



pointed out ways in which the vulnerability could be reduced. The report was presented to the President on March 4, 1959, by the Special Assistant to the President after it had been endorsed by the PSAC and discussed with the Secretary and Deputy Secretary of Defense.

### 3. FY 1960 Budget

To assist in review of the FY 1960 defense budget, a paper on selected issues in the budget was developed by the staff of the Office of the Special Assistant after consultation with individual members of the PSAC. These issues covered the technical questions raised by developments in our strategic striking force, in the defense of the striking force and home base, development of ground and sea forces, and in the area of general military support. This memorandum was sent to the President, the Director of the Bureau of the Budget, and the Special Assistant to the President for National Security Affairs on November 8, 1958.

### 4. Missile Programs

The first brief progress report on the U. S. missile and satellite programs was submitted to the President by the Special Assistant on December 28, 1957, based on discussions in the PSAC. This report concluded that, technically, our missile development was proceeding in a satisfactory manner. It discussed the so-called failures of flight test vehicles. It recommended against giving advance publicity to test firings of satellites, and commented on the chances of success in the Vanguard program. A more comprehensive report was submitted by the PSAC Ballistic Missiles Panel to the Special Assistant on January 3, 1958, listing needed basic decisions affecting the long-range ballistic missile program. Again on February 13, 1958, the Ballistic Missiles Panel recited the technical progress and actions required in the long-range ballistic missile program in a memorandum to the Special Assistant. It recommended, for example, that the Thor missile, alone, be chosen for continued development and use with the termination of Jupiter. It recommended vigorous development of solid propellant engines. It pointed out the advantages of storable propellants. On March 4, 1958, the Ballistic Missiles Panel presented to the Special Assistant a technical analysis of the future of ballistic missile systems as a component of our retaliatory capability and outlined a national program for ballistic missile development over the coming years. This memorandum was transmitted to the President on March 8, 1958, by the Special Assistant. Dr. Kistiakowsky and Dr. Killian then met with



the President on March 10, 1958, to discuss the ballistic missile program. The need for a stronger basic research effort on solid propellants was stressed. A copy of the Panel report was sent to the Secretary of Defense on March 18. On July 2, 1958, the status of ballistic missile programs was again reviewed by the Ballistic Missiles Panel for the Special Assistant. The next report of the Panel was submitted on July 18, 1958. On December 2, 1958, the Panel submitted an analysis of such questions as to whether the Atlas test program should be accelerated, problems of hardening Atlas and Titan, and the realism of the Minuteman schedule. In this report the Panel stated its belief that Titan should not be considered for cancellation. It recommended an over-all review the following spring. The next progress report was made on April 22, 1959, in which the Panel, based on a field trip to the Titan contractor and the Ballistic Missile Division, particularly emphasized the problem of base construction and the elaborateness of planned ground instrumentation. This report also strongly endorsed the proposal to introduce modifications in operational Titans primarily the non-cryogenic storable propellants and in-silo launching. This report was summarized to the President and made available to the Deputy Secretary of Defense and the Special Assistant to the President for National Security Affairs. The aforementioned reports were discussed with and approved by the PSAC during the indicated time interval. The Missiles Panel includes Dr. Kistiakowsky, Chairman, and four other members.



#### 5. Missile Ranges

A report on the national missile ranges and world-wide space surveillance was prepared by two members of the staff of the Special Assistant and submitted to the Special Assistant on April 24, 1959, after discussion with the PSAC. The report pointed up certain major problems requiring early resolution, including those of coordinated management, funding, and the establishment of long-term technical requirements.

#### 6. Solid Propellant Fuels

After discussion in the PSAC, an Ad Hoc Panel on Solid Rocket Propellants was established. A report was submitted to the Special Assistant on March 13, 1958. The Panel made comprehensive recommendations concerning the need for a vigorous R & D program on solid propellants centrally coordinated and based on existing industrial and governmental resources. The Panel was chaired by Dr. Kistiakowsky and included four other outstanding university chemists and senior chemists from industrial companies involved in the solid propellant

program. The report was sent to the Secretary of Defense on March 18, 1958.

#### 7. AICBM

A panel of the PSAC under the chairmanship of Dr. Wiesner was established in January of 1958 to study the problems of ballistic missile defense. Its first general report recommended that a single office be given responsibility for over-all planning and direction of the AICBM development. It outlined the research tasks along the road to AICBM development pointing out its extremely difficult nature and the great uncertainties involved. In a report of May 12, 1958, to the Special Assistant, the Panel discussed the Nike-Zeus schedule, funding, and planned deployment. It also was concerned with the effects of high altitude nuclear detonations on AICBM systems. It pointed out the decoy problem. In a preliminary report of 10 February 1959, the Panel emphasized the value of passive defense, i. e. dispersal, hardening, concealment, and quick reaction, as more certainly effective and inexpensive than active defenses in the time period prior to 1965. The Panel met again on April 25, 1959, and is preparing an assessment of the Nike-Zeus system and the problem of decoys. The AICBM Panel consists of 10 members and, in addition, utilized the services of some seven consultants.



#### 8. Early Warning

An Early Warning Panel of the PSAC under the chairmanship of Dr. Wiesner submitted a report on March 13, 1959, which made a number of significant recommendations regarding the acceleration of a ballistic missile early warning capability (BMEWS).

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The Panel consists of six members and five consultants. The report of the Early Warning Panel was transmitted to the Secretary of Defense on March 23, 1959.

#### 9. Response to Early Warning

An Ad Hoc Panel on Response to Early Warning under the chairmanship of Dr. Wiesner met on April 18, 1959, to consider early warning mechanisms and response to warning. It also covered the scientific and technical aspects of strategic warning. Its report is now in preparation. The group concluded that there was an important need for national policy on utilization of warning in the missile era and for a

primer on warning to interrelate types of warning and response in various time periods. The Ad Hoc Panel included 10 members.



#### 10. Antisubmarine Warfare

A report of the PSAC Panel on Antisubmarine Warfare was submitted to the Committee on December 19, 1958, after a study of over nine months. The Panel pointed out the inadequacies of a current ASW system to cope with the missile launching submarines and recommended detailed technical steps that could affect immediate improvement in ASW capabilities. The ASW report was submitted to the Navy and detailed comments were received on 17 January 1959 from the Chief of Naval Operations. The general concepts of the report were favorably received. The report was subsequently transmitted to the Secretary of Defense. Stemming from review of the Panel report by three members of the PSAC, there was initiated a study on the technical feasibility of broad ocean surveillance of submarines. This resulted in a Navy-sponsored study in Lexington, Massachusetts, involving 40 scientists and engineers from universities, industries, and other organizations. In a report to the Navy on March 24, 1959 (Project Atlantis), the study group concluded that ocean area submarine surveillance is now technically feasible, requiring a new and major effort for its installation. The ASW Panel was chaired by Dr. Harvey Brooks and included five other members.

#### 11. Aircraft Nuclear Propulsion

In view of proposals to accelerate the aircraft nuclear propulsion program, an ad hoc Panel on Aircraft Nuclear Propulsion of the PSAC reported to the Chairman on February 11, 1958, on the status and plans for manned nuclear aircraft. The Panel agreed with previous reports, including an Air Force Board Report and a special panel report of the Office of the Secretary of Defense, that within the present state of the art, a nuclear powered aircraft cannot be built to meet the existing Air Force requirements. It recommended that the major effort in the program be directed toward the development of a reliable, high temperature reactor suitable for flight. The Panel report was made available to the Secretary of Defense. The Panel was subsequently reconstituted by the Department of Defense and made a similar report to the Deputy Secretary. The Panel was chaired by Dr. Bacher and included three additional members.

#### 12. BW-CW

A Panel on Biological and Chemical Warfare was established by the PSAC under the chairmanship of Dr. Weiss. Its report is now in

preparation. The Panel emphasizes the importance of developing non-lethal agents and of broadening the scientific base of the BW and CW research program. In addition to its chairman, the Panel included seven members.

13. Communications

The Panel of the PSAC under Dr. Baker submitted a report on May 1, 1959, on the subject of coordination of military communications development. It called attention to the fragmentation, duplication, and overlapping authority among various agencies evidenced in present Service plans for development of world-wide communications facilities. In addition to its chairman, the Panel included four members.

14. Defense Organization

The Committee was invited in January of 1958 by the Secretary of Defense to submit suggestions from the Special Assistant and from members of the PSAC concerning organizational aspects of research and development in the Department of Defense. Preliminary suggestions were submitted on January 22, 1958. They emphasized the importance that our principal military objectives be clearly focused and that each have strong and clearly focused scientific and technical support. The importance of coordination of scientific activities at policy-making levels and the need for competent policy advice at these levels by scientists and engineers were also emphasized. A post of Under Secretary of Defense responsible for all scientific and technological activities in the DOD was recommended. A memorandum attaching a broad range of suggestions was submitted to the President by the Special Assistant on January 28, 1958.

15. Space Science

In preparation for a presentation before the National Security Council on March 6, 1958, a series of reports and memoranda were generated by the Space Science and Technology Panel. This was in response to a suggestion by the President that the PSAC develop U. S. objectives and organization for the exploration of space. The Panel sought to give guidelines based on scientific considerations which would be useful in making policy decisions on what the national program and organization arrangements for space science and technology should be. A general account of the Panel views is contained in a primer by the PSAC issued by the White House on March 26, 1958, entitled "Introduction to Outer Space". A significant feature of the Panel report was the recommendation

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that a new civil space agency be established, built on the existing NA CA structure. The Space Science and Technology Panel was chaired by Dr. Purcell and included in addition four members. It was later enlarged to some nine members.



16. Cooperation in Outer Space

On August 22, 1958, Under Secretary of State Herter asked for the comments of the PSAC on proposals that the United States might make in the General Assembly of the U. N. concerning the possibilities for joint cooperation between the U. S. and USSR in outer space activities. The letter listed nine possible areas of international cooperation. The Committee replied on September 3, 1958, giving its concurrence in the desirability of a cooperative space program utilizing, where possible, existing international scientific organizations.

17. Vanguard

An Ad Hoc Panel on the Vanguard Program, established in December of 1957, reported on the possibilities of success in the planned Vanguard series of launchings. The report of this Panel was transmitted to the Secretary of Defense on December 28, 1957. The Panel was chaired by Dr. York and included two other members.

18. Arms Limitation Organization

Following a discussion on 16 and 17 March 1959 concerning the need for developing a more thorough understanding of the military and technical aspects of international agreements aimed at the limitation and control of armaments, the PSAC recommended that steps be taken to initiate a sustained program of systematic study, including appropriate research and experimentation, on the military and technical aspects of possible arms limitation agreements. The PSAC also recommended consideration to the manner in which such a program could be most effectively organized and conducted. These recommendations were forwarded by the Committee Chairman to the Special Assistant for National Security Affairs by memorandum dated April 7, 1959.

19. Disarmament Panel

A PSAC Panel on Disarmament met early in January 1958 to review current arms limitation proposals. This Panel was headed by Dr. Haskins and included four other members. It reported to the Chairman of the Committee the need for three studies: (a) of the losses to the U. S.

resulting from a total suspension of nuclear tests, (b) a symmetrical study of the losses to the USSR, and (c) a study of the technical feasibility of monitoring a test suspension. The Panel also recommended a second study covering the technical factors involved in monitoring a long-range rocket test agreement. The substance of this report was conveyed to the National Security Council on January 6, and the studies of nuclear test cessation and monitoring a rocket test agreement were directed by the President.



20. Nuclear Test Cessation Study

As requested at the January 6, 1958, meeting of the National Security Council, a nuclear test cessation study was undertaken by an Ad Hoc Working Group under the chairmanship of Dr. Bethe with representatives of the AEC, Department of Defense, CIA, and the PSAC. The Working Group considered the technical feasibility of monitoring a test suspension and the losses to the U. S. and USSR of such a suspension. The report of this Working Group was submitted to the National Security Council on March 28, 1958, without recommendations.

21. Puerto Rico Report

Following the submission of the Nuclear Test Cessation Report, the Science Advisory Committee met at Ramey Air Force Base in Puerto Rico on April 8, 9, 10 where the implications of the report were discussed in detail. As a consequence of this discussion, a report was prepared by the Committee which numbered among its conclusions the statement that a test cessation agreement would leave the U. S. in a position of technical superiority for at least several years, a position which could not otherwise be maintained. The Committee believed that it was greatly to the technical advantage of the U. S. to obtain a satisfactory agreement for sustained test cessation as soon as possible after the completion of the Hardtack tests. This report was transmitted by the Special Assistant to the members of the Cabinet Committee on Preparations for a Summit Conference on April 17, 1958.

22. Geneva Conference of Experts on the Technical Aspects of Suspension of Nuclear Testing

In late April of 1958 a diplomatic exchange was initiated which led to the meeting in Geneva during July and August 1958 of the Conference of Experts to Study the Possibility of Detecting Violations of a Possible Agreement on Suspension of Nuclear Tests. The Chairman of the delegation was Dr. Fisk of the PSAC. Two other members of the PSAC

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served on the delegation together with numerous technical experts from the Atomic Energy Commission and the Department of Defense. Subsequent to the summer meeting, Dr. Bacher of the Committee served as Deputy Head of the U. S. delegation to the Conference on Nuclear Test Suspension in Geneva which began on October 31, 1958.

### 23. Hardtack II Data and Panel of Seismologists

Following a preliminary analysis by AFOAT-1 of seismic data of the Hardtack II series, which indicated that the conclusions on underground tests in the report of the Geneva Conference of Experts had to be substantially revised, the Special Assistant recommended that the Department of Defense establish a panel of senior seismologists to report on the Hardtack II data. On January 5, 1959, the FSAC issued a statement through the White House based on the conclusions of the Panel of Seismologists.

### 24. Panel on Seismic Improvement and Panel on High Altitude Detection

At the request of the State Department, the Special Assistant to the President appointed a Panel on Seismic Improvement to explore ways to reestablish the capability of the Geneva system and a Panel on High Altitude Detection to review the feasibility of conducting and detecting tests at great distances from the earth.

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The/Panel, chaired by Dr. Berkner, included 13 other experts in the field of seismology and other basic sciences. A preliminary report of the Panel on Seismic Improvement was submitted on January 7, 1959. On March 6, 1959, the Panel issued a special report on the problem of concealment of underground explosions. The Panel submitted a report dated March 31, 1959, on the need for fundamental research in seismology covering a large number of lines of research that could lead to improvements in seismic detection. The final report of the Panel on Seismic Improvement, dated March 16, 1959, was forwarded by the Special Assistant to the interested agencies on March 17, 1959.

The Panel on High Altitude Detection was chaired by Dr. Panofsky and included 12 other scientists and engineers. The Panel submitted a comprehensive report on March 16, 1959.

At its meeting on March 16-17, 1959, the PSAC considered the final reports of the Panels on Seismic Improvement and High Altitude Detection. It endorsed continuing studies and experiments on a reasonable scale and noted the conclusions of the Panels that attempts to conceal



large tests would be very costly but did not attempt to evaluate the impact of the economic factor on a possible nuclear test agreement. These views of the Committee were transmitted with the Panel reports by the Special Assistant to Defense, State, AEC, and CIA on March 17, 1959.

On April 14 the Special Assistant forwarded a summary of the recommendations of the Panel on High Altitude Detection and the Panel on Seismic Improvement aimed at a future program for the improvement of our technical capabilities for detection and of our understanding of these problems. On April 23, the Special Assistant met with the Deputy Secretary of Defense and the Chairman of the Atomic Energy Commission on these recommendations. It was agreed that they should be implemented and responsibility for the implementation was accepted by the Department of Defense and the Atomic Energy Commission.

On May 1, 1959, a Working Group of the Panel on High Altitude Detection met at the request of the Special Assistant to consider the special problem of the detection of tests between 50 and 100,000 kilometers by apparatus located on the earth. A memorandum, dated May 1, presented the Working Group's preliminary conclusions. A complete report will be prepared by June 1, 1959.

#### 25. Technical Considerations Affecting Arms Control

On the basis of extended discussions by the PSAC on the problems of nuclear test suspension and arms control during the first 16 months of its new role, the Special Assistant prepared a memorandum for the President outlining the principal technical factors which may have a bearing on policy decisions affecting nuclear test negotiations, dated March 31, 1959.

#### 26. Monitoring A Long-Range Rocket Test Agreement

As requested at the January 6, 1958, meeting of the National Security Council, an Ad Hoc Working Group on the Monitoring of a Long-Range Rocket Test Agreement was set up under the PSAC with the agreement of the Department of Defense and the Atomic Energy Commission. Chaired by Dr. Kistiakowsky, it included four other individuals. Its report was submitted to the NSC on March 28, 1958. It concluded that, while the remote detection of long-range rockets leaving the atmosphere could be made almost certain by technical means, the discrimination between rockets for military and "peaceful purposes" would be very difficult and that firings for "peaceful purposes" could supply the required

information for a military program. It noted that a prohibition of all nationally conducted large missile tests would not prevent USSR from building an operational missile force if the USSR had already developed ICBM capability at the time of the agreement.

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and NSF letters of 3/10/76 and 4/8/76



#### 28. Surprise Attack

On June 3, 1958, the Secretary of State, in a letter to the Special Assistant, requested the PSAC to explore in a preliminary way some of the general facets of the surprise attack problem, with particular reference to its scientific and technical aspects. On July 10, 1958, the Chairman replied to the Secretary giving him the results of a two-day preliminary discussion of the subject by a group of the PSAC members. The report emphasized that a discussion of surprise attack involves many elements and that it cannot be studied in a limited technical manner. On July 14, 1958, the President sent a memorandum to the Secretary of State suggesting that he join with the Secretary of Defense and Dr. Killian in having a careful study made to further our preparations for possible negotiations on measures to detect and discourage surprise attack. He directed that the study be made after consulting with other government agencies and officials. An interagency group under the chairmanship of Dr. Kistiakowsky was brought together, rendering its report on August 15, 1958. In parallel with the work of the interagency group, a special panel of the PSAC, under the chairmanship of Dr. Zacharias

and including six other individuals, concerned itself with the technical aspects of the problem. Its report was also submitted on August 15, 1958. Subsequently, Dr. Kistiakowsky was named as a delegate and Dr. Wiesner served as a member of the delegation to the Geneva Conference on Surprise Attack.



#### 29. Science and Foreign Affairs

Shortly after its reorganization, the PSAC set up a Panel on Science and Foreign Affairs to examine the broad range of problems involved in the international scientific activities of the U. S. The Panel was active in the reinstatement of the Office of the Science Adviser in the Department of State and the overseas science attache system. One of its members, Dr. Rabi, was suggested for the post of U. S. Member of the NATO Science Committee, and the Panel has been active in following the affairs of that Committee and providing technical back-up. The Panel was instrumental in obtaining the services of the Science Adviser to the Secretary General of NATO and the Chairman of the NATO Science Committee, as well as his successor. Following letters from the Director of the International Cooperation Administration to the Chairman of the Committee, the Panel proposed a study of ways in which science and technology could contribute to the planning of technical aid programs; Africa South of the Sahara was chosen for initial emphasis. The Panel is presently engaged in preparing a comprehensive report in the many areas of interaction of science and national policy, including assessment of our international scientific activities for the advancement of science and for the support of foreign policy objectives. The Panel is chaired by Dr. Bronk and includes eight other individuals.

#### 30. Preparation for Possible Summit Meeting

On April 10, 1958, the Secretary of State requested the Special Assistant to set up an ad hoc committee of PSAC members to consider and recommend possible U. S. proposals in the general fields of science and technology which might lend themselves to exploitation at a Summit meeting. A special panel under the chairmanship of Dr. Bacher and including four other individuals was created, and its report was submitted to the Secretary of State on May 8, 1958. Included in the recommendations of the panel were proposals to create a Council of National Academies of Science of the Summit powers, to increase the flow of scientific personnel between the U. S. and USSR, to extend the IGY program with emphasis on outer space cooperation, and to create a new laboratory for nuclear research under the IAEA. Growing out of this report was the preparation and later submission to the State Department of a report by

Dr. Wiesner on a world-wide communications system based on the use of earth satellites.

31. High Energy Accelerator Physics

At a discussion of the FY 1959 budget of the Department of Defense in December 1957, the President suggested that an item involving a new high energy accelerator be reviewed. This was first reviewed by Dr. Fisk for the Special Assistant, and later by a Special Panel of the President's Science Advisory Committee and the General Advisory Committee to the Atomic Energy Commission. The report of the Special Panel was approved by both Committees and submitted to the President on April 2, 1959, by the Special Assistant with the assistance of the Panel Chairman, Dr. Piore, and one of its members, Dr. McMillan. The Panel report sets forth an orderly national program for the development of high energy accelerator physics over the next several years and recommends the construction of a new high energy electron linear accelerator proposed by Stanford University. This specific proposal was approved by the President. The Panel report accompanied by an explanatory statement on elementary particle physics will be made public. In addition to the Chairman, the Panel included four other members.



32. Computers

An Ad Hoc Panel was established under the FSAC to compare U. S. and USSR computer technology in view of the significant role played by computers in air defense and missile guidance systems. It is expected that the Panel report will be completed by July 15, 1959. Under the chairmanship of Dr. Piore, the Panel includes six other members.

33. Voice of America Panel

An Ad Hoc Panel on the Voice of America was established in October 1958 at the request of the Director of the USIA to review the technical plans and problems of the VOA. Under the chairmanship of Dr. Radford, the Panel of five members submitted its report on January 31, 1959. The Panel found the broad technical planning by the Agency to be generally sound and in accord with good engineering practice.

34. Science Engineering and Education

A Panel on Science and Engineering Education of the PSAC has for more than a year been developing views on ways to strengthen education

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in science and engineering. Its report is now in final form and will be presented to the Cabinet on May 15, 1959. The report sets forth national goals for strengthening science and engineering education and urges general public support to meet these goals. It is planned to release this report publicly. The Panel is chaired by Dr. DuBridge and includes eight other members, as well as a number of consultants.

35. Strengthening American Science

A Research Panel was set up under the PSAC in response to a suggestion by the President that the Committee study ways in which the Federal Government could strengthen science and technology as an essential resource for national security and welfare. The Committee report, released publicly on December 27, 1958, discusses the government planning and management of science and technology and recommends the creation of a Federal Council for Science and Technology to promote coordinated policy planning and more effective management of Federal programs in science and technology. Additionally, the report suggests ways to strengthen government laboratories, discusses the problem of government-sponsored research in non-government institutions and the needs for capital for science. It touches on the support of research by state and municipal governments as well as private support of research. The Panel was chaired by Dr. Piore and included seven other members.



36. Scientific Information

The PSAC early in 1958 appointed a Panel on Scientific Information to consider ways to meet the critical needs of the nations scientists and engineers for better access to scientific publications. The report of the Panel was issued as a PSAC report by the White House on December 7, 1958. Acting on the recommendations of the Committee, the President directed that the National Science Foundation take the leadership in bringing about effective coordination of the various scientific activities within the Federal Government. The Panel was chaired by Dr. Baker and included seven other members.

37. Biological Effects of Atomic Radiation

In March 1959, acting on behalf of the PSAC, the Chairman wrote to the President of the National Academy of Sciences encouraging a study by the Academy to review and up-date the studies they undertook some three years ago on the biological effects of atomic radiation.

David Z. Beckler  
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