OUTER SPACE—A NEW DIMENSION OF THE ARMS RACE. Edited by Bhupendra Jasani.* London: Taylor and Francis, Ltd. (Published for the Stockholm International Peace Research Institute) 1982. Pp. xviii, 423.

The purpose of the Stockholm International Peace Research Institute (SIPRI) is to present an in-depth analysis of the pressing aspects of the arms race as it has been extended from the earth's surface into the far reaches of outer space.[1] Although men of goodwill seek to utilize space and its untapped resources, the reality of the present arms race is that the primary emphasis of the two superpowers has been placed on military aspects—both defensive and aggressive.[2] Every third day, the United States or the USSR launches one of its satellites. Since the first military satellite was orbited more than twenty years ago, nearly 2,000 spacecraft have circled the earth for military purposes—reconnaissance, communications, navigation, weather forecasting, and early warning of an attack by enemy missiles.[3] One of the underlying themes of the book is the inescapable fact that these classes of missiles, supposedly designed for peaceful purposes, are equally adaptable to military applications and even to aggressive warfare. As has been recognized by SIPRI, the control and use of outer space is absolutely indispensable to future military superiority.[4] With the possible entry of China, France, and other industrialized states, the potential for future destruction by space-borne nuclear devices becomes awesome. One of the book's major contributions is that the relationship between the accelerating arms build up in space and the

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[1] OUTER SPACE—A NEW DIMENSION OF THE ARMS RACE at v (B. Jasani ed. 1982) [hereinafter cited as OUTER SPACE—ARMS RACE].

[2] *See, e.g.*, OUTER SPACE—ARMS RACE, *supra* note 1, at 41-89. *See also* McDonald, *Navigation Satellite Systems: Their Characteristics, Potential and Military Applications*, in *id.* at 155-88.

[3] *Id.* at 119.

[4] On a yearly basis, SIPRI has systematically reviewed and evaluated the accelerating military activity in space. See in particular the review of space activities from 1971 to 1980 in Jasani, *A Decade of Military Uses in Outer Space*, 1981 YEARBOOK ON ARMAMENTS AND DISARMAMENT 121-44 (Stockholm International Peace Research Institute). *See also id.* at 279-93; *Military Use of Outer Space*, 1982 YEARBOOK ON ARMAMENTS AND DISARMAMENT 291-315 (Stockholm International Peace Research Institute).

proliferation of strategic nuclear devices is clearly recognized.[5] These two topics are inseparable. As such, this book, in its opening portions, brings out clearly and objectively the significance of the control of space to conventional military operations: a modern military force would be at the mercy of an adversary if its position in space were disrupted. Even retaliation would be precluded if navigation, defensive, and communications satellites were disabled.[6]

The book is divided into two main parts, and the excellent appendices are so extensive that they could be deemed to function as a third major section. Part I, written by Dr. Jasani, is a critical analysis of the papers (and subsequent discussion) presented at a SIPRI symposium in which twenty scientists, lawyers, and diplomats from twelve states analyzed the militarization of space. This group also took the additional step of proposing arms control and disarmament measures. Precise plans to create international machinery utilizing the technology of the major space powers are included. Dr. Jasani and several of the participants recommend that[7] new organizations, drawing upon the personnel and resources of the various agencies presently engaged in the space field, should be created. It has also been proposed that the United Nations

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[5] *E.g.*, Gormley, Book Review, 14 VAND. J TRANSNAT'L. L. 687 (1981) (reviewing STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE, NUCLEAR ENERGY AND NUCLEAR WEAPON PROLIFERATION (1979)). *See also* Gormley, Book Review, 12 GA. J. INT'L. & COMP. L. 459 (1982) (reviewing STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE, INTERNATIONALIZATION TO PREVENT THE SPREAD OF NUCLEAR WEAPONS (1980)); STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE, THE NPT: THE MAIN POLITICAL BARRIER TO NUCLEAR WEAPON PROLIFERATION (1980)); STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE, NUCLEAR RADIATION IN WARFARE (1982).

[6] *See* OUTER SPACE—ARMS RACE, *supra* note 1, at 41-90; *Contribution of Space Technology to the Arms Race*, in *id.* at 91-104. *See also* Blair, *Reconnaissance Satellites*, in *id.* at 125-34; Perry, *Identification of Military Components Within the Soviet Space Programme*, in *id.* at 135-54; McDonald, *Navigation Satellite Systems: Their Characteristics, Potential and Military Applications*, in *id.* at 155-88; Biglieri, *System Aspects in Military Satellite Communications*, in *id.* at 189-96; Sakata & Shimoda, *Image Analysis and Sensor Technology for Satellite Monitoring*, in *id.* at 197-214; Orhaug & Forssell, *Information Extraction from Images*, in *id.* at 215-28.

[7] *See, e.g.*, Nahin, *Orbital BMD and the Space Patrol*, in *id.* at 241-48; Kautzleben, *Some Remarks on U.S. and Soviet Strategies Concerning Manned Activities in Outer Space*, in *id.* at 249-56; Felder, *Recent Advances in the Use of Space for Military Purposes and on Second Generation Nuclear Weapons*, in *id.* at 257-64; Santhanam, *Use of Satellites in Crisis Monitoring*, in *id.* at 265-74; Abdel-hady & Sadek, *Verification Using Satellites, Feasibility of an International or Multinational Agency*, in *id.* at 275-96; Goedhuis, *What Additional Arms Control Measures Related to Outer Space Could Be Proposed?*, in *id.* at 297-310; Hafner, *Anti-Satellite Weapons: The Prospects for Arms Control*, in *id.* at 311-24. For a brief examination of the Soviet proposal for a treaty limiting weapons in outer space, see Bogdanov, *Banning All Weapons in Outer Space*, in *id.* at 325-30.

COPUOS deal with the demilitarization of space because it possesses the highest degree of competence of any existing United Nations organ. The United States opposes this solution on the supposition that COPUOS would exceed its mandate and competence.[8] When dealing with newer areas of law, it is often desirable to utilize existing institutions rather than to seek additional global structures, notwithstanding that the proposed new organs may be theoretically superior. Both solutions are examined by Dr. Jasani and the distinguished participants.

Part I also provides the reader with the necessary technical information concerning the type of equipment presently utilized in space. As is true of the series of SIPRI books, the underlying scientific data is first presented. The hardware, including launch vehicles, of the United States and USSR necessarily dominate, but the development of similar hardware by such nations as China, France, and Japan is examined to the fullest extent possible, despite the secrecy surrounding such space activities.[9]

Beginning with Chapter Four,[10] the book focuses on military programs, especially those of the United States and USSR, but also of China and France. Major topics include the use of manned vehicles, with emphasis on the military applications of the space shuttle, and the perfection of defensive anti-satellite (ASAT) systems. One topic discussed by several of the participants is the use of ASAT devices (e.g. beam weapons). In this context, questions involving ballistic missile defense (BMD) are also placed at issue. In terms of international law, is it legal under the 1967 Outer Space Treaty for the space powers to employ national verification schemes even within the framework of an international monitoring organization? Similarly, would an organization, even a United Nations agency, have the jurisdiction under existing agreements to employ ASAT and BMD systems? In other words, which satellites may be placed in orbit, even for non-aggressive or defensive purposes? The issue of surveillance and defensive weaponry in space and the methods that might be legally utilized to destroy attacking missiles become the concern of several authors.[11] Similar concern is expressed toward the effect on earth of nuclear explosions and con-

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[8] *See* Goedhius, *What Additional Arms Control Measures Related to Outer Space Could Be Proposed?*, in *id.* at 302.

[9] *See, e.g., id.* at 30-40 *passim.*

[10] OUTER SPACE—ARMS RACE, supra note 1, at 41.

[11] *See id.* at 63-83 *passim.*

tamination in space.

Part II contains the detailed papers, the majority of which are worthy of serious consideration. The limited scope of this review precludes an individual analysis of all the suggestions that are offered to reduce and eventually limit all military activities in space. Specific proposals seek the use of national schemes of verification, the adoption of additional space and disarmament conventions, the more effective utilization of COPUOS to deal with military questions, the creation of new United Nations organs that will draw upon the resources of existing agencies, and ultimately the creation of new international institutions with jurisdiction and power beyond the present United Nations structure. Of course, the desired goal is the absolute banning of all weapons in space and the recognition of an unlimited "peaceful sea" within the cosmos.

Collectively, the fifteen papers present the type of technical explanation that is required by lawyers and decision-makers[12] and that is typical of the material set forth in the series of SIPRI books. Beginning with the Eighth Paper, *Orbital BMD and the Space Patrol,* by P.J. Nahin,[13] specific plans are offered. The suggestion is advanced that a space patrol be established, consisting of armed, orbiting platforms "that would be based on the space knowledge and skills of the USA and USSR, but, and most importantly, they would be operated by elite crews selected from all nations of the world."[14] The competence of this space patrol would arise from a treaty. Fundamental to the success of this scheme would be a ban on the possession of certain classes of weapons by state parties. The space patrol would have the mission to destroy attacking thermo-nuclear ballistic missiles, destroy warplanes in flight, engage naval surface forces, and to defend itself from attack. As is true of the several proposals advanced in this book, a consensus among all states would be required; an international convention would have to be adopted and observed in good faith; an international military force would be required; and a supranational type of organization would be mandatory, which undoubtedly would have jurisdiction beyond existing United Nations structures. The obvious drawback is the political climate within the United Nations and the increasing tension between the space powers.[15]

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[12] *E.g.*, Blair, *Reconnaissance Satellites*, in *id.* at 125-33.

[13] *Id.* at 241.

[14] Nahin, *supra* note 7, at 244.

[15] *Id.* at 246.

Of special significance is K. Santhanam's paper, *The Use of Satellites in Crisis Monitoring*,[16] for the reason that reconnaissance satellites would be used, initially by the United States and the USSR, to monitor military activities in space and on the earth's surface. Indeed, present "customary usage" indicates the potential success of such an experiment, owing to the advanced reconnaissance and surveillance systems of these countries. In the reviewer's opinion, the use of military satellites, remote sensing satellites, manned space stations, and space shuttle flights is the most effective means of monitoring military manuevers. At least in the foreseeable future, national implementation by the two great space powers appears to be the most feasible solution. Consequently, the evolution toward international control structures should be considered as a long-range objective. This is not to imply that such plans should be rejected, but instead that any international regime must necessarily evolve within a framework of international law on a case-by-case basis. Indeed, as stressed throughout the book, existing space equipment can be used with equal effectiveness for military or peaceful purposes. Realistically, the employment of such hardware for peaceful goals is the more effective method, as demonstrated by contemporary practice. "[I]t is reasonable to assume that the great powers have used their satellites to monitor every international crisis. . . ."[17] Moreover, the supposition is advanced that this type of surveillance has prevented the spread of conflict into the third world.[18] The hypothetical question posed is :"[W]ould non-partisan information from reconnaissance statellites available from an agency independent of the great powers contribute to confidence building and tension reduction?"[19]

This issue is carried forward in Paper 12 by Dr. A. Sadek, *Verification Using Satellites, Feasibility of an International or Multinational Agency*.[20] Dr. Sadek is especially conscious of the position of the third world countries in terms of present day military reconnaissance and the emerging space law. He seeks to halt the unilateral acquisition and discriminatory dissemination of sensed data and information without the prior permission of the affected

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[16] Santhanam, *supra* note 7, at 265.
[17] *Id.* at 269.
[18] *Id.* at 271-73.
[19] *Id.* at 273.
[20] Abdel-Hady & Sadek, *supra* note 7, at 275.

state.[21] An International Satellite Monitoring Agency (ISMA), a recent proposal of the French government at the first special session of the United Nations General Assembly, would ensure the confidentiality of data acquisition, processing, and dissemination. His alternatives for the establishment of an ISMA stem from the inescapable conclusion that, by the end of this century, ten to fifteen states will have perfected space surveillance capabilities. Originally discussed at the SIPRI symposium, the ISMA could take several forms. In fact, these alternative institutional structures might be applicable to other space agencies, including an umbrella organization, as follows: "(*a*) as a specialized agency of the United Nations—in some respects this may be similar to the IAEA; (*b*) as a subsidiary organ of the General Assembly; (*c*) as a subsidiary organ of the Security Council; and (*d*) as an independent organization (outside the UN system)."[22]

The political issues seem insurmountable, for the reason that state parties to such an agreement must voluntarily restrict their military capability in space and surrender significant phases of their sovereignty. Comparatively easy, on the other hand, are the technical implications and implementation.[23] The scientific capability exists, and the technical problems are relatively minor when compared to the political climate within the United Nations and superpower confrontation. Similar conflicts arise when remote sensing satellites are used for resource sensing, crop surveillance, and even meteorological monitoring. At this point, the interplay between purely peaceful and military uses becomes obvious. Not only are peaceful pursuits and aggressive acts a part of "both sides of the identical coin" at the technical level, but space satellites and manned platforms are equally adaptable to either purpose. Similar disputes will arise in regard to the exercise of state sovereignty.[24]

Within this context, Dr. Abdel-Hady raises a legal issue that is also dealt with in subsequent papers. Precisely which types of military activity, if any, are permissible under the 1967 Space Treaty? Are the practices of the space powers acceptable under customary international law and consistent with the major space and disarmament conventions?[25] One viewpoint is presented by the Dutch

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[21] *Id.* at 277.
[22] *Id.* at 278.
[23] *Id.* at 281-91.
[24] *Id.* at 281-84.
[25] J. GOLDBLAT, AGREEMENTS FOR ARMS CONTROL: A CRITICAL SURVEY (1982).

scholar Professor D. Goedhuis in Paper 13, *What Additional Arms Control Measures Related to Outer Space Could Be Proposed?*[26] Professor Goedhuis contends that the 1967 Space Treaty has not prohibited all types of military activity, but only requires that outer space be utilized for peaceful purposes.[27] Two fundamentally different interpretations of the term "peaceful purposes" have come to the fore. Under one, this term means "non-military," while under the other it means "non-aggressive." The latter interpretation is being followed by the United States.[28] The USSR asserts that all of its satellites serve "useful purposes."[29] The editor and several of the participants attempt to shed light on this issue, for example in connection with BDM and ASAT devices. No final answers can be offered. However, the reader is presented with a clear insight into conflicting interpretations of existing treaty texts and into the growing corpus of customary international law, as evidenced by state practice and bilateral treaties between the United States and the USSR.

Professor Goedhuis comes to grips with the problem of treaty interpretation. In the first instance, which forum will at least study possible control mechanisms? He favors COPUOS. In Goedhuis' view, "the suggestion that the Committee would not possess the necessary expertise to study the matter is difficult to accept."[30] Alternatively, a special forum should be established within the United Nations in which representatives from the various organs that are attempting to limit the military uses of outer space would be included.[31] It would also be helpful to include disarmament negotiators, especially those who seek to avoid confrontation in space. In his *Final Observations*,[32] the various recommendations are summarized. In particular, more detailed reporting pursuant to the Registration Convention is sought. Merely identifying military hardware might represent a first step toward the demilitarization of space. Professor Goedhuis' final suggestion is that world public opinion be aroused. He contends, quite properly, that "there is an extraordinary lack of awareness in the world population at large of

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[26] Goedhius, *supra* note 7, at 297.

[27] *Contra* M. MARCOFF, TRAITÉ DE DROIT INTERNATIONAL PUBLIC DE L'ESPACE 357, 679 (1973).

[28] Goedhuis, *supra* note 7, at 300.

[29] *Id.* at 301.

[30] *Id.* at 302.

[31] *Id.* at 302-05.

[32] *Id.* at 309.

what is at stake in outer space developments and in particular of the disastrous consequences which would result from an intensification of the arms race. . . ."[83]

Part II concludes with a specific proposal concerning the use of anti-satellite weapons as a means of demilitarizing outer space. Professor D.L. Hafner, in his paper *Anti-Satellite Weapons: The Prospects for Arms Control*,[84] offers a detailed plan to implement the proposal originally discussed in Part I. He is extremely concerned over attempts by the United States and the USSR to acquire ASAT systems. Present day satellites are extremely vulnerable to anti-satellite weapons. "Nuclear warheads, directed-energy systems (e.g., lasers, particle beams and radio-frequency transmitters, whether ground-based or in orbit), shrapnel or projectiles driven by high explosives, co-orbital or direct-ascent interceptors—each of these could disable, disorient or destroy a satellite."[85] As the sophistication of these "defensive weapons" increases, it will be possible for clever defenders to devise counter measures to protect their rockets and satellites. Ultimately, however, ASAT systems would be required to retaliate. As a result, a "defensive act" may be perceived by the other party as a "provocative offense." Such an escalation seems potentially endless when military history is consulted. A new dimension, therefore, would be added to the space race. Professor Hafner proposes that ASAT competition be resolved by means of an ASAT agreement between the United States and the USSR. The aim would be a ban on anti-satellite weapons.

Beyond question, Professor Hafner, along with the editor and all of the participants, recognizes the difficulties that will be encountered by negotiators attempting to achieve some of the objectives set forth in this outstanding book. Yet the proposals offered—both at the technical level and in regard to an emerging international law of disarmament—should be carefully examined by future negotiators, statesmen, and international jurisconsults.

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[83] *Id.* at 309.

[84] Hafner, *supra* note 7, at 311.

[85] *Id.* at 313.

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This book fills a major gap in existing space literature and in the literature of space law. Although the literature dealing with the peaceful uses of outer space is sizeable and steadily increasing, the military side has received far less attention, at least in legal publications. As is true of the series of SIPRI books, the theoretical and technical aspects are first set forth for the benefit of the non-scientist (e.g. statesman or attorney). However, *Outer Space—A New Dimension of the Arms Race* takes the additional step of proposing specific political and legal solutions to pressing controversy within the realms of the United Nations and international law. Of course, the difficulties to be faced by the space powers (and other industrialized states and international organizations that are in the process of accelerating their space programs) are not minimized. An objective approach is evident: long-range proposals are examined that express visionary expectations of the world community.

It needs to be emphasized that this book is intended for the serious researcher. The text is comprehensive; all relevant areas are examined, including related rubrics such as peaceful uses of space equipment, the increasing threat of nuclear proliferation, and the deployment of conventional weapons. The importance of space technology to land-based military superiority is brought out clearly. A modern military establishment is dependent, for example, on space communications and surveillance, not to mention defensive and counter weapons. Against this growing threat to humanity, SIPRI and its distinguished participants have not only recognized the growing danger and its consequences, but also taken a realistic approach which significantly contributes to the literature dealing with outer space and international law.

*W. Paul Gormley**