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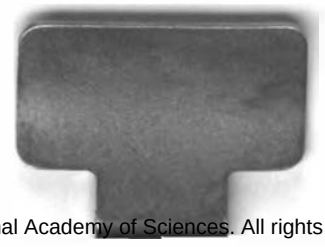

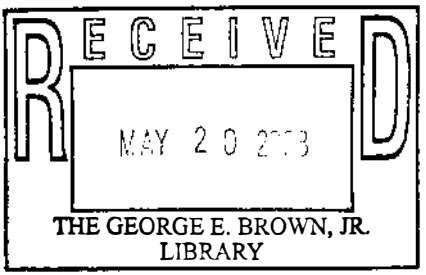

Summary Report of the Workshop on

The Revolution in Information and Communications Technology and the Conduct of U.S. Foreign Affairs

National Academy of Sciences
Washington, D.C.

September 14–15, 1987

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Preface

During a meeting with National Academy of Sciences President Frank Press in December 1986, Ambassador John Negroponte, then Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs, requested that the Academy complex organize a meeting for the State Department to explore the implications of the Information Revolution for the conduct of U.S. foreign affairs. This subject had been identified previously in public speeches by the Secretary of State, George Shultz, both as one which was of keen intellectual interest to him personally and as one which he deemed to be of great significance for the future of the Department of State.

Working closely with Richard H. Solomon and Richard D. Kauzlarich, respectively Director and Deputy Director of the State Department Policy Planning Staff, a substantive agenda was developed for a two-day meeting involving approximately thirty distinguished participants drawn from academia, industry, and government. (The meeting agenda and a list of participants are included as an annex to this report.) Given that the Information Revolution affects virtually every aspect of State Department operations, it was a challenging task for representatives of the Academy and State Department to narrow the range of topics to be covered. A decision also was taken to commission a comprehensive background paper for the benefit of the participants.

The workshop itself was convened on 14–15 September 1987 at the National Academy of Sciences. And, as an indication of his personal interest in the subject, Secretary of State Shultz agreed to deliver the opening remarks. (Moreover, following the completion of the meeting, a delegation of the original participants met with the Secretary to brief him on the outcome.) What follows is a two-part report of the meeting: an edited version of the summary remarks of the chairman, Dr. Ralph E. Gomory, Senior Vice President for Science and Technology of the IBM Corporation, which serves as an executive summary; and a full summary report of the topics covered during the discussion.

As with all endeavors that attempt to break new ground, a number

of challenges were faced in the design and implementation of this project. As a result, a number of people deserve special thanks: Richard D. Kauzlarich, William J. Lowell, and Sandra O'Leary of the Department of State; William Drake, Assistant Professor in the Department of Communication at the University of California at San Diego, who served as consultant and meeting rapporteur; Walter Wriston, Chairman and Chief Executive Officer, Retired, Citicorp, who delivered keynote remarks during the meeting; and Ralph E. Gomory, who served most ably as chairman and provided good counsel throughout the process.

It is both significant and revealing how relatively little attention has been focused to date on this important subject. It is hoped that this report will help to promote such inquiry in the near future.

Mitchel B. Wallerstein
Project Director and
Associate Executive Director
Office of International Affairs
National Research Council

October 12, 1988

Summary Remarks of the Chairman

DR. RALPH E. GOMORY

Senior Vice President for Science and Technology
IBM Corporation

During the course of the two-day workshop on "The Revolution in Information and Communications Technology and the Conduct of U.S. Foreign Affairs," which was organized by the Office of International Affairs of the National Research Council on behalf of the U.S. Department of State, the chairman of the meeting, Dr. Ralph E. Gomory, offered the workshop participants his own brief summaries on each item under discussion. What follows is an edited version of Dr. Gomory's summary remarks which are organized in accordance with the substantive outline of the meeting.

Major Technological Advances in Information Management and Telecommunications That Affect the Conduct of U.S. Foreign Affairs

We started off by talking about the advance of information technology itself. I think that it was fairly clear that this advance is going to continue. The word "revolution" was used, but rapid evolution describes more accurately what is happening. The same technology potential exists in communications. Its actual use is limited by other factors, particularly by the development of software and interfaces that allow one breed of computer or receiver to talk to another. There are still other factors which limit the introduction of this raw power. What we see is enormous potential technological power coming up against a complex social system which has all kinds of constraints and barriers.

A second theme was the effect of this new technology on people's roles; for example, the diminishing independence of ambassadors. Perhaps centralization is a natural tendency that has been made possible by the technology, but it is by no means the only possible outcome.

A very important question that will come up over and over again as we deal with the State Department problems is the question of filtering, of maintaining an adequate selection process for dealing with the increasing quantities of available information. A great deal can be done to filter, and having dealt with a lot of these systems, I think that the filtering problem is a problem that can be overcome.

Finally, these technical possibilities tend to open closed societies. They make it possible to disseminate information through legal or institutional barriers in ways that were not available before and that are now somewhat feasible. Through the use of tapes, through the possibilities of antennas and so forth, and through the possibilities of rather spontaneously organized networks, it will be harder than ever to isolate people or countries from an outside world.

U.S. National Security Interests

Relations with the Advanced Industrialized Countries

Technological changes in the world, to some extent, present a set of new agenda items. Things in the world are more tied together; the world is more of a village. Things that we used to think of as domestic concerns, such as fraud in securities, become somewhat international, and the same could be said for antitrust. So, in some sense, many regulatory problems become international, presenting us with a series of choices. We can try to regulate the world; we can say "let the free market operate"; or we can put more trust in international cooperative institutions.

Another issue is the question of transfer—or loss—from the U.S. of militarily significant technology. This problem is changing because the U.S. no longer holds the clear lead that it used to have in many areas. The lead is now diffused through the alliance, and many of the technological leaders in the alliance do not put the same stress on containing the military technology that we do, which puts a new dimension on the problem of trying to control that technology.

The question of trade tensions in communications and information (C&I) technology is an issue more related to competitiveness than foreign policy. The trade tensions are simply a failure of competitiveness, and a lot of that failure of competitiveness we ascribe to various reasons, not many of them having much to do with foreign policy. The foreign policy challenge will be to deal with the consequences of that failure and to learn to live in a world in which we are no longer dominant in the technology.

Relations with the Soviet Bloc

We all seem to endorse the idea that there is a second industrial revolution. Surely the first industrial revolution transformed the entire world, and those who were the leaders going in were not the leaders coming out. Therefore, if we accept the notion that the change is profound, we can very easily say: If the leaders going in are not the leaders coming out then the Soviet Union as an economic force may be uninteresting forty years from now. This would be the case if one accepts a technological scenario for the second information revolution at this point that places Japan first, the U.S. second, Europe third, and the Soviet Union a poor fourth. In this sense, the whole spectre of the Soviet Union as a major power may not be there, aside from the direct military sphere.

Regarding the question of whether the Soviets are likely to keep up economically in this changing technology, I think the view that societies change slowly suggests that they probably will not.

First of all, on the civilian side, it is always difficult for technology transfer from the outside to have a profound effect. Many of the things that inhibit that effect are internal policies. It is not enough simply to have an item arrive, for example; you may need to have your hand held to make something out of it.

The Soviets have had policies that effectively prevent their scientists from becoming part of any outside world technology. These self-imposed constraints force the Soviets toward one of the least effective policies—namely, the covert and passive approach. Therefore, occasional slips in our export policy that allow just a few things to go through for the civilian economy are not too significant. But this view could not be expressed as comfortably, however, vis-a-vis the military.

Whether the internal uses of new technologies, such as miniaturization, the ability to receive more information, the possibility of networks, will have a liberalizing effect on the Soviet Union is by no means clear. Indeed, as in so many of these technologies, there seems to be both a positive and a negative possibility. For example, there exists the negative possibility that communications technologies may make the West more manipulable when they are properly used. The outcome is very hard to tell.

Relations with the Newly Industrializing Countries (NICs)

Given the global character and rate of change of C&I technology, the role of a NIC is unlikely to be wholly independent of those countries on the leading edge of technology. This characterization relates well to

a common type of interdependency—that of horizontal stratification, in which parts of a product can be manufactured in a NIC and other parts in another NIC, and the whole thing assembled somewhere else, and the software developed in still another country. This kind of partial participation for the NICs involved is at least a step forward.

There are going to be leading countries; there are going to be participant countries; and then there are the "others." From a foreign-policy standpoint, it is this last group that the Soviets might very well try to influence. It is very interesting, therefore, for us to understand how the "others" could join the second tier. The prerequisites for that are social organization and political stability.

There seemed to be a reasonably good consensus that in order to "graduate" a country needs a sound education system, some form of private property/free enterprise, and free borders. With the addition of an airport and a communications system, it should be possible to participate in international competition. But one of the prerequisites to being and staying a NIC is political stability. Thus, there is a danger in starting up the path to industrial development that the economic success gained from having an education system, free enterprise, and so on, might undermine political stability, thereby reversing the entire development process.

This is the picture that we have portrayed. It is one characterized by horizontal production, some countries participating in a lesser way, and some that are completely out of it. We also have tried in the process to characterize the prerequisites for moving up the development ladder.

Impacts of the Information Revolution: U.S. Participation in International Regimes

International regimes emerge from our discussion as of growing importance to the United States. This may be linked to the decline of the United States as a dominant power, and to its evolving role as one of many players in an international arena. The changing membership of participants in these international regimes is another dimension of the move away from unilateralism. There are many more member countries in the relevant international organizations, some of them having no particular stake in the technical issues, but who are members nevertheless. So we are moving again from a two-power world to a multi-power world to a world with a very large number of players. As a result, negotiations over the development of global regimes become both more political and more important.

In coping with these developments, the State Department—or, more accurately, the U.S. delegations in each area—must have both political

and negotiating skills and substantive knowledge of the the particular technological areas. The Department of State would seem to be the natural home for the former, but it is sometimes lacking in the latter. In addition, since this is not the traditional form of diplomacy, it does not seem to be a favored channel within the State Department. So this appears to be an important area, one in which we need to bring better focus within the Department on its mix of skills and on the ways in which it can couple effectively with the business community or other technical communities.

The Development of Transnational Business and the Regulation of Transborder Data Flow (TDF)

A fairly significant point that emerged from the discussion is that transnational business and information services are rolling forward almost as if there were no national governments. From this perspective, national laws and governmental regulations are seen as hindrances but not serious obstacles.

The dimensions that had appeared to represent the most serious potential obstacles—namely, national security and privacy concerns, and even compatibility in standards regulations—have not surfaced as serious barriers to TDF. The reason for this is that there does not seem to be monolithic opposition to TDF in the affected countries. There are those who need this service; there are those who would like to provide it; and there are those who strive to regulate it. But they are not aligned together. In fact, they often work in opposition.

When it comes to security, the issue is really to protect the integrity of assets against inadvertent intrusion rather than from determined governmental intrusion. A few advanced countries might be able to unravel what is now so easily raveled by encryption, but such occurrences are perhaps not even relevant to the question. Even the more current nightmare that everyone can get at everything through interlinked networks is suffering about the same amount of attention—or, more accurately, inattention—that almost all integrity and security matters in computers have had when they were purely on a national, or even local, scale. People have always worried, but egregious security breaches have not occurred very often. So it is always a potential issue, but not yet one that has actually been realized.

Threats to U.S. Leadership in Information Technologies

It was stressed that the U.S. is the overall intellectual leader in this field. The structure of our underlying educational system was pointed

up as one of the determining factors in this. The question is how to translate that intellectual leadership into economic leadership. The U.S. must take advantage of the possibilities that lie in improved application development, which today is clearly a bottleneck.

There was some discussion of new technical entrants, like overhead reconnaissance, which I expressed some skepticism about. The U.S. really has a tremendous ability to start things. Small new companies spring up overnight. People come out of the universities and they pursue new directions. But once a major development occurs, the Japanese organizational ability, their ability to work together, and their ability to arrange long-term financing often allows them to assume the lead.

So there are various dimensions to this problem. I agree with the point that our diversity is our strength. But the Japanese ability to grind forward in given directions, when they become clear, is perhaps theirs. How this ultimately will play out is not clear.

The Role of Information Management in the Conduct of Foreign Policy

What emerged more than anything else from our discussions was a tale of difficulties rather than of triumphs. It was brought out that the direct access to far-off places through telecommunications could allow the bypassing of what normally comes up through State Department channels, and this bypasses the normal adding of value in the form of perspective and wisdom as things come up.

We did manage, in this regard, to distinguish somewhat between crisis management and ongoing foreign policy.

Both budgetary constraints and cultural factors are dominating features that inhibit the effective use of this new technology within the State Department. We heard some desire expressed to have face-to-face communication networks, but it is not clear that the organizational environment has yet integrated electronic mail which is the current state of the art. So on this particular topic, I think we heard more—and this is a personal view—the somewhat confused reactions of an organization which is struggling with something new, rather than a clear picture of what potential exists to help the State Department resolve its problems with communications and information technologies.

Concluding Remarks

We are in the midst of a major revolution, the second industrial revolution. It has begun; it is here; and it is continuing. Merely adapting to what has happened will not be enough. I do not think that there is

any way to be an intelligent participant in this revolution without experiencing it directly. Therefore, I think that it is essential for people in the State Department to have familiarity with computers and communications in their modern form. These things may not be essential for the fulfillment of their tasks, although I think they can be of some help. But it is not possible to appreciate fully what is happening unless one can feel that power and see its limitations at the same time. You must be a participant, or you cannot accurately assess the full implications of this revolution.

1

Technological Advance and the Information Revolution

The first session of the workshop focused on some of the major areas of technological change in communications and information (C&I) technologies that may affect the conduct of U.S. foreign affairs. The analytical problem, as one participant put it, is that while the multitude of technical changes under way can be easily listed, their socio-political effects frequently cannot be defined and measured with precision. Accordingly, the goal of the workshop was to stand back from these changes and attempt to see the broad pattern in the carpet.

To initiate this process, two participants briefly summarized some of the main dimensions of the field. The first speaker focused on the computer field in which there has been a 25–30 percent rate of change every year, or a factor of ten every ten years. It was suggested that the central characteristics of computers today are their increasing miniaturization, speed, and power; their "user friendly" human interfaces, which allow a widening array of untutored persons to substitute efficient processing for formerly time-consuming functions; and the ease with which they may be used to access and search an expanding array of information forms.

The second speaker discussed the telecommunications field and was less optimistic about the pace of progress. He noted that, despite the rapid expansion of upgraded information transfer networks, a number of technical and economic obstacles remain. In particular, the integration of computers and digitized telecommunications creates network dependence on increasingly complex software packages that are limiting or subject to error. Software problems complicate the operation of switching systems, the interconnection of discrete networks, and these problems must be resolved if the full potential of extant plant is to be realized.

While the immediate cost of a given transmission is essentially zero, the costs of software-based protocol conversions and related value-adding functions remain substantial. Moreover, even as we improve our ability to deliver information, users are drowning in an information overload. In the aggregate, society has not yet come to grips with the implications of this problem.

These initial remarks generated a lively debate concerning the rate of technical change and its societal effects. Some argued that the very term "Information Revolution" is fundamentally misleading: that is, the transformation under way can be viewed as a revolution in the long sweep of world history, but the process is instead only evolutionary in the lifetime of any one person. Several participants seconded this paradigm, noting that the pace of systems diffusion and application varies widely across geographical and functional areas. Others disagreed, stating that the term "revolution" accurately captures the breadth and depth of change. One member drew a parallel between contemporary innovations and the creation of the printing press.

A closely related theme emerged from this debate. Some argued strongly that the term "revolution" is misleading not only with regard to the rate of change but also with regard to the mechanism of change. Too often, observers tend to embrace a latent form of technological determinism in which technical changes are said to generate autonomous and immediate social reorganization. Instead, technological development must be viewed as a process affected by political and economic forces. While many C&I systems are essentially "world technologies," regulatory and industrial policies lead to wide cross-national variations in the rate and nature of their diffusion and deployment. Therefore, overly optimistic scenarios in which societies smoothly adjust to new modes of operation could lull us into a false sense of security and leave us ill-prepared to address the essentially political (and frequently conflicting) ways in which different societies and subcultures respond to change. Other participants disagreed with this view, arguing that technology and market pressures combine to force governments and industries either to adjust to new realities or to face the prospect of falling behind in an increasingly integrated and competitive world economy.

The problem of institutional roles reappeared in another extended debate. Some argued that C&I systems are profoundly affecting the roles of individual actors by facilitating the centralization of organizational decision-making. Real-time, distance-insensitive communications may reduce the functional autonomy of corporate and governmental representatives at remote locales, as home offices employ systems to coordinate and manage their dispersed operations globally. One participant went

as far as to suggest that ambassadors at foreign posts would be reduced to being "spear carriers," executing directions received from main State. Others differed strongly, maintaining that human resistance and local bureaucratic countermeasures would thwart any such centralizing tendencies. One member noted that increased communications between home offices and posts did not dictate the content or outcomes of those discussions. According to this view, the inherent logic of the new C&I systems is that of decentralization, allowing officers to bypass central authorities and horizontally communicate across organizational lines.

In summary, the opening discussion sounded several key themes that would reappear throughout the workshop. This session also demonstrated that the same set of circumstances can be interpreted quite differently in accordance with the expertise and experience of the observer. There were both ardent proponents and opponents on the issues of revolution vs. evolution, technological logic vs. political-economic mediation, and centralization vs. decentralization.

2

U.S. National Security Interests

Relations with the Advanced Industrialized Countries

Against this backdrop, the workshop turned to the impact of the Information Revolution on U.S. relations with its allies. One member introduced the discussion by outlining three broad subjects:

(1) Has the internationalization and integration of C&I systems and the services they facilitate created a "global village," generating new issues and pressures on national policymakers?

(2) In such an environment, can export controls be used to channel the diffusion of innovations away from the Soviet bloc?

(3) Can the emerging world information economy deal with the variety of new regulatory, trade, and industrial policy conflicts, as governments seek to appropriate rents and competitive gains for their national industries?

The discussion followed closely this trichotomy of issues. The question of the internationalization of production and integration of technologically oriented markets generated significant debate. One participant argued that these changes have altered fundamentally the nature of national sovereignty by lessening the extent to which governments may pursue restrictive and protectionist policies without experiencing arbitrage in world markets. Another took the premise even further, arguing that national sovereignty is becoming less meaningful, as porous borders make it difficult for governments to control the transnational flow of economic transactions. Several interlocutors expressed concern about the formation of joint ventures and other new international corporate arrangements as a means of bypassing restrictive national legislation.

The internationalization of portfolio investments was said to make the ownership of firms increasingly irrelevant, so that efforts to select national champions will become self-defeating.

These statements elicited strong reactions from some other participants, who said that while national control is becoming more difficult in principle, governments in practice will attempt continually to assert and extend their reach into new domains. In the short term, at least, such actions bode ill for world welfare and ensure that uncoordinated national policies will generate frictions that necessitate new forms of international cooperation. Indeed, one member suggested that the assertion of state power in the marketplace is everywhere on the rise, including in American telecommunications.

The subject of export controls and the alliance proved to be less controversial. Participants were generally in agreement that export controls may be necessary when technologies irrefutably have direct military applications. There was also consensus that controls could only be effective with the full support of our allies, and that a low-key approach is necessary. However, these two limiting conditions are frequently unmet by current U.S. policy.

Workshop participants cited a wide array of problems in our export control program. One stated that export controls inevitably would be plagued by the problem of multiple national suppliers, as in the case of nuclear nonproliferation. In an increasingly complex international system, the declining predominance of the East-West axis was said by several participants to make impossible American efforts to mete out technologies selectively. This is particularly true because the United States has lost its technological edge in many fields and simply lacks the market predominance with which to determine transaction patterns.

The role of the private sector in the administration of controls was judged to be fraught with difficulties. Companies often are frustrated by the haphazard and unpredictable manner in which the United States government applies controls. Further, many archaic control programs remain on the books from previous eras, which is also a source of frustration to the business community. On the other hand, one member criticized American firms for being overly concerned with short-term profit motivations.

A number of participants felt that the precise objectives of export controls require clarification. One noted that there is a difference between technological acquisition and assimilation; the former is the domain of control policies, the latter of technology transfer policies. The capacity to employ acquired systems varies greatly across and within nations, and the identity of the user should affect the level of technology and

information the United States is willing to share. Finally, several people focused on the difficulty of carefully delineating in the dual-use category between commercially and militarily applications of technologies, noting that different definitions continue to generate tensions with our allies.

Trade and industrial policy conflicts with the allies also were a source of debate, yielding two broad sets of problems. The first involves the production of and trade in C&I equipment. Several people expressed the view that foreign governments, and the Japanese in particular, are unfairly subsidizing the R&D programs of domestically based firms. One member questioned this assertion, however, noting the difficulty of demonstrating concretely the existence of such practices. Instead, he suggested that Japanese firms have a lower time discount than their American counterparts and are willing to undertake long-term projects at high initial cost in order to build and retain future market positions. American firms, by contrast, have a tendency to allocate capital to a wide variety of activities that yield higher short-term rates of return but may be less productive in the long run. As stated succinctly by another, the Japanese invest, and we do not. But these assertions also were questioned by participants, who noted that while American capital may indeed be migrating to foreign production and to unproductive paper profits, it is also going into newly dynamic areas, such as services.

In addition to the question of investment priorities, a series of other problems in the equipment trade were mentioned. Some felt that C&I systems may indeed be a strategic sector meriting a more active policy stance. It was noted by some that success for a country the size of the United States should not be based on selected market niches, but rather on the maintenance of a broad and well-integrated industrial base. Further, the United States should draw the line at some minimum percentage of national and global markets to be supplied by domestically based firms, rather than losing certain industries completely.

Supporting evidence was provided from the field of integrated circuits, in which the United States allegedly has become a colonial economy. But another interlocutor noted wryly that this debate was oddly reminiscent of one that took place in Brazil twenty years ago, the outcome of which hardly justifies emulation. This was seconded with the view that any industrial policy would be too little too late, since the government cannot act effectively in rapidly changing markets. Instead, the United States should accept the notion that certain industries will migrate abroad and, to ensure stable supplies, should strive to keep the Japanese on the same team. American success depends, in any case, less on national production than on the creative application of C&I throughout the industrial base.

Regarding the provision of C&I services, there appeared to be consensus that the United States is making sufficient, if somewhat slow, progress. Conflicts in the new field of information trade were viewed as inevitable, given the recent merger of the unregulated world of computers and the heavily regulated world of telecommunications. It will take some time for governments to sort out their priorities and see the benefits of incrementally liberalizing trade in this field. One participant took heart in the fact that in many cases ministries of posts, telephones and telegraphs (PTTs) are losing their absolute control over regulatory policies. Other ministries involved in industrial, financial, competition, and labor policies are becoming more involved in this new growth area and in some cases are becoming effective forces for market liberalization.

In summary, there was broad agreement on the importance of the trend towards market globalization and the effect of government policies on export controls, and trade, but a there was a wide variety of differences as to alternative approaches that might be pursued. The relationship between these issues and its effects on the Western alliance was left unresolved by the workshop.

Relations with the Soviet Bloc

While the session on American relations with the allies had a decidedly economic orientation, the discussion of American relations with the Soviet Bloc was more clearly focussed on questions of national security. Once again, the problem of export controls was raised, and it was questioned whether the new technologies would force the Soviets to become more open as a society. And if so, should we try to stimulate the process by accelerating the flow of C&I systems? One observer felt that it is not obvious that such an effort would promote our security objectives, but he acknowledged that it could facilitate other political and diplomatic priorities.

A specialist in Soviet affairs followed up with an extended discussion of the Soviets' primary economic and political goals and the extent to which C&I technologies promote or oppose them. He suggested that the four principal interests of the Soviet government are furthering industrial development, strengthening the mechanisms of central planning, modernizing the military, and preserving the image of the Soviet Union in the eyes of world opinion.* In the industrial and military cases, new technologies may be of some help to the government. But the Soviets' capacity to obtain foreign technologies is limited by American

* On this last point, the impact of mass media on the Soviet Union and the role of public diplomacy in Soviet foreign policy are discussed in Chapter 5.

export controls, which force them to pursue expensive and covert means to obtain needed items; by economic problems, including the shortage of hard currency; and by self-imposed institutional constraints, such as the travel restrictions placed on most scientists. These factors present an unattractive situation for the Soviets and may make it difficult for them to keep up in the technological race.

Regarding the openness question, it was stated that, contrary to the standard pessimistic and optimistic views, the technologies will not in themselves fundamentally affect the nature of the Soviet system. On the one hand, technical and political forces may prevent the use of C&I to develop an Orwellian society. On the other hand, the new technologies will not necessarily force upon them wholesale reform. There is no evidence at present of a widespread desire among the elites who can access these systems to use them to promote liberalization. Instead, most people simply want them for entertainment purposes or to help improve their standard of living. Much the same could be said, with qualifications, for the East European nations.

The workshop was strongly divided as to whether technology is inherently liberalizing. One participant remarked that people everywhere would choose freedom if given the choice, and that C&I technologies expands the domain of choice. Further, the Soviets recognize that they cannot afford to remain aloof from the Information Revolution if they are to achieve their economic goals and retain their superpower status. It was pointed out, however, that while this may be true, the transitional period could be fraught with internal upheavals that reduce stability in the superpower relationship. It was suggested, by way of comparison, that C&I technologies already are having an impact in China.

Others differed sharply, contending that there are potentially insurmountable obstacles working against Soviet assimilation of the new systems. Further, it was argued that the notion of the inexorability of technology is fundamentally flawed, and that it is simply impossible to predict whether the domestic forces of liberalization or bureaucratic control will win. On the other hand, it was pointed out that the Soviets would not normally take action until actual changes have occurred, but that the technologies may create strong momentum before the Soviet bureaucracy can mobilize to stop it.

Another issue addressed was whether the Soviets are indeed falling behind, and what, if anything, the United States should do about it. The workshop was in broad agreement that institutional and cultural rigidities are blocking efforts to develop advanced systems and applications indigenously, and no one was convinced that this situation would change any time soon, even with *glasnost*. This is, in fact, precisely why the

Soviets are forced to seek technologies from the West. However, this situation may not be to the benefit of the United States, since the essentially dual nature of their economy could allow the Soviets to continue their military efforts regardless of any small shifts in the civilian sphere. Moreover, a weakened Soviet state may not be more cooperative on the global stage. One dissenting view was that any successful effort at civilian modernization would need to be accompanied by a shift in budgetary priorities and a resulting moderation of defense outlays.

It seemed unclear from the discussion what leverage, if any, the United States might have over the diffusion and application of C&I technologies in the Soviet Union. Some felt that there is no reason to discourage the spread of C&I systems. It was suggested that easier access to Western finance might be of help, but others replied that the Soviets already have ample unused credit lines at their disposal. Most felt that the Soviets will continue to promote their indigenous industries regardless of any American foreign policy actions. The only obvious tool at U.S. disposal is export controls, and whether these can be carefully employed to allow strictly civilian technologies into the Soviet Union remains an open question. Hence, the best thing to do under the circumstances may be to pursue a variety of policy approaches and to avoid excessive reliance on any one eventuality.

Similarly, several people questioned the notion that Soviet technology acquisition efforts really merit the concern they receive. It was noted that transfer of a particular component is not the same thing as transferring the entire process, which is often extremely difficult, especially for Soviet scientific and industrial organizations. It was also argued that while access to our C&I technologies might help them with some low-level functions, high-level planning and coordination are unlikely to benefit greatly. Hence, beyond those items which are truly critical to military systems, most participants seemed dubious about the rationale for export controls. Nevertheless, if the United States is willing to pay the political costs in Western Europe, stricter export control enforcement may indeed slow the rate at which the Soviets can develop and field more sophisticated military hardware.

In summary, the group remained divided as to whether C&I technologies will be a decisive force in pushing the Soviet Union toward greater domestic openness. There was more agreement that the Soviets are falling further behind the West and Japan in their ability to produce and apply the new systems, but less on the consequences for our global relationship. Finally, export controls were again mentioned as a potentially useful tool with regard to dual use items with important military applications,

but there was skepticism about the utility of maintaining a broad net of commodities.

Relations with the Newly Industrializing Countries

The third national security area considered was the impact of the Information Revolution on America's relations with the newly industrializing countries (NICs). One interlocutor noted in introductory remarks that the impact of C&I technologies on these countries and their relations with the industrialized countries is difficult to assess. The currently low level of C&I capabilities in many NICs makes it difficult to predict their future trajectories and effects. Nevertheless, while a few countries may succeed in finding a place in the emerging world markets, for most of the developing world the principal effect of the changes under way will be to create new and aggravate old forms of dependency.

The debate was joined when another participant questioned the meaning of the term "industrialization" in the contemporary context. As we shift toward industrial structures based on information and services, traditional manufacturing-based notions of development may prove obsolete. How then, do we evaluate success in this field? What variables should be examined, and what measures should be employed? Some responded that, in many cases, manufacturing still matters, and that governments were therefore seeking assiduously to promote their own national information technology industries. As such, traditional concepts may still be relevant.

Participants offered a variety of views as to what conditions were necessary for the NICs to participate effectively in the world information economy. One suggested that an adequate system of higher education, flexible social organization, and political stability were the keys to success. Another countered that political stability may not be a necessary condition, noting that Germany industrialized rapidly between 1870 and World War II despite almost constant domestic upheaval (and, of course, the First World War). Yet another participant suggested instead that the list should comprise education, open borders, and private enterprise. But another contended that this could only be so under a generous definition of capitalism, since many successful industrialization programs have involved extensive state intervention. As a compromise formulation, it was suggested that, at a minimum, there must be some system of incentives with which to reward entrepreneurial effort, whether bureaucratic or private.

Another panelist suggested that given the existence of the new C&I

technology, all a country needs to enter the global marketplace is an airstrip and a communications center linked to the international networks. It was pointed out that some countries have been able to access and enter global C&I markets without substantial material resources. For example, several Caribbean countries now provide extensive data entry services to the United States over telecommunications lines. Similarly, it was predicted that another Beirut may yet arise in the Middle East to provide regional financial services on a distance-insensitive basis. In this sense, the traditional valuation and utilization of land must be reconsidered. It was also asserted that C&I technologies may allow some countries to incorporate more closely the economies of outlying regions into a well-integrated national whole. If so, some countries might actually be able to skip some of the painful early stages of traditional modes of industrialization.

In a closely related vein, there was an extended discussion of the role of the NICs in the new international division of labor. Some of the participants were quite pessimistic about the capacities of these countries to establish vital C&I industries in an increasingly competitive and integrated environment. Increasing disparities between the developed and developing countries were viewed as inevitable, because most of the Third World, and Africa in particular, could not hope to compete with the large multinationals that dominate most information technology markets. It was noted that the real money and value added remains concentrated in the fields of telecommunications equipment, computers, and microelectronics, in which effective market entry seems a remote possibility. An additional risk was cited: NIC efforts to establish large-scale industries capable of manufacturing standardized components would require massive investments, but efforts to satisfy instead the specialized needs of a limited range of consumers leave countries vulnerable to contractual disruptions. As a result, the international division of labor is likely to become increasingly stratified, with some countries able to innovate, others able only to absorb systems procured on world markets, and still others being left completely out of the game.

Other workshop participants took a more optimistic stance. One noted that it is not necessary for the NICs to compete on the multinational corporation's "high-end" turf. Instead, they could carve out selected market niches in accordance with their local resources. In this view, the NICs may not succeed as standard-setters, but could do quite well as standard-followers, piggy-backing on offerings of industrialized country firms. India, for example, has become a major exporter of software and services that are compatible with the products of leading firms. Other countries could follow similar strategies, particularly if English is their

national language. Industrialization also could be achieved by opening the country to foreign investments, rather than by sinking money into the establishment of indigenous suppliers; the Asian NICs were cited frequently in this connection. As one participant summarized the situation, the struggle over the world product is not a zero-sum game: as the leading countries and companies move up the income scale, new spaces are created for those on the lower rungs to follow.

A final subject of discussion was the recurrent theme of national policy in an integrated world economy. One person asked whether the development of corporate alliances and the denationalization of production might take the edge off international economic tensions. It was noted in this regard that, while we frequently cite the existence of a globalized economy, policymakers and analysts continue to act as if they do not know that it is here. The governments and firms who will thrive are those that recognize and accept the new rules of the game. IBM and other leading companies, for example, now source globally. In fact, it was asserted that if world production is the wave of the future, then nations might as well stop trying to publish detailed balance of trade statistics, just as the American states keep no such accounting of their exchange postures with each other.

In summary, the impact of the Information Revolution on the NICs proved a contentious topic. Some participants believed that traditional development concepts and strategies are obsolete, while others found them still adequate, although possibly in need of modification. There was broad agreement on a laundry list of readily identifiable industrialization prerequisites, but less consensus on where the NICs will fit in the division of labor or on what the United States should do about those nations that may fall by the wayside.

3

The Information Revolution And Challenges to U.S. Economic Competitiveness

U.S. Participation in International Regimes

Shifting from security to more purely economic concerns, the workshop next took up the question of America's role in multilateral regimes. Such regimes are critical to both national competitiveness and world order, as they define the rules of the game governing international interdependence. The discussion began with some observations from various participants as to which regimes and issues were of the greatest salience in C&I technologies. It became clear early on that there was a strong consensus that these regimes would play an increasingly important role in the world political economy, and that the United States should devote greater energy to its participation in them. Among the reasons cited were the relative decline of American hegemony, which makes it more difficult to achieve our goals on a unilateral or bilateral basis; the fact that most other governments attach great importance to regimes as a means of enhancing their relatively less substantial power capabilities; the fact that many governments seek to shape these regulatory arrangements so as to protect their national markets from American competition; and in particular, the relative power shift in multilateral fora caused by the addition and development of many new nations in recent years.

The International Telecommunication Union (ITU) was singled out as being of primary importance in the area of C&I technologies. Several observers decried what they considered to be the politicization in recent years of this formally technical organization. Many governments have come to view telecommunications regulation as an essential industrial tool. Accordingly, the design of technical standards, the arrangement of

operating agreements between national networks, the definition of service offerings and conditions, and various other elements of the regime are being reoriented in light of national trade advantages. One participant disagreed with this view, maintaining that telecommunications regulation has always been a heavily politicized affair. All that has changed, he argued, is that the stakes have become more explicit because of the instabilities and shake-outs occurring in the world market.

Another member offered the view that the multitude of outstanding issues on the regulatory agenda will come to a head next year in the ITU's World Administrative Telegraph and Telephone Conference (WATTC '88). The WATTC will be the first such meeting to be held since the full merger of computers and telecommunications, and it is supposed to design a comprehensive set of rules that will govern all existing and foreseeable communications services. Some foreign PTTs apparently see the WATTC as an opportunity to regain territory by defining restrictive regulations that would protect national industries and inhibit international trade.

One telecommunications regime issue that was the subject of particular contention is the design of technical standards. Two members debated the question of whether the position of the United States in the global standards-making process in the ITU and the International Standards Organization has been enhanced or diminished in recent years. On the one hand, the merger of computers and telecommunications, in conjunction with the market ascendancy of certain firms, has allowed some American businesses to independently determine de facto international standards. On the other hand, many foreign governments are striving hard to collaborate on the design of de jure standards that could slow the pace of American entry into their national markets. But one observer contended that standards-making was a relatively unimportant issue, due to the software-based capacity to interface technically disparate national networks. Other members disagreed strenuously, maintaining that standards are being used increasingly as non-tariff barriers against the United States.

A second major regime to be discussed was that governing international trade. In particular, the debate focussed on the effort now under way to extend the General Agreement on Tariffs and Trade (GATT) to encompass trade in telecommunication and information services. One member observed that the campaign to expand the GATT, which is led by the United States, has been quite difficult because of other governments' tenacious commitment to traditional regulatory principles. The matter is complicated by the difficulty of delineating between computer and information activities on the one hand and telecommunication activities

on the other. Where that boundary line is drawn will determine which services states will be willing to define as tradeable, and which will be governed by traditional regulations. Nevertheless, the United States has succeeded in at least getting the matter of trade in services onto the plates of the negotiators of the current Uruguay Round of the GATT. Several participants expressed the view that this preliminary success is attributable in large part to the active participation of the American business community in the agenda-setting process. All were in agreement that this was a particularly critical set of negotiations in which the United States should remain an active participant.

One final regime issue that was briefly discussed was the efforts of the Organization for Economic Cooperation and Development (OECD) to develop "rules of the road" for transborder data flows. One member reviewed the success of the United States in getting other OECD governments to agree to two sets of principles said to preserve the free flow of information. This success was again attributed to the active and early participation of the American business community in the discussions, as well as to the declining dominance of PTTs in foreign nations' policy-making processes.

In summary, participants agreed that the United States cannot afford to be indifferent to multilateral negotiations, even if these are sometimes exasperating. Only by remaining an active player can the United States ensure that rules are not put in place that will prevent American firms from gaining access to foreign markets and that will diminish the expansion of global welfare. However, some participants felt that there is at present insufficient technical expertise within the State Department to effectively represent American interests in these negotiations. A greater balance between functional and regional bureaus, increased cooperation with the private sector, and an expanded effort to recruit and retain specialists for American delegations were all cited by several members as being of immediate importance to United States foreign economic policy.

Transnational Business and Transborder Data Flows

The workshop next examined one of the most distinctive policy issues in the increasingly globalized world information economy: transborder data flow (TDF), which is the movement over telecommunications lines and across national frontiers of computerized data and information. As one member put it, "The use of TDF by multinational firms proceeds as if there were no nations involved." Between 1975 and 1985, this situation generated a great deal of concern in Canada, Europe, and the Third

World, where it was feared that corporate TDF would diminish national sovereignty and undermine economic, legal, and social policies.

A consensus was reached early on that foreign governments' fears and corporate concerns about the imposition of restrictions on TDF had not developed into a major source of conflict. As such, most of the discussion addressed the question of how this potential problem had been contained. The issue was framed early on when a participant noted that restrictions on content had so far not been imposed on the global electronic communications system. Most governments, particularly in the industrialized world, have shied away from requiring multinationals to process data locally or imposing taxes on data in transmission lines. As such, the international debate on TDF has been subsumed in recent years under two broader rubrics: telecommunications regulation and the conditions for trade in C&I services.

Such barriers to TDF that do exist consist largely of carriage-based regulations on the use of telecommunications facilities and services. These regulations raise the cost of doing business, but they do not constitute a fundamentally new and onerous form of state intervention. Indeed, as one member noted, "They are an inconvenience but not a disaster." There are a number of non-tariff barriers and cases of unfair industrial support regarding trade in C&I services, but these apply to only that small portion of global TDF (by most estimates, up to 10 percent) that can clearly be said to constitute trade. Information transfer within multinational firms, for example between home offices and branch plants, has not been defined as trade and thus subject to barriers.

Why then did TDF go, as a participant put it, "from being the sexiest issue on the plate to a non-issue"? Workshop participants were almost unanimous in attributing this success first and foremost to the active participation of corporate end-users in national and multinational policy processes. The view was repeatedly expressed that it is these users, rather than traditional equipment producers and service suppliers, who are shaping the international policy environment. Manufacturers and PTTs alike have been dragged reluctantly into allowing users the freedom to configure and employ systems and services as their operations require. The interests of corporate users proved to be quite coherent across national boundaries, so that every government was faced with a unified demand for the free flow of information. Further, many firms undertook measures to assure governments that they would not use TDF to subvert national policies; compliance with privacy laws and the formation with local firms of joint ventures were singled out in this regard. As a result of all these private sector initiatives, the issue was defined as global users versus national restrictions, rather than as the United States versus foreign

governments. The former formulation proved to be less controversial than the latter, and governments chose to encourage multinationals' participation in their domestic economies.

Despite the progress achieved in maintaining unfettered TDF, participants saw three issues that remain unresolved. First, there is the security of international networks. The concern was expressed that, as we shift toward a services/information-oriented world economy, our reliance on transmission lines grows accordingly. Yet many national links are vulnerable to disruptions that could expand across the chain of global networks. Further, as network dependency grows, so too do the possibilities for unauthorized access to data banks and related systems. A participant noted that it is very difficult for a firm to know who is on its organization's network; the possibilities for illegal or simply mischievous "hacking" therefore must be addressed.

A second issue is the encryption of communications content. There was some disagreement as to whether governments could or could not (and did or did not) attempt to monitor private sector TDF. Encryption devices are becoming smaller and more effective, and some governments have the capability to break codes if they wish. While the question was left unresolved, there was a consensus that encryption was, in some cases, an important tool for the protection of customer confidentiality and corporate assets.

A third issue involved the commercialization of remote-sensing satellite services. A participant expressed concern that sensitive national security information could be picked up by the SPOT or similar systems and sold at a price to a hostile government. If the demand for remote sensing grows, we may face another trade-off between technological proliferation and market forces on the one hand and national security objectives on the other. The problem could be further complicated if a government attempts to stop the dissemination of information gathered through a foreign system. This would raise the question of whether the First Amendment applies in space, as well as the problem of extraterritorial application of censorship. But one participant countered this view, arguing that the market for remote sensing is simply too limited to justify such concerns. Another suggested that satellites cannot do anything that has not long been done with spy planes, a view that others rejected.

In summary, there was a clear consensus that, for the most part, the TDF problem has been a case of smoke without fire. Further liberalization of telecommunications and services trade should be pursued, however, and the problems of network security, encryption, and remote sensing require further attention from policymakers.

Threats to U.S. Leadership in Information Technologies

The final set of economic issues to be addressed by the workshop concerned the preservation of America's position of world leadership in the field. The initial discussion overlapped with two themes developed above: how to promote American-based industries and secure for them equitable access to world markets. It was suggested that the key to U.S. competitiveness lay not simply in production but rather in our unique ability to integrate and apply systems and services throughout the domestic economy. The complexity of that economy and of our corporate strategies gives the United States a natural edge over the Japanese in the competitive game. Further, American firms have been the most successful at providing users with the specialized items they require, and it is in this area of customer relations that we can excell. From this a panelist drew the conclusion that, rather than focussing on sexy-sounding new policy initiatives, the United States should confine itself to the basics: creating effective hardware and software, facilitating information access, and satisfying end-user demands.

The rest of the discussion focussed on an item not covered in previous sessions: the preservation of America's intellectual leadership in C&I technologies. American ingenuity has historically set the pace for the development of this field; the question now is whether we will continue to set the pace in the future. One participant suggested that our unique set of national institutions, founded on the principles of pluralism and openness, would ensure that the United States remains the most dynamic source of innovation and activity. Several others voiced the opinion that our intellectual leadership can only be maintained if we expand our commitment to foreign language and area studies, maximizing our influence in a more globalized world economy.

Also at issue was the proper role of the government in serving as a catalyst for and providing guidance to the business community. Several people said that industry has a responsibility to provide government with greater feedback about its concerns and to participate more extensively in formulation of national strategies. Two related themes emerged in this context. Concerning intellectual property, a majority of participants believed that more effective national legislation and international regimes are needed to assure entrepreneurs that they will be able to reap the fruits of their innovations. One participant lamented the fact that the United States is not a member of the World Intellectual Property Organization (WIPO), where important activities on this issue are under way. A WIPO regime would provide an important measure of predictability in the international environment. But another strongly

challenged the assumptions of the discussion. He suggested that the reason we are not in WIPO is that the United States is itself "the world's greatest thief of intellectual property," and that any efforts to codify in advance instruments governing future innovations would become rapidly obsolete. Instead, the U.S. should be satisfied with the current ad hoc patchwork of national rules, as these provide the flexibility with which to respond to local conditions. Finally, a crusade to codify intellectual property rights would be premature, because no one knows what should be protected, much less how to protect it. In response, numerous participants cited cases of American innovations in software and systems in which greater protection would have been an asset.

The second theme discussed was the emerging possibility of information protectionism in the United States. While one member argued that "Chinese students are robbing us blind," most of the panel was strongly opposed to any efforts to lock foreigners out of our universities and corporations in order to preserve exclusive national control of information. Even if such restrictions are desirable in principle, in practice almost half the students in our key R&D-oriented university programs are foreigners. Whether restrictions could be imposed in a non-Draconian fashion is therefore in doubt.

In summary, the panelists were united in the view that America's intellectual leadership must be preserved, and many believed that intellectual property laws, rather than information protectionism, are the best means to that end.

4

The Role of Information Management In the Conduct of Foreign Policy

Having assessed the effect of the Information Revolution on the international environment, the workshop next turned to its effect on the internal workings of the Department of State. The discussion began on a controversial note, as one participant argued that the Department was being eclipsed by the White House in terms of its C&I capabilities. In part, this is due to the different mission of the White House and to the fact that the State Department is an expert-based system with people at the core. The result, however, is that the State Department is becoming increasingly marginal in crisis management. Another participant noted that crisis management is one thing but foreign policy management is something else. The State Department has never been a key actor in crisis management; rather, its main role has been in giving advice to the crisis managers, to the President, and to his advisors.

There ensued an extended discussion of turf battles and the distribution of capabilities and influence among federal agencies in foreign policy. Most participants agreed that the Central Intelligence Agency, the National Security Agency, the Department of Defense, and the White House are all well ahead of the State Department in their C&I capabilities. The question then became why State has been relatively less successful in employing the new technologies in a way that would keep it "in the loop" in dealing with large volumes of information.

To address this question, participants briefly examined current and proposed C&I activities at the Department of State. It was noted that the current Diplomatic Telecommunications System is a fairly basic, cable-oriented system organized in a star configuration, with messages from the posts stored and forwarded in hard copy through a central

office at main State. More advanced services, such as data communications, electronic mail, and on-line information searching are available in some places, but on an uneven basis. There was some discussion of the Department's two major proposals for the upgrading of C&I technologies: the Department of State Telecommunications Network (DOSTN), and the Foreign Affairs Information System (FAIS). Both programs, if implemented, would greatly expand States Department capacities, but it appears unlikely that Congress will provide all the funds needed in the near-term for an adequate modernization program.

This description led to a very spirited debate about the constraints that limit State's ability to benefit fully from the Information Revolution. Several people expressed the view that the problem is primarily budgetary. It is extremely difficult to convince the Congress that funds should be made available for a systematic upgrading program, particularly in the current budget climate. The problem has been exacerbated by past statements of certain high-level officials to the effect that foreign policy could easily be managed with a small, tightly knit staff. Such statements ignore the vast array of functions, from economic and political analyses to passport control and post operations, that the Department is obliged to perform. One participant suggested that expert systems could be useful in the performance of many of these roles. The breadth of State's responsibilities clearly merits an enhanced, systematic C&I capability, but the top management at the State Department and members of Congress must be convinced why this is so.

Another constraint discussed was the question of technology itself. A few participants felt that the inadequacy of State's systems may be due to the limitations of available hardware. But most disagreed, arguing that virtually anything can be obtained in the marketplace. The problem is not one of technical constraints and technical fixes; instead, it is organizational and economic. For example, secure videoconferencing on an international basis may soon be available, albeit at significant cost. This elicited the observation that State would do better to concentrate on attaining current capacities, such as the widespread use of electronic mail.

A third constraint involves the importance of security concerns in the Department. The main benefit of new communications channels and services is the capacity to interconnect a number of users and give them access to internal and external information resources. Yet, this capability raises the problem of ensuring that classified and unclassified information do not commingle in an integrated information environment. Similarly, a premium has been placed by ambassadors on information control as the only way to ensure discipline at the posts. While some people saw

these as difficult problems to surmount, others said that they are too easily exaggerated in the current technological climate. Systems now available in the marketplace could obviate the problem of unwanted access through a variety of software innovations that require users to employ codes and other techniques to get into the classified systems.

The most divisive issue was that of organizational culture. One participant claimed that the desire to maintain bureaucratic control, coupled with a certain ignorance of available technologies, had frequently prevented State from employing readily available and cost-effective systems. For example, it was alleged that the use of the telephone had been discouraged in the past to force reliance on cable communications. As he summarized the matter, if top management does not give a damn, then nothing happens. These comments generated vehement reactions from several other participants, who maintained that the State Department had done everything possible to keep abreast of new technologies and to employ them to the greatest extent possible. It also was noted that technical fixes had been accompanied by problems of bad systems advice and a lack of money.

The cultural issue was then broken down into less sweeping generalizations. Several people reviewed some of the problems frequently encountered at State, including insufficient technical training for veteran staff, inadequate numbers of support personnel and explanatory materials about the equipment in place, the purchase of outdated or limited systems on the poor advice of outside consultants, and so forth. Further, recruitment in the Foreign Service has historically been based on an up or out system that has led to a very gradual evolution of views and that has not facilitated technical learning. Similarly, personnel at State have been trained in the traditional skills of diplomacy, in which they themselves function as computers, keeping large amounts of information and expertise primarily in their own heads. It remains unanswered how to institutionalize C&I technologies and how to get personnel to rely on mechanized modes of information storage and access. In addition, people at the State Department with technical expertise are easily lost to the private sector, where the pay scales are more appealing. Leaving aside the problem of constraints, the workshop then explored what the effect of the new technologies on State would be, assuming that they are put into place. The question of centralization versus decentralization in the decision-making processes was revisited. Despite the earlier private-sector-oriented discussion, a number of participants felt that new technology would in fact promote centralization in the foreign policy process.

It was argued that while the Department has not shrunk in size, the number of people actually relevant to the decision-making process would

decrease with enhanced C&I capabilities. Layers of bureaucracy can be and are being bypassed, particularly in crisis management. In Lebanon and in other recent cases, for example, the White House chose to manage field operations itself. Many people believe that ambassadors and posts have become increasingly irrelevant in the information flow and now serve more as "advance agents" for Washington-based officials than as focal points for decision-making. One person observed that, regardless of the technology, this was the natural long-term tendency. Crisis management by definition requires the rapid response time that a large bureaucracy cannot provide; from this perspective the proper role of State is to provide more long-term analysis and informational support.

Another participant put the matter in perspective by noting that in any organization there are two broad informational functions to be performed. One is the transmission of information by people at the bottom up through the hierarchy to top personnel, while the other is the addition of value as information moves up the chain of command. What is at issue is the separation of these two functions so that analyses and recommendations are no longer as dependent on raw input from the bottom. There was disagreement from those who maintained that decentralization is just as likely an outcome.

A final and familiar problem was that of information overload. The increasing volume of information raises the question of how top decision-makers can filter the most relevant data out of the massive number of cables at their disposal. Participants were divided about how serious an issue this really is. Some noted that it is becoming more difficult to screen information, particularly when time is of the essence, while others said that the new technologies provide the means to cope with the problem. The issue is not that the Secretary and top staff have too much information, but rather that there is too much going on that they cannot know about. C&I technologies may make it possible for bureaus to pursue their own priorities independently, without senior-level oversight. The problem is aggravated by the simultaneous movement of information to many places, increasing the incentive for staff members to seek access for their own bureaucratic purposes. This also contributes to the problem of leaks. There was some discussion about whether the differentiation of communications channels contributes to unwanted access and/or paper proliferation.

In summary, the introduction of C&I technologies in the Department of State proved to be one of the more controversial topics explored. Participants differed on the salience of turf struggles but acknowledged that State lags behind other federal agencies in terms of capacities. This lag was attributed by many observers primarily to budgetary and cultural

constraints, although some disagreed with the latter proposition. Most participants agreed that technology in itself no longer is a limiting factor and that security concerns can be adequately addressed by the new systems. In terms of impact, most interlocutors reiterated the theme of increasing centralization in the decision-making process, a notion to which a few people again objected. Finally, information overload was identified by several participants as a serious problem, while others said that its importance has been exaggerated.

5

The Promotion of Fundamental Freedoms and Values

The final item on the agenda concerned the use of C&I technologies to promote liberal values abroad, through public diplomacy and other means. To a large extent, this discussion closely paralleled the previous debate about whether new technologies would promote openness in the Soviet Union. The primary difference was that in this case the focus on the Soviet dilemma was more on the influence of the mass media, rather than simply on the professional application of computers and telecommunications.

One participant led off with an extended discussion of the state of mass media in the Soviet Union. He reiterated the earlier point that C&I technologies would neither promote Orwellian closure nor magically force the Soviets to liberalize. The more likely scenarios are more complex. On the one hand, the availability of information from the West via Voice of America (VOA) and related systems provides incentives for the Soviets to be more truthful in their own internal reporting. If the government's account of events is too much at variance with Western reporting, citizens rightfully become suspicious that they are being lied to. Similarly, awareness of their profile in international opinion may lead the Soviets to moderate their behavior somewhat. On the other hand, the Soviets are becoming very skillful at packaging their news so that there are elements of overlap with Western accounts, but with important interpretive differences. Similarly, the Soviets want to spice up their mass media in order to keep the populace occupied, particularly in light of the current campaign against alcoholism. This requires a fresher look, more varied and sometimes Western-oriented entertainment programs, and so forth. At the same time, the authorities retain an

extensive capacity to perform gatekeeping functions that can limit inflows from the West, if they wish to do so.

A number of specific elements of the Soviet media were mentioned. In the past the Soviets relied heavily on short-wave communications to the outlying regions, but these links are increasingly being replaced with satellite and other transmission routes. This shift may cumulatively strengthen state control over information flow, while giving consumers the appearance of a greater range of programming choice.

A plan to upgrade the telephone network has long been in the works, but it is unclear what the timetable for modernization is. At present, penetration rates and service quality, even in urban areas, are far below the levels attained in most other industrialized countries. Modernization may make it more difficult and time-consuming for the authorities to monitor conversations, simply because of the potential increase in volume. Yet the Soviets have shown great ingenuity in the past in this regard. It also was reported that the elite and military have their own, separate telephone networks. Data communications and electronic mail are still fairly primitive systems in the Soviet Union, and ones to which access is greatly limited, even for the elite. Similar observations were made about Eastern Europe. Again it was noted that most people are not eager for Western media for political purposes; instead, entertainment and an improved private standard of living remain dominant concerns. In fact, much of the demand for VCRs and related technology stems from the desire for forbidden fruits such as pornography. Such systems may present only a marginal threat to the state, since they are in keeping with the tacit agreement to trade political docility for welfare gains.

The thrust of these comments met with agreement from those who felt there was little reason to believe that the new mass media would promote any significant liberalization, since people are more interested in VCRs than in VOA. At the margins the media may make it more difficult for communist governments to lie boldly and may make the costs of censorship a bit higher. In contrast, one participant was of the view that the availability of small, easily concealed satellite dishes and rooftop antennas could make a difference.

Mention also was made of the success of the current Soviet bloc public diplomacy offensive in the West. Most participants seemed impressed with the sophistication of the present Soviet program, and one voiced concern that we are doing significantly less well in this area. Further, there is no symmetry in the propaganda relationship; the Soviets study it extensively, and we make only haphazard efforts. This disparity may in the future allow the Soviets to drive more wedges between the United States and Western Europe.

In policy terms, the United States should reconsider and expand its efforts in the realm of public diplomacy. USIA could do much with the new communications channels, each of which presents distinct possibilities. There has also been significant progress in getting Third World countries to accept the Worldnet service. One person said that it is essential for the United States to get back into the game at UNESCO if we want to shape the trajectory of media policy in the Third World.

Regarding the People's Republic of China, it was suggested that there is a significant relaxation of censorship in progress, and that the purchase of televisions, VCRs, and radios is on the rise. Western media are gaining greater access to the market there than ever before. Another participant questioned this optimistic depiction, however, and said that China remains a very controlled society. In the Third World, one person said, the United States is doing better at public diplomacy than is frequently recognized. People there—particularly the educated elite—are reading the Western press, although it was noted that many of the media remain tightly controlled by authoritarian regimes, which have become quite skillful at manipulation and propaganda.

In summary, the majority seemed to think that no dramatic changes will be engendered in Soviet society in the near term by the new media. The current state of affairs in China was viewed differently by participants, and progress in the Third World seemed to some to be under way. All were in agreement that public diplomacy should receive greater attention in American foreign policy if we are to stay ahead of the East in the arena of world opinion.

Appendix A
Workshop Participants

WORKSHOP ON THE REVOLUTION
IN INFORMATION AND COMMUNICATIONS TECHNOLOGY
AND THE CONDUCT OF U.S. FOREIGN AFFAIRS

Ralph E. Gomory *(Chairman)*, Senior Vice President for Science and Technology, IBM Corporation
David L. Aaron, D.L. Aaron, Inc. (former Deputy Assistant to the President for National Security Affairs)
Joseph T. Brophy, Senior Vice President, Information Processing and Telecommunications, The Travelers Insurance Co.
Richard N. Cooper, Maurits C. Boas Professor of International Economics, Harvard University
B. Garland Cupp, Executive Vice President for Systems, Technology, and Electronic Distribution, American Express Travel Related Services, Inc.
Kenneth W. Dam, Vice President, Law and External Relations, IBM Corporation
Edward J. Derwinski, Under Secretary for Security Assistance, Science, and Technology, Department of State
Hugh P. Donaghue, Consultant, Tyson's Capitol Institute (Senior Vice President, Retired, Control Data Corporation)
Diana Lady Dougan, U.S. Coordinator for International Communications and Information Policy, Department of State
Oswald H. Ganley, Executive Director, Program on Information Resources Policy, Harvard University
Allan E. Goodman, Associate Dean, School of Foreign Service, Georgetown University
Seymour E. Goodman, Professor of Management Information Systems Policy, University of Arizona

William E. Gordon, Foreign Secretary, National Academy of Sciences and Distinguished Professor Emeritus, Space Physics, Rice University

Benjamin Huberman, Vice President, The Consultants International Group

Samuel W. Lewis, Guest Scholar, The Brookings Institution (Career Minister, Retired U.S. Foreign Service)

John L. McLucas, Chairman of the Board, QuesTech, Inc. (former President, COMSAT General and former Secretary, U.S. Air Force)

John D. Negroponte, Assistant Secretary for Oceans and International Environmental and Scientific Affairs, Department of State

Anthony G. Oettinger, Chairman, Program on Information Resources Policy and Center for Information Policy Research, Harvard University

Arno A. Penzias, Vice President of Research, AT&T Bell Laboratories

Ivan Selin, Chairman of the Board, American Management Systems, Inc.

Eugene B. Skolnikoff, Professor of Political Science (former Director, Center for International Studies), Massachusetts Institute of Technology

Richard J. Solomon, Editor and Publisher, International Networks Newsletter

Richard H. Solomon, Director, Policy Planning Staff, Department of State

Ronald I. Spiers, Under Secretary for Management, Department of State

Victor A. Vyssotsky, Director, Cambridge Research Laboratory, Digital Equipment Corporation

Walter B. Wriston, Chairman and Chief Executive Officer, Retired, Citicorp

Mitchel B. Wallerstein *(Project Director)*, Associate Executive Director, Office of International Affairs

Appendix B
Agenda

WORKSHOP ON THE REVOLUTION IN INFORMATION AND COMMUNICATIONS TECHNOLOGY AND THE CONDUCT OF U.S. FOREIGN AFFAIRS

The Board Room
National Academy of Sciences
Washington, DC

September 14–15, 1987

Monday, September 14

8:45 a.m.	Welcome and Introduction of the Participants—Dr. Ralph E. Gomory, Chairman
9:00 a.m.	Introduction of the Secretary of State—Dr. Frank Press, President, National Academy of Sciences
9:02 a.m.	Keynote Remarks—The Honorable George P. Shultz
9:20 a.m.	Introductory Comments—Dr. Ralph Gomory, Chairman
9:30 a.m.	I. Major Technological Advances in Information Management and Telecommunications That Affect the Conduct of U.S. Foreign Affairs
10:30 a.m.	Break
10:45 a.m.	II. U.S. National Security Interests
	A. Relations with the Advanced Industrialized Countries

12:15 p.m.	Luncheon
1:45 p.m.	B. Relations with the Soviet Bloc
3:15 p.m.	Break
3:30 p.m.	C. Relations with the Newly Industrializing Countries
4:30 p.m.	III. Impacts of the Information Revolution A. U.S. Participation in International Regimes
5:30 p.m.	Break
6:30 p.m.	Cocktails (the Great Hall)
7:15 p.m.	Dinner (the Members Room)
8:45 p.m.	Remarks—Walter Wriston
9:30 p.m.	Adjournment

Tuesday, September 15

8:30 a.m.	III. Impacts of the Information Revolution (continued) B. The Development of Transnational Business and the Regulation of Transborder Data Flows C. Threats to U.S. Leadership in Information Technologies D. Challenges Posed by a Global Financial System and Growing Trade Protectionism
10:30 a.m.	Break
10:45 a.m.	IV. The Role of Information Management in the Conduct of Foreign Policy
12:15 p.m.	Luncheon (the Members Room)
1:45 p.m.	V. Promotion of Fundamental Freedoms and Values
3:00 p.m.	VI. Final Discussion and Concluding Remarks
3:30 p.m.	Final Adjournment