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THE UNITED STATES ARMS CONTROL AND DISARMAMENT AGENCY
DURING THE ADMINISTRATION OF
PRESIDENT LYNDON B. JOHNSON

November 1963 - January 1969

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III. RESEARCH PROGRAM

A. Organization and Management of Research

At the beginning of the Johnson Administration, ACDA had completed two years of research on the scientific, technical, military, political, economic, psychological and legal aspects of arms control and disarmament. Most of this effort had been devoted to investigation of the implications of general and complete disarmament. The Agency had investigated ways of controlling missile production, studied outer space applications to arms control, analyzed Soviet attitudes, investigated the economic impact of disarmament and developed under Project CLOUD GAP an outline of test plans for field tests within the context of general and complete disarmament.

By the end of 1963, however, it had become clear that the partial nuclear test ban, the hot line and the U.N. resolution prohibiting weapons of mass destruction in outer space had set the stage for a long, slow process of negotiating single measures on a step-by-step basis. The U.S. plan for general

and complete disarmament remained on the table but emphasis shifted to partial or "collateral" measures. It was necessary then to reorient ACDA research toward a new set of program objectives which could perhaps be achieved in a reasonable time period, say 10-20 years. In early 1964 an effort was initiated to develop a formal statement of objectives which after many false starts finally led to the establishment in April 1965 of an arms control "Objectives Committee."^{1/}

To carry out its responsibility for the conduct of arms control and disarmament research, ACDA in 1962 established a Research Council consisting of the Bureau Chiefs (WEC, ST, IR and E) and the principal Office Chiefs (EX, GC, and RS). The first Chairman of the Research Council was the Assistant Director for ST, followed in October 1965 by the head of the Disarmament Advisory Staff (DAS) who in turn in February 1968 by the Executive Director (EX) who is the present Chairman.

During the Johnson Administration, the Research Council has functioned primarily to review individual

^{1/} See post. p.

external research projects submitted by the Bureaus and to recommend approval or disapproval of these projects to the Director. The Research Council also exercises broad supervision over Agency research management, while responsibility for planning and implementation of Bureau programs is assigned to the Assistant Director for each Bureau.

III. RESEARCH PROGRAM

B. Scientific and Technical Research

Advancements in the science and technology fields affect arms control activities in two general ways: (1) by making possible sophisticated weapons of mass destruction which have the potential for destroying modern civilization and which, therefore, are high priority and urgent subjects for arms control, and (2) by providing techniques which can be exploited to facilitate arms control and disarmament agreements, particularly in helping to solve the verification problems associated with such agreements. Thus, science on one hand generates many of our major arms control problems, while on the other hand, it promises to be of great assistance in solving these same problems.

P.L. 87-297, which established ACDA, states that "the Director shall to the maximum extent feasible make full use of available facilities, Government and private." In keeping with this policy, ACDA depends heavily on other government agencies for scientific and technical information essential to the performance

of its mission. In practice, ACDA places external research contracts directly with other government agencies through reimbursable agreements, or with industrial companies and other research institutions which have already acquired extensive data bases and intimate familiarity with specific subjects through previous research done for other government agencies, particularly the Department of Defense. Through the arrangements with these other government agencies contractors are permitted to draw on these data bases in performing analyses for ACDA. Without such arrangements for the use of existing data the cost of ACDA's scientific and technical research would be prohibitive. However, this dependence on outside agencies does create administrative difficulties. Many delays were experienced in getting access to needed data; in at least one case, the delay exceeded two years. On the positive side, each government agency which is a major supplier of scientific and technical input to ACDA research has designated a central point of contact for arms control and disarmament matters. These points of

contact were of great assistance in expediting the acquisition and transmittal of essential information, and without their help even longer delays in obtaining information would surely have been experienced.

ACDA's external research has focused principally on means to control and limit weapons of mass destruction, with the majority of the effort being devoted to strategic weapons systems. For a number of years this research was divided among a large number of contractors with each addressing an individual segment of the problem. These studies included investigations of: (a) the feasibility of verifying limitations on missile research, development, testing, and engineering activities, (b) the feasibility of evading production limitations by clandestinely developing or producing a ballistic missile force, (c) means of verifying limitations on rocket engine production, (d) the feasibility of verifying limitations on missile characteristics through observation of the launch and re-entry phases of missile testing, (e) verification procedures applicable to

measures to limit space-based weapons systems and possibilities for limiting missile technology resulting from space activities.

By FY 1968 these research efforts had provided a good set of basic data on strategic weapons systems. The main task for the future was to keep abreast of the rapidly changing strategic weapons technology and to analyze the implications of these changes to the arms control objectives. At the same time it was felt desirable to avoid the excessive burden of administering a large number of related contracts and to gain increased efficiency by centralizing in one contractor all external research support requirements associated with a particular arms control problem area. Accordingly in FY 1968 external research on strategic weapons systems was consolidated into two "area" contracts. The first covered offensive strategic weapons systems and addressed the arms control impact of research and applications in such areas as MIRVS, hardening, decoys, and mobility.

The second covered defensive strategic weapons systems and, in addition to providing state of the art data, analyzed such subjects as possible measures for controlling and limiting ABMs, the relationship and interaction between ABMs and limitations on offensive missiles, and the implication of possible overseas developments of ABMs.

Closely related to the "area" contracts was a reimbursable agreement with the CIA which provided ACDA with analyses of data on foreign strategic weapons systems. Another contract focused on the arms control implication of military command, control and communication systems and sought to identify elements thereof which might be improved or exploited through arms control to further U.S. security interests.

Although the principal external research effort was devoted to strategic weapons systems, other elements were also investigated. These included chemical, biological and nuclear weapons (as distinguished from weapons systems). The feasibility of verifying limitations on production,

transportation, and testing of chemical and biological weapons was investigated. Research in the nuclear field covered possible methods for detecting nuclear weapons and techniques and procedures which could be of assistance to an international organization in applying safeguards to peaceful nuclear activities to prevent diversion of nuclear materials to weapon purposes.

A major problem for arms control is the design of verification procedures which while adequately protecting national security interests would not be so intrusive as to be unacceptable to the parties concerned. Much of the scientific research, therefore, was involved in the investigation of means for minimizing human presence in inspection operations by employing to the maximum extent possible unmanned sensors. Surveys of sensor capabilities applicable to arms control were kept up to date to assure that the most advanced scientific techniques were incorporated into verification systems designs. Closely associated with sensor research was the development of tamperproofing techniques so that all parties could have

confidence in the output of unmanned sensor systems.

A relatively small but important part of the external research effort was devoted to basic research, investigating ways in which advanced mathematical techniques, including game theory, might be employed in arms control activities.

In-house research, which draws upon the results of external research and other sources of information, provides the basis for policy formulation. An individual in-house research project, or staff study, may be the effort of a single staff officer, an ACDA working group, an interagency working group, or a special panel involving consultants. As was the case with external research, the prime target of in-house research was strategic weapons systems. In this connection, the rationale for MIRVs, their relationship to ABMs, the effects of overseas deployments of ABMs, and the technical aspects of verification of various proposed limitations on strategic weapons systems were among the subjects studied. Other in-house research addressed seismic capabilities for detecting and identifying underground nuclear explosions,

procedures for safeguarding peaceful nuclear activities, and the impact of peaceful nuclear explosion provisions on various nuclear test ban and non-proliferation measures. Extensive in-house technical research laid the foundation for U.S. proposals to freeze the numbers and characteristics of offensive and defensive strategic weapons system, to cut-off the production of fissionable material for use in weapons, and to ban nuclear weapons tests; as well as the negotiated Outer Space Treaty and the NPT.

III. RESEARCH PROGRAM

C. Research on Military Implications of Arms Control

Within the context of the Agency's mission of developing realistic, equitable, and safeguarded arms control and disarmament measures, the Agency has conducted a research program directed at acquisition of theoretical and practical background knowledge of the ways to assess the effects of arms control measures on the national security interests of the United States and other relevant powers. A combination of in-house and external research resources has been applied to this effort.

The evolution of this program of military research has involved internal problems of research approach, of relationships with the Department of Defense, and of evaluation of the utility of research.

Because of the need for specialized knowledge and skills, the in-house research effort on the

military implications of arms control has been supplemented by an external research program designed to tap the wide variety of professional and technical expertise available in existing research organizations in the Government, in industry, and in the academic community. In the early years of the Agency's program of military research, the management of the external research program occupied a disproportionate amount of staff time, thus limiting the in-house research effort. An additional problem was that while the external research was directed at major problem areas -- such as force capability analysis, verification and inspection concepts and requirements, and European security problems -- it did not usually reflect the ideal situation wherein external research requirements are generated by on-going in-house research efforts.

In the more recent years of the Agency's military research effort, closer relationships have

been established between in-house and external research. This interface has been particularly useful in the area of strategic analysis, wherein the services of external contractors have been utilized successfully for the development of computer models of strategic exchange to assist in-house evaluation of the effects on the strategic military balance of potential measures limiting strategic armaments.

A special problem of research approach concerns assumptions to be used in verification and inspection studies, to which a large proportion of both in-house and external research efforts has been applied. Initially, inspection requirements studies were based on the conservative premise that the desired degree of assurance that other parties were honoring the terms of an agreement would be provided by various forms of on-site inspectorate operations, and that the role of unilateral verification capabilities would be minimized or even

duplicated. Under this premise of a "self-sufficient" inspection capability, requirements for on-site, high-access inspection operations generally were found to be so intrusive as to cast doubt on their political acceptability. More recent inspection studies have been based on the premise that in the real world of arms control negotiations, it is necessary to minimize intrusiveness. Therefore greater reliance (always to the extent consistent with U.S. national security) may have to be placed on unilateral capabilities for verification of agreements that appear to be desirable.^{1/}

In the conduct of such research the Agency obviously depends heavily on ready access to views and information held in the Department of Defense. . . Close and useful relationships have been established at the staff level with those components concerned

^{1/} With reference to possible agreements with the Soviets for leveling off or reducing strategic offensive weapons systems, Assistant Secretary of Defense (ISA) Paul Warnke, on Oct. 6, 1967, stated that we may have to depend on unilateral capabilities for verification. (Documents on Disarmament, 1967, p. 459).

with arms control issues: International Security Affairs, Systems Analysis, Defense Research and Engineering, the Joint Chiefs of Staff. Earlier difficulties experienced in securing data on such topics as force structures and weapons capabilities, for use in both in-house and external research efforts, have largely been overcome; in particular, the support of the intelligence community generally, so essential to the conduct of military research in the arms control area, has proved to be outstanding.

Further progress still is needed in one aspect of the ACDA-DOD relationship: coordination of ACDA and DOD research in the arms control area. Procedures for coordinating individual study proposals with the Department of Defense work well, but are not operative with respect to securing DOD assistance in identifying longer-range research requirements. Even more of a problem, however, is the fact that

relatively few studies being sponsored or conducted by the Department of Defense, which would be considered by ACDA as falling in the category of "arms control research," are so identified by the Department. The Agency becomes aware of those arms control studies which are so labelled through DOD reports to the Agency for inclusion in the annual report to the Bureau of the Budget, but procedures for keeping ACDA informed of the broad spectrum of DOD studies have not been well developed.

The solution of the problem of determining criteria for measuring the usefulness of a research program of military arms control research remains elusive. The simplest criterion is the relevance of the research to questions that have to be answered for current policy and negotiating needs. It has proved difficult to initiate external research projects which would be responsive in a timely fashion to relatively short-range policy formulation and negotiating requirements. One approach to this problem has been

to encourage the development, by certain contractors, of a quick-reaction capability for producing studies related to current negotiating problems; in the military arms control research area, several contractors have been given such tasks and have furnished the Agency with timely assistance of direct use in development of positions on current arms control issues.

There are utilities of research, however, beyond the applicability of results to immediate policy needs. The fact that progress on reaching agreements has so far been slow suggests that discussion of major measures which are of current interest at any given time, such as limitations on strategic weapons systems, may be similarly long drawn-out. Evolving technology and changes in the political climate may justify continuing research on such current issues.

In addition, it is not easy to predict which of many possible kinds of measures may in the future suddenly become of interest for discussion with the

USSR and other countries, and research programs relevant to a wide variety of possible future measures are necessary in order to be prepared for negotiating opportunities.

Moreover (although less directly related to specific proposed or potential measures), longer-range research studies are of value in providing improved tools and techniques of analysis, and in sharpening understanding of the military factors, attitudes, and consequences that must be weighed in evaluating and formulating arms control proposals.

III. RESEARCH PROGRAM

D. Political Research

ACDA has experienced a variety of challenges in the conduct, support and coordination of research on the political aspects of arms control and disarmament and the Agency would be remiss in giving credence to the notion that because of its accomplishments to date future research will afford little or no challenges. Quite the contrary, challenges are to be expected inasmuch as research in this field is ultimately concerned with the nature of and changes in the international environment and the impact of such changes on U.S. national security interests. Understanding such changes in all their foreseeable ramifications is a prerequisite to the design of negotiable arms control measures that enhance U.S. security and contribute to international peace and stability. Accordingly, research now as in the future will require detailed planning by ACDA and close coordination with other appropriate U.S.

government agencies. These procedures, though not cumbersome, warrant further study and refinement to allow ACDA more latitude in carrying out its responsibilities for arms control research.

The challenge to be faced in future political research on arms control are not likely to be of a parochial nature, but will probably involve problems concerning contractual relationships with the academic community, congressional scrutiny of the Agency's continued research in the social sciences, particularly research performed under university auspices, and the utility of such research in the formulation of arms control disarmament policies. Concern over the latter has by no means been restricted to Congressional committees; a few executive departments and offices have often sought to test ACDA's justification of such programs, despite ACDA's statutory responsibilities.

Since the creation in 1964 of the Foreign Area Research Coordination Group (FAR), of the Department

of State, ACDA has on a formal basis solicited the counsel of key participants -- representatives of 21 agencies -- of that group concerning proposed social science research to ensure against the duplication of effort as well as enhance the value of the end-results. It should be noted that even prior to FAR, ACDA had informally broached its tentative research proposals to appropriate government agencies.

While ACDA has found FAR to be a useful device, its experience with the Foreign Affairs Research Council (FARC) has not been without some travail. It may be recalled that FARC was established at the behest of President Johnson to assure that government sponsored social science research on international affairs or in foreign areas did not adversely affect U.S. foreign relations. To this end, ACDA has cooperated to the fullest extent and, to date, no major problems have evolved in coordinating proposed terms of reference with FARC; however, there have been some difficulties as a result of the screening by that body

of final unclassified products which were considered by some members to be potentially sensitive. In instances where it has cleared terms of reference for an unclassified project, FARC has usually deferred to ACDA's judgment as to publication, on the understanding that FARC would assist in the final review if requested and that ACDA would at its own discretion consult other appropriate agencies or offices on problems of substance. In other instances, FARC has proved less flexible and formally asserted its authority in reviewing final products intended for publication.

A few agencies, or components thereof, have on occasion sought to question non-substantive matters, e.g. why ACDA wished to engage in such research, cost of project, end-utility, and lack of scholarship on part of contractor or author. ACDA has not taken serious umbrage to such comments since these are matters entirely within the purview of ACDA.

In this connection, it might be noted that several agencies have shown only token compliance in coordi-

nating with ACDA their arms control research as required under Executive Order 11044.

Much of ACDA's external political research has been performed by a number of well-known universities and, to date, ACDA's relationships with these institutions have been satisfactory. Perhaps one of the reasons for this is the fact such institutions have performed their work as expected in a scholarly fashion, devoid of any sensationalism, and have maintained cordial and professional contacts with Agency personnel.

Although this record is encouraging, ACDA has recognized the potential problems inherent in unclassified research. In some cases, the very subjective nature of political research may prove embarrassing to either the U.S. and/or its allies. Through coordination (see above) with other agencies, some of these problems can be anticipated; if not, they should be resolved through a revision of the terms of reference prior to awarding a contract or by frank discussions with a prospective contractor.

Yet experience has revealed that this is not always possible. For example, in one case an unclassified project required the tentative assignment of appropriate classifications to a few draft papers which, if accepted without revisions, could have reflected adversely on the U.S. Fortunately, ACDA by agreement with the contractor was able to effect suitable revisions and the university made no issue of the temporary classifications, despite some initial restiveness on the part of the latter.

The lessons gained here point up the fact that universities are becoming ever more vocal in asserting a right to perform research, with a view to ultimate publication and indication of government support. The "Guidelines for Foreign Area Research" issued in 1967 by FAR apparently have not completely assuaged the feelings of university researchers. These guidelines, intended to protect and promote both academic integrity and scholarship and, at the same time, ensure that universities remain conscious of sensitivities in foreign area research, will require further

refinement in light of evolving changes in the role and attitudes of the academic community toward government-sponsored research. ACDA has revised its contractual clause to accommodate university sensitivities while maintaining its essential rights. The current formula appears to have worked well, although refinements are made from time to time.

ACDA's expenditures for research in the social sciences have been adequate, but relatively modest -- when compared with expenditures by other agencies in the same or related fields. Though it could have accomplished even more with additional funds, ACDA has during recent years achieved considerable success in political research.

One of the most vexing -- to the outsider -- and perennial questions, however, has been how ACDA has applied the results of such research in solving problems relating to arms control negotiations. Admittedly, it is difficult to ascertain how contract and in-house research studies lend themselves to negotiations. It is not the nature of political

research -- especially that performed on a contract basis -- to fashion specific proposals likely to be adopted by the U.S. and tabled during the course of negotiations. Research in the social sciences is, of course, less precise than that concerned with physical sciences which, in some cases, figure significantly in the formulation and consideration of technical arms control measures concerning military hardware.

These considerations notwithstanding political research -- or what is critically referred to as "soft research" -- can make a meaningful contribution to ACDA's mission. The results of political research provide ACDA with timely or different insights into current problems, e.g., concerning the positions and attitudes or our allies and adversaries, the feasibility or possibility of various measures and agreements, which have a bearing on ultimate U.S. negotiating positions. Viewed in this manner, political research is basic to policy formulation and, in this connection, the specialized competence

of the academic community or other private institutions -- as detached observers of the arms control scene -- can usefully supplement the judgment and experience of senior U.S. policy-making officials and their staffs. Mindful of the expertise and varied disciplines required for arms control and disarmament research, this approach should not be construed as an extravagant subsidization of universities, a criticism which ACDA has repeatedly faced during recent years.

The effects of congressional scrutiny of ACDA's expenditures on political research have been both good and bad. Criticisms directed at the utility of specific projects and funding arrangements have caused the Agency to develop long-range plans for a gradual transition to in-house research to carry forward work which could only have been undertaken through contract effort. Limitations on or cutbacks in budget requests have required a constant reordering of priorities in programs and projects; such actions

have unnecessarily hampered ACDA's planning effort, particularly from the standpoint of maintaining a balanced perspective and continuity in program planning.

ACDA has never denied that certain projects have produced marginal results. Much of ACDA's earlier research sought to cover broad areas -- to catch up, so to speak -- and therefore, critics may have had some cause to point to the lack of specificity and application of results. In recent years, however, political research -- both external and in-house -- has been reoriented to address specific objectives and goals, i.e., less emphasis on historical and theoretical research (which has now been largely accomplished) than on research concerned with current and long-range political and military (strategic) questions, problems of local conflict and peacekeeping.

This shift in emphasis, facilitated in part by the Program Planning and Budgeting System initiated during President Johnson's tenure of office, attests

to the continuous efforts of ACDA to sharpen the focus of its research in such a way as to ensure the prospect that it will yield more practical results. Continued efforts in this direction should also result in fewer criticisms of ACDA research as being too theoretical and marginal and hopefully continue to maintain the congressional and public support required by the Agency to conduct research in so vital an area as arms control.

III. RESEARCH PROGRAM

E. Economic and Behavioral Science Research

By 1963 the Administration had become aware that, with the initial investments in the current strategic missile programs soon being completed, defense spending might level off and even decline in the absence of a new thrust in the arms race. Several factors - such as the regional concentration of defense production, the specialized production capabilities of many defense firms, and the public concern over the role of defense spending in maintaining prosperity - suggested that further research on the problems of economic adjustment to changes in defense spending was in order. Although Section 31 (h) of the Arms Control and Disarmament Act provided for study of "the economic and political consequences of arms control and disarmament, including the problems of readjustment arising in industry and the reallocation of national resources" and Executive Order 11044 of August 1962 provided that "With the advice and assistance of affected agencies, the Director shall

develop and keep current a comprehensive and balanced program of research, development and other studies needed to be conducted by or for the Government for arms control and disarmament policy formulation.", it seemed as if, for domestic economic impact research, the best method of insuring coordination and the development of a well-rounded program and policies would be the organization of an interagency group.

Accordingly, a letter was sent to Dr. Walter Heller, then Chairman of the Council of Economic Advisers, suggesting the creation of a committee of this kind,^{1/} and in July of that year an informal interagency committee was set up by Dr. Heller.

On December 21, 1963, President Johnson, by memorandum to the heads of Defense, Labor, Atomic Energy Commission, National Aeronautics and Space Administration, Arms Control and Disarmament Agency, Office of Emergency Planning, Bureau of the Budget and Council of Economic Advisers, directed formation of a more formal interagency group, of which a member of CEA would be Chairman.

^{1/} See letter from Archibald S. Alexander to Walter Heller dated

The committee was then headed by Dr. Gardner Ackley, first a member and later Chairman of the CEA. Archibald S. Alexander, Assistant Director of the Arms Control and Disarmament Agency (Economics) was named its representative of the Economics Bureau, also participated in the four working groups established to assist the committee.

The committee, known as the Committee on the Economic Impact of Defense and Disarmament, issued its report in July 1965. The report treated the subject broadly. It received wide dissemination and considerable press comment.

The report's chief conclusion was referred to in the President's announcement at the time the report was made public as follows:

"What I find most encouraging of all in the report is your conclusion that our heavy current commitment to defense is not a bar to rapid progress toward disarmament. All Americans will welcome your clear conclusion that "there is no economic reason for the Nation to undergo a major economic decline or a slow stagnation if and when defense outlays are reduced."

"The American people will continue to be determined that our great industrial effort for national defense is their servant and not their master. This is the tradition of the armed forces themselves, and it is the conviction, I am sure, of those who serve in the national defense industries, too."1/

This was the first formal statement, from all the parts of the Federal Government having competence, that the economic and social consequences of disarmament, after a brief transition period, should not only have no adverse effect on the American economy and society, but would provide a healthier economy and a better society. Thus, there was no longer ground for a serious claim, abroad or in the U.S., that the U.S. might be loath to attempt real disarmament because of fears of the economic consequences.

The committee in the report also recommended creation of permanent Federal Task Force on community assistance to handle difficulties created by cutbacks in defense activities in localities heavily dependent on defense spending.

1/ White House Press Release September 4, 1965.

Important ACDA contributions to the report were (1) to urge and to draft language for the conclusion referred to in the next to last paragraph, (2) to provide the results of the research it had sponsored, which were used extensively in the report, and (3) the drafting of the chapter in the report on "Informational and Research Needs."

By the time the committee issued its report, the concerns behind its establishment had disappeared. Rather than declining, defense expenditures were increasing with the escalation of the war in Vietnam.

Because of the similarity, in many respects, between the economic and social consequences that would follow a reduction in Vietnam spending to those which would follow substantial measures of arms control and disarmament, the research and other work of ACDA on the latter were relevant for the former. Accordingly, the Economics Bureau also participated -- to a much more limited extent -- in two informal working groups created by the Cabinet-level committee established to consider the economic impact of de-

escalating the war in Vietnam. The ACDA representatives contributed in particular to considerations of regional and industrial policy and manpower policy. By mid-1968 the formal committee had lapsed into inaction without having developed comprehensive plans for dealing with the contingency.

Research sponsored by the Economics Bureau varies greatly between its three divisions.

The Domestic Economics Division dealt with the economic problems that might face the United States as a result of substantial disarmament and a consequent reduction in defense spending. Most of its contract research in the period through 1968 was devoted to measuring the impact of defense spending and identifying the problems that would arise for various industries, geographic areas, and for manpower by changes in its magnitude; but by 1968 ACDA was beginning to look more closely at measures that might be taken in the event of a cutback in defense spending.

The research sponsored by the International Economics Division concentrated on three areas -- arms transfers, the possibilities of using economic data to verify adherence to arms control agreements, and the burden of defense spending on the world, especially on developing countries.^{1/} Finally, the Behavioral Sciences Division investigated the basic causes of hostility and aggression; the attitudes of groups in various parts of the world, especially in the Soviet Union and Mainland China, towards arms control; and methods of conflict resolution. It also did considerable work in the field of arms control education and related efforts to improve the arms control environment.

Because of their different orientations, the three divisions have had rather different relations with other parts of ACDA and with other agencies within

^{1/} See "World-Wide Defense Expenditures and Selected Economic Data, Calendar Year 1964: and "World-Wide Military Expenditures and Related Data, Calendar Year 1965" (Unclassified). See also "United States Exports of Military Items and Commodities of Potential Military Use" (Confidential).

the government. The work of the Domestic Economics Division was largely separate from that of any other bureau or office within ACDA. This Division had close contact, however, with other agencies of the government (e.g., the Council of Economic Advisers, and the Departments of Defense, Labor and Commerce), and several of its studies were jointly funded and managed with them.

In contrast, the research in the international economic area related in various ways to other parts of the Agency's work. Collaborative efforts with other bureaus sometimes resulted, and for the most part these joint research programs. In which economists worked with military and political specialists and with scientists, operated successfully. Research subjects involving close interdisciplinary collaboration included the control of local conflict, verification of CB weapons and future costs of strategic weapons under various force assumptions.

In one area of research, the International Economics Division did not always have the enthusi-

astic support of other bureaus. Its efforts to apply economic data monitoring to arms control verification, as one means of reducing intrusion, were regarded with skepticism by Agency staff involved in studying physical sensors and direct technical or military inspection techniques. On several projects in this field, however, the Bureau had a good working relationship with CIA. In sponsoring research on Soviet input-output data, for monitoring purposes, ACDA/E also received financial support from CIA and DOD.

The experience of the International Economics Division in working with other government agencies on research matters was for the most part highly satisfactory. AID staff were very cooperative in providing data and specialist assistance relating to arms trade and military expenditure. Three contractual arrangements with Commerce Department worked very well and yielded significant new information and data on arms trade and Soviet record-keeping systems. Relations with CIA economics staff were generally very cordial.

On the other hand, the International Economics Division encountered a less than cooperative attitude in its efforts to develop an independent capability for assessing the cost implications of various force structures. DOD provided summary data, but was unwilling to transfer detailed information on U.S. weapons systems which would permit ACDA to make its own analysis of the cost savings implied by arms control measures.

The problems of coordination faced by the Behavioral Sciences Division arose from the subject matter its research dealt with and its somewhat anomalous location in the Economics Bureau. (Indeed consideration was given to changing the name of the Bureau when it began to engage in this area of work, but "social sciences" was never added to the title because of a possible conflict with the International Relations Bureau.) On the one hand, many persons within the Agency doubted the relevance to arms control of rather basic research in psychology. But on the other hand, when the research of this

division became more policy-oriented, it necessarily involved work similar to that of the International Relations Bureau.

In addition to its other responsibilities, the Behavioral Sciences Division served as the focal point within ACDA for contacts with the Foreign Area Research Coordination Group, and has developed liaison with the many private associations working in related fields. It also provided staff backup for the Social Science Advisory Board.

III. RESEARCH PROGRAM

F. Legal Research

Since 1964, contracts have been concluded and initiated within the Office of the General Counsel on legal and related questions in the following areas:

One aspect of great interest to the Office of the General Counsel concerns the necessity to amend existing legislation if an arms control agreement did come into effect, which would require inspectors to enter upon the territory of a given state. It was our view that the first subject of the study should be the United States. The Agency initiated a contract with Columbia University entitled "Legal Aspects of Arms Control Verification in the United States." The study, based in part on an earlier book by Prof. Louis Henkin of Columbia University who assisted the researchers on this subject, was published in 1966 by Oceana Press and has been widely circulated and reviewed. It assumed the effect that a disarmament agreement, e.g., a cutback in production of fissionable material, would have on existing

legislation and whether limitations would be imposed on the ability of an international inspectorate to verify U.S. compliance of the agreement. Such limitations could be constitutional, statutory, administrative, or through the common law. The rights of citizens would also have to be reconciled with the necessity for access by the inspectorate. The negotiation of detailed agreements of the type contemplated by the study has not borne fruit, at this time, so that the actual utility of the study has not been tested. Its reception, however, within the legal community indicates that it will be a useful research tool.

A study was more recently completed with respect to "Legal aspects of Verification in the Soviet Union." This study was performed by Soviet Law experts at the University of Wisconsin School of Law. The Agency had earlier contracted with Harvard University School of Law for a pilot study on this subject which indicated the need for a more detailed effort. This

study provided the Agency with insight into the workings of the Soviet legislative system insofar as it would provide either a facilitating or obstructive role in the implementation of an arms control or disarmament agreement. Scenarios as to how the Soviet system would work for a cutoff, freeze, or CTB provided more specific application of the problems that might be faced by inspection. This study has already received some practical usage. For example, sections dealing with the ratification process in the Soviet Union have been used to provide background material for the Senate Committee on Foreign Relations during its consideration of the Non-proliferation Treaty. In addition, a portion of the study dealing with Soviet secrecy laws have been published by the Journal of Classification Management, since it represents a unique contribution to the English language literature in this field.

In conjunction with the 1968 ACDA Authorization hearings before the Senate Foreign Relations

Committee, the study was criticized by Senator Fulbright, who excerpted a general conclusory statement from the summary report to attempt to demonstrate that the project had only minimal value and was not worth the cost to the government. The author replied to Senator Fulbright who responded by stating:

"Without reading the entire 386 page principal report, for which I do not have the time, I cannot say whether this summary which you authored was an accurate description of the report and whether an injustice was done." (See attachments)

The Office of the General Counsel has sponsored several studies dealing with the subjects of peacekeeping and arrangements to verify compliance with arms control and disarmament agreements. Two of these studies were performed by Johns Hopkins University. One entitled "The Peacekeeping Proposals of the U.S.: Outline of Basic Provisions of a Treaty of General and Complete Disarmament in a Peaceful World," provided the Agency with many considerations for and against the U.S. proposal for general and complete disarmament.

The project provided much needed analysis in depth by experienced and independent scholars on the problems of maintaining peace leading to and including General and Complete Disarmament under the U.S. GCD treaty outline.

It helped ACDA staff better understand the obstacles to achieving GCD and thus helped reinforce a decision to place more emphasis on seeking collateral measures. The report has also been furnished to our allies at the ENDC as a basis for discussion of the U.S. treaty outline.

In 1966 the report was published by the Johns Hopkins Press in both hard cover and paper back editions. The Agency considered the report to be an excellent and useful job. It has, however, been subject to criticism to which we replied (attached) both in Congress and in the press, the basis of which is that it points out deficiencies in the U.S. proposal since the GCD proposal does not provide adequate machinery to protect national interests in a troubled world.

A second contract with Johns Hopkins entitled "International Organizational Arrangements to Verify Compliance with Arms Control and Disarmament Agreements" was specifically developed around existing U.S. proposals for a cutoff, freeze, CTB, and verification of stage one of the GCD treaty, as well as the Gomulka and Rapacki plans. This study provided useful insights for other related work (e.g., the problems of Soviet verification) and portions were used by the International Atomic Energy Agency as guidance for their drafting of procedures to safeguard chemical processing plants. These procedures were adopted by the IAEA Board of Governors in September 1966.

In June 1966, the Southern Methodist University Law School completed a thirty-month research project on "The International Law of Indirect Aggression and Subversion." It was focused on two related issues of concern to ACDA. First, the applicability of traditional international law principles to regulate

state (and private) practice concerning acts of indirect aggression was examined. Second, an assessment of the sufficiency of these international law principles in "a disarming world" was made.

The report concluded that existing legal principles could suffice to control indirect aggression in most instances, but that the absence of a common world-wide "ethos" rendered these principles nearly meaningless insofar as the lack of a consensus would prevent these principles from being made.

In order to complement some of the verification studies performed for the Bureau of Science and Technology in the field of chemical and biological weapons, the General Counsel's Office is presently reviewing a report on the Development of International Legal Limitations of the Use of Chemical and Biological Weapons. Its purpose is to historically trace the development of these limitations in treaties and customary international law.

III. RESEARCH PROGRAM

G. Field Tests

Inspection and verification of compliance or possible noncompliance with international arms control agreements are fundamental elements of U.S. policy. In consonance with this policy, Mr. Foster, the Director of the Arms Control and Disarmament Agency, chose the examination of the inspection and verification aspects of arms control as one of the first research tasks to be performed when the Agency was created in 1961.

For this initial study of inspection and verification, an interagency Inspection Study Group - ISG - was formed. This group, headed by Mr. Foster, included Department of Defense representatives from DDR&E, DIA and WSEG; as well as representatives from the AEC, CIA, and the Office of the Special Assistant to the President for Science and Technology.

One of the principal findings of the Inspection Study Group, developed in conjunction with recommendations from the ACDA General Advisory Committee,

related to the need for a program of field tests and experiments, and an organization for planning and conducting such tests, and analyzing the results.^{1/} In many subject areas of arms control and disarmament research, and particularly with regard to inspection and verification, there is a limit to the effectiveness of studies which rely almost exclusively on theoretical and analytical techniques alone. The ISG, therefore, concluded that only through field testing could inspection capabilities, under conditions approximating those which probably would exist in an actual treaty situation, be realistically determined.

The decision to run field tests of inspection and verification systems was therefore made by a group of high level Government officials representing the agencies most concerned with national defense and arms control. In order to determine how to implement the findings of the ISG and also comply with the provisions of the Arms Control Act, which

^{1/} The Report of the Inspection Study Group, ACDA Publication, 1962, page 4 (Secret).

require that, in the conduct of its research program, the Director utilize, to the maximum extent feasible, existing facilities, both Government and private, discussions and negotiations were opened by ACDA with officials of the Bureau of the Budget, the White House staff, and with the Department of Defense. The Department of Defense was particularly well suited for field tests involving inspection and verification for arms control and disarmament. Not only are the material and personnel resources of the DOD in themselves the logical targets of arms control inspection and verification operations, but within Defense are to be found experience, manpower, and material whose utilization in support of field testing for arms control inspection and verification is indicated for reasons of effectiveness and economy. As a result of these discussions, the conduct of field tests became a joint venture of the Department of Defense and the Arms Control and Disarmament Agency. This venture was called "Project CLOUD GAP."^{1/}

^{1/} The Process of Establishing Requirements for CLOUD GAP. Field Test Operations ACDA/WEC Working Paper, March 1967. This document reviews the process whereby guidance was formulated, coordinated, finalized and transmitted to Project CLOUD GAP and examines the history, in detail, of selected field tests (SECRET).

Purpose and Direction. Project CLOUD GAP was established in 1962 as a joint ACDA and DOD interagency group. The objectives of Project CLOUD GAP, as specified in the original 3 May 1965 ACDA-DOD Working Agreement on Project CLOUD GAP, were "to field test and refine arms control concepts, techniques, equipments, and systems for inspection and verification developed by ACDA or DOD. This Project is intended to provide a basis for evaluation of arms control inspection and verification concepts of the United States and other nations." Subsequent Congressional action on the Fiscal 1968 Department of Defense Appropriations Bill, with respect to Project CLOUD GAP, required the DOD to terminate its participation in Project CLOUD GAP. ^{1/} This action terminated the funding arrangements provided for in the 26 July 1967 ACDA-DOD Working Agreement, and made it necessary for ACDA to reimburse DOD for all expenses incurred by DOD in providing support, including pay and allowances for military personnel, equipment and facilities to ACDA. This Congressional action also brought about a termination of the 26 July 1967

^{1/} ACDA Instruction No. 26, 15 September 1967 (Unclassified)

ACDA-DOD Working Agreement on 13 September 1967 at which time Project CLOUD GAP ceased to exist as a cooperative ACDA-DOD venture and became the Field Operations Division of the Weapons Evaluation and Control Bureau of ACDA (WEC/FO). This Division is responsible to the Director of ACDA through the Assistant Director for Weapons Evaluation and Control for development and execution of a comprehensive program of research, development, testing and evaluation of concepts, techniques, equipments and systems for inspection of arms control agreements. In addition to this primary mission in support of the Agency, WEC/FO is responsible for a WEC program of research, development, testing and evaluation with respect to both verification and inspection. ^{1/}

Field testing under Project CLOUD GAP, involved both the interest and the resources of a number of government organizations in addition to ACDA. Guidance and direction for this field testing were provided by these organizations through a steering committee jointly chaired by the Department of Defense and ACDA. The termination of Project CLOUD GAP in 1967 ended not only

^{1/} ACDA Instruction No. 31, 11 April 1968 (Unclassified).

the joint participation of the Department of Defense in the field test program, but also the mechanism for the coordination of this program. To continue this interagency coordination under the new organizational setup, (viz., WEC/FO vs Project CLOUD GAP) the Joint Advisory Committee (JAC), comprised of members from ACDA, State, CIA, AEC, and DOD, was formed. This committee, chaired by ACDA/WEC/FO, advises WEC/FO in the planning and evaluation of ACDA coordinated proposals for studies, equipment development, field surveys, field experiments, field tests, and simulation projects.

Field Tests. Early in Project CLOUD GAP's history, the method of operation was not clearly established. Determination as to which field tests were to be conducted was largely a function of practical consideration; a need to gain experience in the operation; the very modest budget that was available for field testing; the very limited staff; and the uncertainty of how resources were to be made available to the Project for field

testing, recognizing that the DOD would be heavily involved.

The summer and fall of 1962 were largely devoted to organization and recruitment of personnel. By early 1963, sufficient resources were available to permit the conducting of a field field test.

The Project's first field operation was conducted at Fort Hood, Texas, between 15 October 1963 and 15 March 1964. Since that time, Project CLOUD GAP and later the Field Operations Division have completed a total of seven field tests, two more are now in the field, and preliminary plans for others have been developed.

Four of the completed tests were concerned with various aspects of inspection system capabilities under a postulated treaty limiting general purpose forces. These tests, described below, became progressively more complex and sophisticated, and for the first time provided a quantitative, rather than subjective, measurement of various inspection techniques and the influence of the numerous variables tested on inspection effectiveness.

CG-3 - Resident Inspection of an Army Installation ^{1/}

This test, a part of the "Limitations on Retained Levels of Forces-in-Being" program, was the first one conducted by Project CLOUD GAP, and, to a large measure, is considered as a device for gaining experience in field tests involving arms control operations. The test was conducted at Fort Hood, Texas, between 15 October 1963 and 15 March 1964 to evaluate the effectiveness of four-man inspection teams which were permitted a relatively high degree of freedom in inventorying armored vehicles. As a result of this test, an Inspection Procedures Manual which specified a set of detailed procedures which could be used for the installation and operation of a resident inspection system was developed. An aerial photographic surveillance phast CG-3A^{2/} was conducted in conjunction with this test to acquire preliminary information on the potential application of aerial photographic surveillance to on-site inspection of an army installation.

^{1/} CG-3 Project CLOUD GAP Final Report Vols I and II CG-3 Resident Inspection of an Army Installation, 31 July 1964 (Confidential).

^{2/} CG-3A Project CLOUD GAP Final Report CG-3A Aerial Photographic Surveillance of an Army Installation, 5 October 1964 (Confidential).

FT-4 - Inspection of Retained Levels of Ground Forces ^{1/}

This test, a part of the "Limitations on Retained Levels of Forces-in-Being" program, was conducted at five U.S. Army installations from 6 May to 28 June 1966 to determine the effectiveness of techniques of intermittent on-site inspection to verify retained levels of ground forces. Ground, air, and combined air/ground teams were investigated during the conduct of the two subtests that composed this overall test. One subtest consisted of a set of field trials simulating intermittent on-site inspection of barracks complexes and a major training area at one installation. The other subtest consisted of a series of inspections at several other military installations wherein the barracks compound and its associated training area were inspected under conditions more closely approximating those of intermittent inspection.

1/ FT-4 ACDA/WEC/FO Final Reports Vols I, II & III FT-4 Inspection of Retained Levels of Ground Forces, February 1968, December 1967 and February 1968 respectively. (VOLS. I & III - CONFIDENTIAL) (VOL II - OOU).

CG-12 - Military Activity Monitoring ^{1/}

This field test was an initial exercise in the monitoring of military activity, conducted from 20 April to 15 May 1964 under relatively optimum conditions of weather, geography and operational environment against a major overt military logistical movement of men and material preparatory to a major military exercise. Its purpose was to measure the capability of ground and air inspection, and to monitor and report upon a large, openly conducted military movement. Seven ground observation posts, 41 aerial reconnaissance sorties, and limited light aircraft and helicopter observations were used. Teams were stationed at cities (transportation centers), airfields, and an arbitrary border.

CG-13 - Inspection of Retained Levels of General Purpose Air Forces. ^{2/}

The objective of this test was to develop, test, and evaluate elements of an inspection system that

^{1/} Project CLOUD GAP Final Report Vols I, II & III CG-12 Military Activity Monitoring, 15 May 1965 (Confidential).

^{2/} Project CLOUD GAP Final Report Vols I, II & III CG-13 Inspection of Retained Levels of General Purpose Air Forces, June, January and June 1967, respectively. (VOLS I & III - Confidential) (VOL II - OOU)

will provide verification of retained levels of general purpose air forces in compliance with a postulated treaty limiting military manpower, specific armaments, and facilities. The test consisted of five experiments involving selected inspection methods against four Tactical Air Command Bases, and twelve other airfields capable of supporting tactical aircraft. To accomplish the objectives of the test, resident inspection teams, intermittent undeclared site inspection teams, aerial observation inspections, aerial photosurveillance, and unattended sensors were used.

A fifth completed test (CG-9A) in the CLOUD GAP program dealt with a different subject: the capabilities of visual inspection for determining the production of strategic delivery vehicles, under some sort of limitation similar to that proposed in the Eighteen Nation Disarmament Committee for a possible freeze on the numbers and characteristics of strategic offensive and defensive nuclear delivery vehicles.

CG-9A - Inspection of Strategic Nuclear Delivery Vehicle
Production

This field test was conducted at four major U.S. missile production facilities between 21 September 1964 and 31 March 1965. The primary objectives of this test were (1) to determine the kind of inspection processes, the degree of access, and the frequency of inspection required for effective verification of production and shipment of SNDV's and subassemblies at the facilities; (2) to determine the feasibility of verifying deliveries and shipments when access is restricted to the plant perimeter or to the perimeter and external area around shipping and receiving buildings; and (3) to determine the significance of plant declarations. Inspection operations were carried out using three types of inspection procedures involving several different degrees of access. Inspection frequencies were varied from continuous to once a month. Shipment inspection teams ranged in size from 6 to 14; production inspection teams

1/ Project CLOUD GAP Final Report Vols I, II & III CG-9A Inspection of SNDV Production, August, June and June 1966; respectively (Confidential).

ranged from one to seven men. Evasion was conducted against both shipment and production teams.

A sixth test (FT-1A) in the program was concerned with the effectiveness of various on-site inspection procedures for identifying underground nuclear tests; in the context of a possible comprehensive nuclear tests ban.

FT-1A - On-Site Inspection for the Identification of Underground Nuclear Tests¹

This test examined the effectiveness of several selected on-site inspection techniques. It was conducted during the period January through May 1967 at two locations, one in the vicinity of Fort Huachuca, Arizona, and the other near Mercury, Nevada, and provided information about the effectiveness of visual ground and air search for evidence of underground nuclear testing, and the effectiveness of atmospheric and soil gas sampling to determine presence of radioactive materials.

¹ACDA/WEC/FO Preliminary Report, Field Test FT-1A On-Site Inspection for the Identification of Underground Nuclear Tests, September 1967 (CONFIDENTIAL)

A seventh test (FT-34) originated in the CLOUD GAP period, was concerned with the demonstrated destruction of nuclear weapons. This test stemmed from the U.S. proposal to transfer 60,000 kg of U-235 resulting from destruction of nuclear weapons to peaceful uses, under international safeguards, if the Soviets would likewise transfer 40,000 kg of U-235. This test, conducted in four AEC plants during the summer of 1967, was designed to determine the extent to which the proposed methods of demonstrating destruction reveal classified information, and to evaluate the effectiveness of the procedures in terms of convincing the test inspection force that nuclear weapons were actually being destroyed.

FT-34 - Demonstrated Destruction of Nuclear Weapons¹

The test investigated the effects of access by inspectors to the demonstration, the effects of varying the size and composition of inspection teams, and the effects of evasion. Valuable information was determined on what classified information might be revealed, how classified information might be protected, and how credible the demonstration would be.

¹Project CLOUD GAP Test Plan CG-34, Demonstrated Destruction of Nuclear Weapons, 22 August 1966 (SECRET)
ACDA/WEC/FO Preliminary Report Field Test FT-34, Demonstrated Destruction of Nuclear Weapons, January 1968 (SECRET-RESTRICTED DATA)

The following two tests are now in progress:

FT-15 - Inspection and Observation of Retained Levels of Ground Forces and General Purpose Air Forces in a Specified Area (UK) ^{1/}

This test, the first to be conducted in a foreign environment (United Kingdom), has generated intense international interest. As a continuation of the "Limitations on Retained Levels of Forces-in-Being" program, it is directly concerned with verification procedures for possible agreements in which limitations on ground and air forces exist. The test operations were conducted jointly by the US and the UK in the Salisbury Plain area of Southern England during the summer of 1968. The operational phase of the test was unique in that inspection subsystems rather than only individual inspection functions were tested. These inspection subsystems employed a variety of inspection procedures and techniques with each subsystem making an independent inspection of the entire test area. Among these techniques and procedures were

^{1/} Project CLOUD GAP Test Plan Field Test FT-15, Inspection and Observation of Retained Levels of Ground and General Purpose Air Forces in a Specified Area (UK), October 1967. (OUO).

the following: manned on-site and off-site observation, aerial reconnaissance, and unmanned sensor surveillance. In addition to furnishing statistical data concerning effectiveness of subsystem operations, this test also has provided a very credible demonstration for US, UK, NATO, and other international official observers of practical inspection techniques for possible conventional ground and air forces limitation agreements.

FT-45 - Tamper Resistant Data Link ^{1/}

It has long been anticipated that unmanned sensor systems may play an important role in making unobtrusive inspection practical in a variety of arms control situations. A concept for a complete tamper resistant system and the hardware for the data link portion have been developed by ACDA. The purpose of this test will be to evaluate the system as a possible aid in monitoring the appropriate operating parameters of declared nuclear facilities operating under international safeguards. The first phase of the test, now in the field, will

^{1/} ACDA/WEC/FO Test Plan Field Test FT-45, Tamper Resistant Data Link, 17 May 1968 (Unclassified).

involve a careful study of the data link to pinpoint possible weaknesses. The second phase will involve an attempt to exploit any such weaknesses in a data link operating in a simulated nuclear environment.

Study and analysis of inspection and verification requirements and capabilities in support of arms control measures relating to offensive and defensive strategic nuclear delivery vehicles currently proceed at a high level of interest. Active interest has been directed more toward flight test verification and prelaunch and launch inspections for a freeze on characteristics and types of missile systems rather than the past emphasis on a freeze on production or quantity of missiles. Unilateral verification plays an important role in support of arms control measures for the more sophisticated weapon systems while agreed inspections will require highly intrusive inspection procedures.

In addition to these field tests, the Field Operations Division is conducting an effort called VISTA. VISTA (Visual Inspection Simulation Techniques for Analysis) employs a simulation model to make analyses of

of the forces-in-being programs. Such a model would permit major savings in future field test costs, by permitting computer simulation of inspection variables as a means of extending testing activity without actually field testing those variables. Statistical comparisons of field test and computer simulation results will be made. The model will then be used to study verification and inspection procedures in different environments and for wider varieties of variables than was possible in the field tests.