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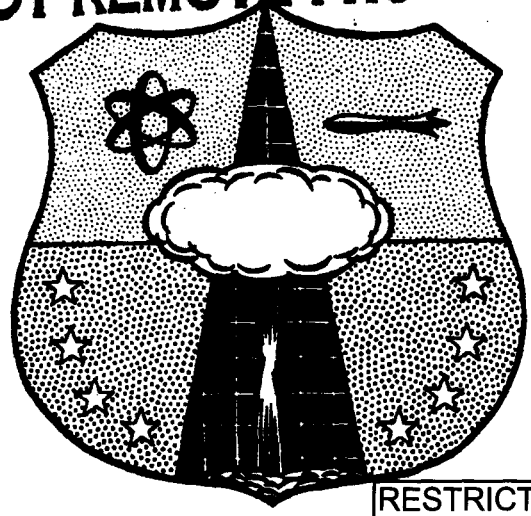

COUNTERFORCE FROM SPACE (U)

by

Frederick F. Gorschboth
Capt USAF

1 August 1961

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AIR FORCE SPECIAL WEAPONS CENTER
Air Force Systems Command
Kirtland Air Force Base
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Capt USAF

1 August 1961

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AIR FORCE SPECIAL WEAPONS CENTER
Air Force Systems Command
New Mexico

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ABSTRACT

The concept of counterforce is analyzed in terms of the strategy, tactics, and weapons involved. It is concluded that the present tendency of military leaders to talk of "counterforce" and "deterrence" as interchangeable concepts greatly clouds the real issue of just what are the advantages and implications of a nonpre-emptive counterforce strategy. The possibility of performing realistic counterforce operations from space (assuming essentially unlimited payloads), the tactics deployment, and weapons involved are examined.

PUBLICATION REVIEW

This report is published for the exchange and stimulation of ideas; it reflects the views of the author and does not necessarily express the intent or policy of this or any higher headquarters.

John J. Dishuck

JOHN J. DISHUCK
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Introduction.

On 28 March of this year, an Associated Press dispatch carried the story that the United States retaliation-deterrence strategy had been shelved in favor of a counterforce strategy. There is a long-standing tendency in the United States, however, to relabel concepts without substantially modifying them. For example, in previous years, the strategy of the United States changed from one of dealing from a position of strength (basically, employing the American nuclear capability against Soviet ground forces) to massive retaliation, to deterrence——without change in targets, equipment, deployment, or objective. Despite label changes, the American strategy did not stray substantially from a plan to bomb Russian cities in response to "unambiguous provocation." The accompaniment of this announcement by a presidential order to refurbish MATS troop-carrying capability with new aircraft does provide promise that there exists a real desire to fashion a new strategy that hopefully will provide a more realistic means of dealing with the Soviet threat. It remains then, to evaluate this new concept. ~~(C)~~

The anatomy of counterforce.

Counterforce may be defined as military pressure applied against enemy military forces. The time element and the objective of the response determine whether the counterforce is pre-emptive, preventive, offensive, defensive, attritive, etc. The objective of such a strategy is, of course, the classical military objective, advanced long ago by Clausewitz: the destruction of the enemy's ability to fight. This may be accomplished by the destruction of his forces, by disarming him, or by placing him in such a condition that he is unable to fight. Such an objective represents a radical departure from that of existing strategies, which have been based upon a more oblique approach to the problem. A review of the grand strategical aspects of the current Russo-American conflict reveals that the present American strategy is less concerned with a suitable method of destroying the enemy's ability to fight than with deciding if an engagement should occur at all. In dealing with a politically pragmatic enemy such as the Soviet Union, however, it is necessary to understand that only two realistic bases exist for their avoiding military action in a situation in which their adversary will not accede to their demands. The first is the improbability of victory; the second is the excessively high price

they may be forced to pay for victory. It is upon the latter premise that the retaliation-deterrence concept rests. (U)

In accordance with this concept, as it is most widely understood, little or no attempt would be made to counter the enemy's military action, either by reacting in a strong defense or by seeking a decision in a powerful offense. Instead, the American approach to the problem postulates that the damage threatened to an enemy in response to attack would be considered to be a greater price than he is willing to pay. However, this response neither addresses nor results in damage to the opposing forces primarily, but rather is directed toward the civilian population. It is not intended to affect the enemy initial attack, but only to avenge it. By such threats the enemy is to be constrained from attacking. In implementing a retaliation-deterrence concept, though little strength would be expended by the nation employing the concept when successful, the destruction of both its armed forces and its civilian population would be risked if it should fail. The more direct response to enemy military action, that is, military force applied against his combat forces, would be more costly even when successful; but if successful, the possibility exists that the war could be won without the incidental annihilation of the responding nation's population. If such efforts should fail, no more would have been risked. The possibility of the defender's success, which conversely implies the attacker's failure, would constitute the other possible basis for the attacker's avoiding military action. Thus, it is evident that no greater deterrent to war exists than the knowledge that one's opponent could successfully fight and win any military action that could be contemplated. (U)

However, such strategic options are not independent of one's enemy, for though mutual deterrence might be an acceptable option for one nation, it might not be judged adequate for the other. If the enemy nation then should choose to decide the issue by military action, the first nation would be required to respond in kind. But again, because the objective of one concept differs from the other, and because there exists a finite limit to the means available for attaining one's objective, forces trained, equipped, and deployed for one strategy would be at a disadvantage in attempting to meet the enemy in another. Such a condition was pointed out by Clausewitz when he wrote:

> Two different objects of which one is not part of the other exclude each other, and, therefore, a a force which is applied to attain the one cannot

> at the same time serve the other. If, therefore, one of two belligerents is determined to take the way of great decisions by arms, he has a high probability of success as soon as he is certain that the other does not want to take it but seeks a different object; and anyone who sets before himself any such other object can reasonably do so only on the assumption that his adversary has as little intention as he has himself of seeking great decisions by arms.[1] (U)

Such differentiation in conceptual objective is seldom provided in current weapon system evaluation by present-day military writers. For example, after the Associated Press release regarding the fundamental change in the American strategy, writings dealing with the use of mobile Minuteman missiles variously described their intended employment as "counterforce" and "deterrence." This duality of function was conceived for the Minuteman force without any modification in structure, equipment, or targets. Thus, it is evident that the terms "counterforce" and "deterrence" are being interchanged even while strategically they are antithetical. (U)

This lack of definition in objective often leads to a lack of realism in weapon system evaluation. For example, as writers continued to develop the deterrent thesis of the mobile Minuteman, the demands placed upon enemy systems regarding accuracy, timing, and salvo capabilities were emphasized. Little attention, however, was given to these same demands upon the Minuteman when this system's counterforce role was considered. (U)

The Minuteman, or for that matter, the Atlas, Titan or Polaris, cannot be employed for counterforce operations. If the principal Soviet threat is that of the ICBM, any counter to this threat must be required to provide some anti-ICBM capability. These systems patently do not possess such capability. If, on the other hand, it is postulated that these weapons would be used to strike pre-emptively against Soviet missiles on the ground in a situation wherein a Soviet attack was held to be imminent, then the mobility and dispersion that are being provided the Minuteman and Polaris are superfluous. This is true because any fixed ICBM, even operating from unprotected launch sites, could provide a pre-emptive attack with much less difficulty than an equivalent mobile system, since it would be operating from permanent facilities and with warheads of greater potential yield. However, whatever system is employed, the obstacles inherent in carrying out an American pre-emptive strike are formidable. On the one hand, timely and unequivocal warning of the imminence of the attack is

necessary, while on the other hand, up-to-the-minute knowledge of the location of the Soviet mobile systems—the enemy equivalent of Minuteman and Polaris—is required. Such needs demand an intelligence-gathering system of such dimensions that at the present time it is seldom seriously contemplated. However, even if these difficulties did not exist, a pre-emptive strike could not be seriously considered in the face of the President's message to the Congress in which he outlined the policy of the United States as follows:

> Our arms will never be used to strike the first blow in any attack. This is not a confession of weakness, but a statement of strength. It is our national tradition. We must offset whatever advantage this may appear to hand an aggressor by so increasing the capability of our forces to respond swiftly and effectively to any aggressive move as to convince any would-be aggressor that such a movement would be too futile and costly to undertake. In the area of general war, this doctrine means that such capability must rest with that portion of our forces which would survive the initial attack. We shall never threaten, provoke, or initiate aggression—but if aggression should come, our response will be swift and effective.[3] (U)

Even if counterforce of a pre-emptive type is not considered and the American mobile system is evaluated in light of its more probable role—a post-attack strike—it is not clear that the American missiles, provided they survived, could be directed against the Soviet strike forces which for one reason or the other were not utilized in the initial enemy strike. This difficulty is again a consequence of the American lack of information concerning the location of the enemy mobile forces in the Soviet Union. Similarly, this obstacle would severely complicate any attempted counterforce operations by aircraft. (U)

A space capability and its effects.

To contemplate a real counterforce effort, therefore, it is necessary that the Soviet missiles be located and kept under constant surveillance. To provide such a capability, it is necessary that the surveillance be furnished from some system which is constantly in position, which has a complete spectrum of sensing devices, and which further can maintain such surveillance continually under all possible meteorological conditions. Such strategical demands lead to the need for a space satellite system of a rather permanent nature, with large enough payloads to carry into space telescopes of astronomical size, with radars with sufficient power and range to cover the distances involved, and with power

sources compatible with the power demands of this equipment and capable of meeting enemy attempts to jam or interfere with the equipment's proper functioning. Further, the satellites must be able to maintain their orbital position. Therefore, they must be provided with sufficient energy to make compensations for drift; and in addition, they must be able to carry out their mission despite enemy military pressure. Hence, they must be able to defend themselves. (U)

If one is seriously considering defending a space satellite force, it must be anticipated that thermonuclear weapons will be included in the arsenal of the enemy and employed by him in any attack upon this force. Because of the 14-Mev neutron emanation that is incidental to the use of these weapons, it is obvious that the satellites must be massively shielded if their equipment and crews are to survive. Such consideration again emphasizes the need for large payloads, already specified in connection with the need for reconnaissance sensors. Such payload requirements could be estimated to range in the thousands of tons; this in turn would require an essentially unlimited energy source——a requirement that suggests nuclear energy—— to place these large masses in orbit and provide maneuverability to them for their military operations, both offensive and defensive. ~~(C)~~

With such a system it becomes more reasonable to consider employing the weapons of the United States in counterforce operations, for the enemy targets could be located and the American systems could be directed against these targets in the course of the American counterstrike. The governing condition that persists, however, is that such an option is realistic only to the extent that the Soviet forces maintain some substantial portion of their striking forces in reserve. (U)

If, on the other hand, the complete inventory of Soviet offensive weapons is employed in their initial strike, little would remain in the way of counterforce targets presenting themselves to the American strike forces. The American response would then be limited to vengence, essentially that of destroying Soviet cities. Such a response would not solve the American problem —— or even address it ——for such a strategy would not have averted destruction upon continental America, and the strike of its surviving units (if such can be assumed) would be irrelevant in both objective and degree to the provocation precipitating the response. (U)

In addition to the inherent weaknesses of mobile dispersed forces, it must be anticipated that an enemy space satellite reconnaissance system of the type postulated could well provide the capability of tracking the dispersed guided missiles of the United States; hence, their survivability in the face of a Soviet first-strike may not be guaranteed, and thus, their lasting deterrent value cannot be assured. This objection to the Earth-dispersal concept is all the more valid in view of the possibility of future technical development that may deprive the submarine of the concealment now furnished by the ocean depths. (U)

In examining the strategic worth of the dispersed systems it is found that the sought-for ingredient basic to nearly all the systems is to complicate the enemy problem of simultaneity of attack. Worldwide dispersal of the retaliatory forces by means of the earth's oceans represents the ultimum utilization of the earth's surfaces for that end. It therefore becomes obvious that to realize substantial gains in dispersal and increased warning time, because of the extreme range and velocity of the ICBM's, one must move off the confines of the earth's surface and seek the solution to the problem in space. (U)

Some inherent advantages of space deployment.

This dispersal in space does not necessarily represent a negative solution, for there are some immediate advantages that accrue from such a change in locale. The first and most obvious is that of strategic reconnaissance, for if one postulates the availability of very large payloads, then one can realistically consider taking into space the necessary tools for constant surveillance. Thus, instead of depending upon the equivalent of U-2 flights or the limited capability of remote-controlled spy satellites for strategic intelligence, it would be possible to obtain day-to-day reconnaissance reports from a force-in-being. (U)

Then too, for the first time, it would be possible to consider the use of very large weapons — perhaps in the multigigaton range — capable of destruction on an extremely large scale. ~~(S)~~

It is necessary to digress in this development to mention that gigaton weapons (1 gigaton = 1,000 megatons) produce destructive effects on the earth's surface far different from those normally associated with the end result of a nuclear weapon. In this case the weapon is detonated above the atmosphere, subjecting the upper layer of the atmosphere to a high flux of X-rays. These X-rays are absorbed by the upper atmosphere, exciting it, and producing an

atmospheric reradiation of thermal energy. ~~(S-RD)~~

Our present knowledge of this weapon effect indicates that a 1-gigaton weapon detonated at about 95 miles above the earth will subject about 11,000 square miles of the earth's surface to a short thermal pulse whose total energy content is greater than 10 calories per square centimeter — enough energy to ignite a very large fraction of all the combustible material in this large area simultaneously. ~~(S-RD)~~

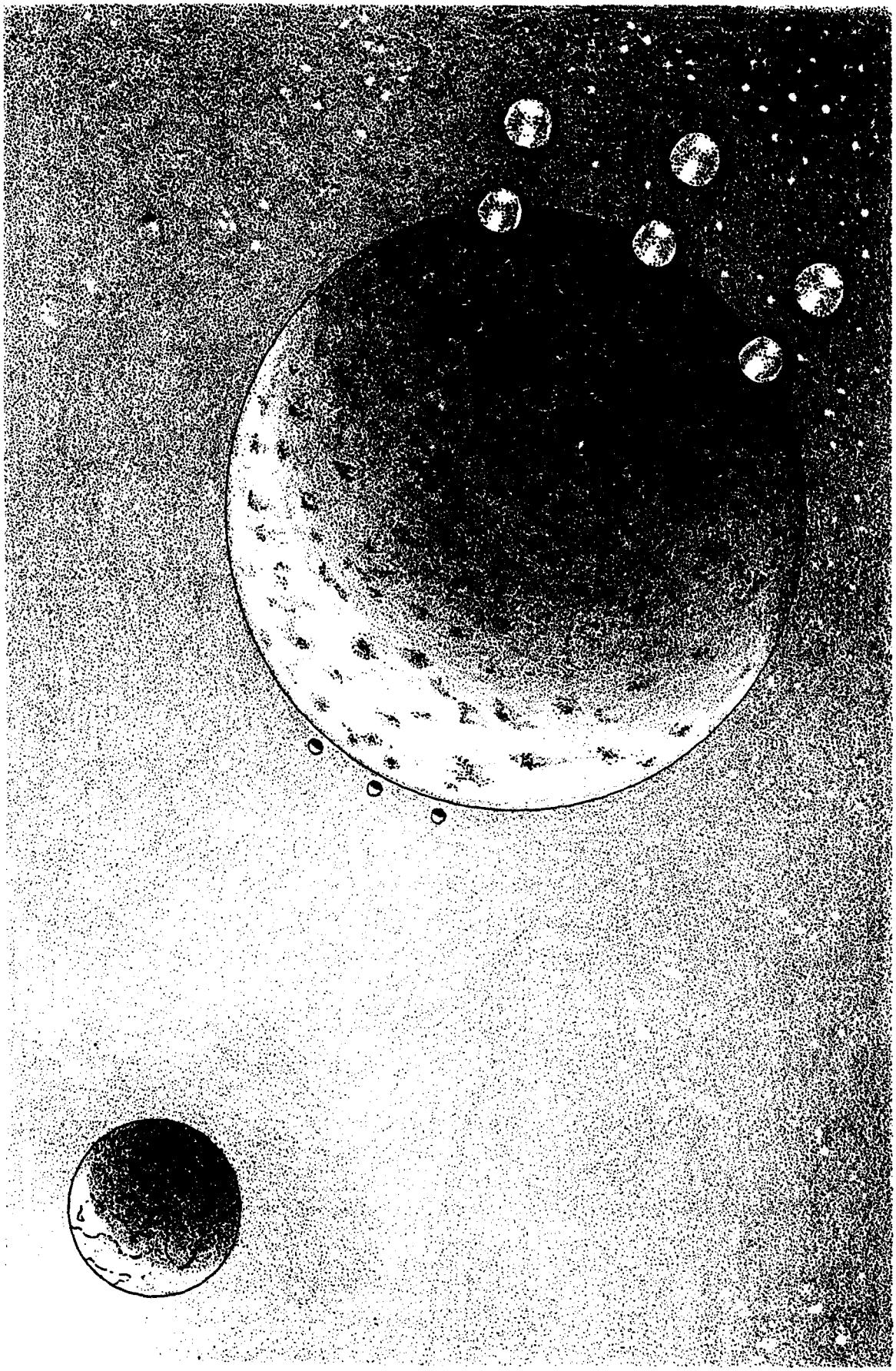
By proper weapon design and choice of detonation point, both worldwide and local radioactive fallout may be reduced to negligible values. This contrasts with much smaller surface-detonated weapons which may leave large areas uninhabitable for years. ~~(S)~~

Paradoxically these large weapons may also furnish an effective counter-force weapon. This is so because most of the Soviet ICBM's with which the American forces would be required to contend would be mobile, hence easily dispersed and concealed. With this weapon employed in the manner described, large areas could be ignited; and if damage to the concealed Soviet missiles were not achieved, the resulting level of turbulence in the atmosphere, at least above a significantly large number of areas, might preclude the launching of many or most of these missiles. ~~(S)~~

Heretofore, little consideration has been given such weapons, for means of lifting and delivering them to the target simply did not exist; and even if they did, these weapons probably would never have been built because of the psychological problems incidental to their being stored on earth. As a result of the promised capability of lifting very large payloads into space, the use of these weapons becomes feasible, at least from the technological point of view, because they could now be lifted and safely moored in space — perhaps behind the moon. ~~(S)~~

Hope from space.

The real advantages of utilizing space are far more consequential, for now, in view of the tremendous potential of propulsion systems that promise the possibility of virtually unlimited payloads, it becomes possible to contemplate a solution of a kind and degree never previously hoped for. The concept is best presented in the form of the following proposition: If, in some manner not now described, it would be possible to move the scene of battle from earth to space, so that the military decision would be rendered there among the combatants,



Lunar deployment for retaliatory forces. 4BT

without incidental destruction to the earth's surface or the danger of the consequent long-term radiation effects of fallout—if this could be done, it would provide perhaps the first step back toward a sane strategy in the nuclear age. (U)

Can such a possibility be taken seriously? Could such a plan be put into effect? There is, of course, no guaranteed method for forcing the leaders of the Soviet Union (or whatever nation may be paramount in the enemy camp in the next decade) to abide by such rules. There are, however, certain pressures that may be set up and brought to bear on a threatening opponent of the United States to induce him to accept space as the logical arena for international conflict. (U)

The dilemma of the enemy.

The first and most obvious inducement to any potential enemy in that direction would, of course, be the deployment of the retaliatory forces of the United States in space. This would remove the present obligation to attack the continental United States in order to pre-empt the American retaliatory power. (U)

Second, if these forces in space possessed an anti-ICBM capability, their very presence there would render less credible both the strike-first and the retaliatory capability of the enemy. Significantly, too, it would restore the defensive function as an inherent capability of the major offensive forces, thus reversing a trend that began in World War I (and commented upon by Brodie).[4] (U)

In the situation in which an American force has been deployed in space, the enemy staff would be presented two choices of action:

(1) They could ignore the space force and attack the American Zone of the Interior, or

(2) They could attempt to neutralize the space force. (U)

If the first alternative were chosen, because of the postulated AICBM capability of the space force, it is possible that the attack may be blunted at the outset, and the level of destruction sought might never be attained. On the other hand, because the space force would have been by-passed, not only would the American retaliatory forces not have been destroyed—they would not even have been threatened; and retaliation would be certain. Again, as in the case of the Polaris employment, it would be necessary to question the objective of such an attack. Indeed, its lemma would be so irrational that the threat of such an

attack would not even constitute a good basis for blackmail. This is so because the inevitable destruction that would ensue in the enemy country would result in a significant lack of credibility in the enemy threat. (U)

If, on the other hand, the second alternative were chosen, there would be two possible ways in which the American space force could be neutralized. It could be (a) destroyed, or (b) counteracted by the enemy's attaining a like capability and thus depriving the United States space force of many of the advantages that accrue from the unilateral utilization of space. If either option to neutralize the American space force were exercised, then essentially the primary objective of the plan outlined would have been realized: the scene of battle would have been moved into space. (U)

If the enemy should attempt to neutralize the space force of the United States, how well could we meet the challenge? To answer that question, it is necessary to examine a typical space deployment as the author envisions it. (U)

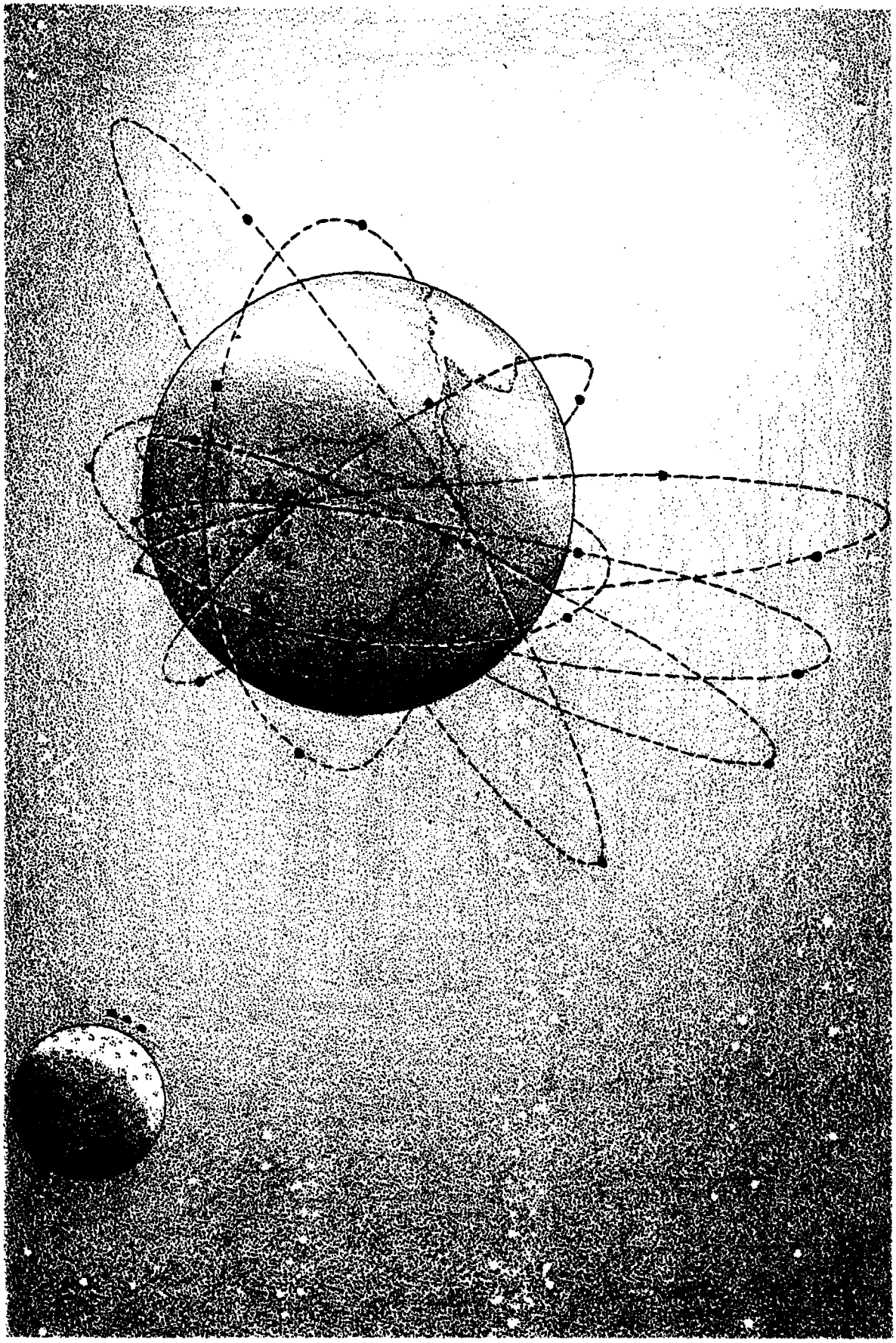
The envisaged force deployed in space might consist of perhaps fifty major vehicles, all of which would be shielded, armored, armed with a variety of offensive and defensive weapons, equipped with the complete spectrum of sensing equipment including infrared, radar, ELINT, and optics, furnished with numerous decoys and ECM equipment, and supplied with the energy potential for extreme mobility in space. (U)

These fifty vehicles would then be organized into three forces: a low-altitude force, an intermediate-altitude force, and a deep-space force. (U)

The low-altitude force.

This is the "Armed Reconnaissance Force" and would consist of 18 vehicles divided into three groups. These ships would operate in three low, (1,000-mile altitude, 2-hour period) circular, co-planar, and polar orbits. (U)

The particular orbit chosen was the result of compromise among the many mission requirements of the force. Since this force would furnish the space fleet the greatest portion of the fleet's reconnaissance information, as well as providing its AICBM capability, it is necessary that the force be stationed rather close to the earth. Yet, for its own safety, it is equally necessary that it be deployed far enough away to provide some warning time. Since the most probable, but not exclusive, path to target for Soviet ICBM's would pass over



Space fleet deployment. ~~(C)~~

the poles, polar orbits were chosen in order to effect the greatest concentration of the force in the most probable path of these missiles. (U)

Before continuing with the description of the force it is again necessary to digress with a brief description of the AICBM capabilities with which this force might be provided. The recent development of a concept called Nuclear Howitzer[5] and a variation of this concept called CASABA —after a directly related non-nuclear experiment of the same name —may provide the technological basis for the development of a formidable AICBM weapon of significant effectiveness. This concept involves a nuclear means of producing and focusing a high-density, extremely high-velocity gas (Nuclear Howitzer) or, by means of a second interaction, a mass of high velocity, solid pellets (CASABA) into an angle of about 2°-4°. The desired effect of this concept is a capability for structural kill of targets such as ICBM boosters at very great distances from the point of detonation —distances as great as 1,000 kilometers —with flight times no greater than a few seconds.[6] While it is undeniably technically possible to produce a working Nuclear Howitzer, the feasibility of CASABA is in some doubt, and, more important, there is very little information available as to the lethality of high-velocity gases or pellets interacting with structural bodies. The current theory, however, indicates that the kill probability will be significant enough to warrant serious consideration of these devices as AICBM weapons when used above the atmosphere. ~~(S-RD)~~

Similarly, there have been encouraging developments in a variety of defense systems based on the SPAD concept. These are fundamentally space mines with a greater or lesser sophistication in discriminating friend and foe, that are spread out in random fashion, in great numbers, over a large volume of space. One scheme to provide this space-mining capability contemplates the distribution of between 760 and 1,800 weapon carriers. Each carrier would contain from three to nine intercept missiles capable of generating velocity increments up to 25,000 ft/sec using Combat Operations Center computed guidance during initial and midcourse flight and IR seeker guidance in terminal flight. The missiles are to be capable of intercept prior to burnout over ranges up to 350 miles from the carriers. Kill is to be achieved by means of HE-fragment attack on the booster tonnage. However, whether one is discussing the more sophisticated SPAD[7] concept or the less sophisticated, and less expensive, Random Barrage System (RBS),[8] it is necessary to point out the inherent limitations and

disadvantages common to them both. ~~(S)~~

The first problem is one of expense, for each carrier launched requires a separate booster to place it in orbit. Second is the problem of maintenance. Presently, the spin-out rate equals or exceeds the proposed launching rate. Thus, in the previous example, if the lower number of carriers (760) containing the minimum number of missiles (3), each with ΔV's of 25,000 ft/sec is used, the total required tonnage in space is about 1,880 tons. However, the significance of this tonnage becomes apparent when one contemplates the necessity of putting these carriers into orbit with available booster systems —for example, the Atlas-Centaur. If one makes a modest allowance for boost failure, approximately 800 shots would be required at a probable cost of $1.6 billion for boosters alone. This figure could probably be greatly reduced by use of recoverable boosters, but the total cost would be likely to exceed $500 million and there would remain the problem of repair, maintenance, and/or replacement if the system is expected to operate over an extended period. ~~(S)~~

As an incidental part of the payload of one of the vehicles described in this paper, an entire system of this kind could be taken into space and maintained on board, ready for use at any time. At this altitude (1,000 miles) the SPAD system is favored because of its greater sophistication in discrimination, but as will be described later, the RBS system would be employed at lower altitudes, where all objects approaching from earth would be considered targets. ~~(S)~~

If one considers the integrated use of the variety of weapons available to the low-altitude force, it becomes apparent that this force can possess a formidable AICBM capability. A typical sequence of AICBM operations might resemble the following. The conflict could very well be initiated by a major Soviet provocation. As a counter, to demonstrate the seriousness with which the United States considers the Russian action, the American Space Force begins to distribute the space mines of the SPAD and the RBS systems, thus effectively putting a cover on the Soviet path to outer space. If it should become obvious that the Soviet Union intends to retaliate with the ultimate provocation, the direct attack, and if the American strategy were a pre-emptive one, the low altitude force could initiate a pre-emptive strike. (The imminence of such an enemy attack would be well marked by the reconnaissance system). ~~(S)~~

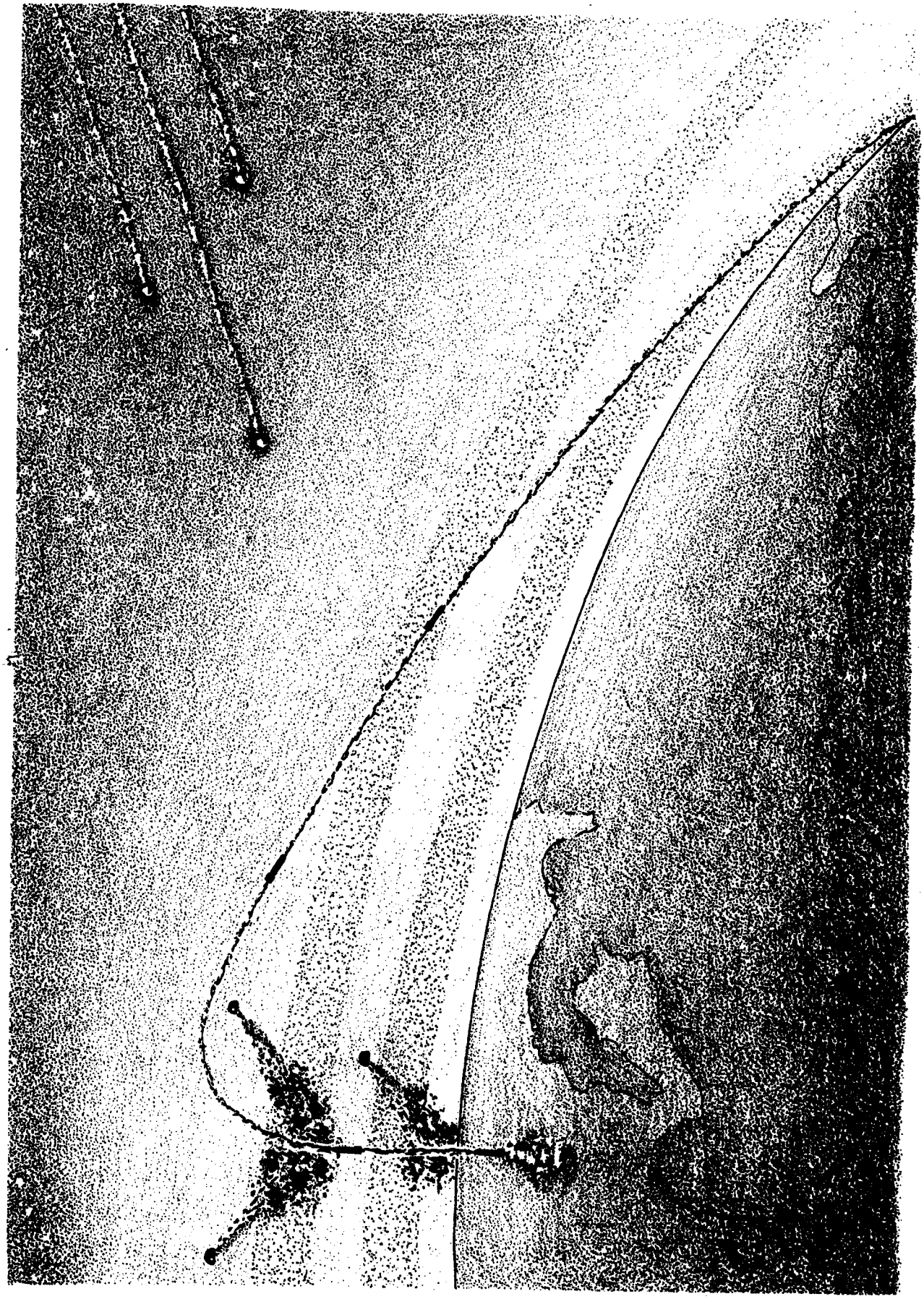
This force, employing thermonuclear weapons with line-of-sight terminal guidance, would destroy known hardened launching sites, and using area weapons

of the kind previously described, could prevent the launching of the concealed mobile weapons. ~~(S)~~

If a pre-emptive attack were not permitted by United States policy at the time, or if in spite of such attack the Soviet missiles did get off the ground, they would be confronted by two screens of space mines while simultaneously being met by elements of the low-altitude force, which would sweep the volumes of space in their path with the Nuclear Howitzer or CASABA weapons. Finally, the missiles would be forced to travel through kill volumes set up in their path that would alternate between saturation with large numbers of small yield weapons, and detonation of larger thermonuclear weapons. ~~(S-RD)~~

By this time, the trajectories of the attacking missiles should be known to the low-altitude force. If the enemy strike is directed against the Zone of the Interior of the United States, an intermediate-altitude force (which will be described later) would move in from its deployment in outer space and set up still other kill volumes to intercept the survivors of the attack on the first force. If, on the other hand, it is concluded that these missiles are being directed against the vehicles of the low-altitude force, this force would have already begun evasive maneuvers, and would bring their weapons to bear in their own defense. Under these circumstances any miss on the part of the attackers would be nearly as good as a hit by the vehicles of this force. If it develops that the enemy objective is to neutralize the United States space force by occupying a position in space themselves, and if they have survived the attacks and penetrated the screen of the first force, they would be turned over to the second force for subsequent attacks. (U)

Inherent in the choices and compromises that were made in the deployment of the low altitude force are certain disadvantages, the most obvious of which is a certain degree of vulnerability that must be suffered by this force. Since these vehicles are close enough in to attack earth-launched missiles, they can, in turn, be attacked by these same missiles; and at an altitude of 1,000 miles, their warning time has not been greatly increased. Then too, in these orbits, the mobility of the force is somewhat limited. Though it would be a difficult operational problem, mathematically, it would still be almost possible for the enemy to salvo against the vehicles of this force —demonstrating that such a deployment lacks depth and has a tendency to breed a Maginot Line psychology of defense. Finally, because of the more dispersed coverage by the low-altitude



Anti-ICBM operations from space. (S)

force in the equatorial plane, this path of egress might still look promising to a determined enemy. (U)

The intermediate-altitude force.

This force would function essentially as the "force of maneuver" of the space fleet. It might consist of perhaps 11 ships organized into 5 groups. The first group would consist of 3 vehicles deployed in a circular, 24-hour, equatorial orbit. (U)

In planning the deployment of this second force, primary consideration would be given to the staunching of the breaches in the low-altitude deployment. Thus, since the equatorial plane would still provide a possible path of egress to Soviet attempts to penetrate the American screen, the first consideration in this new deployment would be to block this path by pre-empting the equatorial plane. In addition, the American Force, by moving out to the 24-hour orbit, would increase its warning time, and the Soviet ability to salvo against the space fleet would be denied. Because of the distance between the two forces, it would be impossible to undertake a simultaneous attack upon both these forces; and thus, the classic problem of simultaneity would confront the Soviet Staff. (U)

In addition to blocking Soviet moves, substantial positive advantages would accrue to a group in this deployment. Thus, because the ships in this group would maintain their relative position to the earth, one ship could be positioned at 90° E longitude to serve as the Combat Operations Center of the fleet. (U)

With the reconnaissance capability previously described possible to ships of unlimited payload, the intermediate-altitude force would provide an ideal location for the Combat Operations Center. From this vantage point the whole of any engagement at low altitude could be seen and evaluated much more effectively than if the COC were in the battle volume itself. In fact, in the event that the first force were penetrated, and the second engaged, the COC would shift to a Lunar Base and control would be exercised by means of a Lunar Observatory located on the moon's near side. (U)

Once again, it is necessary to digress from the development of the Space Fleet to mention another technical development that would bring significant advantages to the Space Fleet. In preliminary talks with knowledgeable defense contractors, the technical feasibility was indicated of a space reconnaissance system capable of picking up targets on the launch pad or boost phase, locking-in on them, and then passing these targets from force to force by a system of

integrated computers. The advantages of such a system to a space force-in-being would be difficult to exaggerate, since an attacker, even after penetrating the low altitude force, would be required to search the whole volume of space to locate the rapidly moving ships of the second force, who in contrast, would have had him passed to them by the first force for interception. In fact, as the control is passed to the Lunar Base and the deep space force, this target would also be passed on. (U)

Because of their being deployed in rather high orbits, the ships of the second force would possess a rather high degree of mobility, and with the reconnaissance capability described, would provide the interceptor force for the Space Fleet in the event an attacker should penetrate the low-altitude force. (U)

In choosing the equatorial orbit for the second force, it was recognized that there existed between the polar and equatorial orbits various possible inclined-plane orbits. In order to block these possible paths and to pre-empt still other possible orbits, other groups of the intermediate-altitude force would be deployed in highly elliptical orbits inclined to 45°, 55°, 65°, and 75°, respectively. (U)

These orbits were patently chosen to block possible Soviet moves, but after postulating such deployment, it was discovered that certain advantages would accrue to the ships in these inclined-plane orbits. Thus, it is seen that the ships in these orbits would spend most of the time at great distances from the earth, and hence would not be immediately vulnerable to attack. At apogee these ships would possess extremely low velocities —a condition that would greatly facilitate changing orbit; on the other hand, at perigee these ships would approach exceedingly close to the earth's surface, moving under the low-altitude force. At the time of this approach, the ships' velocity would be extremely high —approaching escape velocity —thus rendering them exceedingly difficult targets to intercept. (U)

Because of the rather low altitude of their earth approaches, these ships would possess admirable capabilities for reconnaissance as well as provide the ideal carriers for the RBS system, which might be inserted between the surface and the higher-altitude SPAD system. The SPAD system, in turn, would be distributed by the low-altitude force. (U)

The deep-space force.

The third or deep-space force that might be postulated for the Space Fleet

would not figure very prominently in a counterforce mission, other than to intercept and engage those enemy craft that might have penetrated the intermediate-altitude force. Suffice to say that the use of a Lunar Base for logistic purposes and the use of a Lunar Observatory for command and control would so simplify space operations that such a deep-space deployment would not only be feasible, but necessary. (U)

Some strategic considerations.

When the objective of this strategical deployment is considered, it is seen that for the first time since the close of World War II, the defeat of the enemy military forces would become the objective of an American strategy. Thus, for the first time, the major problem of the post-Sputnik era, the Soviet ICBM threat, would be addressed directly. Because a force such as the one described could, it is thought, control the Soviet missile threat, such a force could also induce the Soviet forces to concentrate upon the classical military objective; and consequently, a possibility would exist for the redirection of the military threat of both powers from the respective civilian populations to the opposing military forces. (U)

From the time of the Soviet acquisition of the atomic bomb, the basic question of American military strategy has centered about force vulnerability to surprise attack. Through the years, two solutions have been advanced for decreasing the sensitivity of American forces to tactical and strategic surprise. One of these is dispersal, the other mobility. In fact, the rationale for Polaris and Mobile Minuteman was developed upon these two factors. Moving into space in the manner described would provide the natural extension to dispersed deployment when it is realized that dispersal upon the earth would have, with the utilization of the oceans, reached its limit of usefulness. Thus, the dispersal provided by this deployment in space, coupled with the high degree of mobility possessed by the deployed vehicles, would provide force security without sacrificing the advantage of concentration, for because of the potential velocity of attack its concentration would be demanded at the point of impact, not at the point of departure. (U)

The close coordination and cooperation that have been described in the envisioned operation of the Space Fleet, under the control of the Combat Operations Center in space, should provide maximum economy of force. This is so as a result of the dual nature of the proposed Space Fleet. On the one hand, by the

pre-emptive nature of their disposition, these forces are admirably suited to offensive action; while on the other hand, they would provide at the same time the first realistic attempt to control the Soviet ICBM threat—by erecting the defense, not at the target, but at the point of launch. Thus, this economy of force is most obvious in view of the "gain of the defensive function as an inherent capability of major offensive forces." Consequently, in contrast to the SAC forces of today, space forces such as those described would "interpose themselves between the enemy and the homeland, as armies did and still do whenever the chief burden of fighting is theirs."[9] (U)

Thus, if one considers a significant space capability, for the first time, one can plan meaningfully for counterforce. Some possible technological innovations to facilitate the employment of this strategy have been outlined in this paper, but more significant are the strategical implications of a space capability. Not only does space deployment provide the ideal position for countering the Soviet threat, the ICBM; but more important, it is conceivable that a substantial space capability may also change the strategical reference for future war, so that it may eventually evolve into combat of mutual counterforce—the classical war between combatants. Thus, a promise of the world's civilian populations' being freed from their role as hostages to the mutual "balance of terror" can be considered—a promise that can be devoutly hoped for by all. (U)

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