime Minister on the Joint Defence Facilities', 22 November 1988, (Mimeo), pp.2-3.

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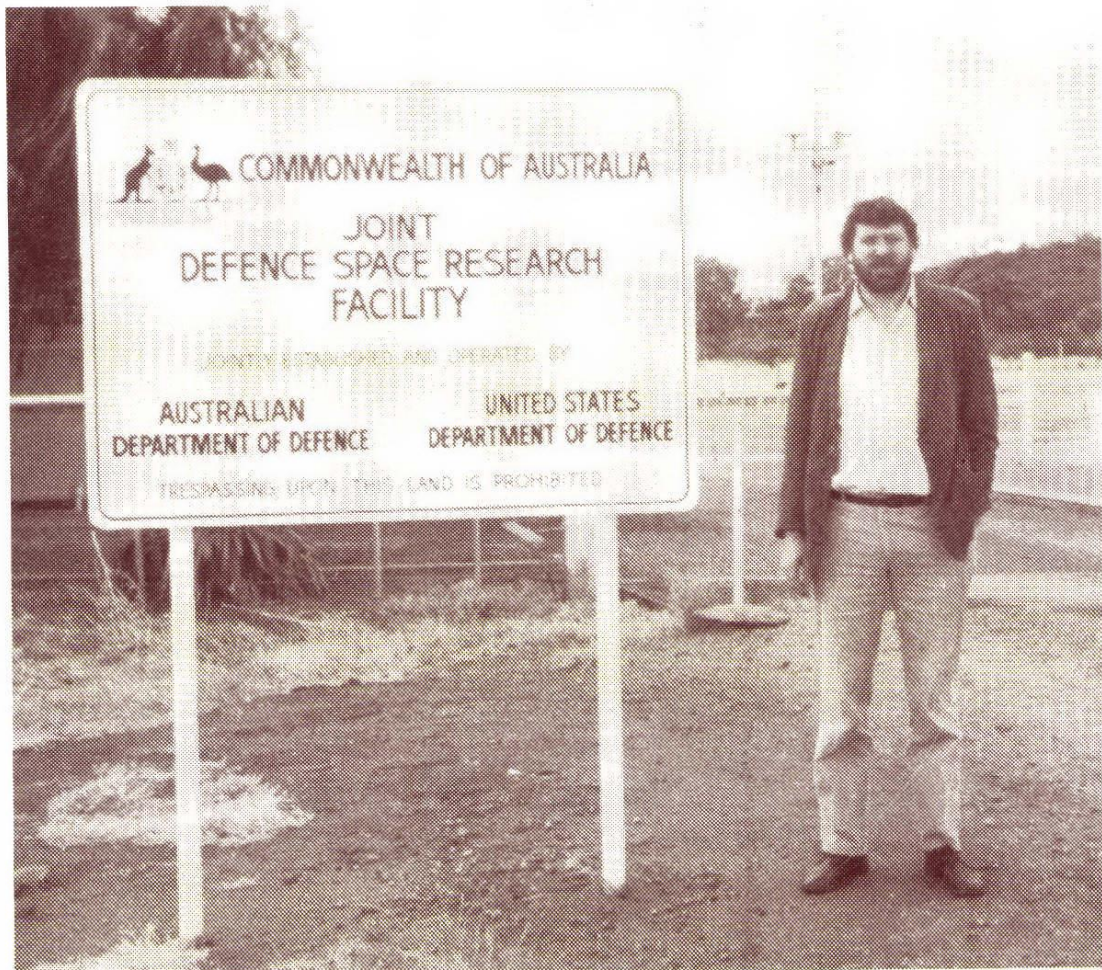
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