Box E—The Timing of Verification Research

An executive branch report to Congress pointed out that the technology development process has to respond in three timeframes:

Quick-Reaction Response (Need exists within **12** months.) This category entails applications engineering (i.e., detailed design of systems, acquisition of components, and demonstration projects) of actual systems to meet a known immediate or imminent treaty-implementation requirement (e.g., fielding of the portal-perimeter monitoring system). Responses rely on existing technology developed as apart of a strong and broad R&D base).

Near-Term Response (approximately 12 to 36 months). In this category, technology R&D responds to possible but not yet agreed verification requirements of negotiations in progress. This requires capitalizing on existing technology R&D with some modifications from research near completion (e.g., tagging technology). Technology has to focus on requirements based on plausible treaty outcomes as well as on current U.S. positions; as with the quick-reaction response, the emphasis is on providing specific responses to specific tasking.

Long-Term Research (approximately 3 to 10 years). Long term (sic) research is designed to develop a broad base of verification technology across the spectrum of arms control-not necessarily tied to any specific present or future treaty requirement but rather to more general verification policy requirements. R&D undertaken in this area entails investigating, developing, and testing promising concepts, technologies, and models. Such research may be generic, with applicability in more than one area of arms control (although it may be oriented toward a specific problem, for example, inspection of sensitive locations without revelation of highly classified or sensitive information not related to treaty compliance). It provides the basis for future quick-reaction and near-term responses.

SOURCE: Section 910 report, op. cit., footnote 8.

has to be directly responsive to policy concerns and more narrowly focused on specific solutions to known problems. For near-term response, R&D should be fully consistent with and directed toward current policy and negotiations, but within this framework, there often is more room for experimentation and initiative in the development of solutions to known problems. There is even greater room for initiative with long-term R&D, but again, U.S. arms

control and national security policy goals define the direction of this R&D.

Note that even for the long term, the Administration stresses consistency of research with *existing* U.S. arms control and national security policy goals. This policy is understandable, in that policymakers do not want to appear to undercut their positions that certain arms control measures would not be in U.S. interests. Nevertheless, recent history shows that sometimes government positions change.[10] And when they do, the availability of contingency plans can give the policymakers a more informed set of choices.

Today, though, the vast majority of (nonintelligence) verification technology research funds are dedicated to the areas of arms control currently being pursued by the Administration: START, Conventional Forces in Europe, nuclear test detection and yield estimation (for Nuclear Non-Proliferation Treaty and Threshold Test Ban Treaty), and the Chemical Weapons Convention. Some of the technologies under development with these arms control agreements in mind someday may also be applicable to other arms control measures. Examples of generic monitoring systems now under research include: tags and seals, portal-perimeter continuous monitoring systems (permanent or ''rapid-deployment' '), and nuclear warhead detection or counting systems. In the absence of policy guidance, however, researchers will be unlikely to develop these systems into specific verification regimes for arms control measures currently not on the Administration's agenda.[11]

Conclusion: Organizational Options

Today, immediate policy needs (such as fleshing out details of verification measures already under negotiation), taken with available technologies, dictate the shape of quick-reaction and near-term research and development. How might the government set long-term research priorities? One can imagine at least six options:

1. **status quo:** continue current arrangements;
2. **incremental changes: add** some focusing procedures to current arrangements;

3. **lead agency:** designate a lead agency from among those now involved in this research;
4. **funding agency:** give one of the agencies now involved not only a designated leadership role, but authority over most relevant research funding;
5. **czar: create** a new managing agency for all cooperative verification technology research; and
6. **new arms control agency:** revitalize or replace ACDA, creating an agency with increased arms control responsibilities, authority, and finding across the board, including research.

Each of these options has advantages and drawbacks.

Option 1: Status Quo

In recent years, the approach appears to have been one of ad hoc adjudication of competing research proposals, with allocation of resources guided by the following general principles:

- expect most research to address technical monitoring requirements defined in ways consistent with current policy expectations;
- support some research on generic techniques that may be applicable both to the current policy needs and to a range of future possible arms control monitoring tasks; and
- for the purpose of enriching the "technology base' from which solutions to future problems might emerge, permit a few researcher-initiated projects on technology issues of less apparent relevance to current policy.

Given the variety of bureaucratic interests with a stake in arms control verification, much of the necessary coordination will continue to be a matter of lateral negotiation among various agencies. With some stimulus from Congress, in the past couple of years the executive branch has taken steps to improve this coordination, for example by creating the National Security Council Verification Technology Working Group.

As shown above, this arrangement seems to be meeting short-term needs for cooperative verification technology development. On the other hand, it seems to be slighting needs for long-term research on comprehensive verification regimes and the technologies that might fit into them.

Even without strong Administration initiative, some options are open to Congress for encouraging a more coherent, longer-range research and development program in verification technology:

- direct and fund one or more agencies (e.g., ACDA, DOE Office of Arms Control) to sponsor additional long-term research on verification concepts and technologies for arms control measures not currently under active negotiation;
- in legislative oversight of verification technology research, require executive branch reports and testimony on the basis for proposed allocations of research resources;
- strengthen coordination among oversight committees dealing with various aspects of verification: House Armed Services, Foreign Affairs and Intelligence; Senate Armed Services, Foreign Relations, and Intelligence;
- during the ratification process for arms control treaties, require that the executive branch supply descriptions and results of systematic analyses of proposed verification regimes; and
- encourage ACDA to staff and support its Office of the Chief Science Advisor to more actively assert its legislatively chartered role in arms control research coordination.

Option 2: Incremental Changes

The executive branch could take steps to improve the coordinating process established during the preparation of the Section 910 Report.

A modest, but potentially useful first step would be to refine budgetary reporting on arms control verification. The Office of Management and Budget has now begun to require that agency budget submissions identify expenditures related to verification. A further set of subcategories could resemble those in DOD budgets: research, advanced development, procurement, and operations and maintenance. Breaking down budgets into such categories would make it much easier for both executive branch managers and congressional overseers to evaluate the content and direction of verification-related research and development. This kind of budget reporting would also ease evaluation of current arms control monitoring activities. Finally, it would permit better estimates of the potential costs of proposed verification regimes.

A second incremental step would be to further formalize the interagency coordinating process. The interagency committee (currently the NSC Verification and Compliance Subcommittee's Verification Technology Working Group) could be assigned to produce decision papers for the NSC.[12] These papers might propose verification regimes for particular potential treaties and then propose research programs to support the regimes. The Arms Control and Disarmament Agency might chair such studies. The studies themselves might be initiated by requests from the NSC or any of the agencies in the group. Because the studies would result in proposals for action to be authorized by the NSC, the affected agencies would have a strong incentive to play an active role. This decision-paper process might be most applicable to near- and mid-term needs for coordinating verification technology development with negotiating plans.

A third step would be to delegate the preparation of long-term research and development plans to a single agency, perhaps ACDA. The plan would not prescribe U.S. policy, but would look to preserving and creating future options. It could identify weaker areas of current research and point out areas where successful technology development might open up new arms control opportunities. Individual agencies would still be left to carry out (or ignore) their elements of the plan. But the availability of an annually updated plan would assist higher-level executive and congressional overseers in making their decisions.

Option 3: Lead Agency

A modest centralization of the current arrangement would be to designate one of the current research-sponsoring agencies as lead coordinating agency. This step would have to go beyond simply having the lead agency chair coordinating committee meetings. It might include directing the agency to conduct planning research and propose the primary, government-wide research agenda in this area. Table 2 lists some candidates for lead agency, along with pros and cons for each.

A significant drawback of this option is that without the authority to determine how money is actually spent, such a lead agency could not enforce a coherent R&D program. Rather, it is likely that the actual program would remain the product of a combination of bureaucratic competition and cooperation. There already appears to be some competition, for example, between DOE and DOD agencies for verification technology roles and missions.

A second problem facing any potential lead agency is that since current research, focusing largely on immediate and near-term needs, is already stretching budgets, a more robust long-term program will require more money. In the executive branch, this is likely to mean asking agencies to reallocate resources away from other, perhaps in their view, preferable missions. For example, for each of the past several years, DOE has declined to request real growth in its Verification and Control Technology budget line, while Congress has chosen to authorize more than DOE requested. In Congress, reallocations of appropriations can also be difficult. The amounts for plausible expansion of existing activities, however, would run to tens of millions, rather than billions, of dollars per year.

Moreover, there appears to be congressional interest in additional verification technology research. In its report on the FY 1991 defense authorization bill, the Senate Armed Services Committee said:

> The committee is disappointed that the Department of Energy has once again failed to adequately support the arms control verification research efforts of its laboratories in its fiscal year 1991 requests. The committee received testimony from both the Under Secretary of Energy and the directors of the Department of Energy laboratories that the requested funding is inadequate to support ongoing arms control negotiations and the requirements of recently concluded agreements. The Senate Select Committee on Intelligence has also recommended additional funding for this very productive research effort with a long track record of successes.

The committee then added $43.2 million to the DOE request for detection technology and directed

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[12] The process might be analogous the joint DOD-DOE process for determining nuclear weapon acquisitions. The relevant agencies of the two departments participate in a liaison committee the Nuclear Weapons Council Standing Committee, chaired by the Assistant Secretary of Defense for Atomic Energy. This committee issues requests for studies based on proposals by the member agencies. These studies produce decision papers for the departmental policymakers. One type of study ("Phase One" examines how perceived military requirements might be met by a range of technology options. The resulting decision papers then identify and propose the most promising choices for further research and development. A second type of study ("Phase Two" evaluates the choices available for developing a specific weapon.

Table 2-Candidates for Role of Lead Agency in Verification R&D

Agency	Pro	Con
Arms Control and Disarmament Agency	—Is the congressionally designated agency for this role —Plays important role in arms control negotiations —Is specialized for arms control tasks	—At present budget and manpower levels, lacks the personnel, expertise, funds, and authority to manage such a program —Is widely perceived to be incapable of assuming this role —As a small, independent agency, lacks intra-governmental clout of DOD, DOE
Office of Arms Control (DOE)	—Many years of experience managing DOE laboratory research on verification -Largest current budget for cooperative monitoring measures —Provides technical advisers to arms control negotiating delegations	—Lacks operational role in implementation of most arms control agreements -Other Departmental interests (e.g. in warhead testing and production) may appear to conflict with some arms control objectives
Defense NuclearAgency (DOD)	—Experienced as OASD Acquisition Under Secretary's manager of DOD verification research	—its Verification Technology Research Center has focused on near-term test and evacuation, not long-term research; -Other DOD interests (e.g., development and acquisition of new weapon systems) may appear to conflict with some arms control objectives —is removed from arms control policymaking arena
On-Site inspection Agency (DOD)	—As designated executor of U.S. on-site inspection activities, is the "customer" for products of cooperative verification research	—Too far removed from arms control policymaking arena —Too busy with current inspection tasks and planning to direct long-term research

the Secretary to submit a report within 45 days of passage of the bill describing each project to be funded. In the final authorization bill approved by Congress, however, the total DOE verification and control technology budget (of which detection technology is an element) exceeded the DOE request by only $30 million. This represented an 18-percent increase over the previous year's overall verification and control technology budget, as opposed to the 5-percent decrease requested by DOE. However, the $30 **million** was earmarked for the technology development portion of that budget, there representing a 29-percent increase as opposed to a requested decrease of 10 percent.

Option **4:** Funding Agency

A more coherent, long-range program will likely require that the President not merely designate a lead agency, but that he assign it the authority and resources to do the job. Congress, in turn, would be called on to authorize and appropriate the resources.

Under this option, the same agencies now overseeing research would continue to do so, but their verification budgets allocations would be funneled through the lead agency. Since money now under the control of one department would effectively pass to that of another department, such a plan would no doubt lead to resistance. In addition, the same problems of identifying the appropriate lead agency as exist under Option 2 would also burden this option.

Option 5: Verification Research Czar

One way of sidestepping problems of bureaucratic resistance and inertia is to create a new organization, a ''czar' with the authority to focus government efforts toward a particular task. For example, President Reagan created the Strategic Defense Initiative Organization (SDIO) to centralize U.S. research and development of ballistic missile defense technology. Besides starting new research projects, the SDIO took over direct management of existing projects and supervised the continuation of others under the management of existing organizations. One could imagine a similar agency for verification research—though funded in the low hundreds of millions, rather than in billions of dollars.

Such a new agency can concentrate government attention on a problem, at least in the short run. In the long run, it has disadvantages:

- it adds a new layer of bureaucracy, but one without a solid base of experience and influence in the operations of the bureaucratic system;
- unless permitted to grow so large as to duplicate the staff resources of existing agencies, it may lack an adequate supply of in-house expertise; and
- the influence of the "czar" may last only as long as the President takes a direct and continuing interest in the mission.

Option 6: New Arms Control Agency

A more dramatic option would be to create a new agency-or to revitalize ACDA—with the bureaucratic and financial resources to execute a coherent arms control research program. Such an agency might also have substantial arms control action responsibilities (policy, negotiation and implementation[13]) that make it a key player. The rationale for creating this agency would be that arms control planning, negotiation, and implementation has become a larger element of U.S. national security policy than ever before, thus outgrowing previous organizational arrangements. Pulling most arms control activities together into one agency might lead to more coherent, comprehensive planning and execution of arms control policy. With respect to cooperative verification technology research, such a new organization would become the chief customer for the research product. It would have a direct interest in seeing that research met both near-term policy and long-term planning needs.

The ACDA charter licenses that agency as the focal point for U.S. arms control activities.[14] Moreover, the law lays special emphasis on the research function:

. . the Director is authorized and directed, under the direction of the President, (1) to insure the conduct of research, development, and other studies in the field of arms control and disarmament; (2) to make arrangements (including contracts, agreements, and grants) for the conduct of research, development, and other studies in the field. . .by private or public institutions or persons; and (3) to coordinate the research, development, and other studies conducted in the field. . .by or for other Government agencies.[15]

With respect to verification,

. . .the Director is authorized (1) to formulate plans and make preparations for the establishment, operation, and funding of inspection and control systems which may become a part of the United States arms control and disarmament activities, and (2) as authorized by law, to put into effect, direct, or otherwise assume United States responsibility for such systems.[16]

For many reasons, though, ACDA has not exuberantly carried out all the missions formally assigned to it. While it does continue to play a major (but not dominant) role in arms control negotiations, its roles in research and in implementation are minimal. Whether ACDA could be revitalized and expanded to take on a larger role, or whether it would have to be abolished and its successor created anew is an open question.

This option, the most drastic in the list, would be the most difficult to carry out. The Departments of Energy and Defense would lose money and person-

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[13] Some have suggested that it would be consistent with the arms control agency mission to place the On-Site Inspection Agency under its jurisdiction. "If that were done [for ACDA]," wrote one reviewer of this report, "the funds that OSIA receives for research, which are not inconsiderable, could be part of ACDA's budget and ACDA would have a better chance of managing the Administration's long-term research on arms control. " On the other hand, the OSIA will necessarily make considerable use of DOD personnel and logistical support; its access to these resources may be more immediate if it remains a DOD agency.

[14] The congressional statement of purpose in the law establishing ACDA says:

The formulation and implementation of United States arms control and disarmament policy in a manner which will promote the national security can best be insured by a central organization charged by statute with primary responsibility for this field. ..This organization must have the capacity to provide the essential scientific, economic, political, military, psychological and technological information upon which realistic arms control and disarmament policy must be based. It shall have the authority, under the direction of the President and the Secretary of State, to carry out the following primary functions:

   (a) The conduct, support, and coordination of research for arms control and disarmament policy formulation;

   (b) The preparation for and management of United States participation in international negotiations in the arms control and disarmament field;

   (c) The dissemination and coordination of public information concerning arms control and disarmament; and

   (d) The preparation for, operation of, or as appropriate, direction of United States participation in such control systems as may become part of United States arms control and disarmament activities.

(22 U. S.C.A. 2551)

[15] 22 U.S.C.A. 2751.

[16] 22 U.S.C.A. 2574.

nel traditionally assigned to them. Even if those agencies parted horn-their resources willingly, the transitions could be awkward. From the standpoint of conducting international negotiations, the relationship between the State Department and the new **arms** control agency would be difficult to work out. In both the executive branch and Congress, there may be concerns that the new organization would become a vested interest in favor of evermore arms control, to the neglect of other national security considerations.

In sum, each option for reorganization has formidable drawbacks. Nevertheless, each seems to offer some improvement over the previous, more or less improvisational approach to verification research.