THE NAVY'S ROLE IN SPACE

RADM LAMBERT, NAVAL WAR COLLEGE, 8 FEBRUARY 1965

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"THE NAVY'S ROLE IN SPACE"

Presentation at Naval War College

8 February 1965

by

Rear Admiral David Lambert, U. S. Navy

It is a distinct pleasure for me to be invited to speak here today. I am an alumnus of the Naval War College, and attendance here was one of the high points of my Naval Career. I've not forgotten the viewpoint of you in the audience, particularly in that you have heard many presentations from this stage on a wide variety of subjects. You have by now read a sizable amount of material and engaged in a variety of committee and seminar discussions concerning the many facets of Sea Power and Roles of the Navy. I am not unmindful that there also approaches a due date on your research papers. In that connection I hope that this presentation today will not cause any one of you to have to rewrite your research.

Since this is a team presentation, I should like to introduce the other members of my team:

Captain E. Van lier Ribbink, Commanding Officer, U. S. Navy Space Surveillance System, Dahlgren, Virginia and Captain C. C. Andrews, Astronautics Program Officer, Bureau of Naval Weapons.

Their presentations will be subject oriented and I shall not duplicate their material.

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Gentlemen, as the signal was sounding convening us this morning, a Soviet satellite, Polyot II passed over us bearing 046 degrees at 205 miles from this auditorium. This was near enough over us to have televised, photographed, or recorded electronics intelligence about us - or more importantly all of the ships at the piers at the Naval Base. Before we finish this morning's presentation there will have been a total of 31 satellites pass over us - or in the near vicinity. Captain Van lier Ribbink will discuss this situation in greater detail in a few minutes.

The subject of our presentation is "The Navy's Role in Space" and to this end I shall outline the areas of naval interest in space and astronautics. They can be grouped into four categories as follows:

First, the direction of effort towards increasing the effectiveness of naval forces in accomplishing currently identified naval tasks;

Second, the direction of effort toward preventing degradation of naval effectiveness in an environment imposed by enemy space technology;

Third, the direction of effort uniquely associated with naval technology needed by and made available to other services, offices or agencies to assist in accomplishing their assigned tasks;

Fourth, the direction of effort primarily associated with broadening the base of knowledge and techniques in support of the National Space Program.

Of the above, the principal effort is directed toward developing a space capability in those areas that will best assist the Navy to carry out its mission and tasks more effectively, quickly and cheaply. We plan to integrate all space operations into our regular naval operations exactly as we do air, undersea, and surface operations. We envisage space operations of the future as a routine day-to-day part of naval activity.

In the furtherance of these naval interests the Navy Astronautics Program is guided by the following objectives:

First, to influence, wherever possible, the design of DOD or NASA satellite systems to ensure that Navy requirements are met;

Second, to design, develop, and operate satellite systems uniquely supporting Navy requirements, or requiring unique naval capabilities;

Third, to make available competent naval officers to other Services or Agencies to ensure the most effective applications

of naval technology to national objectives where and when needed;

Fourth, to maintain an active astronautic research program to prevent naval obsolescence stemming from advances in space technology;

Fifth, to establish and maintain an educational and training program responsive to advances in space technology; and

Sixth, to participate actively with the National Aeronautics and Space Administration manned space flight program to ensure a constant awareness of the potential of manned space flight as it may affect naval operations.

Historically, the Navy has had an interest in astronomical technology, celestial mechanics, characteristics of the solar system and space since the establishment of the Naval Observatory in 1830. In the mid-forties the Navy indicated its awareness to the contributions space technology could make to increased naval effectiveness through research in upper air and near space observations from rockets and balloons. In the decade starting in 1946, the Navy continued probing into a wide range of experiments, developments and concepts in the operational use of rockets and in the space environment. Events commencing with the Soviet SPUTNIK I and our Army developed Explorer I tend to mark the real starting signal

of the "Space Race." The Navy joined the race with Vanguard several weeks after Explorer I. Despite the small size of the Vanguard satellite and the series of disheartening launch attempts during a time when the United States was frantically seeking a space spectacular to offset the impact of the Soviet success, Vanguard was in fact a significant success and accomplished several scientific goals. Now that its primary mission has been completed, one might conclude that it was too successful, as its predicted life in orbit is nearly 1,000 years and as it has continued to transmit its signal on 108.02 megacycles, effectively tying up that communications frequency. With the "Space Race" only seven years along, the full impact of the assorted technologies, infinite possibilities and future implications are already enormous to consider. The space achievements of both the Soviets and the United States are in our near field of view. There is little doubt that activity in space will continue to increase and that developments of the next seven years already programmed will be as dramatic as have been those of the past seven. I will mention the short span of time from the airplanes of Wilbur and Orville Wright to today's X-15, RB-70, and a Supersonic Transport to come, as an example of what can be done. As an example spread over a longer time frame, look at the first USS ENTERPRISE, a sailing sloop of 70 tons mounting 12 four-pounder cannon and 10 swivel guns

in 1775 compared to the present nuclear powered ENTERPRISE of 86,000 tons with its jet air group possessing a nuclear weapon delivery capability. While the problems associated with space seem formidable today, there is little doubt that our burgeoning technology will be capable of solving these problems, as well as others not yet foreseen.

Yes, the Navy most certainly has a role in Space. Complete identification of and support for this role at times may be difficult, however. We hear such arguments as:

"Why should we spend great amounts of Navy money on space and astronautics while our present Navy suffers from shortages of new ships and new aircraft, -- and while increasing requirements are being laid upon naval forces throughout the world?"

Of course, this type of argument could be used against research in any field and, if it were valid, we should not have the Fleet Ballistic Missile Submarine and a host of other effective weaponry in today's fleet.

The expense of the development of a national capability cannot truly be evaluated within the short historical perspective. Currently the procedure of evaluating the cost of a total weapon system, if you will pardon the expression, from "Womb to Tomb" should also be applied to the development of national capabilities throughout their total productive life span.

Who would care to say that steam ships are more costly than sailing ships? It is in this context that the Navy views nuclear powered ships. Steam power and metal-hulled ships released the Navy from the constraints of the sailing days. The rifled gun barrel introduced new tactical concepts beyond the limits of chain shot and grappling hook. Today we are in the transition to a new era of mobility and flexibility through the potentials of missiles, nuclear power and space.

Last month marked the 10th anniversary of those famous words of Captain Wilkinson of NAUTILUS, "Underway on Nuclear Power." This past year three nuclear powered ships, ENTERPRISE, LONG BEACH and BAINBRIDGE conducted their around the world cruise, completely free from logistic support. This cruising capability should be provided in all new naval ships, to meet the requirements of the present and future.

Unfortunately at the time of the Sea Orbit I cruise, security restrictions prevented what might have been a statement as dramatic and far-reaching as that spoken by Captain Wilkinson of NAUTILUS, and it would have been by Captain Price, Commanding Officer, USS LONG BEACH, who could have said "Underway on Nuclear Power and Navigating by Satellite." LONG BEACH had a prototype satellite navigation receiver on board and during the cruise fixed her own position precisely

and in addition established precision fixes of the ENTERPRISE using the real-time data link of the Naval Tactical Data System. This feat in itself is historic, since the hand held sextant has been the only navigation system covering ocean areas south of the Equator. Captain Andrews will discuss the navigation satellite in more detail.

Let me return to my earlier remarks on the costliness of progress. Who indeed would say that our modern land and air transportation systems are more expensive than the oxcarts of little more than a century ago? Not only in terms of such economic indices as "dollars per ton mile" - but also in terms of the accelerating effects which the development of our present systems have had on the growth and development of this country - the sailing ship and the oxcart prove to be extremely expensive when viewed in this historical context.

Therefore, the logic of saying space developments are prohibitively expensive can be more properly replaced by a logic which postulates that we cannot now comprehend the economics of their full life.

If the decision criteria in the past had upheld views that steam ships or aircraft were too expensive, one can only speculate as to how much that attitude would have cost us - not only in terms of national productive indices - but also in national power, prestige and development opportunities.

It therefore appears that our cost effectiveness concepts should develop further and use considerations of the long term economic realities that history has taught us as well as the considerations of short term cost accounting principles. Also, it is my personal opinion the predominating element should be effectiveness rather than cost. In this way we would select the most effective weapons with full knowledge of and consideration for their relative costs. We might then talk of applying not cost-effectiveness, but rather effectiveness-cost techniques to the decision making process.

Cannot the full development of space technology in the national interest be associated with the kind of decision so hotly contested in the Congress for the Louisiana Purchase of 1803?

However, there must be guarded consideration in Naval thinking toward Space so as not to jump to the conclusion that because space is there, we should take everything we have on earth, and place it into orbit. The task of exploration and utilization of Space, while demanding from a scientific and technical aspect, has a devouring appetite for resources. This sobering thought then leads us to consider two facets of the Navy's role in Space. The first is: What applications of Space technology will contribute to the effectiveness of Naval Forces? The second is: What realistic threats to the

United States and to Naval forces can be or, more rationally, will be exerted from the space environment?

The close interlocking relationship between capabilities and requirements must be examined in order to formulate answers to these questions.

For example: The capability exists to place a nuclear warhead in a near-earth orbit and to de-orbit the device quite accurately to an intended point for detonation. Does this capability then justify a requirement to negate such a capability? The rationale continues by analyzing the requirement to put a nuclear weapon into near-earth orbit in the first place, when other means of delivery are less costly and already exist. Continuing a step further, is this orbital delivery of a weapon a threat to the fleet? At this point, we must define the fleet. Is it one destroyer enroute to Guam, or an aircraft carrier attack group in the Mediterranean or an antisubmarine task group in Mid Atlantic? Then, when the definitions are complete, we must go back and re-evaluate the capabilities and the threats.

The real thrust of this type of scenario is based on the evaluation of "could this be done" as opposed to "would this be done."

Today the Navy is aware of this "could be done" aspect of a weapon in orbit -- but is much more concerned about what

"would be done" and, gentlemen, is being done in the space application of surveillance. An effective surveillance capability from space might reduce the Navy's flexibility to hide at sea and thus make more difficult the exercise of the principle of surprise. Other very real threats would likely exist in the areas of jamming or disrupting communications, or reducing the usefulness of our own satellite systems upon which we are going to rely more and more for weather, communication, navigation and surveillance information.

The surveillance of space, along with the ability to place satellites in orbit, is a very real requirement. This need to keep track of things in space was realized during the early development of Explorer and Vanguard and strongly focused by the first Sputnik.

The Navy conceptually developed the interferometer technique of satellite detection under the Advanced Research Projects Agency (ARPA) in 1958. Last month marked the 4th anniversary of the Navy's Space Surveillance System as an operational activity participating with the U. S. Air Force in the Space Detection and Tracking System of CINCNORAD.

I now introduce my team member, Captain Van Ribbink, Commanding Officer of NAVSPASUR, to discuss what Space Surveillance requires and how it affects the Navy.

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Concluding Remarks

8 February 1965

by

Rear Admiral David Lambert, U. S. Navy

While not the total extent of all of the Navy's interest in space, what you have heard this morning should serve as an indication of the views of the Navy and of the direction in which the Navy feels it should go in its role in space.

I should now like to highlight several specific areas.

First, the Manned Orbital Laboratory or MOL program is the most extensive military space venture to be undertaken by the Defense Department. The Air Force has been assigned the role of Executive Agent for this effort with Navy participating. The broad concept of the MOL is to determine the utilization of military man in the space environment and to what degree his functions in space can contribute to or compliment existing earth based systems. A broader implication of this effort is to explore the feasibility and determine the technology which might be required to accomplish military objectives from space. Much of the basic technology of the MOL program is inherent in the NASA programs of Gemini and Apollo; however, the objectives are very different. NASA's efforts are focused toward the ultimate manned lunar expeditions, whereas the MOL program is aimed at the utility of a

military space platform should the future require the capabilities which could be afforded by such a space system.

The Navy's interest and participation in the MOL program have an operational flavor in that we are interested in the capabilities of ocean surveillance from space as it may be enhanced through the use of improved sensors, data acquisition and processing, and the survivability and reliability of the system over a long period of time.

As a minimum, the MOL will provide a new source of information which will significantly affect the control of military forces. It could, through use of new and sophisticated sensors and communications equipments open a new avenue in the field of command and control.

Data from many sources are required for effective command and control. Integration into our command and control nets of ever-increasing amounts of data which will become available from satellites as well as other sources will be essential if such data are to be used to enhance the control of military forces. The requirements of commanders to receive accurate and meaningful information on a real time basis will necessitate continuing improvements in each element of our Command, Control and Electronic nets.

The particular role that man might fulfill in the command and control function in an MOL is less clearly defined than his over-all military usefulness in space. Studies are currently in progress to determine what experiments need to be performed in space in order to assess his utility and ability to contribute significantly to command and control functions. In this connection, analysis of recent Soviet reports concerning the physiological effects of prolonged weightlessness upon the Cosmonauts as well as results obtained from our own manned space flights indicated that man himself may well be a limiting factor in the consideration of routine operations in space. However, supersonic flight and altitudes above 20,000 feet were once viewed as formidable challenges.

Next, Satellite Mission Analysis is an area of space detection, tracking and identification which now requires a genuine "breakthrough." It is a long, slow process to monitor Soviet satellite telemetry and then through the technical intelligence community derive data to indicate the mission of a foreign satellite. In order to afford any degree of quick response upon which to take action, passive or otherwise, the capability to determine the mission of the satellite is paramount. One of the present views is that little, short of a co-orbital interceptor with a long-handled screwdriver to take off a cover plate and look inside, will suffice. In the same vein of levity, there is another observation which says

that one Soviet defector would be worth a billion dollars of R&D. Nevertheless, without further knowledge in this area we can only be guided by this sobering thought, that normally it will take considerable time to estimate the significance of a new Soviet satellite.

In estimating Soviet intentions, students of communism and the USSR have learned to lean heavily on two sources of information. One is precedent, and the second is public speeches or writings of responsible communists in positions of authority. About two years ago, the Minister of Defense of the USSR, Marshal Malinovsky, in a speech to the students of the equivalent of our National War College, and again in a USSR publication, stated in response to a question about as follows:

"It would be ridiculous to assume that we would expend the terrific technical effort and money on space programs if we didn't expect to derive the maximum military benefit." This is not an isolated statement of Russian intentions in space. Mr. Khrushchev last year publicly announced the photo-reconnaissance of the continental U. S. by satellite.

Can we say then that there is no threat? The Soviets have not yet turned to highly secure transmissions to disguise their operations. This has been valuable to us so far, otherwise we should have less than a little knowledge to date.

A high degree of threat may not be with us yet, then again it may be and we just do not know it.

The Navy seeks to use space to accomplish naval objectives and to prevent space from being used to the detriment of those objectives. Within the constraints of present policy, the Navy believes it feasible to pursue the necessary research and technological developments which will enhance its ability to conduct operations in space which are in support of roles and missions presently assigned to the Navy.

Reflect for a moment, if you will, on three significant factors affecting the decision of a fleet commander. These are weather, communications and navigation. These have not been completely accessible and fully reliable in the past. Pick any Monday morning as a task force is preparing to proceed to sea. The problem of establishing communications is well known to many of you. To those of you who are not familiar with such a sortie, I can state from experience that it is a very real problem to achieve loud and clear radio contact with every ship and aircraft on the tactical nets.

Once at sea, the problem of accurate weather forecasting is slow, often inaccurate and unreliable, thus leaving oft-times to chance, a crucial element in the operation of forces at sea.

On the subject of navigation, note that only a small fraction of the ocean surface is covered by a navigation system other than the hand-held sextant. At the same time accurate, reliable all-weather navigation is of increasing importance to naval operations.

Now, within the near time frame, through our planned space systems, commanders will be provided with more adequate tools with which to communicate, navigate and forecast weather, each of which will contribute to the increased effectiveness and efficiency of Naval forces in the conduct of warfare at sea.

Decisions concerning space must be made daily at all levels of government and defense. Studies are being piled on top of studies in an effort to keep ahead in the space race. The cost of operating in space has only started its spiral upward. Some of you here have participated, many of you here will participate, to some degree in the space program. I know the War College is well aware of the impact that space is making upon our defense posture. It would be well to keep our thinking flexible enough to encompass this new dimension which is now with us, in the consideration of all of our future military responsibilities.

The requirement to become educated and knowledgeable in space and its applications is as vital as that to keep up with

the incorporation of aircraft, nuclear propulsion, missiles, and rockets over the past several decades into the Navy and naval operations.