About NSA

BY J. R. KILLIAN, JR.

~~Top Secret Eider~~

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General Samford, Ladies and Gentlemen—I am very grateful for this opportunity to visit with you of NSA today. It is always a thrilling experience, I'm sure, for anyone to come to an establishment of this kind and see it in its great scale, its great complexity, for the first time. Actually, this is not quite my first visit, because I had another visit several years ago with another part of your establishment, so I can use a story of mine about the young lady who went to a cocktail party, and after she had had two cocktails she went up to her hostess and she said, "You know, I feel a lot more like I do now than when I came in." -and so I do about NSA.

Now my first contact with NSA came back in 1954, I think it was, when I had the responsibility of directing a study, the report of which came to be tagged unhappily with my name. A group of scientists and engineers who participated in this study became, as a result of their participation, intensely and creatively interested in various aspects of our intelligence problems, and in the application of science to these problems. It was out of this study that there subsequently developed, I think it's fair to say, a whole new set of relationships between the intelligence community and particularly NSA and the scientific community. It was really out of this special activity that my own interest in intelligence matters was created and my present relationship with the intelligence community, which I find so stimulating and important, actually grew. I suspect, too, that it was because of this that I became involved as a member of the President's Board of Consultants on Foreign Intelligence Activities when it was created in 1956. Out of this combination of activities there has grown a new appreciation at the top levels of Government of the value of a close relationship between science and intelligence, and I see very real evidence that this understanding exists at the present time.

Just a year ago, two events occurred which both symbolically and in actual effect have demonstrated the new acceptance of the importance of science in Government affairs and which have relevance to your activities. These events included the reconstitution of the President's Science Advisory Committee in the White House, with an intensification

of its work, and the establishment of my office as Special Assistant to the President for Science and Technology. In revitalizing the Science Advisory Committee, widening its scope and associating it with the White House, the President has given special recognition to the fact that science and technology, in addition to their use in solving specific problems, have a direct and creative impact on the formulation of Government policy

My function and that of the Science Advisory Committee is to provide answers to questions raised by the President, to undertake assignments for him of an advisory kind, to mobilize the best scientific advice of the country, and to make recommendations to the President on ways in which U. S. science and technology can be advanced, especially in regard to ways that they can be advanced by the Federal Government and how they best serve the nation's security and welfare.

It is important to note that the Special Assistant is invited to sit in on the meetings of the National Security Council and the Cabinet and, when appropriate or requested, to present the views and findings of the Science Advisory Committee. The President has thus created a mechanism to bring objective scientific and engineering advice to the top level of Government in a manner that reaches all agencies and departments of Government and yet can serve each of them.

In carrying on its work for the President, the Science Advisory Committee is organized into some fifteen panels at the present time, these panels including both regular committee members and members drawn from outside of the Committee.

In recruiting these panels, the policy has been to select the best-qualified scientists and engineers we can find in the country, and to draw upon their special competence and experience in tackling the problems confronting us. A number of these panels deal, of course, in the area of defense, but others are concerned with unclassified problems of importance to the advancement of science generally in the United States. We have a very active panel, for example, on Science and Foreign Relations; another on National Research Policy; and another which has just completed its work on ways of better handling the translating, abstracting, and dissemination of information. We have also set up *ad hoc* groups to try to help devise a national policy on high-energy accelerators. We have had active groups working on technical analyses to back up our international discussions on test cessation and on reducing the hazards of surprise attack.

The Science Advisory Committee serves as a board of directors or consultants to me as Special Assistant to the President. It has the prerogative, when it chooses, to report directly to the President. At the present time the Committee and my office have over fifty scientists and engineers at work.

Intelligence has been one of the principal interests of my office and of the Committee and one of the most active panels is the so-called Baker Panel. Dr. Baker is with us here today. This panel originally came into being as a result of a discussion in the President's Board of Consultants on Foreign Intelligence Activities, when representatives of NSA indicated that they would welcome suggestions on how some of their ideas might be implemented, in the research field particularly. The Board of Consultants recommended to the President that a carefully selected group of scientists be brought together, and he asked the Science Advisory Committee to select this panel and to be its sponsor.

I venture this bit of history by way of emphasizing the increased role of science and technology in Government and the key emphasis which groups of scientists that have been brought together by the President have placed upon signals intelligence. There is a clear recognition on the part of our policymakers of the unique scientific and technological requirements of signals intelligence and of the key role of the NSA in applying science to intelligence and to our national security.

It is not inappropriate to point out that the interest of the President's Board of Consultants on Foreign Intelligence Activities, his Science Advisory Committee, and the Baker Panel in the activities of NSA has served to emphasize the growing importance of the Agency and to increase the understanding at top levels of Government of its function, of the changing technology which affects its activities and scope, and of the impact of developing communications technology on the over-all organization of our signals intelligence activities. The recent revision by the National Security Council of a group of Intelligence Directives resulted from recommendations of the President's Board, and one of the new NSCID'S provides in consonance with the findings of the Baker Panel, as you doubtless know, for the consolidation under NSA of both COMINT and ELINT. The melding of these two great efforts reflects not only the fact that technology has inexorably made clear the interdependence of both COMINT and ELINT, but also the fact that NSA has increasingly demonstrated its capacity and effectiveness and shown that its remarkable resources and performance justify the taking on of these additional responsibilities.

I have had the illuminating and impressive experience of not only being interested in the technical aspects of NSA, but also of observing the results of its work as reflected in the reports at the National Security Council level. Week in and week out the information gathered through COMINT and ELINT reflects itself in the information placed before the policymaking offices of Government and proves its great usefulness. I think it important that you be aware of the impact of your work and of the great part NSA-collected information plays in our policymaking today.

I would add one further observation. I am aware, together with many others, of the extraordinary response of the personnel of NSA to emergency demands in the recent past. For example, when a recent foreign crisis demanded drastic extension of area intelligence gathering, technical and operational members of this agency, we know, kept a 24-hour schedule daily, even sleeping in their working quarters, and produced immensely valuable information which had not previously been specified by priorities or demands. This kind of performance and dedication, I can assure you, is deeply appreciated. I venture the further observation that such dedicated performance, carried out with great energy and inspiration, reflects the fact that here in this NSA environment personnel are allowed to respond within a framework which permits them to use their judgment, their knowledge, and their abilities in a way that stimulates exceptional performance.

And now against this background of personal experience and interest let me venture some comments about some of the current and changing conditions and requirements which seem to me to affect the role of the National Security Agency.

The United States policy of not initiating war, together with the present U. S. ability to retaliate if we are attacked, emphasizes the value to the enemy of achieving surprise. The ability of air attack and soon of missile attack to cripple, if not destroy, has greatly augmented the need of the U. S. to detect a surprise attack. It seems clear that no enemy would attack the United States under present conditions unless he thought that he had a chance of achieving surprise. Clearly the consequences of surprise are so great that every effort to eliminate it is justified. The hazard of surprise thermonuclear attack has greatly increased the importance and complexity of the classic mission of intelligence the provision of useful strategic warning.

A second factor that has imposed new requirements on information gathering and intelligence is of course the great compression of the time element as a result of the development of modern weapons systems. One need only note this effect by considering the problem of early warning when intercontinental ballistic missiles become operational. In the face of this condition we have no choice but to maintain a taut readiness and an alertness of response to assure that we have quick and certain reaction to any moves an enemy may make.

Still a third factor, in part affected by technological developments, is the increasing difficulty of gaining intelligence through more conventional and classical means and the consequent increased importance of new and sophisticated techniques. I need not tell you that we have obtained little information through classical covert operations inside the Soviet Union. No amount of skill or courage will serve to circumvent in any large degree the elaborate security measures available to a police state. I need not tell you either that changing technology in the communications field and in cryptography have made our information gathering more difficult. As a result of these conditions it has been necessary to place increasing reliance on advanced science and technology in our intelligence-gathering activities. In the subtle and complex art of measures and counter-measures in intelligence collection, it has become increasingly important that we use the ultimate in science and technology to improve our intelligence gathering. The challenge, in fact, which faces us today is to devise techniques which may be so close to the frontier of scientific knowledge that they may remain as a consequence unsuspected by the enemy for months or even for years and thus yield us an advantage because they are cloaked in the best of all possible security—the condition where we know more and are more advanced than the opposition.

Still another new condition which greatly affects NSA is the rapidly growing volume of electronic intelligence. The development of missiles and the great increase of telemetered weapons and space-vehicle activities are examples of the systems that generate growing volumes of ELINT and have the effect of broadening NSA's responsibility.

Yet another factor is the change in the nature of the race between cryptography and cryptanalysis. It would seem that the rate of breaking has now possibly been exceeded by the rate of making. This fact holds profound implications for the Agency. Especially does it point up the enormous importance of consolidated effort and teamwork and research and of the clear recognition of priorities in relation to achievable goals. There is no evidence at all that some of the most challenging NSA jobs such as [redacted] will be achieved by splitting up or separating in any way the NSA effort. Further, there is little evidence that these challenging jobs will get done as they might have been done in the past by some inspired splinter efforts or by groups going off to do something entirely different. The reading of communications information is just that and admits no fanciful escapes from reality. It cannot be accomplished by establishing a space platform from which to analyze the spectrum of Mercury.

I have spoken of the inexorable effect of technological change on the program and the activities of NSA. This warrants additional emphasis, particularly that aspect of it which points up the crucial importance of technical intelligence work to the welfare of the nation. Major developments in our technology, in business, and industry, and indeed broadly in our culture will emphasize the growing importance of communications processing in the years ahead. For example, computers, communications theory, extensive broadcast and personal communications systems, the growing literacy in the world, and the

need for increased education by mass communication techniques—in general the whole complex of sensing and control by which society orders itself is now clearly overlapping the NSA orbit. This will be an overlap of high value and significance if the gifted people who are being increasingly attracted to these general information handling activities can discover and understand that they can make enormously valuable contributions through the NSA itself. There are other forces apparent today which are of great significance. It becomes increasingly clear that the critical needs of coming decades in our society may not be primarily the obvious ones such as materials or foods or energy resources; they may indeed be the means of better organizing and ordering our society, and this implies increasing need and reliance upon communications. We face great increases in air and sea traffic, and eventually space traffic, which will have to be regulated by communications. You already know, of course, of the immense communication nets such as the SAGE System and the techniques they suggest for handling air traffic problems. An essential factor in these great systems of communication, of travel, and of transportation will be checking schemes We have also the possibility of systems which may be designed for the ultimate control of armaments. This week a group is departing for Geneva to discuss with the Soviets the techniques of reducing the hazard of surprise attack; a discussion of experts on the problem of monitoring various ways of springing a surprise attack. While this may appear remote from your present-day activities, I am sure that you will readily agree that if and when agreements are made for monitoring systems either for nuclear tests or for the purpose of reducing the hazard of surprise attack, NSA will have a big part to play in the period during which such systems are operating.

The increased importance of space and space vehicles is opening up an entirely new vista for signals intelligence. The reconnaissance satellite is an obvious possibility in space technology. Such a device can most certainly carry signals-intelligence equipment. In the light of present-day experimentation with radio telescopes, we may well discover techniques of using these research tools as collectors, to some limited degree, of signals intelligence.

With all of these impending developments before us we may well conclude that the survival of our society may depend upon the sampling and cross-checking of communications and ELINT signals which all nations must increasingly use to organize and direct their activities. This, of course, is looking far ahead, since we know that at present there is the heavily pressing problem of getting the original communications themselves good enough to do an elementary job of serving the purposes of free world governments to increase stability, security, and understanding. But that job will certainly be done. As it is done the

importance of verifying, cross-checking, and otherwise processing information by means other than the obvious sender and receiver will become of increasing importance. This is a stirring vision, far beyond the classical concepts of COMINT and ELINT, but it is a surely evolving one. It means among other things that the NSA will face the requirements of gaining practice and experience in very large-scale, very complex information handling. The systems-engineering development which improves the intercept and collection as well as the elementary analysis of a huge bulk of material recently being acquired can have tremendous value for responsibilities which may come to the agency in the years ahead.

In conclusion, I would note some of the important steps which have recently been taken or impending which should be of direct assistance to NSA in meeting its current problems and future responsibilities. I think, for example, of the concept and establishment of the CRITIC system. One of the highly valuable attributes of signals intelligence is its ability to react rapidly to perturbations within the enemy's communications system. If, however, the information derived from this perturbation suffers long delays in transmission, we have not gained anything. If we are to rely upon signals intelligence as our prime source of early warning information, we must be sure that the material arrives where it can be used promptly. It does no good to warn the target after the missile has reached its destination. In the development of the CRITIC system there is a prospect of insuring that the required timely intelligence arrives in the hands of the President in time to be useful.

Another important development which I alluded to earlier is the integration of COMINT and ELINT. Each of these fields is important in its own right, but the melding of them into an integrated whole can yield information that up to this time has remained unexploited. It can also insure that we do not miss important information that otherwise has not been available to us. I am hopeful that this new approach will be useful in meeting some of the telemetry and data-processing problems that we are now facing.

I also feel that the research institute which is now projected should be of great value in augmenting the presently very effective research activities of the Agency. It can help, without in any way weakening security, to bring the Agency in closer contact with the creative civilian scientific community. It is hard to restrain enthusiasm for the possibilities of having effective contributions to the basic understanding of cryptology and cryptanalysis without at the same time having to bring these new contributors into possession of necessarily super-secret material. Occasionally, academic research has revealed new general levels of knowledge, new patterns of what science or technology could

reasonably be expected to do, without tying results to doing a particular thing, such as breaking a particular code. The evolution of NSA has reached the point at which it can make excellent use of this aspect of academic work and the projected research institute should help to make this possible. The student of cryptanalysis and of information processing in such an institute can work hard and imaginatively on information processing, and in a way, year in and year out, that enables him not to feel constrained by immediate day-by-day requirements or demands. I do not mean to suggest that such a research institute should be or can be separated or isolated from the in-house research and technology of NSA. Rather it should primarily serve to assure that research on cryptanalysis will be introduced to the NSA environment itself and flourish there in greater measure even than it has already. For example, the proposed institute should provide an effective frame of reference for the scientific achievements that must be appreciated in the vast NSA program in which achievement so generally means production.

These random observations, Ladies and Gentlemen, are prompted by the work of my scientific associates who have been devoted to the program, the people, and the objectives of NSA. They arise, too, from the opportunities which I have had through various bodies of an advisory kind, to look at the broad policy questions which are related to our national intelligence effort and to the science and technology which must so closely be coupled with this effort. What NSA is doing and what our entire intelligence community is doing is of enormous importance to our national security and our national leadership and as such it warrants the attention, the understanding, and the best efforts of able men and women who have contributions to make to its program. I feel this very strongly and I, in closing, would like to say again how much I appreciate your hospitality and to assure you that while you may, due to the wraps of security, feel that you work in obscurity, the importance of what you do and the fine spirit and dedication with which you do it are understood and deeply appreciated and are one of the great assets of our nation today in a time of trouble. And I would say finally how much we can all respect and appreciate and understand the fine leadership which this Agency has at the present time.

Thank you very much.