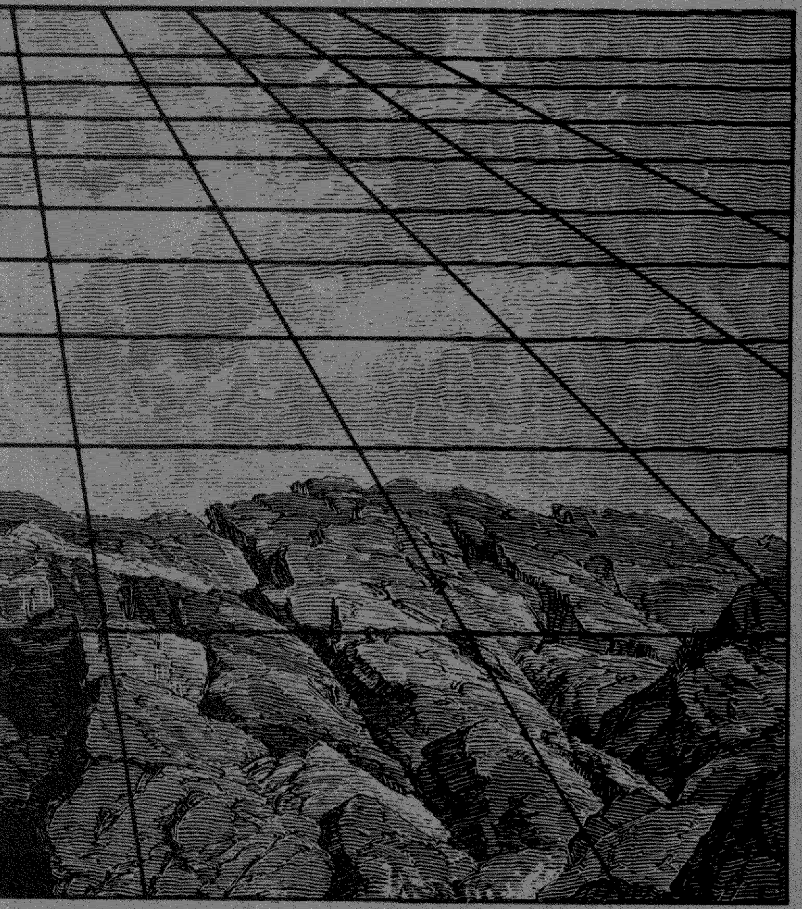
Creating Strategic Vision

LONG-RANGE PLANNING FOR NATIONAL SECURITY

SMITH ■ ALLEN ■ STEWART ■ WHITEHOUSE

Introduction by Newt Gingrich



The cover: Adapted from *Harter's Picture Archive for Collage and Illustration*, ed. Jim Harter (New York: Dover Publications, Inc., 1978).

Creating Strategic Vision

Creating Strategic Vision

LONG-RANGE PLANNING FOR
NATIONAL SECURITY

Perry M. Smith
Jerrold P. Allen
John H. Stewart II
F. Douglas Whitehouse

WITH AN INTRODUCTION BY
NEWT GINGRICH

1987

NATIONAL DEFENSE UNIVERSITY PRESS

WASHINGTON, DC

National Defense University Press Publications. To increase general knowledge and inform discussion, NDU Press publishes books on subjects relating to US national security. Each year, in this effort, The National Defense University, through the Institute for National Strategic Studies, hosts about two dozen Senior Fellows who engage in original research on national security issues. NDU Press publishes the best of this research. In addition, the Press publishes especially timely or distinguished writing on national security from authors outside the University, new editions of out-of-print defense classics, and books based on conferences concerning national security affairs.

"Long-Range Planning: A National Necessity," by Perry M. Smith, was published in slightly different form as "Creating a Strategic Vision: The Value of Long-Range Planning," in *Air University Review*, September–October 1986.

Proofread by Mary Loughlin, Editorial Research Associates, Washington DC, under contract DAHC32-87-A 0017.

NDU Press publications are sold by the US Government Printing Office. For ordering information, call (202) 783-3238, or write to: Superintendent of Documents, US Government Printing Office, Washington, DC 20402.

First printing, July 1987

Library of Congress Cataloging-in-Publication Data

Creating strategic vision.

Biblography: p.

1. Military planning—United States. 2. United States—Military policy—Forecasting. I. Smith, Perry M. (Perry McCoy)

U153.C74 1987 355'.033'73 87-14000

In memory of the best long-range planner
of his generation,
Major General Don Morelli, United States Army,
a man with both a strategic vision
and the courage to pursue that vision

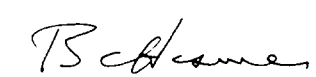
Contents

Foreword

Although long-range planning remains as much art as science, several rigorous methodologies have been developed since World War Two for strengthening the quality of such planning. These methodologies and the best of the new long-range planning ideas from business, government, and the military were the subjects for study by a year-long National Defense University research seminar, directed by Major General Perry M. Smith, USAF, then Commandant of the National War College and previously Director of Air Force Plans.

In examining the methodologies, the concepts, and the programs now in-place, members of the seminar weighed and debated planning from their own experiences as defense planners. From this sustained examination emerged four thoughtful essays—by General Smith, by Air Force officers, Colonels Jerrold P. Allen and John H. Stewart II, and by F. Douglas Whitehouse, a senior analyst of Soviet economics.

These essays guide the reader to a realistic understanding of long-range planning and suggest ways to think creatively and pragmatically about the future. Because world conditions change constantly, continuous long-range planning must have a permanent voice in national security deliberations. The National Defense University is pleased to publish these essays as a contribution to a strengthened national security.



Bradley C. Hosmer
Lieutenant General, US Air Force
President, National Defense University

Preface

This is a book about vision; more specifically, it is a book about long-range planning. It is also a book about innovation, creativity, and divestiture, and about various ways to plan for the future, including the use of "alternative futures" as an analytical methodology. It is a book about how to think about the future, how to plan for the future, and how to make day-to-day decisions within the context of a vision for the future.

Although long-range planning is done well in certain places in Government, it is generally not done well—or at all—in too many agencies or departments. The successful models can point the way as we try to institutionalize the long-range planning process throughout those elements of our Federal Government that formulate and implement national security policy.

Although this book is based generally upon matters of national strategy, its principles apply throughout government at the Federal, State, and local levels and in all generic planning areas, especially fiscal, organizational, political, technological, doctrinal, and resource areas. One of the most exciting conclusions of this examination is that long-range planning can easily become part of the decisionmaking process in large organizations—government, business, nonprofit, private, or charitable. This book attempts to convince leaders to think about long-range planning as crucial and helpful to the organizations they lead and serve. Although the business world benefits from excellent books on strategic planning, there is no adequate book on how to accomplish long-range planning and how to institutionalize a long-range planning process in governmental organizations. We hope this book is a beginning.

We thank Captain Ray Johnson, US Navy, who made many useful suggestions on each of the chapters. Colonel Alan Gropman, USAF (Ret.), whose conceptual and practical knowledge of the long-range planning process is most impressive, was very

helpful in providing many substantive suggestions on how to improve this book. Bob Kimmitt made a number of very helpful suggestions. Mary McNabb, Yvette Taylor, Patricia Pasquarett, and Lieutenant Junior Grade Cathy Salvato, US Navy, were responsible for the typing and editing of the many versions of the manuscript. We appreciate the highly professional contributions of our NDU Press editor, Ms. Janis Hietala. We owe a particular note of thanks to Mary McNabb, who has devoted 30 professional years to ensuring that the National War College operated at the highest level of excellence; she contributed in many ways to this effort. As always, Connor Smith was a careful editor and constructive critic.

THE AUTHORS

Introduction

NEWT GINGRICH

America faces a 21st century challenged by military and political competition with the Soviet Union, terrorism in the Third World, and economic competition with Asia and Europe. Our weaknesses are due as much as anything to our lack of strategic vision. We lack effective systems for systematic, long-range planning and an ability to think about long-range agendas for large institutions.

America is traditionally a pragmatic, fragmented, short-term focused country. Our strength is in the power of the free marketplace of goods *and* ideas. This freedom stimulates and guides individual entrepreneurs to achieve great things. We are the nation of Thomas Edison, the Wright brothers, Henry Ford, and outgrowths of their separate organizations. This culture stands in contrast to those dominated by long-term, continuously evolving, large institutions. Our heroes are people who mold great institutions, rather than being molded by them. Garry Wills notes in his study of the Kennedy family that FDR had the easier problem because he was creating the New Deal. The post-World War II generations have a much harder problem because they've inherited large bureaucracies and institutions that require incredibly complex systems of management and evolution.

This book is a key building block to the development of American strategic vision, long-range planning, innovation and

Newt Gingrich is a US Congressman from the 6th district of Georgia.

thinking about the future. The effort to look at the Air Force experience, to consider a surprise-free future for dealing with the Soviet Union, and to outline the fundamental questions of an introductory model for long-range planning will be helpful to everyone who is concerned about America's defense establishment and about America's future.

It is clear that the world is changing rapidly and becoming more complex. There is a dynamic interaction between both the change and the complexity. Therefore, we need to have clearer ways of developing vision, more effective techniques to generate a strategic plan, and a more powerful relationship between senior leaders and their planners.

Perry Smith's experience in developing the Air Force system of vision development, long-range planning, and reporting to a senior leader is an experience worth studying by every student, not just of the military, but of any large system. The IBMs, AT&Ts, and General Motors of the future will find the necessity for strategic vision, strategic planning, and strategic management applies to American institutions in the economic arena just as surely as it applies to institutions in the military arena.

The authors of these essays concede they are pioneers. They have initiated the venture, not completed it. But for any who hope to take the next step, they will find this work a remarkably good first step and I commend it to them.

Creating Strategic Vision

Long-Range Planning: A National Necessity

PERRY M. SMITH

There are many useful techniques which can help force you and your institution to reach out beyond today's issues, problems, policies, and mind sets and to think seriously about the long-term future. By long-term, I mean 10 years or more into the future. The most productive timeframe for serious consideration by long-range planners is the 10- to 25-year period. Any time short of 10 years is so near term that it is hard to conceive of significant changes or approaches that might move an institution in new directions. In addition, most innovative short- to mid-term planning tends to be threatening to many who are committed to present policies. A timeframe beyond 25 years is so difficult to deal with intellectually that it is probably not worth much time and effort. Exceptions to this 25-year rule would be appropriate in certain technical and research and development areas where it is clear that something revolutionary and important could be accomplished, but not within the next 25 years. Examples are space

Major General Perry M. Smith, USAF (Ret.), served as Commandant of the National War College, 1983–86. A combat pilot and wing commander, Major General Smith also is a former Military Assistant to the Deputy Secretary of Defense and former Director of Plans for the Air Force.

exploration, medicine, or certain defense technologies. Other areas also worthy of consideration beyond the 25-year point would be long-term trends and opportunities in demography, mineral exploration, and use of seabeds.

1. How to Think About the Long-Range Future

Some Useful Approaches. The use of an alternative futures approach has been helpful to many long-term planners, for it forces the mind out of the "let's plan for the most likely future" technique which is so common yet so intellectually restrictive in most planning systems. By considering a world beyond the year 2000 when the Soviet Union might no longer be a superpower or when the United States might be facing one or more high-technology military threats or when the international economic system has collapsed or when a significant number of terrorist groups possess suitcase-sized nuclear weapons, the planner might find avenues of creative inquiry. The use of the alternative futures approach is both a sobering and a mindstretching exercise highly recommended for both long-range planners and decisionmakers. It is this technique that Doug Whitehouse uses, beginning on page 93, to stretch our minds about the Soviet Union of the future.

Another useful approach to the future is the writing of prospective history. The idea is to pick a year, such as the year 2010, and then attempt to write a history from now to then. In this narrow context, the planner might ask these questions: what would the Department of Defense look like in the year 2010; what weapons systems will be deployed; what will the base structure—both overseas and stateside—look like; how will we be organized; what missions will we have retained; what new ones will have been incorporated; and what ones will we have given up and why? Once such questions are answered, an examination of the timing of both divestiture and research and development activities can lead to decisions in the near-term that would release money, manpower, and other basics through divestiture, for use in more productive areas.

How to Choose Long-Term Planners. Only a small percentage of any professional group generally make good long-range planners. Identifying long-range planners and carefully selecting the best are very important responsibilities of the leader and his chief planner. There are some useful methods to identify, select, motivate, and reward long-term planners. The Kirtin psychological test measures a continuum of psychological preferences from highly adaptive to highly innovative. Those who are more than one standard deviation above the norm as innovators can be considered as potentially effective long-range planners because they tend to be very creative and they like to deal with new ideas and new approaches to issues. The Myers-Briggs Psychological Type Indicator is also useful in identifying individuals who are comfortable with long-range planning. Individuals who score high in the "judging" category tend to make good planners. At the National Defense University in Washington, DC, and other institutions, a great deal of research has been done with the psychological testing of executive-level people.*

Interviews can be very helpful to see how widely read a potential long-range planner is. Those individuals with a deep understanding of history tend to make good planners because they can identify trends that may continue into the future. They also tend to be skillful in identifying those new developments that may have lasting impact of some importance on the future. Interviews can also identify those individuals who are uncomfortable with present policies and programs and who are willing to take risks to chart new courses for the future.

Long-Range Planning Across the Government. I hope that one day each of the major departments in our Government, each of the military services, and each of our Government agencies will have a small long-range planning division manned with carefully chosen, creative and energetic individuals with solid operational backgrounds. The President should take two hours

*Those interested in pursuing the experiences of National Defense University in psychological testing of executive-level people may contact Executive Development (NDU–A–ED), National Defense University, Fort Lesley J. McNair, Washington, DC 20319–6000.

each month to address a long-range issue, and he should provide comments to his long-range planners in reaction to their ideas and recommendations. I hope that the Secretary of Defense, Secretary of State, our top military officers, the chiefs and secretaries of military services, the directors of the CIA and DIA, and the national security advisor to the President will also meet with their long-range planners on a monthly basis and provide feedback to them. Once every six months, the long-range planners from these agencies should meet to present papers, give briefings on their most recent studies, and trade ideas. Once a year, the top planners from each of the alliance nations should meet to share ideas and insights.

It is my hope that a long-range national security plan will be prepared and signed out by each new President, preferably within nine months of taking office, which would create a strategic vision for the nation and a strategic challenge to the national security communities. This short, 8- to 10-page plan would establish goals and priorities, would be updated annually, and would be presented to the President each year for discussion, modification, and approval. The annual presentation could be held each July, timed to have the maximum impact on the planning of the departments, agencies, and military services involved in the development of national security plans, programs, and budgets. This approach would create the proper framework for decisionmaking.

When decisions are made within the context of a strategic vision and with a full consideration of the long-term consequences of each decision, greater coherency in planning and policymaking results. However, most leaders of governmental organizations are caught up in daily responsibilities and spend little time in creating a strategic plan for their agency or Service. In addition, they often fail to encourage the establishment of a long-range planning process that would allow them to deal with various long-range issues on a systematic and a regular basis. Leaders who are captives of an overly full daily schedule fail to plan systematically; they tend to rely on ad hoc long-range studies. Although these can be quite useful, I very strongly believe

that an occasional ad hoc long-range study is not enough to ensure that opportunities are seized to take advantage of changes in technology and the international environment, economic factors, threat realities and perceptions, demographic factors, and other areas. A systematic long-range planning process is essential for creating and maintaining a strategic vision and for building a strategic program.

2. Why Managers and Leaders Avoid Systematic Long-Range Planning

From my experience as a leader, a planner, an operator, a researcher, and a teacher, I have come to a number of conclusions that may help explain why there is so much resistance to an institutionalized long-range planning process.

Determinism. A number of senior leaders in our Government have a basically deterministic view of the future, which is manifested in various ways. Some believe that the course of the future is already largely predetermined by forces outside their control. In their judgment, the best they can do as leaders is to adjust to an already predetermined future and make the best of what is bound to happen anyway. In fairness to these determinists, it is clear that certain things that will happen in the future are not controllable by men or women at any level or in any place. For example, Brazil will remain, for many years, a large country with enormous natural resources, vast areas of jungle, and a population largely concentrated along its coastline; Sweden will not count as much in world politics, economics, or military capability as will the United States, France, Germany, or the Soviet Union; nations will be largely stuck with their present climate, population, natural resources, topographical features, and periodic natural disasters for the foreseeable future.

What planners maintain, and determinists deny, is that man can make a difference, that strong, aggressive, and decisive leadership by leaders of major governmental and business organizations can, in fact, change the course of the future. The planners argue that the Roosevelts, Churchills, Ho Chi Minhs,

de Gaulles, Nakasones, Reagans, Gorbachevs (and the planners who support them) can and do make a difference in the course of human history. Dedicated long-range planners also maintain that these leaders can make much more of a difference in shaping the future if they create a strategic vision and combine this vision with a systematic planning process that includes an element of long-range planning.

A significant impediment to the establishment of a regular long-range planning process is the fear by leaders that they will be "locked in" by a long-range plan. A long-range plan that is not reviewed and updated (at least every two years) becomes quickly outdated, evolves into rigid dogma for the institution itself, and might be misused by external forces. All long-range plans should be written in such a way that they remain useful guides for present and future decisions. "Sunset" clauses (provisions that phase out or cancel the plan at a specified date in the future), scheduled reviews and updates, and flexible language in the plans are all useful techniques to avoid overly rigid long-range plans.

Long-Range Plans as Threat to the Authority of Certain Leaders. Long-range plans, by their very nature, tend to be viewed as threats to some leaders and staff directors. To not plan at all is often a safer and more comfortable approach for leaders than actions that lead to plans that appear to reduce the authority of various leaders within an organization. This is especially true when one organization is trying to develop long-range plans for other organizations. For instance, major commanders in the field sometimes are reluctant to allow a military service staff at the highest level to develop force-structure master plans. The commanders in the field sometimes fear that the development of these plans in Washington, as well as their modification over time, will wrest a certain amount of power and prestige away from these field commanders.

The Short Tenure of Leaders. Most governmental officials hold their positions for relatively short periods of time and tend to have "planning horizons" that generally correspond to the amount of time they expect to hold their present jobs. Heads of

departments and agencies and chiefs of staff of the military services commonly can look forward to four years or less in office before they retire, resign, or are ousted because of a change in administration. Helmut Schmidt, Margaret Thatcher, Charles de Gaulle, George Marshall, and Dean Rusk, with their long tenure in top positions, are very much the exceptions to the rule as far as leaders of large organizations are concerned. Many business leaders also face relatively short tenures, as well as the requirement to report progress annually. People who need to look effective in the short term seldom develop the mentality or the apparatus for strategic planning.

The Ideological Bias Against Planning. Planning has a bad reputation in much of the Western world, particularly in capitalist societies. Planning, to many citizens, has the appearance of governmental direction or control as well as governmental inefficiency and waste. Much of this skepticism about planning in Government is well founded (particularly when the planning is economic and industrial), but this antiplanning bias tends, unfortunately, to spill over into the national security environment. Western leaders must strongly resist the temptation to avoid the responsibility for long-range national security planning. To throw the national security planning "baby" out with the economic planning "bath water" is a grave but avoidable mistake.

3. Long-Range Planning in the United States Air Force.

Long-range planning takes many forms and operates in many different organizational settings. However, I believe that there are some important fundamentals. An analysis of the development of the long-range planning system in the United States Air Force may be helpful to leaders and planners of the future who wish to make long-range planning part of the planning and decisionmaking process of their agencies or departments.

The long-range planning process, as it works in the top echelons of the Air Force, is quite mature as a result of a decade of evolution in the crucible of the Pentagon Air Staff. In 1977,

Secretary of the Air Force John Stetson helped institutionalize the long-range planning process by asking two important questions: (1) Where is the Air Force long-range plan? and (2) Who are the long-range planners? He quickly found there were no answers to either question. Secretary Stetson asked that a study group be formed to study both Government and business organizations and to develop a means by which long-range planning could become a part of the Air Force planning and decisionmaking systems. The study group looked carefully at both industry (General Electric, New York Telephone, and Michigan Power were particularly helpful) and Government and devised a long-range planning system along the following lines.

A long-range planning division of 10 officers led by an Air Force colonel was formed. This division was designed to have regular and direct access to the Secretary of the Air Force and the Air Force Chief of Staff. One of its first undertakings was to write a 10- to 12-page long-range planning guidance memorandum. This memorandum is updated yearly and is approved each year by the Air Force Chief of Staff and the Secretary of the Air Force. The Long-Range Planning Division members, along with the Director of Plans (a major general), meet privately with the Secretary and the Chief of Staff each month and address a specific long-range planning issue. These interchanges are not coordinated with the Air Staff agencies or with major commanders and often suggest radical solutions to long-range problems or issues. After a 20- to 30-minute briefing, a number of "candidate strategies" are suggested. The Chief and the Secretary are asked to pick the strategy with which they are most comfortable. The long-range planners take this guidance and enter the suggestions of the Chief and the Secretary into the regular planning process.

In a few cases, the Secretary and the Chief will take a recommendation for implementation in the next 10 to 25 years and decide to examine the possibility of near-term implementation. For instance, in the early 1980s, the Air Force Chief of Staff and Secretary sought to bring together organizationally (both in the field and in the Air Staff) the command, control, and communications elements with computers. The long-range planners had

recognized that over the next 15 years, computers and command, control and communications elements would become more integrated and more interdependent; keeping computers separate would make no sense by the year 2000. The Chief and the Secretary saw the wisdom of the long-range planners' case and decided to push up the date of consolidation by about 15 years.

The Chief of Staff and Secretary took similar action with the Special Operations mission. The long-range planners recommended consolidation of Rescue and Special Forces under the Military Airlift Command in the 1990s rather than keeping the Special Operations mission in the Tactical Air Command. The Chief and Secretary liked the idea and asked that a much earlier consolidation date be studied. A few months later, after the study was completed, they decided to consolidate over the next year to complete the action by 1983.

The Air Force Long-Range Plans Division has also become a clearinghouse for new ideas, for innovation, and for creativity. The Chief of Staff and Secretary look forward to their monthly sessions with the long-range planners. These interchanges allow them to escape their in-boxes, to think conceptually, to deal with new approaches to problems, and to freewheel intellectually with a group of bright and uninhibited officers. These sessions are also exciting for the officers of the Long-Range Plans Division, for they have the rare opportunity to share their ideas with the top two leaders of the Air Force without having to coordinate these ideas and recommendations with any major command or Air Staff agency.

In some cases, the Chief or Secretary strongly disagrees with the planners and cancels the entire effort after hearing their briefing. For instance, General Lew Allen, Chief of Staff of the Air Force in the early 1980s, disapproved recommendations that would have radically changed the Air Force logistics system over the next 30 years. The general also rejected a long-term investment strategy that was based on a long-term economic model with which he was quite uncomfortable.

Many issues have been addressed through this regularized long-range planning system: for example, Latin America, technology, investment strategy, logistics, NATO, the Pacific Basin, and space. All of these issues were addressed from the perspective of the early part of the 21st century.

4. The Fifteen Laws of Long-Range Planning

As a result of my experiences with plans in the Air Force, the Office of the Secretary of Defense, and a major NATO headquarters, as well as my research in long-range planning at Columbia University, the Air University, and the National War College, I have developed 15 laws of long-range planning that should be helpful to anyone seriously considering the implementation of the long-range planning process. Although it is rather presumptuous of me to label these points "laws," it is my firm view that if long-range planning is going to be effective in the decision calculus of leaders in Government, most, if not all, of these laws must be followed. Many long-range planning efforts fail because one or many of these laws are violated or ignored. I recommend that these laws not only be used when establishing a long-range planning process, but also be used as a checklist for long-range planners at all levels to ensure that planners and leaders do not drift away from important fundamentals.

Before I outline my 15 laws, let me discuss in greater detail the monthly interactive sessions that should be held between the long-range planners and the top leaders of the organization. The chief planner of the organization (in the military, normally a two-star general or admiral) should introduce each of these monthly briefings and should remind the top leader or leaders that they are about to hear an "uncoordinated" briefing that addresses the long-range future. The briefings by the long-range planners should be short (20 to 30 minutes), should use a small number of visual aids, and should address one specific subject.

At the end of the briefing, alternative strategies or options should be outlined and the top leaders should be asked to react to these objectives and alternative strategies. The approach should

be, "Which approach, strategy or option do you *like*?" (rather than, "Which approach, strategy or option do you *choose*?"). The long-range planners should not seek *decisions*; they should seek reactions and general guidance from the top boss. It is also important that the top leaders understand these ground rules. Because these are uncoordinated briefings that the rest of the leaders, staff, and field agencies have not seen, it is not fair to press for a decision at these long-range interactive sessions.

After the briefing is completed and the candidate strategies are covered, the rest of the two-hour period should be spent in a "no holds barred" discussion. The participating long-range planners must be willing to challenge policy, procedures, systems, organizations, and doctrine as they would or would not apply to a world 10 or 25 years hence. The chief planner must be willing to take the heat from his superiors if they react very negatively to "radical" briefings or recommendations.

Whether the leaders like or do not like any of the options outlined, the long-range planners must press the leaders for their reactions and general preferences among the options. Sometimes the leaders prefer a combination of two options or a less radical variant of one of the options. As the interactive session draws to an end, the chief planner should review the discussion to ensure he and his long-range planners understand fully the comments and feedback they have received and to remind everyone in attendance that no initiative will be taken without full coordination with staff and field agencies.

If the chief planner abuses his access and his mandate and uses the long-range planning process to "run around the system," top staff officers and field agency leaders will join together and try to shut down the access of the long-range planning division to the top leaders. Clearly, the chief planner has an important but delicate responsibility. He must encourage his long-range planners to be innovative and creative, to challenge present policy and to develop issues, briefings, and options that stretch the minds of the top leaders. In addition, he must be willing to take radical ideas, strategies, and doctrines to the decisionmaker. On the other hand, the planner must be fair

to his staff colleagues in operations, finance, logistics, personnel, and research and development. He must convince them that he will not abuse his access by pushing for decisions on uncoordinated issues. He must also be fair to subordinate decisionmakers. In other words, the chief planner must be somewhat schizophrenic. He must support present policy and at the same time challenge that same policy as it might apply in the long-term. A planner who merely projects policy into the future is not a planner but is simply a caretaker or gatekeeper, while a planner who undermines present policy makers damages the coherence and legitimacy of the organization that he serves. Here lies the great challenge and the great opportunity; this is what makes long-range planning so rewarding.

1. Long-range planners must answer the "What's in it for me?" question.

It's important that long-range planners must be able to convince their bosses, themselves, and other planners throughout the entire organization that long-range planning, in fact, accomplishes something that is worthwhile not only to the institution but also to all the individuals in the process. The most important person to convince, of course, is the top decisionmaker himself. Unlike Secretary Stetson, who asked incisive planning questions, many decisionmakers may not seriously consider long-range planning requirements until it is too late to provide coherence to the series of day-to-day decisions they have already taken. The challenge, then, is to convince the leader very early in his tenure, when his mind is open and his energies are at their peak, that it is worthwhile to spend two hours every month dealing with a long-range planning issue. It is also important to convince him to reserve his valuable time for this endeavor, to engage the long-range planners in a serious dialogue, and, most important, to make day-to-day decisions in the context of a strategic vision and a strategic plan.

It is also important for the major staff chiefs and the major field agency leaders to understand and support the value of

long-range planning, both at their level and at the very top of the organization. Their support, either active or tacit, for an institutionalized long-range planning system in which the decisionmaker gets to deal with radical ideas on a regular basis is important. By bringing up interesting ideas, insights, and alternative strategies to help solve some difficult long-range problems, the long-range planners can help the decisionmaker immeasurably. Over time, the decisionmaker will look forward to these sessions, for they can be opportunities for him, in a freewheeling environment, to be challenged by new ideas, new approaches and new insights, and most important, to articulate his objectives. He can also use the long-range planners as a sounding board for his ideas. In sum, if the decisionmaker sees no direct benefit to himself, then the long-range planning effort is doomed to fail.

2. *Long-range planners must get and maintain the support of the top decisionmaker.*

The top decisionmaker must be willing to tell his executive officer or his secretary that he wants to see the planners on a regular basis. This point is an adjunct to the first law, but it needs further development and clarification. There must be enough priority in his interest in these sessions that pressing issues of the moment do not cause the meetings to be postponed again and again. The long-range planners must make a contribution in this regard in that they must work out a schedule for each year. The subjects chosen for each session must be of high interest to the decisionmaker so that he will agree to these sessions on a monthly basis and stick with this schedule throughout the year.

It is also important that the decisionmaker be willing to allow approximately two hours for each session. Normally, anything less than two hours does not give justice to the issue nor does it give the decisionmaker the opportunity to really get away from his in-box and think about the long-term issue. Short sessions do not leave enough time for good discussion, dialogue, and feedback after the briefing is given. The decisionmaker must occasionally discuss the value of long-range planning in his staff meetings, in his decision meetings, and in his normal

day-to-day activities with his staff and with the major commanders and leaders of the various field agencies. If he does not encourage long-range planning and if he doesn't ask the occasional question, "How does this decision which I am about to make fit into our long-range plan?" the long-range planners will have a great deal of trouble getting support as they try to fold long-range planning options and approaches into the normal planning, programming, and budgeting process. One useful technique is to schedule a long-range planning session shortly before the leader is about to travel overseas (for instance, holding a "Latin America in the 21st Century" session just before a Latin American trip), or before the leader is to make an important speech or to testify before the national legislature.

3. *Long-range planners must have direct access to the top decisionmaker.*

It seems to be quite clear after the examination of long-range planning efforts in business and government that unless the long-range planners work directly for the decisionmaker or, at a minimum, have direct access to him, the long-range planning effort will not be successful. Most of the best run agencies or business companies in the United States have long-range planners working directly for the chief executive officer; the United States Navy has that system within the Defense Department. This is the ideal arrangement because the planners are protected by the boss. They remain close to the boss by being a part of the immediate staff. Another option is to have the long-range planners work for the chief planner but with direct access to the top decisionmaker on a regular basis. In this arrangement, the role of the chief planner becomes critical, as he must be committed to allow his long-range planners to develop radical ideas. He must not remove some of the best ideas on the way to the decisionmaker. If he filters the information and recommendations, the impact of the long-range planners on the thinking of the decisionmaker is reduced.

4. *Briefings by the long-range planners to the top decisionmaker must not go through the normal coordination process.*

This is a delicate but very important point. If the long-range planners have to coordinate their briefings with all the agencies

within the staff and with all the field agencies, many of their best ideas will be filtered out and much of the impact of their briefing on the decisionmaker will be lost. The tendency is that anything that seems to bring into question present policy, doctrine, tactics, or organization will be objected to by one or more staff agencies. The planners would then have to compromise their briefing and their recommendations to accommodate these concerns. This tendency inhibits an innovative and creative long-range planning system. Full coordination generally leads to a bland briefing and predictable recommendations that probably will not interest the decisionmaker. Over time he will lose interest in seeing the long-range planners.

5. *The long-range planning process must lead to some decisions in the present.*

The long-range planning process can be useful even if it does not lead to decisions in the present. However, to establish and maintain legitimacy and support for a continuous long-range planning effort, it is essential that an occasional decision be made for early implementation of an idea relating to a long-range issue or a long-range plan. So often the question is asked by critics of long-range planning, "But what does this all lead to?" Critics argue that unless the long-range planning process leads to some decisions in the present, it is just an intellectual exercise of little value. To gain legitimacy for the long-range planning process, it is helpful for the decisionmaker to take a good look, on occasion, at a long-range issue with the idea of early implementation. Making decisions in the near term on long-range issues is a wonderful way to legitimize the long-range planning process.

6. *The process must be institutionalized.*

Having an institutionalized long-range planning process is very important. Ad hoc studies are useful and may play an important role in bringing a large number of people into the long-range planning process for a period of time and focusing attention on an issue or issues relating to the longer term, but ad hoc studies are not enough. If there is no institutionalized process to

encourage the leaders at the top of the organization to consider long-range issues on a regular basis, many opportunities will be lost. Employing a combination of both ad hoc studies and an institutionalized, regularized, month-by-month long-range planning process is the best way to ensure that the advantages of long-range planning are maximized in an organization.

7. *Within the framework of an institutionalized process, long-range planning must remain remain flexible.*

The institutionalized planning process can become rigid and can lead to plans that are so inflexible that they become dysfunctional. In order to ensure that long-range plans remain flexible, all of the plans should be reviewed periodically so that they don't become too rigid or too out of date. There should be an established "sunset clause" of one to two years after publication of a plan, at which time the plan no longer has legitimacy and credibility as long-range policy. (Ad hoc studies should normally remain as studies and not become formal plans.) This expiration date should be stated specifically on the cover letter of each plan. What is stated in the cover letter about how the plan is to be used is very important. The decisionmaker should *not* sign most long-range *studies,* but he should sign most, if not all, long-range *plans.*

8. *In addition to the institutionalized process, periodic ad hoc studies are needed.*

Ad hoc studies are the norm in most organizations and often lead to decisions that are innovative and useful. The ad hoc studies often get the visibility and support that the institutionalized process does not get. Some examples of excellent ad hoc studies accomplished in recent years by the military services of the United States are Seaplan 2000, AirLand Battle 2000, Army 21, Air Force 2000, and the Air Force Project Forecast II. One of the auxiliary benefits of ad hoc studies is that they often expose large numbers of bright people to long-range problems and issues. These people often become life-long advocates of long-range planning, and for the rest of their professional lives, they ask the big, long-term questions as they work on issues from

staff and leadership positions. However, no matter how profitable a study or group of studies may be, the ad hoc approach is no substitute for an institutionalized planning process.

9. Long-range plans must be readable and short.

There have been many long-range plans and studies that are of such length (often in multiple volumes) that few people ever read them. It is important that all long-range plans be short, readable, and as free of jargon and acronyms as possible. These plans should be packaged well—with many diagrams, charts, and the highlighting of words—to make them interesting enough for busy people to pick up and read through. Ad hoc studies should be no longer than 300 pages. The annual long-range plan should be even shorter—no more than 10 or 12 pages long, with a 1- to 2-page executive summary—so that it can be read quickly and have real impact.

10. Planners must develop implementation strategies.

The long-range planners should develop general implementation strategies to give the planners, programmers, and budget people ideas on how to carry out and implement the policies established in these plans. Decisionmaking is only one part of the overall planning process. Implementation strategies are as important as the decision itself. The long-range planning divisions, which should always remain small, can help the rest of the staff by providing some implementation ideas and avenues of approach. They should not be the implementers themselves, but they should assist the implementers as they move from plans to programs to budget to reality.

11. Planners must avoid constraining the innovation and divestiture process.

There is a general tendency in developing long-range plans to put constraints on plans related to budget, technology, and time, for example. Although these constraints can help make the plan look more realistic, they also tend to restrict the vision of the planners and, in turn, the vision of the decisionmaker. For instance, one of my big mistakes, in the development of the Air

Force 2000 Plan was the rather severe fiscal constraints (1 percent real growth each year in the Air Force budget from 1987 to 2000) that I established before the planning began. As a result of these fiscal constraints, some interesting opportunities were rejected out of hand because they could not not be funded within these boundaries. Long-range planners should avoid this kind of constraining activity, both from the point of view of innovation and creativity and also from the point of view of divestiture. There should be no scared cows; planners should be willing to recommend the divestiture of organizations, major weapon systems, and major R&D programs, for example. If planners constrain themselves by not allowing the full consideration of divestiture opportunities, they are doing a disservice to the institutionalized long-range planning process and to their boss.

12. Planners must avoid single-factor causality.

There are many people in pivotal institutions in this country who believe in single-factor causality. Basically they think that only one thing really counts, whether it be economics, technology, political factors, or another factor. However, single-factor causality is usually erroneous and is too simplistic. Those who accept it readily in their thinking develop a mindset that does not take into account other factors. Long-range planners must be broadly scoped people; they must take into account many factors in doing their planning. When a leader tends to focus on a single factor, it is the responsibility of the long-range planners to try to break him out of that mindset. They must try to convince the leader that, in fact, there are multiple factors that play roles in the development of future courses of action.

13. Planners must avoid determinism—economic, political, technological, and others.

Anybody in the long-range planning business who thinks that the future of the world is determined largely by events outside the control of the institution in which he works should not be a long-range planner. Long-range planners must assume that their plans, ideas, innovations, creativity, and issues really count. They must feel confident that if the decisionmaker makes a decision based on their ideas, that decision can have an impact on

the future courses of events. Planners must assume that people in key positions can and do make a difference. Those involved in developing long-range plans should be careful that no determinism creeps into the calculus of decisionmaking, the briefing, or the plan itself.

14. Planners must stay in close contact with the operational, doctrinal, policy, R&D, communications, logistics, and manpower communities.

One of the lessons from the corporate world is that the long-range planners working directly for the chief executive officer sometimes get isolated over time from the issues, problems, concerns, and pragmatic considerations that really exist. This is one of the key reasons that the new chief executive officer of General Electric decided in 1984 to restructure and reduce the planning staff drastically at the corporate headquarters of General Electric. Long-range planners at the highest level must get out to the field and talk to the scientists in the laboratories, to field commanders and leaders, to the operators and maintainers, and to other staff agencies at all levels. Only by staying in close contact with these disparate groups can the long-range planners ensure that what they recommend to the decisionmaker is relevant, useful, and helpful in the pursuit of the goals of the institution. By getting out into the field and talking to people at all levels, the planners can try out their ideas informally to see how practical these innovative alternatives are. Moving about the organization also enables them to collect some of the better ideas, innovations, and creative thoughts of people at all levels that will help them develop better long-range issues, options, and plans.

15. Incentives must be provided if innovation is to be maximized.

It is rare when governmental organizations provide good incentives and rewards for the people who can think conceptually, broadly, and in the long term. Incentives must be established and publicized to encourage the person with ideas to come forward and present them. There should be awards to laboratories

for creating new ideas in technology, awards to long-range planners for developing new concepts, and awards to manpower experts for developing better organizations, for example. When it is time to hand out awards, the decisionmaker should be involved and the ceremony should be widely publicized. Alternatively, if a large ceremony would create undue friction, personal notes or brief meetings can be substituted.

Those people who go into long-range planning should fully understand that they are taking risks; if they are going to do the job well, they are going to have to question present policy, procedures, organizations, doctrines, weapon systems, resources, and so forth. Creative and innovative planners are going to make people angry on occasion. If they are not self-confident people or if they are ambitious, risk-avoidance careerists they will have little to contribute to the process of long-range planning.

Long-range planning will never anticipate and solve all of the problems and dilemmas that we will confront in the future, but it can certainly help us to be prepared for some of them. Perhaps, even more important, a long-range planning process can keep us alert to new possibilities, new insights that will help us in decisionmaking, and new ways of meeting the future's challenges.

Suggested Readings

We all should be concerned about the future, for that is where all of us will be spending the rest of our lives. For those readers who may be interested in stretching their minds in this regard, I suggest the following books: *Coming Boom: Economic, Political, and Social* (New York: Simon & Schuster, 1983) by Herman Kahn, *Encounters with the Future: A Forecast of Life in the 21st Century* (New York: McGraw-Hill Book Co., 1983) by Marvin Cetron and Thomas O'Toole, *Megatrends: Ten New Directions Transforming Our Lives* (New York: Warner Books, Inc., 1983) by John Naisbitt, *The Third Wave* (New York: Wm. Morrow & Co., Inc., 1981) by Alvin Toffler, and from Headquarters, USAF, *Air Force 2000* and *Air Reserve Forces 2000*.

Institutionalizing Long-Range Planning

JERROLD P. ALLEN

One of the best ways to examine the utility of any activity is to compare and contrast that activity within a number of organizations. In this examination of long-range planning in the Navy, State Department, Federal Emergency Management Agency (FEMA), the National Aeronautics and Space Administration (NASA), and the Air Force, several lessons can contribute significantly to effective planning. In 1978, the Navy did a study of long-range planning and set up a short-lived strategic planning staff. The Department of State also has tried long-range planning, with little lasting effect, and FEMA has been urged to set up a long-range planning system but has done little. On the other hand, NASA provides an example of the benefits to be gained by successful planning.

1. Long-Range Planning in Four Government Agencies

Long-Range Planning in the Navy. The Navy experienced a flurry of long-range planning efforts between

Colonel Jerrold P. Allen, USAF, is a 1985 graduate of the National War College and currently a wing commander at Grand Forks Air Force Base.

1977 and 1980. First was the release of Seaplan 2000, an attempt to document maritime force structure requirements for the future. Then came the Maritime Balance Study, an effort sponsored by the Defense Science Board to investigate using business strategic planning methods to develop a strategy for maritime competition with the Soviet Union. During this same period, three separate studies recommended that the Navy establish a long-range planning organization; one was established in January of 1980. I examine what the Navy accomplished and discuss why the flurry of activity produced little lasting effect.

Seaplan 2000 was an ad hoc study performed during the Carter administration; the purpose was to create a plan for the long-term future of the Navy. Francis J. West of the Center for Advanced Research at the Naval War College led the effort to conduct battle and campaign analyses to determine force level and shipbuilding requirements. After the report came out, it drew fire. Critics belittled Seaplan 2000 for "lacking an adequate statement of goals and priorities."[1] Perhaps the greatest weakness of Seaplan 2000 was bad luck; its timing was extremely poor. It called for significant increases in Navy ships just as loud criticism hit the Navy and its shipbuilders for cost overruns on submarines and surface ships. In a 1978 speech, senior Office of Management and Budget official Dr. Edward R. Jayne told an audience at the Naval War College that efforts to buy more ships depended largely on getting the Navy's act together and stopping cost overruns.[2] Jayne criticized Navy planning, saying that the Navy was sailing in too many directions and was confused about the future. He made it clear that he viewed purchase of additional nuclear aircraft carriers as prohibitively expensive. Seaplan 2000's lack of success may have helped prompt the next effort.

In the summer of 1978, Andrew W. Marshall, Director of Net Assessment in the Office of the Secretary of Defense, suggested that the Defense Science Board sponsor an investigation of business strategic planning concepts to develop a strategy for long-term maritime competition with the Soviet Union. The Defense Science Board appointed Paul H. Nitze, former Secretary of the

Navy and former Deputy Secretary of Defense, as chairman of the study.

The Navy effort spanned six months and included meetings with planning experts from Government and industry. This study concluded that business strategic planning methods had some useful application to defense planning and that business methods can be useful in improving our competitive standing with the Soviet Union. The study revealed some essential elements of successful long-range planning systems:

a. Active participation by top management and input by field commanders.
b. Clear statements of objectives.
c. Explicit goals and priorities.
d. Matching of limited resources to limited objectives.[3]

The study group recommended that the Navy include long-range planning in the planning and programming process and that the Chief of Naval Operations and the fleet commanders participate personally. Regarding maritime competition with the Soviets, the study recommended that if the US Navy was unable to obtain significantly greater funding for shipbuilding, then forward deployments and readiness should be cut to allow acquisition of future force structure.

The Defense Science Board made a separate report to Secretary of Defense Harold Brown. The board found long-range planning worthwhile and found the current planning system too shortsighted. The Department of Defense staff was urged to create its own long-range planning organization and to develop a successful long-range strategy. This recommendation apparently fell on deaf ears.

Another recommendation to create a Navy long-range planning staff came from Dr. Victor Besiuk's study of the organization of the Office of the Chief of Naval Operations. Dr. Besiuk suggested that the Chief of Naval Operations strengthen the long-range planning function while reorganizing his own staff.[4]

Thus, the Navy's leadership was coaxed several times to establish a long-range planning organization, and on 15 January

1980, the Long-Range Planning Group (OP–OOX) was born. The leader was Rear Admiral Charles R. Larson, a Naval Academy graduate, aviator, nuclear submariner, White House Fellow, and Naval Aide to President Nixon. On his staff were three commanders and two captains; all were highly qualified in their operational specialties and three had impressive degrees—an M.A. from Oxford plus Ph.D. degrees from Harvard and MIT. The OP–OOX group was considered part of the immediate staff of the Chief of Naval Operations. Admiral Larson had a small office on the fifth floor of the Pentagon; the rest of the OP–OOX staff, however, was housed several miles away at the Center for Naval Analyses. The Long-Range Planning Group had an official mission:

> To assist the Chief of Naval Operations in systematically identifying and prioritizing long-range Navy objectives, weighing alternative strategies for achieving them, and assessing the impact of future resource limitations on future naval capabilities; and to serve as principal staff advisor to the Chief of Naval Operations on long-range planning matters.[5]

The group's objective was to influence current decisions, answer the leadership's toughest questions, and institutionalize the long-range planning process. The group was concerned that the toughest questions might "lead to unpleasant answers."[6]

The Chief of Naval Operations took two steps to show his support for the Long-Range Planning Group. First, he presented the team and briefed their responsibilities at his senior flag officer conference. Second, he gave the team responsibility for writing the Chief of Naval Operations Planning and Programming Guidance, the document that serves as top-down guidance to the Navy staff for use during the planning and programming cycles. This responsibility gave OP–OOX direct contact with the Chief of Naval Operations and added a long-range focus to the guidance for current planning and programming.

The group prepared several papers for the Chief of Naval Operations. These efforts included long-range looks at energy, strategic minerals, attrition versus maneuver in air warfare, and manpower prospects in the 1990s. These were probably not the

"hard questions" the group expected to field, but some of the papers were not well received by the Chief of Naval Operations. He penned his disagreements on the papers, and the dialogue ended. There were no other major studies. By the spring of 1982, the Long-Range Planning Group's demise was evident. It was functioning as a special staff for the Chief of Naval Operations, working current issues on an ad hoc basis. Soon after becoming Chief of Naval Operations, Admiral James Watkins made the obvious official; he disbanded the Long-Range Planning Group in June 1982.

The demise of OP–OOX illustrates the first principle of long-range planning: the planners must have the support of the leader. Admiral Holloway formed the Long-Range Planning Group because of several reasons. The Air Force had presented their own excellent example. There was pressure from former Secretary of the Navy Nitze and the Defense Science Board, and—perhaps most important—the Navy had been warned that it must improve its planning before it could purchase additional aircraft carriers. When the Reagan administration and Secretary Lehman came into office, the Chief of Naval Operations may have perceived that he no longer needed to show the administration that long-range planning supported the requirement for 600 ships and new nuclear carriers. The Navy's commitment to long-range planning waned and the Long-Range Planning Group disbanded.[7]

Several Navy offices do some long-range planning today. One Pentagon staff group writes the Chief of Naval Operation's Planning and Programming Guidance, and another prepares the extended planning annex. Two members of the Chief of Naval Operation's Executive Panel published an article in 1984 about planning for the year 2000 for US defense technology, the industrial base, demography, US family structure, the fragile infrastructure, and the political consensus, concluding:

> The cost of not having an early warning system to identify critical societal trends as they develop is increasingly perceived as prohibitive. Such trends shape the common environment that the armed services will share. Failure to project, identify, and anticipate the potential impacts of these trends is to abdicate responsibility to the future generation at

which time the costs of corrective action may be prohibitive and national security critically endangered.[8]

An early warning system to identify trends is just a part of the need. Also required are a look at futures that are more than mere extrapolations of the present, an institutionalized long-range planning system that coordinates the efforts and findings, and most important, the support and participation of the top leader.

Long-Range Planning in the Government Agencies. Over the years, there have been several attempts to establish long-range planning methods in Government agencies. A review of current situations at the Department of State and Federal Emergency Management Agency reveals that without strong support and active participation by top leadership, long-range planning will not prosper. These requirements are satisfied at the National Aeronautics and Space Administration, and there strategic planning works well.

Recent Secretaries of State have demonstrated little faith in long-range planning. Dean Rusk's position is typical:

> Policy planning must be in the subjunctive mood. But Providence has not given us the capacity to pierce the fog of the future with accuracy, and so the planning point of view must involve a continuing process of revision and adjustment. A brilliant plan which is no longer relevant is not much help. [Planning] may be an invaluable experience for those who participate in it and who look over the results. It does help, for example, to discover the questions which might otherwise be ignored.[9]

I argue that in this final sentence Rusk grudgingly attributed some good to long-range planning, but the bulk of his comments indicate that he is not a strong supporter.

Lincoln Bloomfield claims that nearly all of the recent Secretaries of State failed to institute planning that was independent minded and future oriented. He cites Zbigniew Brzezinski in 1969, following a two-year tour in the State Department Policy Planning Council, criticizing the Secretary of State for "persistently neglecting his planners."[10] Bloomfield also noted Henry Kissinger's criticism of State Department planning in the mid-1960s. According to Dr. Kissinger, "What passes for

planning is frequently the projection of the familiar into the future.... Lip service is paid to planning."[11] In the first Nixon administration, Kissinger attempted to elevate the prestige of long-range planners, but Bloomfield believed that they accomplished little—the Chinese initiative was born in the minds of Nixon and Kissinger without significant assistance from strategic planners. Bloomfield credits Secretaries Cyrus Vance and Alexander Haig with attempting to improve long-range planning—and with achieving little or no success. At the State Department, short-term issues repeatedly take priority over long-range planning.

Bloomfield consistently claims that long-range planning will never succeed at the State Department because of the overriding pressure of current crises.[12] The perception persists that to have clout, planners must be helpful in the most urgent problems, not involved in far-out thinking on hypothetical problems many years away. Bloomfield's solution is long-range planning done largely by outsiders. He argues that the outsiders would be free to use greater imagination and could engage in delicate issues regarding bureaucratic turf and divestiture of responsibility.

It appears likely that outsiders would have an even tougher time than insiders in getting the full support of the Secretary. Full support determines success or failure in implementations of long-range planning and full support has not yet been achieved.

A look at long-range planning in the Federal Emergency Management Agency reveals that no agency-wide system exists. When Director Louis Giuffrida took over in 1981, he asked Senator John Tower to request a General Accounting Office (GAO) examination of FEMA management. There were five major findings from GAO's study. One of the findings declared that FEMA's "long- and short-range planning was either nonexistent or ineffective."[13] During 1984 interviews, I asked two FEMA officials if a long-range planning system now exists. They answered affirmatively, but each said that the majority of the work was done in the other's office.[14] They gave lengthy explanations of the difficulties encountered in setting up the management system and of fighting several battles regarding FEMA's

responsibilities. To the agency's credit, key leaders have written papers for the Director on FEMA's future roles, but institutionalizing long-range planning is a low priority at present. If the pressure rises again, perhaps as a follow-up to the General Accounting Office report, the priority may move up. For now, FEMA leadership is far more concerned with current issues.

Despite the *Challenger* disaster and its current difficulties, NASA is the Government's leader in the successful use of long-range planning systems. Former NASA Administrator James Beggs declared that the United States' preeminent position in aeronautics and space is an achievement of the NASA management approach in which long-range planning plays a major role.[15] Of course, NASA's mission provides the ideal setting for implementation of long-range planning; NASA has few of the day-to-day responsibilities performed by the other Government agencies I examined.

NASA's best-known success was the Apollo program which put a man on the moon in 1969. This came nearly 12 years after the Soviet Union jolted the US technological image with the orbit of *Sputnik I*. The successful lunar landing involved management of revolutionary technologies and leadership of 20,000 contractors, 200,000 workers, and researchers at 200 universities. One observer claims that the greatest accomplishment of NASA—moon landings, communications satellites, and other technological spin-offs notwithstanding—is its potential contribution to improved planning of great undertakings.[16]

Today, NASA's long-range planning process is thriving. The system looks out 10 to 20 years and sometimes requires looking ahead 100 years. There are five major features of the process:

a. The Administrator and his senior managers participate actively in the planning process, thus increasing the relevance and acceptance of the plans.

b. A major product of the planning process is a list of long-term goals published to guide the organization's efforts.

c. The process of planning is considered to be at least as important as the plan and its achievement. Even if a plan is found to be not very useful when the future arrives, the thinking that went into the planning will have paid dividends over the years and will be useful for replanning.

d. Management believes that the long-range planning process significantly improves internal communications.

e. The process is decentralized. Planning is accomplished primarily at subordinate levels, not at NASA Headquarters.[17]

The agency attributes a great deal of its accomplishments to its long-range planning system. Three agencies—the Navy, the State Department and FEMA—have no institutionalized long-range planning system. NASA does, and it has enjoyed success over the past 20 years, a fact that should not be overlooked by other agencies.

2. Long-Range Planning in the Air Force

In early 1978, Secretary of the Air Force John Stetson initiated a study effort that resulted in the birth of a long-range planning organization that has endured over the years.[18] Based on his experience in the corporate world, Secretary Stetson believed that Air Force planning could be enhanced by adoption of big business strategic planning methods. He asked the Air Staff to charter a study group to:

a. Survey corporate long-range planning techniques and determine the feasibility of their adoption by the Air Force.

b. Develop a process for institutionalizing long-range planning.

c. Examine the world 20 years into the future, detailing threats and opportunities for the Air Force and the nation.

Secretary Stetson's study and the evolution of the process formed in that initial effort proved instructive.

Studying Corporate Long-Range Planning. Brigadier General James P. Albritton led a study group of 20 action officers from across the Air Staff, retaining the Stanford Research Institute to

assist. The Rand Corporation also participated. Two tasks occupied the group initially: research on various topics to prepare papers on the future and study of corporate strategic planning methods.

The research on the future was done primarily in the Washington area. Officers met with experts from Government, academe, and specialized organizations on topics ranging from demographics to outer space. Much of this study of the future simply extrapolated obvious trends into the future. One shortsighted example was the group's study of energy supplies. The group erroneously accepted the prediction that demand for oil would continue to grow at recent rates and that severe shortages would dominate the world economy by the mid-1980s. A bit more visionary was the work regarding changing regional priorities, yielding predictions of the rising importance of Latin America to US interests. Also valuable was the work showing growing roles for women in the Air Force and the importance of leadership attention to the needs of Air Force families.

Members of the team visited several corporations. They surveyed the strategic planning techniques of Texas Instruments, General Motors, IBM, Ford, and a large public utility, the Michigan Power Company. The team's first impressions signaled that business planning techniques offered little for the Air Force. Of the five companies, only Michigan Power planned seriously beyond seven years into the future, but its single-product operation was hardly similar to the broad range of Air Force activities. Furthermore, none of the corporations faced the outside influence exerted on the Air Force by the Congress and Department of Defense. Despite the differences, a few principles were learned:

a. Active support by top leadership is essential to successful and enduring strategic planning because it helps bring along the rest of the bureaucracy.

b. Top leadership should participate regularly in an interactive process to prevent the planners from developing unacceptable products.

c. The leadership should issue top-down guidance to make clear the organization's long-range objectives and plans for reaching those objectives.

Reaction to this six-month study was generally favorable. The most important result was the establishment of a permanent organization responsible for long-range planning. Previous Air Force plans for the future were usually done on an ad hoc basis, and were quickly forgotten following the disbanding of the groups that did the work. This was unfortunate because the members of these groups were the people who had the greatest commitment and knowledge of specific recommendations. Past studies programs had exciting titles such as Toward New Horizons and New Horizons II. One effort, the Long-Range Capability Objectives Plan, implied an important purpose by emphasizing achievement of long-range objectives. These studies, however, were not linked to the formal planning process, and they did not establish a permanent organization of experienced long-range planners. This error was recognized, and in early 1979, the Air Force named a brigadier general to head the newly created Deputy Directorate for Long-Range Planning within the Directorate of Plans. Twelve officers were assigned to the Long-Range Planning Division and 20 others from two sister divisions were given responsibilities to assist in the long-range planning effort.

Institutionalizing the Long-Range Planning Process. In early briefings describing the purpose of the Air Force's long-range planning system, two phrases were used that told much about the philosophy of the new organization. One said, "The Air Force is a non-prophet organization," and the other said, "Process is our most important product." These two philosophies were developed following the first long-range planning interchange with the Secretary of the Air Force and the Chief of Staff. It was obvious that the planners could not simply study an issue and predict the future. Without prophets, a procedure was developed whereby the planners would brief the Air Force leadership on a particular issue, emphasizing US interests, uncertainties, opportunities, and threats. Then candidate objectives and strategies

were presented. The top leadership was then to endorse, modify, or reject the candidate objectives and strategies. The goal was to get leadership guidance on specific issues.

During the first year, the long-range planners met with the Secretary and Chief on a monthly basis. Topics of these interchanges included emerging technologies, manpower, economics, and five regional studies (Western Europe, Middle East, Africa, Latin America, and Asia). At the end of the year, two separate documents were published: the *USAF Global Assessment* and the *Planning Guidance Memorandum (PGM)*. The PGM was signed by the Secretary of the Air Force and the Chief of Staff.

The *USAF Global Assessment* was a compendium of the research done that year in preparing for the interchanges with the Air Force leadership. It looked out 15 to 20 years and addressed all of the areas that were discussed with the Secretary and Chief. It was provided to planners throughout the Air Force, with three stated purposes:

a. To explain the background data used by the Secretary and Chief to produce their *Planning Guidance Memorandum.*

b. To bring long-range considerations to bear on the current planning process.

c. To stimulate debate on how to best achieve the long-term goals of the Air Force.

The document was nearly 200 pages long and was not read cover-to-cover by many planners. However, it was well organized and easily referred to as a specific issue prompted its use. Because the *Planning Guidance Memorandum* consisted of only about a dozen pages, the *Global Assessment* was a valuable reference document that amplified the abbreviated guidance in the *Planning Guidance Memorandum.*

Signing of the *Planning Guidance Memorandum* by Secretary of the Air Force Hans Mark and Chief of Staff General Lew Allen signaled their support for the Air Force's new long-range planning procedure. The *Planning Guidance Memorandum* established top leadership's priorities for the planning cycle based on their year-long dialogue with the long-range planning staff.

The *Planning Guidance Memorandum* reflected topics discussed during that first year. There was heavy emphasis on changing regional priorities, which reflected the long-range planners' predictions of growing US interests in certain areas over the long term. The areas of personnel and technology were discussed specifically. Here, Dr. Mark inserted guidance on a technological opportunity which he felt held great promise—the military use of laser weapons. The document contained economic guidance for planners: prepare better for the fiscal constraints of the programming and budgeting cycles. In addition, the *Planning Guidance Memorandum* borrowed from work done by other Air Staff planners to emphasize key aspects of three important force planning categories strategic nuclear, force projection, and tactical air forces for theater conflict.

The *Planning Guidance Memorandum* also explained how it and the *Global Assessment* fit into the evolving procedure for long-range planning. In addition to providing a basis for force structure and regional planning, these documents were to be a basis for the Air Force-wide mission area analysis process and formulation of the *USAF Planning Guide*. The *USAF Planning Guide* attempted to rank order capabilities the Air Force requires to perform its many missions. The three documents—the *Global Assessment, Planning Guidance Memorandum,* and *USAF Planning Guide*—were to lead ultimately to the final document, the *USAF Strategy, Force and Capabilities Plan.* This plan was intended to support Air Force inputs to the *Joint Strategic Planning Document* and to provide planning forces required to execute the national strategy. Through this document, planners hoped to give a well-reasoned, long-range planning perspective to development of the annual *Program Objective Memorandum* (POM). Many seasoned Air Staff officers thought this was the key to determining the success of the new long-range planning system, actually influencing how the limited resources were allocated among competing requirements during the annual POM battle. By this criterion, the new long-range system did not initially appear to succeed, and over the years the *Strategy, Force and Capabilities Plan* has been replaced by new documents in an effort to exert greater influence on the POM.

The long-range planning system did achieve much in its first year of existence. Meaningful interchanges took place on a monthly basis with the Secretary and the Chief. Although the leadership did not always agree with the long-range planning staff, some recognized that honest disagreement was an indicator that the long-range planners were doing their job of looking beyond the current thinking. The planners succeeded in surfacing new issues, provoking dialogue, and obtaining direct input from top leadership. The fact that the *Planning Guidance Memorandum* was signed by the Secretary and Chief with little change—other than Secretary Mark's insertion of increased emphasis on lasers—indicated their support for the long-range planning process and their satisfaction with the year-long series of interchanges.

The long-range planners next briefed each of the major air command planning staffs on the contents of the *Planning Guidance Memorandum.*[19] Reaction to the briefing was positive; this is hardly surprising, since the briefing opened with a picture of the document's cover which prominently displayed the signatures of the Secretary and Chief. However, interest and support from the major commands were generally weak; only one four-star was among the general officers who received the briefing. There was little follow-up to the briefing and distribution of the document. Air Force long-range planning ended its first year as a process largely isolated in Washington.

Evolution of the Process. In the five years since the publishing of the first *Planning Guidance Memorandum,* progress has been made in integrating long-range planning into the overall Air Force planning process. In addition, the beginning of active participation by the major air commands is finally underway.

Interchanges with the Secretary of the Air Force and the Chief of Staff remain the foundation of the process. The list of topics discussed with the top leadership have included US interests, threats to those interests, opportunities, objectives, and strategies out to 20 years in the future; for example:

Laser Weapons
Strategic Defense
Air Force Personnel Planning
Air Force Logistics Planning
Arms Control
Latin America
Special Operations
Power Projections
Combat Environment
Pacific Basin
Low-Level Conflict
Biotechnology
Future Military System Technologies
Long-Term Competition (Soviet Union)
Terrorism
Global Environment and Regional Priorities
Artificial Intelligence
Space
Domestic Environment

In addition, each year an interchange is devoted to discussion of the annual *Planning Guidance Memorandum.*

Several of the past interchanges have produced concrete results. For example, the interchange on special operations forces led to a more streamlined organization and transfer of helicopters and aircrews from Tactical Air Command to Military Airlift Command. Another interchange led to the merger of computer management effort with management of command, control and communications (C^3 became C^4). Nearly every interchange has resulted in new Air Force positions on key issues, and many of the positions have been adopted in Joint Chiefs of Staff documents.[20]

The *USAF Global Assessment* remains the supporting document for the *Planning Guidance Memorandum.*[21] This document looks forward 15 to 20 years. It provides a long-range view of the environment in which the Air Force expects to operate. It contains the background data, supporting analyses, objectives, and candidate strategies used in the development of the *Planning Guidance Memorandum.* The *Global Assessment* also presents a consolidation of long-term perspectives on broad Air Force issues, world regions, and major Air Force functional areas. It is completely rewritten every four years to coincide with changes of administration and presidential guidance. It is annually updated to reflect the research done for the year's interchanges with the Secretary and Chief and to reflect the

judgment and preferences stated by the top leadership during the interchanges.

The *Planning Guidance Memorandum* is the centerpiece of the system; it is titled as the Secretary and Chief's document and is signed by them. Its stated purpose remains to provide Air Staff and major air command planners with broad executive guidance and long-term perspectives to initiate the planning cycle. The document sets priorities for Air Force long-term (15 to 20 years) planning objectives which support national security objectives. It contains specific long-term planning guidance for each functional area within the Air Force (strategic offense, strategic defense, airlift, etc.).

To increase the impact of long-range planning on the all-important *Program Objective Memorandum* decisions, two new documents have been added to the process. The first, the *USAF Strategy and Policy Assessment* replaces the old *Strategy, Force and Capabilities Plan.* The *Strategy and Policy Assessment* evaluates current US national security objectives, military objectives and military strategies. It reviews and critiques the current *Defense Guidance* and the *Joint Strategic Planning Document.* Air Force planners believe that the *Strategy and Policy Assessment* is a key indicator of the success of long-range planning because it draws on the work of Air Force long-range planners to shape the *Defense Guidance.* Thus, in recent years the Air Force has, through its long-range planning system, influenced the document that tells the Services what to put in their POMs.

To more directly influence Air Force preparation of the POM, planners now produce the *USAF Planning Input for Program Development,* also known by its short title, *The Plan.* The document provides priorities for each of the Air Force's missions, specialized tasks, and broad activities (that is, organizing, training, equipping and sustaining forces). These priorities help develop the Air Force *Program Objective Memorandum. The Plan* was recently changed in format to present guidance more succinctly and to provide very specific POM objectives. The document also contains a summary of the

Air Force-wide mission area analysis (MAA) effort—a rank ordering of what capabilities are needed to accomplish the mission. *The Plan* consists of about 50 pages. It is apparently effective because programmers are using it to build the POM. Figure 1 shows how the Air Force planning documents relate to each other and to the Joint Chiefs of Staff and Department of Defense planning products.

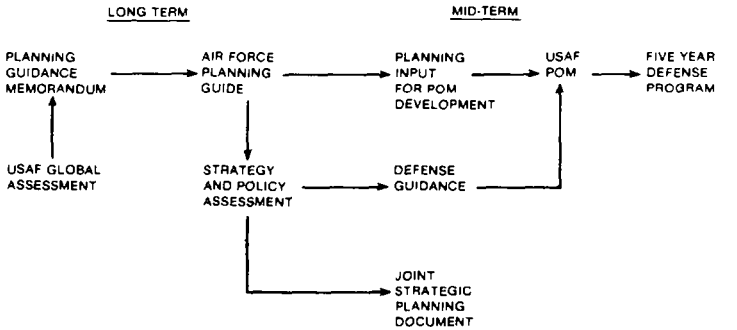


Figure 1. *The USAF Planning Process.*

In addition to providing full-time direction of the institutionalized process, Air Force long-range planners conducted a study requested by the Chief of Staff called the Air Force Innovation Study, 1995–2025. A task force of Air Force representatives and civilian experts generated more than 500 potential innovations. In the spring of 1985, the task force submitted a report that included an implementation strategy and responded to the following charter from the Chief of Staff:

a. Identify alternate futures within which the Air Force may operate.

b. Identify emerging technologies and applications.

c. Identify significant innovations in technology, organizational structure, resources, and concepts of operation.

d. Select the most promising concepts for operations in global, regional, and local environments.

e. Suggest ways to implement selected innovative ideas.

f. Identify barriers to innovation and suggest ways to deal with these barriers.

g. Develop methods to encourage and systematically incorporate future innovations into Air Force plans and programs.

h. Enhance corporate understanding and support for innovation.

There are two points to be made regarding the significance of this study. First, it was directed by an *existing* long-range planning organization. It was not an ad hoc effort like Toward New Horizons, New Horizons II, and several other previous study programs. It was led by people who knew long-range planning, and when the study was complete, those leaders continued to be active long-range planners. Thus, a great deal of experience and learning was not lost when the study was finished. The second point is that the Air Force Innovation Study was done with active participation by the major commands. The appropriate commands were involved in each of the panels and subgroups. A 1984 *Business Week* article emphasized that corporations have learned that strategic planning will not succeed if it is isolated in the headquarters. Operating divisions must be actively involved.[22] Thus, it is important that long-range planning is growing beyond the Pentagon. One of the most active major commands is the Strategic Air Command; it submitted more than 70 potential innovations.

Long-Range Planning in Strategic Air Command. The Strategic Air Command (SAC) is the leader of the Air Force's major commands in commitment to long-range planning, with an office with a colonel as director and six action officers. This office is chartered to conduct long-range planning to develop command objectives in support of national security policy and strategy, and to develop innovative ideas to enhance future force effectiveness. It serves as the SAC focal point for development of the *USAF Global Assessment,* the *Planning Guidance Memorandum* and the *Joint Long-Range Strategic Appraisal.* The office is also responsible for SAC participation in the research, analysis, and studies of the Air University Center for Aerospace Doctrine.

In addition to fulfilling its assignment as the SAC focal point for the Air Force long-range planning process, the office has conducted several other activities. It published a thoughtful paper on fostering innovation. It has led three conferences for SAC's lieutenant generals to focus on long-range issues, hosted the 1985 Air Force-wide Long-Range Planning Conference, and sponsored studies and conferences on issues such as the use of nonnuclear weapons in strategic missions.

The SAC long-range planners are also responsible for developing ideas to enhance future strategic force effectiveness. To accomplish this task, a long-range issues group has been formed that includes representatives from across the SAC staff and that reports through SAC's board structure to the command section. The group is chartered to focus on issues that will influence changes for the future of SAC. The group collects ideas and encourages leaders to champion those ideas it considers to have the greatest potential for payoff. The group generated 72 ideas for the Air Force Innovation Study.

SAC's Office for Long-Range Planning, in conjunction with the Long-Range Issues Group, has developed a briefing and follow-on report that outlines the expected environment for the year 2000 and beyond and the SAC objectives appropriate for that setting. The study emphasizes that today's decisions will determine what the Strategic Air Command does in the next century. It recommends the direction for decisions that should be made now or soon to assure command goals are met well into the 21st century.

In summary, the Air Force has successfully institutionalized a long-range planning system. The system is now influencing present decisions, based on careful consideration of the long term. There are three features of the Air Force long-range planning process:

a. Strong support by top leadership.

b. Active participation by top leadership.

c. Promulgation of concise top-down guidance.

The Air Force Innovation Study has the potential to improve the Air Force's future contribution to national security. It should also improve future long-range planning efforts because planners from across the Air Force are actively involved. Until now, this has been a major weakness of Air Force long-range planning. At last the major commands are participating, but thus far, only the Strategic Air Command has an active, full-time long-range planning staff that has accomplished significant tasks. The rest of the Air Force and other interested agencies can profit from the lessons explained by Major General Smith in the first portion of this book.

3. The Next Steps

An institutionalized long-range planning process can benefit nearly all Government agencies. Evidence of this statement is the success of NASA, which climaxed a decade of revolutionary technological effort, putting a man on the moon and experiencing considerable success in the space shuttle program—the *Challenger* disaster notwithstanding—and Mars and Venus probes. Much of the credit goes to NASA's long-range planning system.

At a less spectacular but certainly no less important level, the Air Force has institutionalized a planning process that brings long-term considerations to bear on critical current decisions. The Air Force task, however, is more formidable than NASA's; the annual Air Force budget is more than four times the total cost of the decade-long Apollo program, and the nation depends on the Air Force to help maintain the peace.

Although this examination has focused on two agencies that depend heavily on procurement of expensive, technologically sophisticated systems, the Marshall Plan and NSC 68 are evidence that organizations unlike NASA and the Air Force can successfully perform long-range planning. Future research is needed to tailor a process for use by the Department of State, the Federal Emergency Management Agency, and other organizations that bear little resemblance to NASA and the Air Force. An

appropriate effort would be a historical study of the planning process that produced the Marshall Plan. How was it done? How was support won? What were the key obstacles and how were they overcome? A similar study of NSC 68 is also recommended.

Another suggestion is to research long-range planning in other countries. The Scandinavian countries and Japan appear to employ strong systems for setting and achieving national objectives. This study could form the basis for a paper recommending a system for long-range planning at the National Security Council level.

The following captures the spirit of long-range planning:

Think in anticipation, today for tomorrow, and indeed, for many days. The greatest providence is to have forethought for what comes. What is provided for does not happen by chance, nor is the man who is prepared ever beset by emergencies. One must not, therefore, postpone consideration till the need arises. Consideration should go beforehand.[23]

Notes

1. Long-Range Planning in Four Government Agencies

1. *Historical Perspectives in Long-Range Planning in the Navy* (Washington, DC: Office of the Assistant Secretary of the Navy for Research, Engineering and Systems, September 1980), p. 76.

2. Bernard Weinraub, "Young Aide Shapes Defense Policy," *The New York Times*, April 15, 1978, p. 9.

3. *Historical Perspectives in Long-Range Planning in the Navy*, pp. 78–80.

4. Ibid., p. 77.

5. Ibid., p. 85.

6. Gordon Riggle, "Looking to the Long Run," *US Naval Institute Proceedings*, September 1980, p. 65.

7. Conversation by telephone with Admiral James Holloway (Ret.), Washington, DC, 6 March 1985.

8. Robinson Harris and James Montgomery, "Long-Range Planning for the Environment Circa 2000," *Naval War College Review*, July–August 1984, pp. 63–71.

9. Lincoln P. Bloomfield, *The Foreign Policy Process: A Modern Primer* (Englewood Cliffs, New Jersey: Prentice-Hall, 1982).

10. Ibid., p. 167.

11. Ibid., pp. 167-68.

12. This view was expressed in an interview at Fort Lesley J. McNair, Washington, DC, on 9 November 1984. In addition to *The Foreign Policy Process: A Modern Primer*, see "Planning Foreign Policy: Can It Be Done?" in *Political Science Quarterly*, Fall 1978, pp. 369–91.

13. Comptroller General Report to the Congress, *Management of the Federal Emergency Management Agency—A System Being Developed* (Washington, DC: General Accounting Office, 6 January 1983), p. iii.

14. Conversations by telephone with George Orrell and Lyn Smith, Federal Emergency Management Agency, Washington, DC, 20 November 1984.

15. James Beggs, "Leadership—The NASA Approach," *Long-Range Planning*, vol. 17, no. 2, 1984, p. 12.

16. Ibid., pp. 13–14.

17. Ibid., p. 23.

2. Long-Range Planning in the Air Force

18. This section is based on the author's personal experience as a member of the Air Force Long-Range Planning Division from mid-1978 to late 1980 plus three articles that provide excellent coverage of this evolution. Former Secretary of the Air Force John Stetson has described what he intended for the Air Force to gain by its study of corporate planning ("Broadening the Strategic Planning Process," *Air Force Magazine*, May 1979, pp. 58–59). Colonel Alan Gropman, deputy team leader in the initial effort and now the Air Staff's Deputy Director for Planning Integration, wrote a comprehensive description of the results of the initial study ("Long-Range Planning, A New Beginning," *Air University Review*, November–December 1979, pp. 49–54). Colonel Gene Davis, an Air Force long-range planner in 1980–1981,

wrote an article asserting that the Air Force has succeeded in developing a process by which its leadership and the corporate body consider the future when making present decisions ("Three R's of Air Force Planing," *The Bureaucrat*, Summer 1982, pp. 51–53).

19. The major air commands are the function operating organizations of the Air Force. They include the Strategic Air Command, discussed in this paper, with assets of 120,000 personnel, 850 aircraft and more than 1,000 intercontinental ballistic missiles.

20. The majority of these positions are classified. However, the veracity of this statement is supported by my personal experience as a long-range planner from 1978 to 1980 and also by my interview on 21 February 1985 with Colonel Nils Ohman, Chief of the Long-Range Planning Division at Headquarters US Air Force, Washington, DC.

21. The description of documents that are part of the current US Air Force planning process is taken primarily from an internal HQ, USAF Directorate of Plans letter dated 23 December 1983 and a November 1983 message from HQ, USAF Directorate of Plans to all major air command planners, entitled "USAF Planning Process Update."

22. "The New Breed of Strategic Planner," *Business Week*, September 17, 1984, pp. 62–68.

3. The Next Steps

23. Baltasar Jeronimo Graciban y Morales, *The Science of Success and the Art of Prudence*, trans. Laurence C. Lockley (Santa Clara: University of Santa Clara Press, 1967), p. 45.

Bibliography

Asher, William, and Overholt, William H. *Strategic Planning and Forecasting*. New York: Wiley-Interscience, 1983.

Bates, Donald L., and Eldredge, David L. *Strategy and Policy*. Dubuque, Iowa: Brown, 1980.

Beggs, James M. "Leadership—The NASA Approach." *Long-Range Planning*, vol. 17, no. 2, 1984, pp. 12–24.

Bloomfield, Lincoln P., Professor of Political Science, Massachusetts Institute of Technology, Cambridge, Massachusetts. Interview, 9 November 1984.

_____. *The Foreign Policy Process: A Modern Primer*. Englewood Cliffs, New Jersey: Prentice-Hall, 1982.

———. "Planning Foreign Policy: Can It Be Done?" *Political Science Quarterly*, Fall 1978, pp. 369–91.

Brandt, Steven C. *Strategic Planning in Emerging Companies*. Reading, Massachusetts: Addison-Wesley, 1981.

Chappelle, Thomas. Deputy Director, Management Support Division, National Aeronautics and Space Administration, Washington, DC. Conversation, 20 February 1985.

Clem, Harold J. *Mobilization Preparedness*. Washington, DC: National Defense University, 1983.

Collins, John M. *U.S. Defense Planning, A Critique*. Boulder, Colorado: Westview Press, 1982.

Davis, Gene H. "Three R's of Air Force Planning." *The Bureaucrat*, Summer 1982, pp. 51–53.

Drucker, Peter F. *Technology, Management and Society*. New York: Harper and Row, 1958.

Earner, William, Captain, Office, Secretary of Defense (Net Assessment), Washington, DC. Conversation, 11 September 1984.

Engstrom, Peter J., Lieutenant Colonel, Office for Long-Range Planning, Headquarters Strategic Air Command, Offutt Air Force Base, Nebraska. Interview, 31 October 1984.

Etzold, Thomas H. "Being Right Too Soon." *US Naval Institute Proceedings*, January 1983, pp. 57–61.

Graciban y Morales, Baltasar Jeronimo. *The Science of Success and the Art of Prudence*. Translated by Laurence C. Lockley. Santa Clara, California: University of Santa Clara Press, 1967.

Gray, Colin S. *Strategic Studies and Public Policy*. Lexington, Kentucky: University Press of Kentucky, 1982.

Gropman, Alan, Colonel, Deputy Director for Planning Integration, Headquarters, US Air Force, Washington, DC. Interview, 14 September 1984.

———."Long-Range Planning, A New Beginning." *Air University Review*, July–August 1984, pp. 63–71.

Harris, R. Robinson, and Montgomery, James N. "Long-Range Planning for the Environment Circa 2000." *Naval War College Review*, July–August 1984, pp. 63–71.

Holcomb, M. Staser. "Planning for the Navy of the 1980's." *US Naval Institute Proceedings*, September 1980, pp. 40–45.

Hussey, David E. *The Truth About Corporate Planning*. Oxford, England: Pergamon Press, 1983.

Kronenberg, Philip S. *Planning U.S. Security*. Washington, DC: National Defense University Press, 1981.

Lehman, John F., Jr. "Nine Principles for the Future of American Maritime Power." *U.S. Naval Institute Proceedings*, February 1984, pp. 46–51.

Lorange, Peter. *Implementation of Strategic Planning*. Englewood Cliffs, NJ: Prentice-Hall, 1982.

McNichols, Thomas J. *Executive Policy and Strategic Planning*. New York: McGraw-Hill, 1983.

Margiotta, Franklin D. *Evolving Strategic Realities: Implications for U.S. Policymakers*. Washington, DC: National Defense University Press, 1980.

"The New Breed of Strategic Planner." *Business Week*, 17 September 1984 pp. 62–68.

Nicholls, David. "Long-Term Defense Planning." *NATO's Fifteen Nations*, April–May 1981, pp. 26–32.

Ohman, Nils B., Colonel, Chief, Long-Range Planning Division, Headquarters, US Air Force, Washington, DC. Interview, 21 February 1985.

Orrell, George. Federal Emergency Management Agency, Washington, DC. Conversation by telephone, 20 November 1984.

Paine, Frank T. and Anderson, Carl R. *Strategic Management*. Chicago, Illinois: Dryden Press, 1983.

Riggle, Gordon G. "Looking to the Long Run." *U.S. Naval Institute Proceedings*, September 1980, pp. 60–65.

Rosenberg, David A. Institute for National Security Studies, National Defense University, Washington, DC. Interview, 29 November 1984.

Shaud, John A., Major General, HQUSAF/XOX. Letter to action officers, 23 December 1983.

Smith, Lyn. Federal Emergency Management Agency, Washington, DC. Conversation by telephone, 20 November 1984.

Smith, Perry M. "The 15 Laws of Long-Range Planning." Lecture, The National War College, Washington, DC, 14 November 1984.

Steiner, George A. *Strategic Planning: What Every Manager Must Know*. New York: Free Press, 1979.

Stetson, John C. "Broadening the Strategic Planning Process." *Air Force Magazine*, May 1979, pp. 58–59.

Taylor, Charles W. *The Relationship of Forecasting to Long-Range Planning*. Carlisle Barracks, US Army War College, 15 November 1982.

US, Comptroller General, *Report to the Congress; Management of the Federal Emergency Management Agency—A System Being Developed*, 6 January 1983.

US, USAF, HQSAC. "Issues, Innovation and Long-Range Planning; A Convergence of Planning Techniques," Offutt AFB, October 1984.

US, USAF, XOX. Message to Air Force major air command planners, "USAF Planning Process Update," November 1983.

US, USN, Office of the Assistant Secretary of the Navy for Research, Engineering and Systems, Naval Research Advisory Committee. "Historical Perspectives in Long-Range Planning in the Navy," September 1980.

Vawter, Roderick L. *Industrial Mobilization: The Relevant History*. Washington, DC: National Defense University Press, 1983.

Weinraub, Bernard. "Young Aide Shapes Defense Policy," *New York Times*, 15 April 1978, p. 9.

West, Francis J. "Planning for the Navy's Future." *US Naval Institute Proceedings*, October 1971, pp. 26–33.

Whittaker, James B. *Strategic Planning in a Rapidly Changing Environment*. Lexington, Massachusetts: Heath and Co., 1978.

Methods for Developing Alternative Futures and Long-Range Planning

JOHN H. STEWART II

Planners need to understand the methods that can be used in long-range planning so they can pick the best for their institutions and needs and can better understand the plans themselves. For the *users* of long-range studies and plans, I examine six methods often employed in developing alternative futures, the relationship of alternative futures to three long-range planning models, and, to a lesser extent, the long-range national security planning context. My explorations are intentionally nontechnical.

The methods used to develop alternative futures are not new. Many will recognize some as traditional operations research methods and others as coming from various disciplines. As the distinction here, however, using these methods to develop *long-range futures* is a relatively new phenomenon and is known as futures research, futures studies, futurology, futurism, futuristics,

Colonel John H. Stewart II, a former director of Operations for the Tactical Air Command Joint Studies Group, is a 1985 graduate of the National War College. He is currently assigned to England Air Force Base, Louisiana.

and similar terms.[1] The concept of using alternative futures in long-range planning is also newer than the methods. This concept emerged in the 1960s when many researchers recognized it was futile to try to predict a single future in an increasingly complex world that was changing at an accelerating rate. In the words of Olaf Helmer, a noted innovator in futures research,

> The future is no longer viewed as unique, foreseeable, and inevitable; instead, it is realized that there are a multitude of possible futures, with associated probabilities that can be estimated and, to some extent, manipulated.[2]

Planning is the tool to manipulate the future, and to acknowledge an array of possible future conditions. Helmer says,

> whether plans are made in the public or in the private sector, whether they are made in Norway or Romania or the United States, there is a growing awareness that sound planning must be based on as clear an accounting as possible of expected changes in the operating environment for which the plans are being formulated.[3]

If, as Helmer asserts, there are a multitude of possible futures and planning must account for them, then users of long-range plans need to be aware of ways of building alternative futures and how alternative futures relate to the planning process. My intention is to increase this awareness. Long-range national security planning, however important it may be, is not institutionalized, and, to the extent that it is done on a national scale, it is done on an ad hoc basis. Given this situation, I believe there is utility in speculating about which planning models and methods are best suited for this ad hoc environment.

1. Fundamental Concepts

Alternative Futures. An *alternative future* is a description of a *possible* future state of events relevant to the planning object. The first idea contained in the capsule phraseology "possible future state of events" can mean events that are plausible, feasible, consistent with forecasts and projections, or, simply, reasonable to expect. The precise meaning depends on the orientation of the planning effort and how far in the future it looks. In general, the range of possible events expands as we look further

into the future. The further out we look, the greater the number of alternative futures.

The second idea in "events relevant to the planning object" means that the planning object *defines* the relevant aspects of the future. For example, the relevant aspects of the future for a mom-and-pop dry cleaning store (the planning object) in a metropolitan area may be (1) expected population density in a ten-block radius, (2) expected traffic patterns and road development, (3) trends in dry cleaning chemical prices, and (4) trends in fabrics used in readymade clothing. But, the relevant aspects for long-range planning to field a major strategic weapons system become infinitely more complex; for example, (1) the future strategic posture of the USSR and other potential nuclear powers, (2) the state of US technology, (3) the future condition of the US economy, and (4) the future state of the US political system, as well as many other factors.[4] Thus, an alternative future may be a rather simple set of four or five trend projections for the dry cleaning business or a complex set of interrelated global forecasts for the major strategic weapons systems. Alternative futures for the same time period but for different planning objects will look very different. Also, an alternative future may be expressed in quantitative or qualitative terms, verbal or mathematic expressions, or a combination of these. The form depends on the nature of the planning object and the type of information available.

Alternative futures may be used in a variety of ways. An alternative future may be used to describe a set of *desirable* developments—what we want to happen. Two or more alternative futures may be used to describe the boundaries within which possible futures may occur. Or, a reference case, derived solely from an extrapolation of current trends, may be used as a baseline for developing other futures or as a baseline for planning. Such a reference case is sometimes called a "surprise-free" future.

It should be clear from this discussion that the term alternative future does *not* connote prediction. Alternative futures are tools for systematically thinking about the future, not predicting it. In

this sense, the concept of alternative futures underlies *all* long-range planning and implies that the decisionmaker *can* make a difference. Different plans and decisions made today will result in different futures tomorrow.

Realizing this fundamental truth creates a mindset essential to productive long-range planning. Rather than attempt to predict an inevitable future, the planner keeps a sharp eye out for ways to influence the future through actions he can take *today*. Rather than being an academic exercise, using alternative futures in long-range planning becomes a practical activity affecting what we do *now*.

Predictions versus Projections. The difference between the words *prediction* and *projection* has been a source of misunderstanding in future-oriented work. Robert Ayres, a leading futurologist, clarifies the differences as follows:

> Forecasts fall broadly into two types: projections and predictions. These are often confused. Predictions are statements or opinions about what will happen in the future. Since this is too much to ask except in limited circumstances, it is hardly surprising that most predictions are either disreputable or ambiguous. Palm readers, oracles, and astrologers typically hedge their statements and muddy their language to where the results are approximately equivalent to the cryptic statements printed on slips of paper found in Chinese fortune cookies. Serious predictions in the realm of social, political and economic affairs are usually short-term; they deal with a few years at most.... A projection ... is a contingent statement. It rests on a series of stated or implicit assumptions.... The assumptions are explicitly stated; their reasonableness can be appraised... A different forecaster may make different assumptions and come up with different results. Both results may be "valid" in the strict sense of correctly describing the projective consequences of the underlying assumptions.[5]

Some researchers still attempt to predict, but only a few and only for very short time periods. For longer terms, the idea of projection is more common.

Long-Range Interpretations. In general, there is no specific time associated with the term *long range*. As was the case with *relevant factors* in alternative futures, the definition of long-

range depends on the planning object. For example, long-range economic planning for a small industry might be one or two years. For national security planning, a much longer planning horizon is generally appropriate, largely due to the long lead-times associated with weapons development. In this instance, long-range means 10 to 20 years, a planning horizon appropriate for long-range national security planning.

2. How Alternative Futures Fit Into Long-Range Planning Models

Long-range planning can be defined as planning in which

> the operating environment at the plan's target time is expected to have changed substantially compared to present conditions.... Dissatisfaction with the present, while providing valuable clues to avenues of amelioration, needs to be supplemented with forecasts of just how that environment is likely to change.[6]

This explanation helps outline the concept of long-range planning and points out that forecasts are an inseparable part of a long-range planning process, a point that is often overlooked and rarely debated. To explore the relationship of alternative futures (which are types of forecasts) to three long-range planning models, I have selected long-range planning models that illustrate different approaches and have different implications for development of alternative futures. The discussion will illustrate the major issues that need to be considered. The three models do not, however, illustrate the complete range of long-range planning models. Each of the models falls into the general category of "rational planning modes."[7] For a discussion of other types of planning models, refer to David Wilson's *The National Planning Idea in U.S. Public Policy: Five Alternative Approaches*. Each model is presented as an abstract conceptualization of a planning process that, in reality, is more complex and is iterative. With this thought in mind, the models are presented to illustrate conceptual differences rather than to show how the model is used.

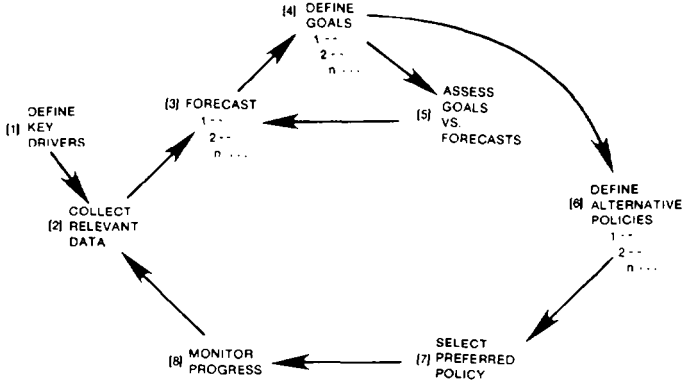
The Futures Group Strategy Formulation Process. The Futures Group is a private research organization that assists

Government and industry in long-range planning. It, under contract, developed alternative futures for use in the Innovation Task Force chartered by the Chief of Staff of the US Air Force. The model used in the project is illustrated in figure 1.[8] Examination is keyed to the numbered steps in the figure.

According to the Futures Group process, in step 1, the key drivers (variables) in the environment under consideration are defined. This step requires knowledge and understanding of what does and doesn't matter, pares down the number of variables, and reduces the complexity of subsequent steps.

In step 2, current and historical data on each of the key variables are gathered to form the basis of the long-range forecasts (the alternative futures).

In step 3, the alternative futures are formulated, using expert judgment or genius forecasting (discussed later). The number of possible alternative futures depends on the number of key drivers selected. In their Air Force study, the Futures Group used three key drivers with two dimensions each (for example, high, low) yielding eight alternative futures. Four of these eight alternative futures were selected for detailed consideration.



Source: Adapted from an Air Force briefing by the Futures Group, 20 September 1984.

Figure 1. *A strategy formulation model.*

In step 4, organizational goals are defined for each alternative future, and, in step 5, these goals are iteratively assessed against the alternative futures formed in step 3. This creates a feedback loop, and this loop is executed before the next step.

In step 6, policies are developed to meet the goals for all futures, and, in step 7, the preferred set of alternative policies is selected.

After the policy is adopted, progress is monitored through another feedback loop (step 8), and the entire process is adjusted incrementally as events unfold.

There are several notable features of this long-range planning model. The number of key drivers must be kept small since the number of possible alternative futures grows rapidly (for example, with four key drivers, each with two dimensions, the possible number of alternatives futures would be 16). In the Futures Group Air Force study, 12 key drivers were nominated for use but only three were selected. These included the involvement of the United States in world affairs, the involvement of the USSR in world affairs, and the manner in which power was distributed or balanced. Defining and limiting key drivers in this way *forces* the planner to focus on the most important characteristics of the problem. This process requires expert judgment to select the most important key drivers.

Not all the alternative futures generated by a process such as this are possible or feasible. The planner must continue to use expert judgment to select a few possible and feasible futures for further consideration. A common solution is to select a worst case, a best case, and a surprise-free case, although caution is in order since this procedure may result in only unlikely events being considered. Neither the best case, worst case, nor surprise-free case is very likely to occur.

An alternate approach advocated by some experienced planners selects a "preferred world," that is, a world the planner wants to occur. This makes sense if after examining the key drivers, the planner believes he (or his decisionmaker) can significantly influence the key drivers and thereby shape the

outcome. For example, the US Government is in a position to shape key drivers affecting military strength (such as funding and technology development) and planners may decide that the United States can achieve a preferred strategic or military balance. This was the case in the Manhattan Project and the reorganization of the Air Force after World War II. It may be the case today with the Strategic Defense Initiative. This proactive stance is attractive to many planners and is a reasonable choice when the planning element has a large degree of influence over the environment.

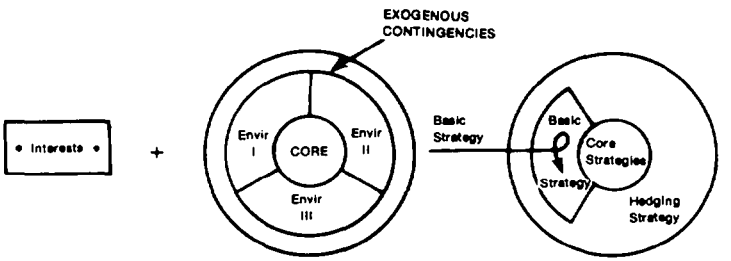
By developing goals for *each* alternative world, the planner can examine a range of goals and observe which are constant and which change across the different worlds. The same applies to policies. Thus, this approach can provide a decisionmaker a wide variety of action alternatives to shape the future. This planning model accommodates a wide variety of methods and can provide the planner with great flexibility.

Ascher and Overholt's Strategic Planning Model. William Ascher and William Overholt are the authors of an excellent text, *Strategic Planning and Forecasting: Political Risk and Economic Opportunity*. They propose two models, one for actors who have little influence over their environment and a more sophisticated model, shown here, for actors (such as the United States) who have considerable influence over their environment. Figure 2 shows Ascher and Overholt's model.[9]

The Ascher and Overholt model begins with definition of interests. The authors caution that this step is frequently given too little attention and is more complex than it appears. According to the authors, the planner

> must, first, list the interests; second, attempt to weight the interests; third, evaluate the interest in the specific region and time period of interest; and, fourth, comprehend as well as possible the ways in which the different interests complement and contradict one another.[10]

The next step is analysis of the environment. The Ascher and Overholt three-part conceptualization of the environment (shown in figure 2 as CORE, Envir 1...n, and EXOGENOUS CONTINGENCIES) reflects their recognition that a powerful



Source: William Ascher and William H. Overholt, *Strategic Planning and Forecasting; Political Risk and Economic Opportunity*, p. 31. Copyright © 1983, John Wiley & Sons, Inc. Reprinted by permission of John Wiley & Sons, Inc.

Figure 2. *Ascher and Overholt's strategic planning model.*

actor with defined interests has a degree of influence over the environment but is still partially at the mercy of events beyond the actor's control. Specifically, the portion of the environment (called CORE) reflects that portion of the environment the actor can largely control *relative to his interests* or that is stable regardless of his actions. The areas identified as environments 1...n (Envir 1 ... n) are those portions of the environment that are distinct from each other and from the core and over which the actor has less influence. The area surrounding the environments (EXOGENOUS CONTINGENCIES) reflects random, uncontrollable, or unpredictable events. In total, this conceptualization reflects a sophisticated view that the future consists of deterministic elements (CORE), possible elements (Envir 1 ... n), and unpredictable elements (EXOGENOUS CONTINGENCIES).

To satisfy the actor's interests in this multi-faceted environment requires a sophisticated three-part strategy (the right side of figure 2). The core strategy consists of those actions that will satisfy the actor's interests in the core environment—those things the actor can control or expect to happen. The basic strategy consists of those actions designed to cope with either the

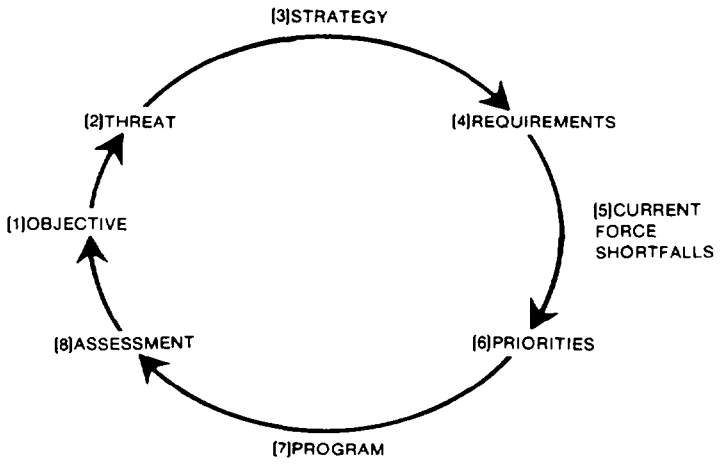
most desirable or most likely environment (Envir 1 or Envir 2 or Envir ... n). Together, the core and basic strategy define the actor's primary strategy. A hedging strategy, often dealing with less vital issues, is added to account for the environments not accounted for by the basic strategy and the exogenous contingencies.

Two significant features of this model are (1) interests are defined before environments are examined and (2) there is no explicit feedback loop between any steps in the model (a difference from the Futures Group approach).

This model reflects a complex view of alternative futures and the ways to deal with them, acknowledging that the future for a major actor ranges from the knowable (CORE) through the possible (Envir 1) to the unpredictable (EXOGENOUS CONTINGENCIES), all of which must be planned for. This model accommodates a complex view of reality and should be adaptable to a wide variety of methodologies. It is amenable to a wide variety of methodologies and appealing because it reflects a major actor as neither victim nor master of his fate, but a blend of both.

The Air Force and Its Force Structure Development Model. The US Air Force has been a leader in long-range planning in the Department of Defense and has practiced long-range planning for many years, using a variety of long-range planning processes for strategy development, personnel, combat support, and force structure. One long-range planning model for force structure development is shown in figure 3.[11]

The model begins with a determination of objectives. Objectives are compared to the threat, and, based on that comparison, a strategy to meet the threat is developed. Then, force structure requirements necessary to carry out the strategy are developed. These elements are compared to current forces to determine current force shortfalls. These are rank ordered to develop an acquisition program. The final step is an assessment of the acquisition program relative to the original objective. The process is iterative.



Source: Air Force Headquarters.

Figure 3. *An Air Force force structure development model.*

A notable feature of this Air Force model is that it is objectives-, threat-, and strategy-driven. These elements are given in the sense that they are the products of other planning processes within and without the Air Force (for example, objectives and strategies are predominantly shaped by the *Defense Guidance*). Alternative environments are bound by the threat and fiscal restraints. Perhaps because of these factors, alternative futures are not explicitly reflected in this model as was the case in the Futures Group and Ascher and Overholt models.

These three models are only a few of many possible products and represent abstractions of processes that contain additional steps and feedback between steps; they are iterative. Nevertheless, each treats alternative futures in a unique way. The Futures Group model generates a number of distinct alternative futures. Ascher and Overholt generate futures consisting of likely elements and unpredictable elements added to a predictable core. The Air Force planning model for force structure sees the future primarily in terms of threats and resources. Each model reflects

different degrees of influence of the actor over the planning object.

There is no hard evidence to show whether the choice of a particular model affects the selection of methods for developing alternative futures or whether the model affects the outcomes. It seems reasonable to expect that both would be affected, suggesting that the user of long-range planning products should not only question the substantive output but also the assumptions and implications of the model. In particular, the following issues apply to all three models:

Developing objectives. The models reflect different approaches to developing objectives. The Futures Group determines objectives after an assessment of possible environments while Ascher and Overholt and the Air Force determine objectives before anything else. The question is, Which model is more appropriate? Answering this question requires us to consider how much influence an actor has over his environment.

If the actor has a great deal of influence, developing objectives before looking at alternative futures is reasonable. If the influence is low, it makes more sense to look at the environment and see what opportunities (choices of objectives) are available. In either case, developing objectives without some consideration of alternative futures is a hazardous foundation for long-range planning because of the possibility of (1) a change of objectives over time or (2) a change in the future that would invalidate a predetermined objective. Thus, an explicit consideration of long-range objectives versus alternative futures early in the planning process is prudent.

The relationship between objectives and strategies. The three models develop strategies to cope with the future—to increase the chances that a desired state of events will exit. Yet none of the models shows feedback between strategies and alternative futures. This feedback should be considered, according to Olaf Helmer.

The actions a planner is contemplating would, if implemented, alter the probabilities of some of the forecasted developments; the cross-impact

feedback from these hypothetical self-generated events should be taken into consideration when deciding between alternative plans.[12]

Process versus judgment. Finally, it should be clear that the three models are nothing more than ways of organizing thoughts about the planning problem. The prudent planner will not only give due consideration to the process used but will remain aware that the process will affect the problem solving techniques. He will avoid the trap of letting process drive the outcome to the exclusion of factors which, in his judgment, should be considered.

3. Methods Used to Develop Alternative Futures

I reviewed six methods used to develop alternative futures, mainly to give a broad overview of a range of techniques; those who want more detail will find my bibliography useful. Because futures research terminology is not standard and can be confusing, I have noted some alternative terms where appropriate.

Keeping in mind that these methods are normally used in a constrained environment with competing influences, the problem addressed, the planning model, the planning horizon, the data available, and the researcher's time and resources all influence the selection of methods or the combinations thereof. Any implication that futures research has achieved scientific status is not intended.

> The key to progress in this field has been the recognition that in dealing with the future, especially in "soft" areas such as social, political, and economic development, we have no firm laws providing the kind of predictive power associated with the laws of physics, but must rely largely on intuitive understanding and perceptiveness of experts in the relevant areas.[13]

Trend Extrapolation. Some form of trend extrapolation (also called trend analysis, trend forecasts, or trend projection) is in most alternative futures.[14] In its simplest form, trend extrapolation is past data plotted as a function of time and fitted with a curve which is extended into the future. There are many curve fitting techniques for both simple or complex data, for example,

linear regression, curvilinear regression, and time-series analysis. Additionally, a technique called multiple regression can show likely relationships (but can not necessarily prove cause) between two or more sets of data.

Although trend extrapolation has many limitations, it remains popular for several reasons. For one, if past trend data are available, a trend extrapolation is quick, inexpensive, and does not require much understanding of causal factors. If existing data are regular and extend well back in time, forecasters feel confident that a trend projection is reliable in the short run. If previous forecasts made from the data were good, then confidence in subsequent forecasts is high.[15]

Trend extrapolations can help the researcher identify fundamental relationships. Even if the forecaster has low confidence in their predictive value, trend extrapolations may provide useful planning baselines, may reveal relationships (when multiple regression techniques are used), or may generate useful questions.[16]

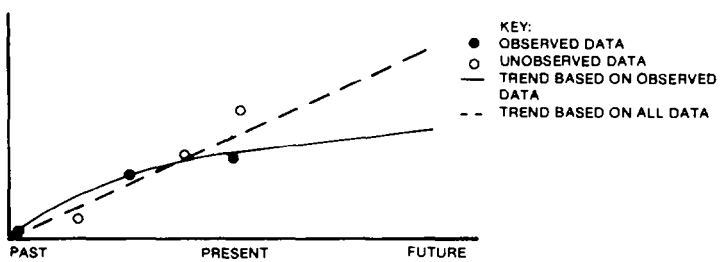
Trend extrapolation has major limitations. Most important, trend extrapolation in and of itself does not require understanding of causal relationships. Thus, it does not require intellectual rigor. Consequently, trend extrapolations are sometimes given unwarranted credibility. This occurred in the *Global 2000 Report to the President*. Many of the trend extrapolations were individually presented as conditional, yet the gloomy predictions of the report (which were soon invalidated) ignored the soft quality of the supporting trends.[17]

In a related limitation, trend extrapolations assume that what has been happening in the past will continue in the future.[18] For example, in 1978 the CIA produced a pessimistic report on global petroleum resources based on the assumption that the excessive consumption patterns and the price elasticity of demand for oil would continue. The projections proved flawed, largely due to a much higher than expected price elasticity of demand for petroleum in Japanese and Western markets that contributed to the current worldwide oil glut and the fragmentation of OPEC in the mid-1980s.

There are also problems that can stem from inaccurate or incomplete historical data or mathematical curve fitting.[19] Figures 4 and 5 illustrate two of many potential problems.

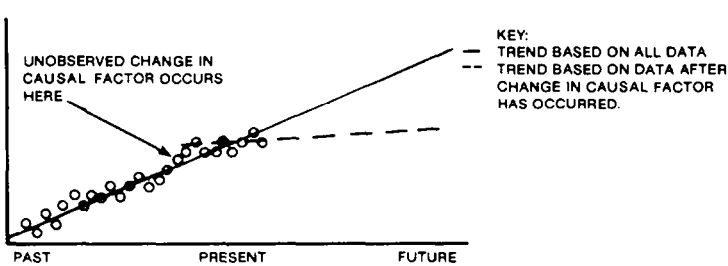
Also, important debate often focuses on other methodological problems. An outstanding example is the *Global 2000 Report to the President.* In that report, hundreds of projections are based on the last two or three decades of recorded data. As a critique of the study states,

> many advisors were concerned that the study's projections were based to a large extent on trends and relationships characteristics of the past two or three decades only. They asserted that data pertaining to



Source: The author.

Figure 4. *The problem of incomplete data.*



Source: The author.

Figure 5. *The problem of unobserved change in a causal factor.*

the past two or three decades is often misleading and that quite different trends or relationships can be perceived when a longer period is taken into consideration.[20]

My brief discussion of limitations of trend extrapolations is *not* meant to imply either that forecasters are unaware of these limitations or that trend extrapolation should not be used. Victor Ferkiss' views provide a good summary:

> Obviously futurists—and ordinary human beings—who engage in trend extrapolation are not so naive as to believe that trends must necessarily continue in the future as in the past. What is being posited is rather that certain causes are operating to produce certain effects and that unless one can find reason to believe that these causes will cease to operate as they have in the past, one must assume predictions based on this method will vary with one's assessment of the causes of existing trends and the likely stability of these causes.[21]

In summary, trend extrapolation is the most widely used technique for developing alternative futures and is often the only available technique. It is also the simplest and least sophisticated and has limited ability to show causal relationships. For these reasons, its utility is greater for short-range studies (where less change in causal factors is likely) than for long-range studies. Healthy skepticism and a close look at the data base, the limitations of the specific curve fitting technique, and the underlying assumptions will help prevent overconfidence in trend extrapolation.

Simulation Modeling. Simulation modeling has been widely used to explore the future. In the late 1960s, Jay Forrester brought widespread attention to his systems dynamics approach to modeling through his popular book *The Limits to Growth.* Perhaps the most ambitious project based largely on simulation modeling was the *Global 2000 Report to the President. Global 2000* attempted to integrate several Government resource, population, and environmental models.[22]

What is a simulation model? The first concept to understand is that of a model. Conceptually, a model is a "simplified version of reality."[23] This means all models are abstract, and through a selective process, some factors are included and some are left

out.[24] Models are not tied to a specific methodology and can be mental images, physical models, graphic representations, verbal representations, or mathematical representations of reality.

Modeling connotes a static snapshot of reality, but simulation connotes an imitation of the behavior of a system over time or a dynamic representation of reality.[25] A simulation captures relationships, functions, and cause and effect. Combining the concepts of a model and simulation leads to the idea of a simulation model as an abstract representation of a system "from which the behavior of the system over time can be inferred."[26]

Most future studies deal with a large number of relationships and trends, which are usually reduced to mathematical relationships and computerized.[27] Thus, in a realistic definition of simulation models used in futures studies,

> a simulation model imitates and represents the system under study in the form of a set of mathematical variables and a number of explicit relationships between them. These relationships are sufficient to determine the change in the model variables over time (the model behavior), this process usually being performed with the help of a computer.[28]

The basic steps in model building are the definition of the segment of reality to be modeled, the determination of key variables, and the establishment of relationships between and among variables. According to some authors, this modeling activity provides a valuable indirect benefit by forcing "the analyst to make explicit which elements of the situation he is taking into consideration" and imposing on him "the discipline of clarifying the concepts he is using."[29]

Theory formulation and testing are also indirect benefits of simulation modeling. Each relationship between variables is based on an explicit or implicit expert judgment. The sum of these judgments—embedded in a model—constitutes a rough theory of cause and effect between the model inputs and outputs. Once constructed, a model, more than any other technique for futures research, provides an opportunity for experimentation.[30] This can help formulate or refine hypotheses and serve as an

excellent way to aid communication between experts, particularly if they participate in building the model and testing it.

A direct advantage of simulation models is that, once constructed, they can handle data quickly and inexpensively. This speed permits the easy manipulation of model data, parameters, and relationships for sensitivity analysis. Sensitivity analysis is an examination of how changes in data or how relationships in the model affect the outcome of the model as a whole. Sensitivity analysis with expert interpretation makes a valuable tool to determine what is important and unimportant within the model. It may also be useful for hypothesis formulation and testing. Sensitivity analysis does not, however, verify the model as an adequate portrayal of future reality.

Unfortunately, there is little that can be done to test a future-oriented model against reality since that reality does not exist. Some advocates have suggested that a future-oriented model can be verified by testing it against historical data. For example, data from 10 years ago can be entered in the model to see if the model produces today's data. This type of testing may increase confidence in the short-term predictive powers but falls prey to all the criticisms of trend extrapolation as a long-term predictive tool. In effect, this type of testing assumes that all the parameters driving the model will change in the future as they have in the past.

Simulation modeling is usually computerized, and thus model relationships must be expressed mathematically. Once the decision to computerize is made, there is a strong temptation to focus only on quantitative data and exclude qualitative aspects. As Quade states,

> A great pitfall of quantitative anlaysis and modeling is to quantify and model what we can, not what is relevant, neglecting the difficult—like Kaplan's drunk looking for his key under the street light even though he had dropped it in the dark around the corner.[31]

The criticism may seem so obvious that the occurrence of this phenomenon would be rare, but it is not. For example, this criticism was raised against the *Global 2000 Report to the President,* which was prepared by hundreds of eminent scientists.[32] The critique of the study says,

many advisors were concerned also that the study tended to project only those characteristics of the recent past for which "hard" quantitative data were readily available. For example, they noted that GNP projections ignored the major segments of LDC economies that were cash economies, that energy projections ignored firewood consumption (a major fuel in LDCs), and that food, energy, and mineral projections ignored water consumption.[33]

Along the same line, simulation models generally do not reflect the influence of secondary variables, new causes for change, or human intervention (for example, the effect of politics) on future decisionmaking.[34]

Computerization makes all simulation models subject to the effects of mathematic approximations. The effect can be exaggerated in models in which mathematical relationships are expressed as change over short periods of time and are used several times to produce the final answer. Very small changes in mathematic factors (0.99 versus 1.01) can produce order-of-magnitude changes in results (in this case $x = 2$ versus $x = -1$).[35]

$$\left.\begin{aligned} x - y &= 1 \\ x - 0.99y &= 1.01 \end{aligned}\right\} \quad \text{giving as result} \quad \begin{aligned} x &= 2 \\ y &= 1 \end{aligned}$$

and

$$\left.\begin{aligned} x - y &= 1 \\ x - 1.01y &= 1.02 \end{aligned}\right\} \quad \text{giving as result} \quad \begin{aligned} x &= -1 \\ y &= -2 \end{aligned}$$

This phenomenon may seem so obvious that it would be eliminated from major studies, but it is not. In the critique of the *Global 2000 Report to the President,* an example similar to the one above is given with the following commentary:

> Numerical operations with economic data ... impose their own requirements. Without knowledge of errors, the feeding of economic data into high-speed computers is a meaningless operation. The economist should not believe that "correct" solutions of many linear equations and of other computations, such as multiple correlations, are necessarily meaningful.[36]

Another evaluation of models notes that a mathematical assessment of the model used as the basis for *The Limits to Growth* demonstrated that

relatively minor changes of parameters and relationships in the model can lead to radically different outcomes for the future of the world system. For example, Scolnik (1973) shows that with less than 5 percent variation in a small number of key parameters ... the model shows a smooth trajectory of unlimited growth until the year 2300.[37]

In addition to these methodological problems, there are some practical problems with simulation modeling, such as cost and time. Whereas the simplest models may take a few weeks to construct, large-scale models characteristic of major studies easily absorb man-years of effort and hundreds of thousands of dollars. One military forecasting model the author evaluated was originally contracted for $1.2 million and was expected to be delivered in one year. Two years and over $1.2 million later the model had yet to be tested. The *Global 2000 Report to the President* was over two years in the making and cost millions of dollars.

Another practical problem is documentation. Thorough documentation of a model takes at least as long as model building and is a laborious task requiring that each assumption for each relationship in the model be specified. When working with large models, the model building team often loses track of the inner workings of the model due to inadequate early documentation, personnel turnover, or simply, growth in complexity. When any of these situations occurs, the model loses its value and should be dropped as a decisionmaking aid because without thorough documentation it is impossible for an observer to evaluate or even understand the model.

This problem has occurred even with widely touted models. The Mesarovic-Petel Strategy for Survival Model for the Club of Rome was documented, but the documentation was so obscure it was useless. As a prominent futures researcher pointed out, "the reader who attempts to delve into the innards of the model in the back-up volumes will encounter monumental difficulties in deciphering the details."[38]

In summary, simulation modeling can be a useful tool for building alternative futures. Its greatest strength lies in its ability to relate a large number of variables and, once a model is

constructed, to rapidly and inexpensively produce a variety of outcomes. The process of building models and experimenting with them provides a learning and communicating environment. As Helmer states,

> the standard operations research techniques for such utilization is that of constructing an appropriate model of the situation; such a model—by introducing a precise structure and terminology—serves primarily as an effective means of communication and thereby, through a feedback process, helps the expert to arrive at a clearer understanding of his subject matter.[39]

Thus, some researchers call simulation models "learning models" and "what-if models," reflecting their value as tools to improve understanding.[40]

Obviously, users should be aware of the limitations of models as long-range forecasting devices; however, even experts continue to overlook modeling limitations. The Meadows world model and *The Limits of Growth* encountered strong international criticism for the way conclusions were drawn from the computer runs and because Meadows overestimated the possibility of drawing definite conclusions from differential equation models.[41]

A closing caution seems appropriate. If modeling limitations are misunderstood and models are misused, "the results may be so misleading that the user would have been better off without the model."[42]

Cross-Impact Matrix Analysis. Both trend extrapolation and simulation modeling are frequently criticized for failing to measure interaction among variables. Trend extrapolation is particularly susceptible since it generally highlights a single parameter. Simulation modeling accommodates relationships between variables, but the number is sometimes limited to reduce complexity and preserve the essential qualities of transparency and abstraction. Also, both simulation modeling and trend extrapolation normally deal with trends rather than events.

Cross-impact matrix analysis is one way to deal with the interaction of both trends and events. First devised by Olaf Helmer,

cross-impact analysis is a lesser known technique, but it has been used widely by General Electric, the Futures Group, the Swedish Government, and others. The essence of cross-impact matrix analysis is a simple, two-dimensional matrix. All relevant events ($E_1 \ldots E_n$) and all relevant trends ($T_1 \ldots T_n$) are arrayed on both the horizontal and vertical axes.

The first step of the cross-impact matrix analysis is selection of the relevant events and trends that could affect the future being considered. These events and trends are usually selected based on expert judgment. Each of the events must have a reasonable chance of occurring and have an important impact on the relevant future. Each of the trends should be relevant to the future and be either indicators of how that future is progressing or of trends that, if they changed unexpectedly, would affect the future.[43] An event could be "Soviets develop operational military laser"; a trend might be "Soviet defense spending grows at 1.5 percent."

After the events are arrayed in the matrix, expert judgment is used to estimate the probability of each event and trend occurring *if* the corresponding event or trend on the other axis occurs. For example, assuming event E_1(on the vertical axis) has occurred, what then are the probabilities that event E_2 through trend T_5 (on the horizontal axis) will occur? This process is repeated until all blocks in the matrix are filled. This is not a trivial task; even a relatively small 20 × 20 matrix requires that 380 probabilities be estimated.

There is considerable value in building this simple matrix. It forces thought about the relationship of each factor to every other factor. However, adding another simple idea can increase its value.

The idea is to use blocks of time as stepping stones to the future. For example, using sample probabilities to determine whether an event occurred in a given block, event E_2 has a probability of .5. One can flip a coin 10 times or use a computer to determine if E_2 occurred in block 1 through block 10. (See sample results underlined in figure 6.) This same procedure applies

to the other events. (The actual procedure is a bit more complex.) The figure 6 example run of this procedure shows which of the five events occurred in which blocks for the next 10 years.

Trends can be handled in a similar way. The result will be a trend value for each block. Matrices for events and trends together give a picture of one way the future could unfold. The matrices show when events occurred and what values each trend had at a given time. Each run of the analysis will produce a different set of tables.

Cross-impact matrix analysis has some definite attractions. Like simulation modeling, it can serve as a communication and learning tool for experts. It also can be used as a "what-if" model and as an aid to hypothesis testing and formulation. Because each run of the model will generate a different scenario, the model is a useful tool, once built, to rapidly generate alternative futures that are logically consistent and show how a future evolves. Finally, although the model building process is complex and time consuming, the output is simple. The data are displayed in a readily understandable form.

BLOCK	1	2	3	4	5	6	7	8	9	10
E_1	X	X	X	X	X	X	X	X	X	X
E_2	X		X	X			X		X	
E_3		X								
E_4					X			X		
E_5										

Source: Adapted from Olaf Helmer, *Looking Forward: A Guide to Futures Research* (Beverly Hills: Sage Publications, 1983), p. 173.

Note: At X, the event occurred in the block. Event E_1 was assumed to occur in each block. Event E_2 had a .5 probability of occurrence and did occur 5 out of 10 times.

Figure 6. *Event occurrences.*

On the other hand, there are several methodological problems as yet unresolved. These are (1) the order in which two impacts occur may change the outcome; (2) double counting of impacts may occur; (3) changes in trends have a linear impact on outcomes whereas in reality the impact may not be linear; (4) the pair-wise comparisons (for example, impact of event 1 on event 2) do not capture the synergistic relations that occur in the real world.[44] Finally, the process can be tedious and time consuming. In the final analysis, it relies more on expert judgment than any other aspect.

In summary, cross-impact matrix analysis is valuable as a learning and communication tool. Its value as a forecasting tool lies principally in its ability to produce scenarios that are logically consistent and that illustrate how events and trends interact over time. Its greatest value is that cross-impact analysis forces intellectual rigor and explicit consideration of the interaction of all variables selected for analysis.

The Delphi Technique. The Delphi technique originated in the Rand Corporation in the early 1950s.[45] Delphi has been widely used in future studies and a variety of other applications. The basic idea behind the Delphi technique is that many experts, focusing on a subject in a systematic way, can bring more information to the subject and can produce a more comprehensive forecast than can a single expert. Furthermore, Delphi is based on the conviction that face-to-face methods tend to be unwieldy and prone to distortions from the bandwagon effect or domination by strong personalities.[46]

Some researchers question the wisdom of relying heavily on expert intuition. However, expert intuition has more substance than meets the eye. According to Helmer, who originated the Delphi technique,

> emphasis on the intuitive character of much of expert judgment is not intended to imply that all judgment of this kind is purely subjective and unsupportable by objective fact or intersubjectively accepted theory. Very often, an expert serves primarily as an efficient transmitter of knowledge commonly accepted within the scientific community.[47]

Many variations of the Delphi technique have appeared since its inception, but they all resemble the original technique. The following 10 steps illustrate the basic technique.

Step 1. Formulation of a team to undertake and monitor a Delphi on a given subject.
Step 2. Selection of one or more panels to participate in the exercise. Customarily, the panelists are experts in the areas to be investigated.
Step 3. Development of the first-round Delphi questionnaire.
Step 4. Testing of the questionnaire for proper wording (e.g., ambiguities, vagueness).
Step 5. Transmission of the first questionnaire to the panelists.
Step 6. Analysis of the first-round responses.
Step 7. Preparation of the second-round questionnaire (and possible testing).
Step 8. Transmission of the second-round questionnaire to the panelists.
Step 9. Analysis of second-round responses. (Steps 7 to 9 are reiterated as long as desired or as necessary to achieve stability of results.)
Step 10. Preparation of a report by the analysis team to present the conclusions of the exercise.[48]

A brief example from Olaf Helmer may help the reader appreciate the procedure. Panelists in a Delphi study of the future of automation were asked, among many other questions, when a machine would become available that would comprehend standard IQ tests and score above 150.[49] After the responses of 12 experts were received, the median responses and interquartile ranges were calculated and given back to the panelists. The panelists were shown this information and asked to modify their responses or to supply their rationale for responses outside the interquartile range. Generally, the feedback is anonymous to avoid any tendency to yield to the judgment of particularly eminent experts.[50] In rounds 2, 3, and 4, the expert responses changed, with round 4 representing the final "group consensus." In the first round, the median response was 2020. Some positions changed significantly in rounds 2 and 3 while

others apparently did not. After the fourth round, the median response to the question was 1990, and interquartile ranges had dropped considerably.

There is no proof that the convergence of opinion found in the Delphi leads to the "right" answers. However, some short-term testing of Delphi versus conventional forecasts has been done at the UCLA business school. The results generally showed that Delphi came closer to producing an answer near the real value than did conventional means in two out of three cases.[51]

The Delphi technique has a number of strengths. The above example deals with a single event, but Delphi can also be used to deal with trends. It is a method that can be used when no other method is available, either because no method exists or because of time, staff, or other resource constraints.[52] In this sense, Delphi is often referred to as the method of last resort.[53]

Delphi is a convenient method for identifying trends and events that warrant consideration and narrowing them down through an iterative process. This is especially useful when conducting broad interdisciplinary studies outside the researcher's field of expertise. For example, a researcher might choose to focus further research only on events or trends where the least convergence of expert opinion exists.

Finally, Delphi can be an economical way to engage a large number of diverse people in a research project with minimum intrusion on their schedules while reducing political or positional conflict and the bandwagon effect.[54] As with the other tools discussed above, it can be a powerful learning tool for the primary research team and could be an aid to hypothesis formulation.

On the other hand, the technique has been criticized for lacking any basis in forecasting or predictive theory.[55] With the exception of the testing done by UCLA, I can find no basis to contradict this charge. In all fairness, this charge can also be made about virtually all long-range forecasting tools.

The technique has also been criticized as subject to bias on the part of the research team and on the part of the respondents.[56]

The research team could intentionally or unintentionally shade the questions. Even if the research team could write totally unbiased questions, the respondents would have professional or personal biases. Selection of as broad a cross-section of experts as possible may counter this problem.

An important criticism is that the averaging used to define the consensus gives undue emphasis to the majority, who may be "wrong," and insufficient attention to the minority with a far-out opinion, who may be "right." Also, averaging gives all "experts" equal weight even though they may be ignorant of the details of a particular question.[57]

In sum, the Delphi technique is not a scientific approach to projecting future environments. Particularly bothersome is the lack of research team control over the behavior of the "experts," and the relative lack of insight into *how* the experts arrived at their opinions.[58] In sum, Delphi and its variations are useful tools for examining expert opinion and focusing research but should be used with a full appreciation of their limitations.

Scenario Building. Scenario building is not a method in itself, but can be a product of many methods and combinations of methods. It deserves special attention because it is the method of choice for a number of important long-range planning efforts within the Department of Defense (DOD). Within the Joint Chiefs of Staff, four scenarios were developed for use in a recent revision of the Joint Long-Range Strategic Appraisal, the DOD document which looks 10–20 years into the future and provides the approved baseline for long-range planning throughout DOD. The four scenarios, or alternative worlds, were developed by a research team based on interviews with over 80 experts.

A major project was undertaken in the Air Force to develop and explore "innovations in technology, operational concepts, and organization structure" which aim at improving the Air Force's ability to meet future national security requirements.[59] As part of this effort, the Futures Group developed a set of scenarios describing four alternative worlds and the evolution of events and trends that would plausibly lead to those four worlds.[60]

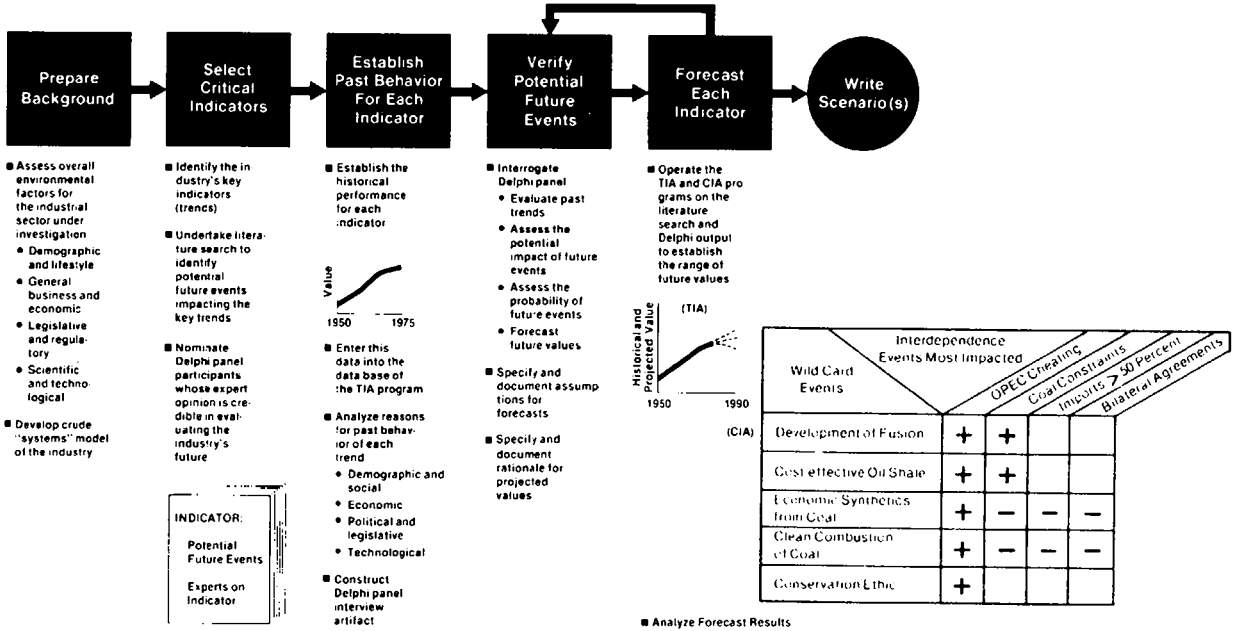
Scenarios have long been associated with Herman Kahn, who describes scenarios as

> hypothetical sequences of events constructed for the purpose of focusing attention on causal processes and decision points. They answer two kinds of questions: (1) Precisely how might some hypothetical situation come about, step by step? and (2) What alternatives exist, for each actor, at each step, for preventing, diverting, or facilitating the process?[61]

Although a scenario itself can lead to a single future, usually a group of scenarios with common elements is used to illustrate how we might transition from the present through different paths to a range of alternatives.

I mention that scenario building is not a method but may be done with a variety of methods. Perhaps this explains some of the vagueness of the term in futures research and conditions produced by a specific run of a simulation model, a set of conditions selected in a cross-impact matrix analysis, or the result of Delphi or genius forecasting. Scenarios may also be quantitative, nonquantitative, or combinations thereof, or they may be simple verbal descriptions of events. Thus, it is difficult or impossible to make methodological comparisons of scenarios and other methods. Methodological comparisons can be made only between a *specific* scenario and some alternative.

Although there are as many ways to build scenarios as there are problems to consider, scenarios generally require a degree of integration that ultimately relies on expert judgment and creativity.[62] Figure 7 illustrates how scenarios were once constructed at a major US corporation, one of the early advocates of scenario use in long-range planning.[63] The method is no longer representative of the company's current strategic planning process; however, it illustrates how scenario building crosses various disciplines and uses trend analysis, the Delphi technique, cross-impact matrix analysis, and trend impact analysis to provide a mix of objective and subjective data. The final step, however, relies on a team of scenario writers to integrate the information.[64]



Source: Rochelle O'Connor, *Planning Under Uncertainty* (New York: The Conference Board, Inc., 1978), p. 8. Reprinted with permission of the publisher. *Note:* TIA is trend impact analysis and CIA is cross-impact analysis.

Figure 7. *How scenarios were constructed.*

Despite the diversity of methods used in building scenarios, there are some common ideas that can help evaluate a specific scenario or determine whether a scenario is appropriate to the issue under question.

(a) We cannot predict the future, but by designing a number of plausible and consistent descriptions of hypothetical future developments or situations (scenarios) we can delimit the uncertainty space which we want to take into account in studying the problem at hand.

(b) If we want to anticipate problems and improve our future situation, we should not just assume that present trends will continue; instead we should design desirable futures (scenarios), identify branching points and mechanisms of change so as to find actions which can affect developments in a desirable direction.

(c) If we are concerned with the future development of a specific system or planning object (e.g., a business firm, the energy system, etc.), it is useful to make explicit assumptions (scenarios) about the future development of the environment of the system (otherwise the implicit assumption is often made that there would be no change at all).

(d) It may be useful to try to synthesize fragmented, dispersed and sometimes vague knowledge into a holistic and consistent picture (scenario) of a future development or situation. This is particularly important when there are considerable cross-impact effects between developments in various fields which cannot be taken into account if they are considered separately.

(e) To get a realistic picture of possible future developments in an area where discontinuities and changing trends may emerge as the result of specific events and actions, it can be useful to try to describe a number of hypothetical developments as resulting in part from the decisions and actions of various actors.

(f) Certain future developments are considered unlikely but dangerous. By making an effort to imagine in some detail how such developments might arise, we may be able to make preparations which will render them less probable or less dangerous.[65]

Scenarios have a number of strengths. Scenarios, more than any technique already discussed, are the most adaptable planning tools because they can combine elements of all other forecasting

devices, can be tailored specifically to planning object or environment, and can explicitly deal with the effect of decisions.

Using several scenarios, the consequences of plans and strategies can be tested against several plausible environments. Elements of plans that do well in more than one environment may be incorporated in a core strategy while elements that appear useful in less likely scenarios may be reserved for contingency plans.[66] Because a variety of approaches are available, they can be tailored to the unique aspects of the problem being considered. Scenarios do depend on the creativity of the scenario writer or team, and since many consist largely of verbal descriptions, they may be more interesting and attention-getting than other presentations of alternative futures.[67]

On the negative side, since scenarios do not claim to be predictive, some critics claim that scenarios are an ideal way for a futurist to have his cake and eat it too—to engage in idle speculation without being held responsible.[68] In the absence of any methodological rigor or norms, scenarios can be all things to all people.

Scenarios share many of the shortcoming of their methodology. These shortcomings can be either increased or decreased depending on the method used in the scenario; for example, if a set of scenarios is based on a simulation model that is fundamentally flawed, the flaws will be multiplied by the number of scenarios generated. On the other hand, combining several trend extrapolations into a scenario may minimize the impact of errors in a single trend. From a practical standpoint, developing multiple scenarios can absorb a lot of resources, particularly if planning staffs are expected to develop full-scale plans for each scenario.[69]

Because a large amount of judgment goes into scenario building, the credibility of the scenario depends heavily on the creditability of the scenario builders. If this function is delegated too low in the organization or if it is performed without sensitivity to the needs of senior planners, the scenario's creditability is likely to suffer.[70]

In sum, the popularity of scenarios compared to the more traditional forecasting tools may lie in the apparent blunders associated with these other tools and overzealous advocacy of their predictive powers, both of which occurred in the 1970s.[71] In scenarios, the sometimes overly optimistic claims of methodologists are replaced with frank humility, acknowledging that we cannot predict the future.[72]

Given the current state-of-the-art of forecasting tools, the scenario building approach offers a reasonable method for developing alternative futures for complex environments. It offers an opportunity to combine the best aspects of other available techniques with expert judgment without overselling the final product.

Expert Judgment and Genius Forecasting. Discussions of methodologies make it clear that no methodology is a substitute for basic intellectual activity. The simplest trend extrapolation fails to have meaning unless a well-informed mind, cognizant of the strengths and limitations of the technique, is engaged to give meaning to the raw facts. Interpretation of the data remains more an art than a science.

Similarly, the most elegant and esoteric simulation model is built on a foundation of individual judgments that can only have credence if those judgments individually and collectively reflect an appreciation of what makes a difference and what cause produces what effect. In virtually all future-oriented work, expert judgment is the link between the real world and methodologies which would otherwise be sterile. It is an integral part of future-oriented work, a point easy to overlook when being confronted with an intriguing choice of methodologies. Expert judgment does not imply, however, that the expert in a model is a Renaissance man; rather, it implies specific expertise in the problem being considered.

There is a well-established place in futures research for the Renaissance man. The work of individuals such as Issac Asimov, Herman Kahn, and Daniel Bell has often been termed genius forecasting. Genius forecasting is a catchall term for the

products of individuals who possess unusual intellect and broad knowledge and who can synthesize historical knowledge and draw conclusions about the likely trend of events.[73] The forecasting is characterized by a holistic view of the world and the attempt to recognize broad trends, such as Herman Kahn's "Basic, Long-Term Multifold Trend" and John Naisbitt's "Megatrend" views.[74]

Much methodological development in futures research is an attempt to avoid genius forecasting, in part because genius forecasting has an uneven record as a predictive method. Of late, however, there has been a recognition that the perspectives offered integrate results from the whole range of forecasting techniques and overcome some of their limitations. Notably, the Futures Group used genius forecasting to develop scenarios for the Air Force Innovation Task Force.[75]

Genius forecasting offers a way to probe the future without bogging down in methodological traps and has proven to be a source of innovation, which often produces interesting products; Naisbitt's *Megatrends* was on the *New York Times* bestseller list for 60 weeks.

Of course, the credibility of genius forecasting relies almost totally on the credibility of the person doing it, and Renaissance men are in short supply. A more serious criticism is that the results are not reproducible. This limitation is especially significant in the public policy formulation arena where skeptics abound.

In sum, expert judgment and genius forecasting should be considered valid approaches to probing complex futures, as they offer ways to bridge the gap between the complexity of the real world and the simplicity of even the most complex methodology. As a source of insight and innovation, they are unparalleled. Because their processes are neither reproducible nor transparent, expert judgment and genius forecasting should not be the sole basis for public policy formulation; only the genius or expert himself can properly defend his work.

All planning requires that the planner have an explicit or implicit image of the future state of the planning object. Trend

analysis and related methodologies—or simply an implicit belief that things tomorrow will be much like today—are sufficient for short-range planning. As the planning horizon moves further into the future, uncertainty increases, and the probability increases that new factors will replace old ones as the dominant factors. When examining long-range planning (10 to 20 years) and complex planning environments, there are no tools that will allow more than a gross estimate of what the future environment will be like. Thus, the concept of using a range of alternative futures, developed using a mix of methodologies and expert judgment, offers the most promise that plans will provide a hedge against an uncertainty in the future.

4. Long-Range Planning, Alternative Futures, and Their Relation to National Security Planning

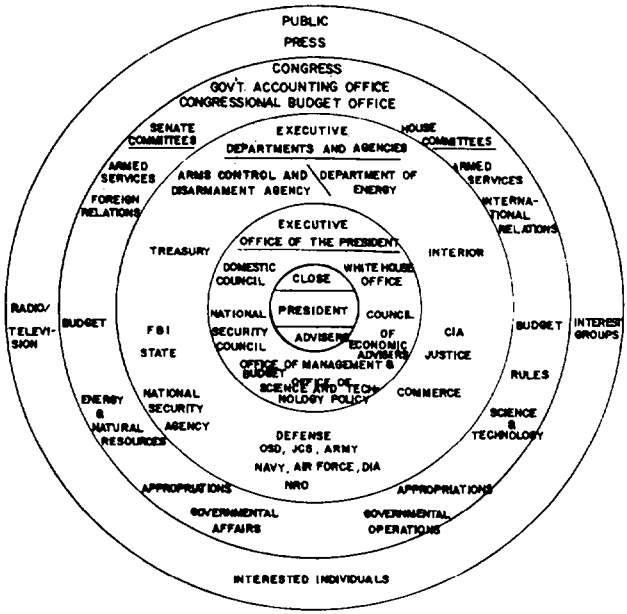
Tying together everything said so far in the broad context of the national security policy-making process, the next section relates the long-range planning models and methods for developing alternative futures to national security planning and indicates which models and methods are most applicable to that process. A number of planning models and methods that I have not covered exist; the considerations here can easily be applied to them also.

The Planning Environment. Planning for national security is perhaps the most complex task the Government performs. Although national security does not include every government function, it does include many, according to Harold Brown, a former Secretary of Defense:

> National security, then, is the ability to preserve the nation's physical integrity and territory; to maintain its economic relations with the rest of the world on reasonable terms; to protect its nature, institutions, and governance from disruption from outside; and to control its borders.[76]

National security policy deals with many interrelated disciplines, including, but not limited to, military strategy formulation, economics, domestic politics, and diplomacy.[77] Thus, national security planning occurs in a diverse policy formulation

environment with many players. The President, his key advisors, and the National Security Council play the central roles. The State Department, Department of Defense, and the Congress all are influenced by the media and the public.[78] Figure 8 illustrates the complexity of the national security policy-making environment. This environment is characterized by bureaucratic relationships, political decisionmaking and a large dose of personal influence—in short—bargaining rather than analysis.[79] Even in this complex environment, however, I believe it is possible to make some observations regarding the utility of long-range planning models and methods of developing alternative futures.



Source: Amos Jordan, William J. Taylor, Jr., and others, *American National Security: Policy and Process* (Baltimore: Johns Hopkins University Press, 1981), p. 202. Reprinted with permission of the publisher.

Figure 8. *The national security policy-making environment.*

Observations on Long-Range Planning Models. The Air Force had its force structure development model designed for a specific result: force structure. Its best use is at the Department of Defense level (although it is an excellent tool to support advocacy for force structure requirements at any level) where detailed consideration of the military threat and strategy—the major drivers in the model—occur. Thus, this model is an excellent *component* of a national security planning process but is not readily adaptable to broad strategic planning for national security. For this purpose, more general models are needed (and are, in fact, used in the Air Force).

The Futures Group model, more readily adaptable to the complex national security environment, considers a wide variety of alternative futures and generates a variety of policy options. A significant difference between this approach and the Air Force force structure model is that the Futures Group *generates* goals rather than starting with goals as the Air Force model does. Goal generation should be a feature of any national-level long-range planning model.

However, the Futures Group model is somewhat reactive since it *begins* with forecasts of the environment and, from these environments, generates goals. Despite the feedback loop between the goals and the forecasts, I believe there would be a tendency for users to develop goals in reaction to a preexisting environmental forecast. This sort of orientation is appropriate to an entity operating in an environment over which it has marginal influence. This is not the case for a superpower. Thus, this model would be applicable to national security planning only in special situations where US influence is limited.

Of the three models, Ascher and Overholt's strategy formulation model is the most adaptable to US national security planning. First, it is a proactive model beginning with interests that act *on* an environment. Second, it uses stable, general interests consistent with the fact that US security interests have remained relatively stable over many years, regardless of changes in the external world.[80] Finally, the conceptualization of the environment reflects the US condition as a powerful actor on the world

scene, yet subject to influence by events beyond its control (for example, the OPEC oil shock). With the addition of a feedback loop between strategies and interests, this model is a good selection for use in national security planning.

Observations on Methodologies. Obviously, no single methodology is adequate for national security planning. Ideally, a mix of methodologies will be used to cope with the many complexities. Nevertheless, there are some characteristics of the methodologies that warrant discussion.

Trend extrapolation is one-dimensional and best suited for easily quantifiable data. Most national security planning will rely on trend information as a part of the process; however, trend information should rarely be a deciding factor in long-range planning because of the increasing uncertainty associated with trends over the longer planning horizons and the dominance of nonquantifiable factors in most national security matters.

Simulation models share some of the same characteristics of trend extrapolation and are generally so technically complex that only a few people in the decisionmaking apparatus would have confidence in or understand the underlying assumptions and processes. Simulation models should normally be used to develop insights which, once developed, can be justified and articulated on their own merit without falling back on the inner workings of the model.

Cross-impact matrix analysis is more transparent than simulation modeling because the matrix itself can be viewed and discussed in relatively nontechnical terms. However, computerized manipulation of the matrix produces some of the same limitations of simulation modeling (technical, not transparent). Therefore, like simulation modeling, it is most appropriate as an initial analytic tool to gain insight, not as an advocacy tool in a policymaking forum.

Although the Delphi technique has methodological shortcomings as an analytic tool, it is the only tool which can readily be used to represent the consensus of experts. The technical aspects of Delphi are relatively straightforward, involving mainly the

concept of averaging. The main inputs are qualifications of the experts and the Delphi questions, both of which can be evaluated by a knowledgeable policy maker. Since consensus is a common component of policy making, the Delphi technique deserves a higher rating than "method of last resort" in the national security decisionmaking environment.

In this assessment of methodologies for applicability in long-range planning, scenario building, expert judgment and genius forecasting tie for methods of first choice. All are very broad and can be supported by a wide variety of less comprehensive methodologies. The approaches are quite different in many ways but reflect what we see daily in the policy-making process. Scenario building accommodates the "what-if" mentality that is part and parcel of public debate, and genius forecasting and expert judgment reflect the way some of our most notable leaders (e.g., Henry Kissinger) operate. These approaches should be readily acceptable in the national security planning process.

In sum, for long-range national security planning, this broad assessment indicates that a broad, proactive planning model, such as the Ascher and Overholt strategy formulation model, and the less technical methodologies for developing alternative futures, such as scenario building, expert judgment and genius forecasting, are preferred. The more detailed, technical approaches are apt to be too specialized or to be misunderstood in the wide-ranging national security policy development environment. Such approaches are best reserved for supporting roles.

The long-range national security planner faces a complex decisionmaking environment. However, a common-sense appraisal of the planning model methodological options in relation to the policy-making environment is possible, as I have illustrated. Armed with an awareness of strengths and weaknesses, the long-range planner has an excellent chance of making a positive contribution to the national security policy formulation dialogue.

Notes

1. Victor C. Ferkiss, *Futurology: Promise, Performance, Prospects*, The Washington Papers, vol. V, no. 50 (Beverly Hills: Sage Publications, 1977), p. 5.

2. Olaf Helmer, *Looking Forward: A Guide to Futures Research* (Beverly Hills: Sage Publications, 1983), p. 17.

3. Ibid., p. 21.

1. Fundamental Concepts

4. Analytic Services, Inc., *Air Force Innovation Task Force, Innovation Workshop* (Washington: ANSER, Inc., 1983), p. 17.

5. Robert Ayres, *Uncertain Futures: Challenges for Decision Makers* (New York: John Wiley and Sons, 1979), pp. viii–ix.

2. How Alternative Futures Fit into Long-Range Planning Models

6. Helmer, *Looking Forward*, p. 195.

7. David E. Wilson, *the National Planning Idea in U.S. Public Policy: Five Alternative Approaches* (Boulder: Westview Press, 1980), p. 117.

8. Interview with Hal Becker, Executive Vice President of The Futures Group, Glastonbury, CT, 20 September, 1984.

9. William Ascher and William H. Overholt, *Strategic Planning and Forecasting: Political Risk and Economic Opportunity* (New York: John Wiley & Sons, 1983), p. 31.

10. Ascher and Overholt, *Strategic Planning and Forecasting*, p. 24.

11. Interview with Alan Gropman, Colonel, USAF, Deputy Director for Planning Integration, Headquarters, USAF, Washington, DC, 15 October, 1984.

12. Helmer, *Looking Forward*, p. 274.

3. Methods Used to Develop Alternative Futures

13. Helmer, *Looking Forward*, p. 20.

14. Jib Fowles, ed., *Handbook of Futures Research* (Westport, Greenwood Press, Inc.: 1978), p. 250.

15. Brita Schwarz, et al., *Methods in Futures Studies: Problems and Applications* (Boulder: Westview Press, 1982), pp. 16–17.

16. Ibid., p. 22.

17. Julian L. Simon, "Global Confusion 1980: A Hard Look at the Global 2000 Report," *The Public Interest*, no. 62, Winter 1981, pp. 3–20.

18. Ferkiss, *Futurology*, p. 20.

19. Ibid., pp. 17–18.

20. US Council on Environmental Quality and The Department of State, *The Gobal 2000 Report to the President: Entering the Twenty-First Century*, vol. 2 (Washington: US Government Printing Office, 1980), p. 713.

21. Ferkiss, *Futurology*, p. 21.

22. *The Global 2000 Report*, pp. vii–x.

23. Fowles, *Handbook of Futures Research*, p. 329.

24. Helmer, *Looking Forward*, p. 53.

25. Fowles, *Handbook of Futures Research*, p. 330; Ferkiss, *Futurology*, p. 23.

26. Fowles, *Handbook of Futures Research*, p. 330.

27. Ibid.

28. Ibid.

29. Helmer, *Looking Forward*, p. 54.

30. Ibid., pp. 45–46.

31. E. Quade, *Analysis for Public Decisions* (New York: American Elsevier, 1975), p. 308.

32. *Global 2000 Report*, pp. v–vi, xiii–xviii.

33. Ibid., p. 714.

34. Schwarz, et al., *Methods in Futures Studies*, pp. 36–37.

35. Ibid., p. 38.

36. *Global 2000 Report*, p. 719.

37. Fowles, *Handbook of Futures Research*, p. 343.

38. Ibid., p. 336.

39. Helmer, *Looking Forward*, pp. 339–340.

40. Schwarz, et al., *Methods in Futures Studies*, p. 38.

41. Ibid., p. 40.

42. Ibid., pp. 144–145.

43. Helmer, *Looking Forward*, p. 160.

44. Ibid., pp. 179–180.

45. Thomas E. Jones, *Options for the Future: A Comparative Analysis of Policy Oriented Forecasts* (New York: Praeger Publishers, 1980), p. 45.

46. Ibid.

47. Helmer, *Looking Forward*, p. 88.

48. Fowles, *Handbook of Futures Research*, pp. 274–275.

49. Ibid., p. 149.

50. Ferkiss, *Futurology*, p. 22.

51. Helmer, *Looking Forward*, p. 154.

52. Schwarz, et. al., *Methods in Futures Studies*, p. 13.

53. Helmer, *Looking Forward*, p. 13; Fowles, *Handbook of Futures Research*, p. 299.

54. Schwarz, et al., *Methods in Futures Studies*, pp. 13–14.

55. Ibid., p. 13.

56. Ibid., p. 131.

57. Jones, *Options for the Future*, pp. 64–65.

58. Ibid., p. 66.

59. Analytical Services, Inc., *Air Force Innovation Task Force*, p. 1.

60. Ibid., p. 11.

61. Herman Kahn and Anthony Wiener, *The Year 2000: A Framework for Speculation on the Next Thirty-Three Years* (New York: The MacMillan Company, 1967), p. 6.

62. Jones, *Options for the Future*, p. 21.

63. Fowles, *Handbook of Futures Research*, p. 228.

64. Rochelle O'Connor, *Planning Under Uncertainty: Multiple Scenarios and Contingency Planning* (New York: The Conference Board, Inc., 1978), p. 8.

65. Schwarz, et. al., *Methods in Futures Studies*, pp. 28–29.

66. O'Connor, *Planning under Uncertainty* pp. 11–12.

67. Fowles, *Handbook of Futures Research*, p. 223.

68. Ferkiss, *Futurology*, p. 23.

69. O'Connor, *Planning Under Uncertainty*, p. 14.

70. Ibid., p. 11.

71. Ibid., pp. v, 1.

72. Fowles, *Handbook of Futures Research*, p. 226.

73. Ferkiss, *Futurology*, p. 22.

74. Kahn and Wiener, *The Year 2000*, p. 39; and John Naisbitt, *Megatrends* (New York: Warner Publications, 1984).

75. Analytical Services, Inc., *Air Force Innovation Task Force*, p. 14.

4. Long-Range Planning, Alternative Futures, and Their Relation to National Security Planning

76. Harold Brown, *Thinking about National Security: Defense and Foreign Policy in a Dangerous World* (Boulder: Westview Press, 1983), p. 4.

77. Ibid., p. 199.

78. Theodore Bauer and Eston White, *National Security Policy Formulation* (Washington: National Defense University, 1977), pp. 1–11.

79. Amos A. Jordan and William J. Taylor, Jr. *American National Security: Policy and Process* (Baltimore: Johns Hopkins University Press 1981), pp. 201–3.

80. Brown, *Thinking about National Security*, p. xvii.

Bibliography

Albert, Kenneth S., ed. *The Strategic Management Handbook*. New York: McGraw Hill, 1983.

Bell, Daniel, ed. *Toward the Year 2000: Work in Progress*. Boston: Beacon Press, 1967.

Cimbala, Stephen J., ed. *National Security Strategy: Choices and Limits*. New York: Praeger Publishers, 1984

Conboy, William A., ed. *The Challenge of the Future Visions and Versions*. Lawrence: The University of Kansas, 1981

Cornish, Edward, ed. *1999: World of Tomorrow*. Washington: World Future Society, 1982.

_____. *The Great Transformation: Alternative Futures for Global Society*. Bethesda: World Future Society, 1983.

Feather, Frank, ed. *Through the '80s: Thinking Globally, Action Locally*. Washington, DC: World Future Society, 1980.

Grinnon, John. *Future Worlds*. New York: Plenum Press, 1981.

Hawken, Paul, et al. *Seven Tomorrows: Toward a Voluntary History*. New York: Bantam Books, Inc., 1982

Knorr, Klaus, and Morgenstern, Oskar. *Political Conjecture in Military Planning*. Princeton University: 1968.

Kronenberg, Philip S., ed. *Planning U.S. Security*. Washington, DC: National Defense University, 1981.

Lorange, Peter. *Implementation of Strategic Planning*. Englewood Cliffs: Prentice-Hall, Inc., 1982.

_____, and Vancil, Richard F., eds. *Strategic Planning Systems*. Englewood Cliffs: Prentice-Hall, Inc., 1977.

Margiotta, Franklin D., ed. *Evolving Strategic Realities: Implications for U.S. Policymakers*. Washington, DC: National Defense University Press, 1980.

Ornauer, H., et al., eds. *Images of the World in the Year 2000: A Comparative Ten-Nation Study*. Atlantic Highlands: Humanities Press, 1976.

Pecci, Aurelio. *One Hundred Pages for the Future: Reflections of the President of the Club of Rome*. New York: Pergamon Press, 1980.

Radford, K.J. *Strategic Planning: An Analytical Approach.* Reston: Reston Publishing Company, Inc., 1980.

Schwarz, Stephan, ed. *Knowledge and Concepts in Futures Studies.* Boulder: Westview Press, 1976.

Solem, Erik. *Futures of the International System: Reflections on Forecasting Models and the Future Evolution of the International System.* Ottawa: Department of Defense, Canada Operational Research and Analysis Establishment, 1980.

Stonich, Paul J. *Implementing Strategy: Making Things Happen.* Courbridge: Ballinger Publishing Co., 1982.

Wilson, David E. *National Planning in the United States: An Annotated*

Coping with Alternative Soviet Futures: A Case Study in Strategic Planning

F. DOUGLAS WHITEHOUSE

Future events do not occur at random; the future of human endeavor is a function of knowledge and experience acquired in the past and decisions made in the present. If today's decisions are based on clearly defined objectives and some notion (whether visionary or calculated) of the environment in which we expect the results of our decisions to play out, the process of arriving at these decisions is known as strategic planning.

Strategic planning, then, is a way of thinking about the future, thinking about what we want (that is, defining our objectives or interests), thinking about the conditions which are likely to surround us in pursuing our objectives (projecting alternative environments), and thinking about ways to achieve our objectives either within the constraints of these environments or by influencing events to achieve a preferred environment

F. Douglas Whitehouse is a Soviet specialist and economist and a 1985 graduate of the National War College.

(developing a strategy, a course of action). Although the future is fraught with uncertainty resulting from inadequate knowledge and excessive complexity, strategic planning offers us a framework for reducing or at least defining the uncertainties.

1. The Process of Strategic Planning

There is no single right method for strategic planning. Instead, there are a variety of techniques or tools available to aid the individual, the organization, or the nation in systematically thinking about the future and in organizing thoughts into a coherent plan of action. These tools range from simple intuition to complex mathematical models designed to assess the impact of changes in hundreds of variables simultaneously. The literature on strategic planning is rich in methodological techniques.[1]

For any given exercise in strategic planning, the specific tools employed will depend on who is doing the planning and for what purpose. A corporation planning a future product line, for example, is likely to rely heavily on market surveys and the imagination and ingenuity of its leaders. A nation engaged in developing a five-year or longer plan for its economy is likely to employ a variety of sophisticated modeling techniques to gauge the interaction among the various sectors of the economy and assess the impact of alternative resource allocation patterns. Regardless of the simplicity or complexity of the exercise, all strategic planning involves forecasting: projecting our interests or objectives and assessing their relevance for the time period in question, projecting the key variables that will drive the alternative environments in which we must operate, and projecting the impact of our actions (our strategy) on the alternative environments.

Defining Objectives. Projections into the future, whether of objectives, environments, or strategies, involve coping with uncertainty. In defining objectives, we must ask ourselves whether they will be relevant for the time-frame being considered. In general, the more specific the objective, the shorter the time horizon of its relevancy. For example, an objective to minimize the threat of nuclear confrontation would be relevant only as

long as nuclear weapons remain viable instruments of war, but an objective to minimize the threat of superpower confrontation would be relevant for any and all weapon systems that might exist during any time period of interest. In other words, when defining objectives in the face of uncertainty, we must state the objectives at a high enough level of generality to ensure that they remain relevant throughout the time-frame under consideration.[2]

Simply listing interests or objectives at a high level of generality, however, is not enough. If projections are to be useful in strategic planning, we must attempt to weight the objectives—deciding which ones are most important during the time period of interest—and discuss the ways in which the various objectives complement or contradict one another.[3] This will be illustrated later, in section II, where I define our interests in coping with alternative Soviet futures.

Projecting Environments. Unlike the case of objectives, projecting environments in the face of uncertainty cannot be handled by moving to higher levels of generality. To do so would likely produce environments composed of redundant statements that would be of little use to policy makers. Nor can we simply take snapshots of what the environment will be like 20 or 30 years from now. In both cases we lack sufficient knowledge of the potential interactions among events and trends to provide meaningful statements about the results of such interactions. We can, however, reduce the uncertainty of future trends and events by (1) projecting several alternative environments, each depicting a different but important pattern of interactions, and (2) exploiting what we know about the behavior of past trends and events. To ensure that each projected alternative environment is realistic, we must describe each step in the chain of cause and effect from the present to the future. That is, we must construct scenarios. Moreover, the alternative environments must be relevant (that is, they must describe trends that affect our objectives), and they must be coherent (meaning that the trends and events must follow some overall theme, such as *economic stagnation or technology-led innovation and growth).*[4]

Methods for projecting alternative environments abound throughout the strategic planning literature. The forecasting techniques common to operations research, for example, clearly have an important role to play in projecting alternative environments. Although these methods provide a means of dealing systematically with much of the uncertainty surrounding projections, they are not foolproof. Nor can they substitute for human intuition. Reflective thinking and judgment are as important as formal techniques in assessing future events and trends and should be employed liberally in any study of the future. In the words of Albert Einstein,

> I believe in intuition and inspiration ... at times I feel certain that I am right while not knowing the reason .... Imagination is more important than knowledge. For knowledge is limited, whereas imagination embraces the entire world, stimulating progress, giving birth to evolution. It is, strictly speaking, a real factor in scientific research.[5]

Accordingly, the alternative environments projected for the USSR in this paper draw heavily on my own intuition and imagination based on nearly 20 years of research experience on the Soviet Union.

A word of caution is in order. The Soviet environments described in this paper should not be interpreted as "either/or" alternatives. Rather they should be considered as potential points on a continuum of possibilities. Defining a precise scenario or "best guess" is beyond the scope of this analysis. Instead, my focus is on developing a strategy to cope with the range of possible scenarios bounded by the two I describe.

Developing Strategies. Developing alternative strategies to match each of our alternative environments would be a useful exercise only if we could shift readily from one strategy to another as circumstances warranted, and only if such shifts had little or no influence on the environments. Clearly, however, the United States is such a powerful actor on the world scene that changes in our strategy would have a substantial impact on the evolution of any future environment. In addition, the purpose of strategic planning is to facilitate today's decisions which generally are responsive to only one strategy. For example, decisions

which implement major R&D programs or the construction of major capital goods are expected to be relevant for decades. To be effective, such decisions should be taken in the context of a single broad strategy designed to deal with those elements common to the most important alternative environments. Taken collectively, such elements can be referred to as the core environment and the strategy for coping with them, or simply as the *core strategy*.[6]

The core strategy is much like a national doctrine, providing a clear area of guidance within which policy makers can maneuver, but the articulation of a core strategy is not sufficient to constitute a strategic plan. The core must be supplemented by a basic strategy designed to influence the environment toward the preferred alternative and to successfully fulfill our objectives. As Ascher and Overholt put it, "Whereas the core strategy deals with the constants of the environments, the basic strategy copes with the variable features."[7]

The final element in putting together a strategic plan is the development of a hedging strategy to cope with unforeseen contingencies—events outside the range of possibilities covered by the alternative environments. Such events include surprises whose occurrence, although extremely important, would be highly improbable; specific examples relevant to this would include a full-scale revolt in Eastern Europe or a complete switch in the Soviet economic systems to a market orientation. Hedging strategies differ from core and basic strategies in that the former are usually a series of *ad hoc* contingency plans rather than fully articulated strategic concepts. Generally, the more complete the basic strategy, the less the need for hedging measures.[8] Realistically, however, a basic strategy that covers all possible contingencies would probably be of such complexity as to render it useless to policy makers. A simple straightforward basic strategy, together with a hedging strategy to cover only the most important and most probable contingencies, would be of much greater value to the policy making community.

The steps of defining objectives, projecting environments, and developing strategies represent only one approach to strategic

planning. There are many others, to be sure. But it is my opinion that the process as described is the most relevant for strategic planning on a national level. I use this process in devising a strategic plan for the United States to cope with the Soviet Union during roughly the next 30 years. In so doing, I have drawn on the thoughts of Government administrators, military planners, and academic scholars, as conveyed through their lectures and writings, and on my own experience in analyzing Soviet affairs. I would not presume to suggest, however, that the plan I have fashioned represents or even approximates a panacea for US policy makers, nor even that it represents rigorous adherence to the steps I have just described. Rather, the effort is offered as an exercise in thinking about the future, a point of departure for more rigorous and thoughtful analyses of the issues raised. If my case study does nothing more than raise questions about the probability of the scenarios generated, it will have accomplished its goal.

2. Defining US Objectives

In defining objectives for some future period we need to carefully consider the criteria we want these objectives to meet. One criterion is relevancy. An equally important criterion for the objectives of a nation, in my view, is consistency with the basic values and beliefs of the nation. For if the objectives of a nation fail to reflect its values, they will also fail to receive the support of its people. In a democracy, any plan of action based on such objectives will be doomed to failure.

What, then, do we value as a nation? At the most basic level, our values are clear; we believe in life, liberty, and the pursuit of happiness. Put in an international context, these values could be restated as peace, security, and self-determination. A peaceful world is not life threatening, and Americans, for the most part, are interested in promoting peace. Security to a democratic people implies liberty: freedom from the threat of tyranny imposed from beyond one's borders and freedom from the fear of total annihilation. Such is the liberty that comes from national strength—strength of will, strength of purpose, and strength of

means; Americans place a high value on strength and security. The link between pursuit of happiness and self-determination is perhaps a bit more elusive, but it seems to me that no nation's people can enjoy the pursuit of happiness without first attaining self-determination. As Americans, we have espoused self-determination for all nations as a basic intent of our foreign policy for generations.

With these basic values in mind, our goal is to formulate meaningful objectives consistent with these values and relevant to our relations with the USSR through the first decade or so of the 21st century. Here, we run into a perennial *chicken and egg* problem that continuously plagues strategic planners. How can we derive objectives unless we know how the USSR is going to behave during the next 30 years? Although this question might suggest that we should start by projecting the future environment and *then* formulate our objectives, it only demonstrates the iterative nature of strategic planning and the need for continual feedback and adjustment as the planning evolves. As a starting point it is necessary to understand the basic nature of the USSR and the factors that motivate its leaders, and for this we can draw on the historical record.

It is clear after nearly 70 years that the USSR represents a totalitarian regime committed to defending an internal system of rule that permits no opposition, and is interested in subverting to that same system any nation that provides the opportunity to do so—including the United States. Because Soviet leaders seek legitimacy through control and subversion, the totalitarian nature of the system probably will endure for at least several generations. As the interests of the USSR are likely to remain inimical to our own, and promote behavior that could pose a threat to our own values, our objectives in coping with the USSR in the future must be oriented toward either changing the USSR's interests, altering its behavior, or inhibiting its ability to act. Attempting to change Soviet interests would involve altering the basic values of Moscow's political leadership, a task we could no more accomplish than they with ours. Moreover, historically most attempts to alter the USSR's behavior by peaceful means

have been fruitless. Thus, we are left with the third option, inhibiting Soviet ability to act (to behave in ways that threaten our values).

Accordingly, based on our third option, I have selected the following three major objectives as the foundation of a strategic plan for coping with the USSR over the next 30 years.

a. *To deter Soviet aggression:* to restrain or discourage through fear any acts of violence directed at the United States or any other nation; to create an environment that raises the cost to Moscow of any hostile acts committed beyond its borders.

b. *To contain Soviet influence:* to prevent the USSR from successfully conducting activities beyond its borders that might enhance its ability to exercise hegemony over any nation or to disrupt any US or allied alliances; to limit Soviet use of space for hostile or threatening purposes.

c. *To minimize the threat of superpower confrontation:* to create an environment that reduces to a minimum the risk of total war between the major world powers; to discourage the notion by any world power that it could engage successfully in a limited war with the United States, either directly or through surrogates.

I believe, these objectives reflect our values of peace, security, and self-determination, though not necessarily in that order. Indeed, neither the objectives nor the values are mutually exclusive. Each overlaps and supports the others.

It is not by accident that these objectives correspond roughly to US policy goals that have been pursued in one way or another for about 40 years, and with some success. Because some version of these objectives has been articulated by this country's senior leaders for the last four decades, the objectives can be thought of as expressing the US leadership's guidance to the planning process.

Merely identifying US objectives, however, is not sufficient to move us to the next stage in the planning process. As noted, our efforts must include some evaluation of the objectives in

terms of their relevance, their complements, and their contradictions. A few words are also in order about their relationship to one another.

Each of the objectives overlaps and supports the others. For example, if we could successfully deter Soviet aggression we would have contained to some degree the spread of Soviet influence, since aggression is one of the chief means by which the USSR expands its sphere of influence. Similarly, a successful policy of containment could, in some cases, raise the cost to Moscow of aggressive action, which, in turn, could reduce the threat of a superpower confrontation.

Although there seems to be considerable complement among the objectives, the potential for conflict or contradiction is also present. A policy designed to deter Soviet aggression, for instance, could conceivably require the use of force, resulting in a heightened risk of superpower confrontation. On the other hand, an excessive emphasis on avoiding confrontation could result in a de facto policy of appeasement, undermining both deterrence and containment.

The key to achieving a complement instead of a contradiction among our objectives lies in designing a strategy whose individual elements are themselves complementary. For a nation such as the United States, this can be accomplished best by formalizing the strategic planning process and engaging in it on a continuing and consistent basis, periodically altering elements of the plan to meet new or changing circumstances.[9] For this case study, then, a final assessment of our objectives must wait the construction of our strategy for meeting them.

A brief judgment about the relative weights that should be attached to our objectives: clearly, deterring Soviet aggression is the *sine qua non* of our objectives, for without a determined and convincing policy of deterrence we run a high risk of confrontation at best and annihilation at worst. The remaining objectives carry nearly equal weights, in my opinion. If forced to choose, I would have to give the edge to containing Soviet influence as I have defined it. Success in meeting this objective would mean

that a superpower confrontation would have to be initiated by the USSR, and if our objective of deterrence—to which I have already ascribed the greatest weight—were also successful, the risk of a Soviet initiated confrontation would be minimized.

3. Projecting Alternative Soviet Environments

What will the USSR be like in the 21st century? Will we be able to achieve the objectives I outlined? If the trends of the last decade in the Soviet economy and society are harbingers of the future, we could face a much weaker USSR than we know today. On the other hand, if these trends are reversed as a result of new and enlightened leadership policies or major breakthroughs in technology, we could face a much more powerful adversary. Where on this spectrum of possibilities will the USSR emerge, and how much impact will the United States have on the outcome? These are the issues to which to turn.

There is no way we can know precisely what the environment of the future will hold. At best we can only postulate a logical progression of events based on what we know to exist now, what we know about the behavior of those trends that brought us to the present, and what we think alternative combinations and permutations of these trends might yield in the future. Fortunately, some of these combinations and permutations are more knowable than others and can be projected with considerable confidence (for example, demographic trends). Unfortunately, however, these trends usually are not the most important ones. For the latter (such as leadership attitudes), we generally can offer only educated guesses based on past experience.

In projecting alternative Soviet environments, I elect to develop scenarios that represent two points on a continuum of plausible outcomes. Neither of these scenarios are radical extremes. They are far apart, to be sure, but they are not so extreme to be rejected out of hand. Instead, the scenarios cover what I consider to be a reasonable range of plausible outcomes that others can ponder and refine. No doubt, the actual environment will be somewhere between the scenarios—its features

determined, in part, by US ability to foresee opportunities and plan specific policy actions to influence the course of events. One scenario is based on a continuation, and eventual worsening, of the economic and social trends we have witnessed in the Soviet Union since the mid-seventies, resulting in an environment of economic stagnation or decline, a loss of influence abroad, and a diminution of Soviet military power vis-a-vis the United States. My other scenario is based on technology-led innovation and growth, reflecting major breakthroughs in energy technology and farming, as well as advances in the use of outer space. Its result is a reversal of the declining economic trends, and a lessening of the apathy that has characterized Soviet society. Which environment is more likely to occur? I will leave that question for others to decide for themselves. Obviously, the former is the preferred scenario, but the process of getting to this scenario will present some difficult decisions for US policymakers, which if not taken could create as much potential danger as that inherent in the Soviet high-growth environment.

In both scenarios, the Soviet regime remains committed to its ideological underpinnings, and in each scenario energy is a key driver. Although the energy factor may sound like economic determinism, it is not. There are an infinite number of scenarios that could emerge between the two described here. The energy issue has been emphasized in both scenarios because it is important and because the contrast illustrates the diversity of plausible outcomes. One particularly disturbing issue emerges from these two scenarios. To the extent that they may be equally plausible, the disparity between them could represent a potential gap within the body of informed opinion. Thus, any effort we can make toward narrowing that gap in advance of major US policy decisions might improve the chances for success of such decisions.

Some may wonder why a scenario depicting reform-led innovation and growth was not developed. First, what some consider to be reform, others assess as simply a change in policy direction. Second, and more important, an innovative high-growth USSR stimulated by technological change would in my opinion have to be accompanied by major internal reforms in order to be effective.

Soviet Economic Stagnation. When Mikhail Gorbachev came to power in 1985, the USSR faced a convergence of economic constraints and social malaise unlike anything it has encountered since WW II. The simple growth formula upon which Soviet leaders have relied for the past 40 years—maximum inputs of labor and capital—no longer yielded the annual growth dividends that traditionally provided sizeable resources for consumption, investment, and defense. Rising costs of raw materials, energy shortages, slowing growth in labor and capital resources, and sluggish productivity had taken a severe toll on the economy since the mid-1970s.

After 1975, growth in heavy industry slowed sharply and, with it, the wherewithal to maintain rapid rates of growth simultaneously in the output of investment goods, defense hardware, and consumer durables. The industrial slowdown was characterized by shortfalls in the production of key industrial commodities—especially steel, construction materials, and machinery. In the energy sector, both oil output and coal production had slowed substantially, reflecting an approach to resource management that has emphasized short-term exploitation at the expense of maximum lifetime recovery.

To some extent, the decline in economic growth reflected increasing tension between the demand for and supply of labor, capital, and natural resources. More important, it also reflected the Soviet failure to use resources more efficiently. Although productivity has never been the primary engine of Soviet economic growth, it had become a constraint on growth. Barriers to innovation and substitution of capital for labor were and are formidable. The foundations of the Soviet system—directive planning, central allocation of resources, administratively set prices and incentives oriented toward quantitative production goals—encourage redundancy and waste in the use of resources. Managers still find it prudent to hoard workers as the managers' bonuses are still tied largely to fullfilling output goals. The resistance of managers to the introduction of new technology or equipment that might temporarily disrupt production processes and jeopardize plan fulfillment is notorious.[10] Additionally, there

is no automatic system for transferring resources from one use to another. Industries, for example, do not expand or contract on demand from consumers, but on command from planners.

The effect of these rigidities is a tendency of the system to reproduce itself in the same mix of output and the same pattern of investment for decades. This, together with relatively higher growth in investment and capital stock than in either labor or output, has resulted in rapidly diminishing returns to new capital stock and hence to investment.[11] The continuing existence of diminishing returns means that the new plant and equipment coming on-stream will be very much like the old plant and equipment already operating, and that the full potential of any new technology embodied in the new capital will not be realized. Moreover, inordinate delays in planning, designing, and constructing new production facilities will inhibit the process of lowering the average age of capital stock and often will render useless the new machinery and equipment (both domestic and imported) that will have been waiting to be installed (often for years and exposed to the elements, if the past is a guide). This situation, which prevails in much of Soviet industry despite Gorbachev's program of modernization (which cannot be implemented easily or quickly), will continue as long as the rigidities inherent in the centrally planned and repressive Soviet system continue.

The USSR's inability to bring new capacity on-line more rapidly will continue to delay the introduction of labor- and materials-saving technology, thus hampering Soviet efforts to conserve resources. This is particularly important in the case of energy. Because the energy consumption structure in the USSR will continue to be dominated by heavy industry, major gains in energy efficiency will have to come by upgrading industrial technology—a time consuming, capital intensive process.

In addition to these problems, the Soviets will face a sharp shift in the growth of population in the 21st century. The average annual growth in the Slavic population, which registered about 1 percent in 1959–79, will fall to about 0.5 percent during 1980–2010.[12] More important, much higher growth will occur in

the generally less skilled and less mobile Muslim populations of the central Asian republics, making it more difficult for the Soviets to staff skilled positions in the heartland of the Russian republic and in its eastern regions—areas where most of the demand for labor will be occurring. On top of this, unless death rates increase sharply due to growing alcoholism and related cardiovascular disease, the next 30 years could see a much larger share of retirees in the USSR's population, and in turn, a sharp increase in the demand for social services. In a society where such activity holds last place in the pecking order for resource allocations, this would only deepen resentment among a growing segment of the population.

Thus, Soviet leaders will be under increasing pressure to reconcile economic capabilities with resource constraints. Although the USSR is a planned economy that boasts long-range plans on the order of 20 years, no clear strategy has been proposed to deal with the problems described above. Instead, it seems likely that the leadership will continue their crisis management approach—throwing a larger share of investment resources into what is considered to be the most pressing problems of the moment. Energy will have to rank high, if not first, on this list.

The energy outlook. Much of the USSR's ability to sustain economic growth depends on exploitation of its energy resources both for domestic use and to earn hard currency. For the past half century, the availability of energy resources has fueled Moscow's extensive growth model, and Soviet leaders have maximized the short-term exploitation of these resources with little or no thought to their possible depletion. Not only have the scarce resources been underpriced, but the perverse Soviet incentive system has rewarded overfulfillment of short-sighted production goals, regardless of how much of the resource may have been wasted or rendered unusable in the process. When efficiency in extraction was considered at all, it usually was in terms of maximizing labor productivity—an indicator that generally declines as resource deposits get deeper or more difficult to work.

In *oil* production, the Soviets have emphasized development over exploration and have overproduced existing fields, with the result that no major new discoveries have been made since the early 1970s and the potential lifetime of existing fields has been shortened. Moreover, the USSR does not have the drilling capability to pursue adequate development and exploration programs simultaneously.

Depletion of existing reserves means that more and more rigs and crews have to be allocated to development drilling so that new wells in old fields can compensate for declining output per well. Indeed, development drilling requirements are now rising so rapidly that they will soon outrun (and may have already) the USSR's capability to supply rigs, crews, and associated equipment. Because of these factors, oil output (which in 1984 declined, for the first time since WW II) will be determined during the next decade by the outcome of a race between the increasingly rapid depletion of existing fields and the speed with which the Soviets can put on-line an ever larger number of less and less productive wells.

More significant for the long-run, the adequacy of the USSR's oil reserves has been called into question by a running debate over the last few years between the Ministry of Geology and the Ministry of Oil Production. In essence, the oil producers claim that the geologists have overestimated the quantity of reserves available for exploitation.[13] Given the antiquated state of much of the USSR's production and seismic technology, this indictment indicates a protracted decline in output, if not a precipitous one. Although the Soviets have potentially abundant oil reserves in the Arctic, East Siberian, and offshore areas, commercial development of such reserves would be at least a decade away under the best of circumstances. Given the current state of Soviet technology, together with the resource scarcity and the immediate needs for increased energy production, it seems unlikely that these areas could be effectively producing before the turn of the century without substantial Western assistance.

With oil production falling, the Soviets will switch their emphasis on energy development to *natural gas*. The presence

of vast untapped polar gas reserves should support rapid growth in gas output until about 2010. The USSR openly claims over 34 trillion cubic meters of natural gas reserves, five times more than US gas and about 40 percent of the present world reserve base.[14] Nevertheless, natural gas will not be a panacea for Soviet energy problems, especially if oil production drops rapidly. Gas-for-oil substitution will be slowed by (1) an inability to distribute gas reliably to many customers because of the lack of extensive local pipeline networks and storage facilities, and (2) the time involved in converting many industrial processes to gas. The small network of local distribution lines and underground storage sites for gas will force most substitution to occur near major gas trunk lines coming from West Siberia and Soviet Central Asia. Without the expensive infrastructure of local feeder lines and storage already in place, decisions to convert to gas are unlikely in cases where reliable supply is essential and where the costs of conversion are large.

An inadequate gas distribution network could remain a bottleneck for some time if Moscow concentrates more on building trunk lines for export. More export pipelines are likely to be a function of foreign (notably West European) demand for gas. Currently, such demand is weak, but as the economic recovery in Western Europe gains momentum, so will the demand for gas. Thus, unless the Soviets move now to put the required domestic distribution and storage infrastructure in place (and there are no plans to do so), they are likely to a find themselves building export pipelines and yet unable to muster the resources for the domestic network.

Even if gas distribution were not a constraint, many oil burning industrial boilers and furnaces are too small or too old to make gas-for-oil substitution viable, and these units will be retired very slowly. Indeed, the concentration of oil consumption in rapidly growing capital-intensive sectors (for example, heat and power production, motor transport, and aviation) over the last 25 years has locked the USSR into heavy dependence on oil as an energy source. This enormous quantity of oil-dependent capital stock already in place cannot be turned over quickly, and therefore will inhibit the rapid transition to other fuels.

Soviet *coal* production will not provide much relief. The industry has been in a 10-year slump. Output in the older western basins has been limited by worsening geological conditions, inadequate past investment, insufficient new mine starts, and difficulties in attracting and retaining experienced workers. As is the case with other sources of energy, increasing investment will be required to push up coal production. Large scale development of lower quality Siberian and Kazakh coal must await a major expansion of rail capacity together with commercial development of coal enrichment processes, slurry pipelines, or high-voltage electric transmission lines from mine-mouth power stations—projects with heavy up-front costs and long lead times.

Nuclear power holds a high priority in Soviet plans for the generation of electricity, especially in the energy-short European USSR, but the nuclear power program is far behind schedule, and the Chernobyl accident has driven up the already high cost of electric power. Accordingly, the nuclear share of total primary energy probably will rise from about 1 percent in 1980 to nearly 5 percent by 1990, and to roughly 10 percent by the turn of the century.[15] This will not be sufficient, however, to offset the decline in oil and stagnation in coal. Although the Soviets can build nuclear power plants without the fetters of environmental lobbies or undue concern for the citizenry, doing so could prove detrimental to them in the long run. The USSR consistently gives short-shrift to safety measures throughout the economy, and this practice well may extend to the nuclear industry. In addition to Chernobyl, there is evidence to suggest that the Soviets may have suffered a large-scale nuclear accident in the Urals some years ago.[16] Thus, even without a strong environmental lobby, the USSR will have to proceed slowly and carefully down the nuclear path, since their intent is to build more plants near the major centers of population in the western part of the country.

During at least the next 15 years, the Soviet energy plan is to devote the bulk of their efforts to the further development of natural gas.[17] Although this happens to be the path of least resistance, it is a risky one. Even if they meet their output plans for

gas, they may not be able to use all of it due to rigidities in the patterns of energy consumption and an inadequate distribution network. Nevertheless, in traditional Soviet campaign fashion, they will devote massive doses of resources and rhetoric to achieving gas output goals, and precious little of either is likely to be expended to advance the state of the art in innovative energy programs.

These developments suggest that by the time the USSR enters the second decade of the 21st century, oil production will have fallen substantially, coal output probably will be stable at about present levels (in terms of energy content), the bulk of natural gas output will be exported, and the Soviets will still be trying to expand local gas distribution lines and construct more nuclear power plants. Given continued, albeit slow, expansion of energy-intensive industries during the next 20–25 years, chances seem good that by about 2010 energy demand will have outstripped supply and the energy constrained economy will stagnate or even suffer some decline.[18] Because the USSR's economy is so taut and interdependent, energy shortages in even just a few sectors would reverberate throughout the system creating second and third order effects whose impact could be more severe than the energy shortage itself. As usual, the greatest impact would be felt by the Soviet consumer. The work force would become even more discouraged, drunk, and despondent than it is today, and labor productivity would fall, exacerbating the downward spiral in production.

The USSR would not be able to extricate itself easily from this situation. Having relied on imports of advanced Western technology, the USSR would be ill prepared to advance the state of the art in these technologies. Moreover, by this time the technology gap between East and West is likely to have increased substantially as a result of the explosion of computer technology in the West and its suppression (or compartmentation to defense use) in the East.[19] No society that suppresses information from its own people can ever hope to be at the leading edge of world technology.

In an effort to offset the gains being made in the West, Soviet leaders are likely to channel the best of their resources into that area where the USSR performs the best: defense. Moscow will feel this is necessary not only to counter the West and perhaps modern industrial China, but also to maintain its hold over Eastern Europe and ensure that the resource flow from Eastern Europe continues. There may even be a tendency among Soviet leaders to circle the wagons around the Bloc, so-to-speak. Indeed, the fundamental importance of Eastern Europe to the USSR will not change. Maintenance of Eastern Europe as a buffer zone and potential springboard for military action or political pressure against Western Europe, as well as assurance of rule in the region by Communist leaders who will act within key domestic and foreign parameters set by the USSR, have historically been matters of the highest priority for the Soviet leadership. Thus, the character of relations between the USSR and its East European client states, which has changed from little more than pure colonial domination into a form of highly asymmetric interdependence today, could regress toward colonial domination again in the 21st century.

Soviet relations with the Middle East will be determined largely by what happens in the Middle East itself (an issue beyond the scope of this study). In Afghanistan, the Soviets may well go the way of the United States in Vietnam. By the turn of the century, the USSR either will have killed most of the Afghan population or decided that the effort isn't worth the candle. As to the Persian Gulf area, the Soviets are not likely to make an overt military move in that direction as long as they believe it would precipitate a superpower confrontation. Additionally, Moscow's commitment to domestic natural gas development over the next decade or so probably will lower its interest in foreign sources of oil, especially if the gas policy enjoys some success through 2010. After that the USSR will have missed any window of opportunity it might have had to seize the oil sources of the Middle East, since the United States probably will have taken a commanding lead in military technology, firmly committed to defending the Middle East.

As for the rest of the Third World, the Soviets are not likely to maintain strong commitments, given their domestic economic and social problems, their preoccupation with maintaining hegemony over Eastern Europe and Afghanistan, and their felt need to counter what they see as a more threatening environment from the West and perhaps from China.

Whether the Soviet environment in the early part of the 21st century plays out at all closely to what has been described here, the important question is what Soviet leaders of that era will be like. All of them will rise to power through the Communist party apparatus, and their prime goal likely will be to maintain and perpetuate their control.[20]

While the current leadership seems to be taking a more innovative approach toward such issues as "openness" and "decentralization," their desire to maintain central control over much of the economy is still strong and will limit the extent of decentralized decisionmaking authority and open communication that will be tolerated.

Technology-Led Innovation and Growth in the USSR. What if the crisis period mentioned in the previous scenario was accelerated by about 25 years?

This could occur, for example, if Soviet oil production drops precipitously over the next few years as a result of an inadequate reserve base. The USSR would be caught with no immediate alternative energy source (including natural gas) to offset most of the loss in oil production, and all of the domestic repercussions I mentioned likely would materialize.

Under these circumstances, securing the oil resources of the Middle East might loom very large among Moscow's policy options, but even today the Soviets perceive that the United States and probably NATO would not stand idle while the USSR helped itself to the Persian Gulf. Despite the lack of a commanding US lead in military might, the current rough parity probably is sufficient to convince the Soviets that an all-out war with the United States (plus NATO) would spell disaster for them as well as for us. Even with a stagnant economy and all its attendant difficulties, the perceived risk of annihilation would be too great.

An alternative for Moscow would be to turn inward, licking its domestic wounds and husbanding its resources under a new and younger leadership. The top leader would have been only 10–15 years old during WW II, and might perceive that, given the domestic crisis, the only way for the USSR to emerge again as a world power would be to apply the best resources at its disposal to getting the domestic economy moving again. This could not be done easily or quickly and, at a minimum, would require a sharp reallocation of resources away from defense and into the civilian sector.[21] Some rather unorthodox steps in dealing with the West also would be required, such as returning the disputed Kurile Islands to Japan in exchange for key technological processes, or major Japanese investment in Siberian energy and raw materials development. In addition, the Soviets could consider granting West European and American firms on-site participation and equity in major joint ventures, for example tertiary oil extraction and refining, state-of-the-art manufacturing processes and Western consumer goods industries, including plants for producing agricultural equipment.

During this retrenchment period, which probably would last through much of the 1990s, the Soviets, by concentrating resources in areas that have already shown some promise but lacked sufficient resources for development, could achieve some technological breakthroughs in energy production, agriculture, and the use of outer space for materials processing. Such breakthroughs, in turn, would give a boost to productivity and stimulate economic growth. By the turn of the century, more and better resources would be available to modernize and expand their military forces (including space-based systems), provide more investment for further economic growth, and ensure a higher standard of living for the population.

Energy technology. If the Soviet leadership recognized during the late 1980s that a sharp drop in oil production was likely because of insufficient exploitable reserves, they could redirect a sizeable amount of investment resources to other energy sources, especially natural gas and coal. Additional resources could be applied not only to gas and coal production directly, but also to

local pipeline transmission networks, infrastructure for Siberian coal production, and synfuels development. Methanol, for example, can be derived from both coal and natural gas (as well as other sources); the Soviets already have developed a limited capacity for methanol production. A concerted effort in this area, together with acquisition of the Mobil Methanol-to-Gasoline (MTG) process from the United States, could move the USSR further down the learning curve in synfuels production and use. The Mobil MTG process is simple, energy-efficient, and produces a high-quality high-octane gasoline that could take some of the pressure off available crude oil resources.[22]

By the mid-1990s, the Soviets could have a well-developed commercial synfuels program, accounting for a large share (if not the largest) of world production. Methanol would be a particularly attractive option since it can be used as a feedstock for producing single-cell protein—an important livestock feed additive (discussed in the next section on agriculture technology).

In addition to an emphasis on synfuels development, the USSR would undoubtedly step up its nuclear power program as well as devote a greater research effort to fusion technology. Both the United States and the Soviets have been conducting research in nuclear fusion for some time. So far, the Soviet TOKOMAK device has been one of the most successful in approaching the fusion threshold.[23] This is another area—and the most important in the long term—where a concentrated effort by the Soviets might achieve a major breakthrough. The ability to harness fusion power would provide the USSR with an inexhaustible source of energy. Given the research that has occurred to date, it seems well within reason to expect a breakthrough by the late 1990s or early in the 21st century. Such an event would remove most of the pressure from available oil resources.

Another area of energy technology where the USSR could achieve a breakthrough in the 1990s is the production and use of superconductors for long-distance electricity transmission.[24] Superconductors would enhance Soviet ability to transmit electricity produced from coal at mine-mouth power stations in Siberia. This would increase greatly the value of developing the

Kansk-Achinsk and Ekibastuz coal basins and relieve some of the pressure now being placed on the electric power grid in the western part of the country.

Agricultural technology. Raising the efficiency of the USSR's agriculture would be another area high on the list of leadership priorities during the retrenchment period. This sector of the economy has consistently claimed more than one-fourth of the country's investment resources annually and still cannot meet the population's demand for quality and variety of food. Key problems facing the leadership in this sector are the high cost of producing livestock products and the vulnerability of grain crops to the vagaries of the weather. Only by importing record quantities of meat in recent years has Moscow been able to keep per capita meat consumption from falling.

Despite a long-standing emphasis on the livestock sector, progress in this area has been hindered by a chronic shortage of high-energy feeds and an imbalance among major feed components, including a serious protein deficiency.[25] To offset the protein deficiency, the USSR has begun producing single-cell protein for use as a feed additive, but production has been hampered by difficulties with hydrocarbon contamination from the petroleum feedstock. A major effort in enzyme research by the Soviet microbiological industry, however, may develop a method to remove much of the contamination within the next few years. Currently the Soviets have over 100 facilities engaged in advanced microbiology activities.[26] In addition, the use of methanol as a feedstock for single-cell protein production may alleviate some of the problem, and would provide a complementary use for the USSR's synfuel output.

New plant and seed varieties are another area ripe for Soviet technological gains. Biogenetic innovations may lead to a whole family of new plant and food varieties within the next decade. The Soviets already have made substantial advances in biogenetic engineering, particularly in the use of lasers on DNA genetic materials.[27] Thus, drought resistant and high-yield grain varieties for Soviet agriculture could appear sometime in the 1990s. These innovations could increase substantially the returns

to Soviet agricultural investment and sharply reduce, if not eliminate, Moscow's need for imported grain and meat.

Materials processing in space. Most technology experts believe that processing materials in space can yield products with near-revolutionary properties and mind-boggling characteristics. The Soviets have recognized this for at least a decade and have put together a program for a major space-based factory to manufacture a large number of alloys, ceramics, semiconductors, and composite materials. Extensive experiments in brazing, welding, and soldering in space have made the Soviets world leaders in the construction of large space structures. They have developed semiconductor materials with much higher levels of purity than those manufactured on earth. They have made spectacular advances in laser optics, such as producing glass materials with refractive properties that cannot be duplicated on earth. And they have produced superconductors with exceptional properties for conducting electricity.[28]

Such products are made possible by the near total vacuum and almost zero gravity of the space environment. An accelerated Soviet program in space over the next decade or so could result in materials with near science fiction properties, particularly in the area of metal alloys and ceramics. Such advances would provide the basis for a quantum jump in state-of-the-art technology for a host of applications: microelectronics, space travel, drilling technology, communications, medicine, construction, supercomputers, education, and defense. In fact the spin-off technology from materials processing in space will undoubtedly affect all economic activity.

Defense applications of these advances would be particularly important to Moscow, as they would enhance the performance levels of virtually all Soviet weapon systems by several orders of magnitude[29] and perhaps lead to totally new systems and concepts of warfighting. Additionally, major advances in medicine and pharmaceuticals could alleviate some of the USSR's major health problems. Advances in drilling technology could enhance deep drilling under high pressure and temperature conditions, facilitating additional recovery of oil and gas and perhaps leading to development of geothermal sources of energy.

Technological advances such as those described here have a tendency to feed on each other, leading to even greater breakthroughs. Advances in supercomputer technology would be particularly relevant in this regard. Thus, sometime in the second decade of the 21st century, we could face a much more powerful Soviet Union, competing with us not just for influence in the family of nations, but also for the resources of the moon, the asteroids, and elsewhere.

Meanwhile, back on earth, the USSR would have emerged from its period of retrenchment, by about the year 2010, with a more vigorous and technologically advanced economy, albeit at the expense of great sacrifice by its people during what surely would have been an extremely oppressive decade. But the Soviet people have traditionally suffered oppression stoically, and they well may do so again. The revitalized USSR would likely resume a vigorous foreign policy aimed at regaining its position as a major world power (or even as *the* major world power). Moscow likely would attempt to split any Western coalitions, such as a US-Western Europe-Japan triangle, and undermine US influence elsewhere in the Third World. Moreover, the USSR could be in a better position to succeed than it is today, particularly if the developed West—having seen the Soviets turn inward during the late 1980s—retreated from any attempt to advance international cooperation.

4. Developing the US Strategy

Thus, we should plan now for the possibility of having to cope with a powerful, and perhaps even dominant, USSR and to develop a strategy for ensuring that such an environment does not come to pass.

Our strategy must be designed so that the decisions we make today will move us in the direction of a preferred environment—one in which our objectives can be met. Our objectives are known, and the environment we would prefer is that of a weakened USSR unable or unwilling to risk any new foreign adventures or commitments (that is, something akin to what we have described as Soviet stagnation). Because we cannot know with

certainty which environment will emerge, we need to identify those factors that affect our interests and are common to both environments (and to any variant between them).

Identifying the Core Environment. Because both scenarios depict a totalitarian regime dedicated essentially to the same principals that it holds today, the common (or core) factors can be found in the Soviet regime's objectives. In both cases, we would be dealing with a regime whose objectives vis-a-vis the United States are (1) to discredit us in the eyes of both our allies and the nonaligned nations of the Third World, to maintain coequal (or achieve superior) superpower status, (2) to contain the costs of strategic military competition with the West, and (3) to reduce the risk of nuclear war.[30] When stated in a broader context (as listed below), we can readily see the conflict between Soviet objectives and our own.

Soviet objectives. **To intimidate the Western world into submission and deference;** to discredit the US with its allies and Third World nations; to maintain coequal or better superpower status through nuclear superiority. **To spread Soviet hegemony as far as possible;** to decouple the US from its ties with Western Europe and Japan; to ensure international conditions favorable for building communism, and support national liberation movements around the world. **To contain the costs of competition with the West;** to restrain advances in Western technology through arms control agreements and the exploitation of peace movements in the Western countries; to acquire advanced technology by legal or illegal means; to reduce the risk of nuclear war.

US objectives. **To deter Soviet aggression;** to restrain or discourage through fear any acts of violence directed at the US or any other nations; to create an environment that raises the cost to Moscow of any hostile acts committed beyond its borders. **To contain Soviet influence;** to prevent the USSR from successfully conducting activities beyond its borders that might enhance its ability to exercise hegemony over any nation or to disrupt any US or allied alliances; to limit Soviet use of space for hostile or threatening purposes. **To minimize the threat of superpower confrontation;** to create an environment that reduces to a minimum the risk of total war between the major world powers; to discourage the notion by any world power that it could engage successfully in a limited war with the US, either directly or through surrogates.

The only common ground between the Soviet and US objectives is Moscow's desire to reduce the risk of nuclear war. In this case, however, the Soviets view nuclear war in the context of a possible means to limit the cost (not necessarily monetary) of competition with the West. To Moscow, the possibility of nuclear war is real and the writings of the Soviet General Staff support this view:

> The most important task of the General Staff in preparing for a modern war is the detailed planning of employment of nuclear weapons by all services of the armed forces.[31]

Moreover, it is clear that the Soviets view their goal of intimidation seriously and would use their nuclear leverage to achieve it. Aleksandr Solzhenitsyn describes the intimidation:

> At one time there was no comparison between the strength of the USSR and yours. Then it became equal.... Perhaps today this is just greater than balance, but soon it will be two to one. Then three to one. Finally it will be five to one....With such a nuclear superiority it will be possible to block the use of your weapons, and on some unlucky morning they will declare: "Attention. We're marching our troops to Europe, and if you make a move, we will annihilate you." And this ratio of three to one, of five to one, will have its effect: you will not make a move.[32]

Our core strategy, then, must be designed both to fulfill our own objectives and to counter those of the USSR. This is where the line between objectives and strategy begins to blur; where the two become closely interrelated, thus making it critically important for the nation's top leaders to be involved as closely as possible in the strategic planning process. Unfortunately, this is not often the case. Policy makers at the highest levels generally are too busy trying to make today's policy from yesterday's events to give much thought to planning for tomorrow. Most Western democracies seem to display nearsighted vision. As George Kennan put it:

> I sometimes wonder whether ... a democracy is not uncomfortably similar to one of those prehistoric monsters with a body as long as this room and a brain the size of a pin; he lies there in his comfortable primeval mud and pays little attention to his environment; he is slow to

wrath—in fact, you practically have to whack off his tail to make him aware that his interests are being disturbed; but, once he grasps this, he lays about him with such blind determination that he not only destroys his adversary but largely wrecks his native habitat. You wonder whether it would not have been wiser for him to have taken a little more interest in what was going on at an earlier date and to have seen whether he could not have prevented some of these situations from arising.[33]

The unfortunate thing about Kennan's statement is that it was made over 30 years ago. The Soviets have amassed since that time an enormous arsenal of sophisticated weapons. They have taken advantage of every opportunity (and there have been plenty) to acquire state-of-the-art technology from the West for both defense and civilian purposes, and they have pursued an aggressive—at times violent—foreign policy in virtually every corner of the globe. It will be a real tragedy if Kennan's quote is still relevant 30 years from now, especially if an environment closer to the Soviet high-growth scenario evolves.

The Core Strategy. In my opinion, the core strategy around which we can build a set of consistent policy actions or options should be *to maintain technological supremacy* in both military and civil activities. To a large extent, I agree with Dr. Hans Mark of NASA who noted:

> ... the ability to do things determines the range of choices that people have [and] technology creates the boundary conditions in which you conduct politics.[34]

That is not to say that technology determines policy; I say only that technology provides a framework within which we can exercise a number of options. The further advanced our technology becomes, the greater the number and type of options we can consider. As long as our technology is more advanced than that of our adversaries we can ensure (if we so choose) that the *game* is played in our court and on our terms.

The United States has the economic capacity and the sociopolitical system to give us the edge in pushing the frontiers of today's most advanced technologies further and faster than any potential adversary can. We exude knowledge and information,

exchange it, massage it, and raise it to the highest power; the USSR suppresses it. We are the world leader in the technology of information processing (for example, supercomputers). Advances in this field have been, and will continue to be, one of the keystones to quantum leaps in other technologies (e.g., microelectronics, bio-technologies). Technological gains feed on one another, speeding up the entire process of advancing technology. As technological progress accelerates, so does the interaction of technologies. Thus, there could be greater gains in new technology during the next 30 years than have occurred in the last 300 years.

Cost and social acceptance are the primary brakes, or governors if you will, on technological advance. Although these two factors can inhibit progress in the United States more than in the USSR, the free interaction among our scientists and engineers and the rapid and near ubiquitous flow of information more than compensates. Indeed, we are often confronted with a queue of technological advances waiting for funding or political and social acceptance.

Thus, a core strategy of technological supremacy would enable us to cope with the constant (or core) of the alternative Soviet environments that we might face. Additionally, I advocate concentrating our R&D efforts and funding on four major technology groupings: information processing technology, space related technologies (including materials processing), bio-technologies, and energy-related technology. There is considerable overlap and feedback among these groupings, and they are likely to be the areas of greatest potential competition with the USSR. Both military and civil applications should be included.

The Basic Strategy. As the core strategy deals with the constants of the potential environments, the basic strategy must deal with the variables in them. That is, we must be prepared to cope with various Soviet policies as Moscow pursues its objectives.

Our basic strategy also must be designed to move us in the direction of our preferred environment. Thus we need to formulate policies that will frustrate—make more costly—Soviet attempts

to intimidate other nations, to drive a wedge between the United States and its allies, to acquire advanced Western technology, and to solve domestic economic and social problems. At the same time, we must be careful not to be so aggressive in pursuing our policies that we create a recognizably hopeless situation in the USSR. This could have the effect either of stimulating a violent military reaction or creating the environment we want to avoid.

Therefore, our policies should concentrate directly on efforts to strengthen our own position rather than to weaken the Soviet position. The first area for concentration should be the Strategic Defense Initiative (SDI), not for its military value as a deterrent, but for the spin-off value that the R&D effort is likely to bring.[35] By the mid-1990s, research on SDI should have prompted advances in laser optics, space travel, surveillance techniques, communications, and a host of other technologies. In terms of its deterrent value, SDI might never offer total protection, but it might provide an effective deterrent against a first strike. Equally important, the basic concept can be achieved technically in the immediate future. The technology is already available for a space-based weapon system of satellites capable of firing projectiles at enemy missiles in the early boost phase (before deployment of warheads). Only the laser and particle beam technologies have yet to be developed.

Pursuit of SDI now would result in a quantum leap in military technology and warfighting concepts by the turn of the century. As the system advanced technologically, defensive measures against conventional warfare also might come to the fore. Eventually, the need for most offensive weapon systems might be reduced to near zero, and we could divest ourselves of much of the current structure of military forces—probably during the second decade of the century (2010–2020).

A second element of our basic strategy should be further development of the Rapid Deployment Force (RDF) concept. The RDF should be large enough and well enough equipped to seriously disrupt any Soviet military commitment. This raises the risk to Moscow in any contemplated military adventures. To

complement the RDF concept, the United States should seek to strengthen its commercial and diplomatic ties with countries where the RDF might be required (notably, the Middle East and Latin America). Agreements for prepositioning of equipment also should be sought with these countries.

The concept of prepositioning has been criticized largely because of its potential to provide "a huge incentive for the enemy to disrupt the mating of the men flown in with the heavy weapons and equipment waiting for them."[36] Although this could conceivably be a problem in Europe, I doubt that the incentive for an adversary to attack prepositioned material and equipment in either Latin America or the Middle East would outweigh the problem of possibly drawing additional countries (where the equipment was prepositioned) into the fray, particularly if the adversaries were surrogates (for example, Cuba, Libya, or Syria) for Soviet sponsored aggression.

The third element of our basic strategy should be to encourage the West Europeans to accept more responsibility for the ground force defense of Europe. The US nuclear umbrella should remain and even be strengthened with the development and deployment of a stealth bomber. But we should pursue a phased withdrawal of some US ground forces and use the withdrawn forces to augment the RDF. The withdrawal should be carefully orchestrated with the Western European governments so as not to raise fears about the US commitment, fears which might drive the Europeans to seek accommodation with the Soviets. This would require that the US divest itself of the notion that we cannot do anything that might offend the allies.

We also should offer NATO new generation military equipment in the 1990s (for example, fighter and bomber aircraft) at subsidized prices (in lieu of subsidizing US-Soviet trade with government guaranteed loans). By the mid-1990s, the United States could be producing superfighters, for example, featuring lightweight composition materials, high-thrust engines, and stealth technology. These fighters would be capable of accelerating faster and turning tighter than any other fighter presently deployed (either US or Soviet).[37] A few wings of such aircraft

deployed to the NATO countries could increase the air defense deterrent for Europe.

In negotiating the phased withdrawal of US ground forces from Europe, we could further sweeten the pot by offering to subsidize development of European natural gas deposits. This policy also would head off further Soviet efforts to capture the West European gas market. Obviously, this would not be an equal incentive for all West European countries since the gas deposits are not distributed evenly throughout Europe. To have any effect, the subsidy would have to benefit the purchasers as well as the producers of natural gas. Despite the complications (and there are many), success in such a policy would deprive the USSR of major additions to its hard currency earnings. Even if this policy is not viable, some method of securing energy independence for the West Europeans (and Japan) must be pursued. An alternative might be a concentrated US effort (not unlike the Manhattan Project) to reach a breakthrough in fusion power. This technology could then be shared with our allies, obviating their need for Soviet natural gas.

I propose, as the fourth element in our basic strategy, a policy of pursuing arms control negotiations, not that I expect a great deal to come of such negotiations. I don't, but at least this step would keep the United States and the Soviets on speaking terms in one area, and perhaps lessen the tension and uncertainty that could arise in both Moscow and Washington from a total lack of intercourse. Moreover, in conducting arms negotiations we should pursue agreements that would reduce the mass of Soviet weaponry and Moscow's flexibility in using it (for example, reducing the total number of warheads and limiting forward area deployments).

Reducing the mass, or the total number of weapons in the Soviet arsenal, would limit the ratio of Soviet to US forces and extend the time (we hope indefinitely) before Moscow would feel confident enough about this ratio to pursue any large-scale military option. That time could occur only if the United States (and the West) did nothing to improve the state of its own forces, gave away the store in arms control agreements, and returned to

an era of appeasement in its relations with the USSR (similar to the detente period of the early 1970s). Moscow is keenly aware of what detente can do for them. As Brezhnev put it a few years ago in a speech to Communist leaders in Prague:

> We are achieving with detente what our predecessors have been unable to achieve using the fist.... By 1985, ... we will have achieved most of our objectives in Western Europe.... Come 1985, we will be able to extend our will wherever we need to.[38]

In pursuing arms control agreements, we must be careful not to mirror-image Soviet intentions and become lulled into limiting our own flexibility. This is particularly important in negotiating the use of space. Here, our emphasis should be on outlawing the deployment of offensive weapons in space. I realize that the line between offensive and defensive is very thin, if it exists at all, but perhaps by the mid-1990s, some distinction can be drawn based on power levels of laser or particle beam emitters. Even so, verification procedures might be impossible.

Finally, as the fifth element in our basic strategy, we should pursue policies toward the Third World that both demonstrate the benefits of democracies and build good will for the US. Indeed, the United States has been trying to do this for years with mixed results. For our good, we should keep trying. Any time we are successful limits the opportunity for Moscow to spread its hegemony. There may even be a way to increase our success rate. For example, because multinational corporations combine many of the advantages of national governments (such as access to large financial and real assets) without some of the disadvantages (such as the stigma of colonialism), we should seek opportunities to direct their energies in the Third World in ways that benefit the US Government, the corporations, and the Third World countries involved.

I do not want to imply that multinational corporations are a cure-all for the world's economic ills, but I believe they have the greatest potential for effectively providing Third World countries with development programs and investment capital in a relatively short time, witness the economic development of the oil states in the Persian Gulf. Although the natural wealth of the oil

resources was the prime factor in the meteoric modernization of these countries, such progress probably could not have come about as quickly without the catalytic effect of the multinational corporations involved.

One of the greatest impediments to development in the Third World has been the gap (that is, the time lag) between the potential for economic development (dictated primarily by technology) and the potential for educational and social development (dictated primarily by culture). The advance of information processing technologies and their use in furthering education and providing information could go a long way toward narrowing this gap in a non-threatening way for many Third World countries. Thus, multinational corporations, often both users and developers of information processing technology, may have considerable potential for stimulating the process of education and modernization in these countries.

Therefore, the US should develop—with the multinational corporations—opportunities to combine the strategic concerns of the Government with the financial incentives of the private sector. Some of this is already being done on a limited scale through the use of insurance incentives and tax concessions, but more needs to be done so that the formulation of foreign policies (on the Government side) and profitable development programs (on the private sector side) would complement each other rather than compete with each other. Melding the interests of Government and private enterprise certainly is not simple. Nonetheless, it seems that we are on the threshold of an era that will require some form of imaginative coordination or partnership between Government and private enterprise if we are to thwart effectively (with minimum risk of superpower confrontation) Soviet influence and intended hegemony in much of the Third World.

The Hedging Strategy. We now face the question of what we would do if the policies based on our core and basic strategy failed to move us in the direction of our preferred environment or if some unplanned-for-event occurred that would affect our objectives significantly. Although there may be an infinite number of events one might postulate, I have considered two: a

revolt in Eastern Europe at the turn of the century, and the emergence of a Soviet leadership that eschews central planning and embraces market socialism. Both seem unlikely at this juncture, but both could have a significant impact on our objectives. Additionally, the latter could result in the emergence of the Soviet high-growth environment.

Revolt in Eastern Europe. If, by the turn of the century, the USSR has pressed its client states in Eastern Europe to provide resources to the Soviet Union so hard that the economies of Eastern Europe are on the verge of collapse, a full-scale revolt could break out. (The details about how such a scenario would unfold are beyond the scope of the study.) Such a scenario would very likely be met with force from the USSR to crush the uprisings. How easy this recourse would be for the Soviets would depend partly on whether the non-Soviet elements of the Warsaw Pact refused to fight. In any event, the United States could respond by contacting the Soviet leadership, offering to mediate a settlement, and threatening (assuming we had a comfortable lead in military technology if not force size) to come to the aid of Eastern Europe militarily if Moscow declined the mediation offer. By that time, the Soviets might be in no position to refuse, given the unfolding of the stagnating environment. Once hostilities stopped and mediation began, the United States could press for independent East European states free of Soviet dominance, in exchange for selected economic and technical assistance to aid Moscow in coping with some of its more pressing domestic economic problems.

If such a scenario came to pass, and if we were successful even in getting Moscow to agree to mediation, the potential domestic repercussions within the USSR might be even greater than the spill-over effects from the East European revolt itself.

Market socialism in the USSR. If an entire new generation of Soviet leaders emerged, perhaps in the second decade of the 21st century, and if, under the pressure of a faltering economy and social malaise at home and an inability to function as a major power abroad, this leadership abolished central planning and

adopted some form of market socialism, what would be the impact on our objectives, and how would we react? First of all possibilities, the United States (and the rest of the developed West for that matter) likely would exclaim, "Convergence is at hand," again. This would be a mistake. The Soviet Union would have been operating for nearly 100 years under a rigid system of central control over resource allocations and would not be making the transition to a market-oriented economy easily. There would be much floundering on the part of managers and disruption of production as each economic enterprise scrambled for resources and new supply-demand relationships. Moreover, retention of the basic totalitarian system of rule would continue to inhibit the free flow of information and interrelationships vital to the effective functioning of the market mechanism. In addition, the military might not be happy with the situation, perhaps turning on the leadership and establishing a dictatorship with even more rigid controls than currently exist and with a more risk-oriented outlook on foreign adventures. On the other hand, a market-oriented system, after a few years of initial floundering, might work itself out, placing the USSR on a sustainable growth path that could evolve into a high-growth environment.

Under market socialist conditions in the USSR, the United States should stick to basic strategy to ensure that we remained at least a decade ahead of the USSR technologically and militarily. Probably the most important contingency plan we could make would be to exercise extreme caution in dealing with the Soviets. We should not be too anxious to conclude commercial, arms control, or other agreements that might either jeopardize our lead through a transfer of technology or limit our military flexibility. Eventually, another generation of Soviet leaders could emerge who might be less enamoured with the notion that the USSR should spread its hegemony around the world, be less fearful of encirclement by the West, and be more enlightened about the benefits of a free and open society. Such leaders might view their own massive redundancy in military might as wasteful, particularly if it had no opportunity to be exercised without risk of confronting a much more advanced adversary in the United States. Thus, they too might choose to divest themselves

of offensive weapons systems and concentrate more on defensive systems and diplomacy in their international relations.[39]

5. Directions for Future Research

The scenarios and the strategic plan I developed represent a first cut at thinking about the future of US-USSR relations. Many of the issues raised here, as well as some that are not addressed at all, are worthy of further research and more rigorous analysis. The Soviet scenarios themselves could benefit from a more thorough examination of such issues as trends in Soviet health care and the potential impact on the work force as well as the impact that potential advances in Soviet pharmaceuticals might have on health care trends. In addition, future Soviet influence in the Middle East could be brought more clearly into focus by an analysis of alternative futures for the Middle East itself and an assessment of potential Soviet responses to such alternatives.

In considering the basic strategy for coping with alternative Soviet environments, areas for further research include (1) the potential for developing US defenses against Soviet aircraft and cruise missiles as a supplement to the SDI; (2) specific methods to encourage countries in the Middle East and Latin America to respond positively to US overtures for prepositioning military ordnance and supplies; and (3) development of specific incentives for encouraging multinational firms and Third World countries to engage in cooperative ventures that ultimately strengthen US-Third World relations. An investigation of the potential spinoffs that might be derived from the R&D effort associated with the SDI, together with an assessment of their impact on civilian and military technology, would be a beneficial futures study for strategy plans.

Another important area for future research is the potential response of the East European countries to alternative Soviet futures. For example, what is the threshold of tolerance for Soviet oppression in Eastern Europe, and how might the United States reduce Soviet hegemony in this region without precipitating a

military confrontation with the USSR? What domestic repercussions would result in the USSR from loss of Soviet hegemony over Eastern Europe? What would be the political and economic outlook for the countries of Eastern Europe, individually and collectively? Although we may never be able to provide clear-cut answers to any of these questions, they are certainly part of thinking about alternative future environments that may lend themselves to the development of strategic plans and policies.

Notes

1. The Process of Strategic Planning

1. See, for example, William Ascher and William H. Overholt, *Strategic Planning and Forecasting: Political Risk and Economic Opportunity* (New York: John Wiley & Sons, 1983); George A. Steiner, *Strategic Planning* (New York: Free Press, 1979); Jib Fowles, ed., *Handbook of Futures Research* (Westport: Greenwood Press, 1978); and Wayne I. Boucher, ed., *The Study of the Future: An Agenda for Research* (Washington, DC: Government Printing Office, 1977).

2. Ascher and Overholt, p. 2.

3. Ibid., pp. 24–25.

4. Ibid., pp. 26–27.

5. Quoted in Steiner, p. 9.

6. Ascher and Overholt, pp. 28–30.

7. Ibid., p. 30.

2. Defining US Objectives

8. Ibid., pp. 34–35.

9. Suggesting a formalized system for US strategic planning is beyond the scope of this study. An interesting proposal for such a system, however, has been suggested in an unpublished memorandum by Major General Perry M. Smith (Ret.), former Commandant, The National War College, Washington, DC.

3. Projecting Alternative Soviet Environments

10. For a more detailed treatment of this subject, see Stanley Cohn, "Soviet Replacement Investment Policy," Joint Economic Committee print, *Soviet Economy in a Time of Change* (Washington: Government Printing Office, 1979), pp. 230–45.

11. The notion of diminishing returns is closely related to the substitution of capital for labor. When capital grows more rapidly than labor, returns to capital do not have to decline if there is an offsetting change in the production method—i.e., technology. In practice most new technology is embodied in new capital stock, and most investment contains some degree of relatively new technology. In an efficient environment, this steady stream of new technology reorganizes production processes and thereby increases output while saving labor and raw materials. Douglas Whitehouse and Ray Converse, "Soviet Industry: Recent Performance and Future Prospects," p. 414.

12. Based on estimates of the Center for International Research, Bureau of the Census.

13. *Izvestiya*, 24 March 1984, p. 3.

14. US, CIA, *Handbook of Economic Statistics*, 1983, p. 117.

15. Office of Soviet Analysis, CIA.

16. Zhores A. Medvedev, *Nuclear Disaster in the Urals* (New York: 1979).

17. *Ekonomicheskaya Gazeta*, 12 (March, 1984): 11–14.

18. The paradox of this situation is that as economic growth slows, demand for energy declines; eventually growth and energy demand reach a balance. Whitehouse, "Soviet Resource Allocation in the 1980s: Some Speculation," Lecture to USAF Academy, August, 1979.

19. Despite Gorbachev's intent to push the development and production of high-technology products, including computers, the Soviets' lack of experience with these technologies and their proclivity for compartmentation will likely inhibit the assimilation and widespread diffusion of such products at least for the rest of this century.

20. Robert A. D. Ford, "The Soviet Union: The Next Decade," *Foreign Affairs*, Vol. 62, No. 5, (1984), pp. 1132–44.

21. Gorbachev is the leader I have in mind. Whether he (or anyone else) could convince the military to take a cut in resource allocations

certainly is open to question. But if the crisis were severe, I have to assume that the Soviet military leadership would see the benefits to be derived from a healthy economy.

22. Robert A. Meyers, *Handbook of Synfuels Technology* (New York: McGraw-Hill Book Co., 1984), p. 77.

23. Robert U. Ayres, *Uncertain Futures: Challenges for Decisionmakers*, (New York: John Wiley & Sons, Inc., 1979), p. 293.

24. Ibid., p. 280. A superconductor is a material that loses all electrical resistance when cooled to a low enough temperature and can carry a current for an indefinite period with no dissipation.

25. Barbara Severin, "The Livestock Feed Issue," Paper presented at the Seventh International Conference on Soviet and East European Agriculture, Paris, July 1984, p. 1.

26. Richard Wohl, "Soviet Biogenetic Research," *Defense Science 2002+*, August 1984, p. 58.

27. Ibid., p. 59.

28. Richard Wohl, "Material Science: Soviets Lead Way in Space Processing," *Defense Science 2002+*, December 1984, pp. 53–58.

29. Ibid., p. 55.

4. Developing the US Strategy

30. I have used as a basis for the discussion on Soviet objectives, lectures given by a number of scholars of Soviet and international affairs at The National War College, Fort Lesley J. McNair, Washington, DC, 1984–85.

31. *Voyennaya mysl'* (Military Thought), October 1964, p. 23; quoted in Robert Jastrow, "Why Strategy Superiority Matters," *Commentary*, March 1983, p. 28.

32. Ibid., p. 32.

33. Quoted in Paul Seabury, "Reinspecting Containment," in *Beyond Containment*, ed. Aaron Wildavsky (San Francisco: ICS Press, Inc., 1983), p. 49.

34. Keynotes address to the Tenth National Security Affairs Conference published in William A. Buckingham Jr., ed., *Defense Planning for the 1990s* (Washington, DC: Government Printing Office, 1984), p. 10 and p. 17.

35. I am grateful to Capt. Ray Johnson, M.D., USN, for making this point.

36. Edward Luttwak, *The Pentagon and the Art of War* (New York: Simon & Schuster, Inc., 1984), p. 241.

37. Paul Kinnucan, "Superfighters," *High Technology*, April 1984, pp. 36–48.

38. Jastrow, p. 32.

39. An argument could be made that the current Gorbachev leadership is moving in this direction. Indeed, Gorbachev may be a truly enlightened leader, but I remain skeptical of his ability to convince the rest of the leadership, especially the military, that this would be a prudent course of action.

CREATING STRATEGIC VISION
Long-Range Planning For National Security

Cover display in Zapf Book Light Italic
and Megaron Bold Italic.
Text and display in Times Roman and Times Bold Roman.

Advisory readers: Major Donald Anderson, NDU,
and Major Kurt Weiland, US Military Academy.

Design and edit by Janis Bren Hietala.

Cover art by Nancy Glover
and figure mechanicals by Charlotte Pocze.

THE NATIONAL DEFENSE UNIVERSITY

Lieutenant General Bradley C. Hosmer, USAF
President

THE INSTITUTE FOR NATIONAL STRATEGIC STUDIES

Dr. John E. Endicott
Director

THE NATIONAL DEFENSE UNIVERSITY PRESS

Dr. Frederick Kiley, *Director*

Colonel Robert Kvederas, USA
Associate Director

Dr. Joseph E. Goldberg
Professor of Research

Major Donald Anderson, USAF
Deputy Director for Production

George C. Maerz, *Senior Editor*

Dr. Dora Alves, *Writer-Editor*
Thomas Gill, *Writer-Editor*

Janis Bren Hietala, *Writer-Editor*
Edward H. Seneff II, *Writer-Editor*

L. J. Conk, *Production Supervisor*

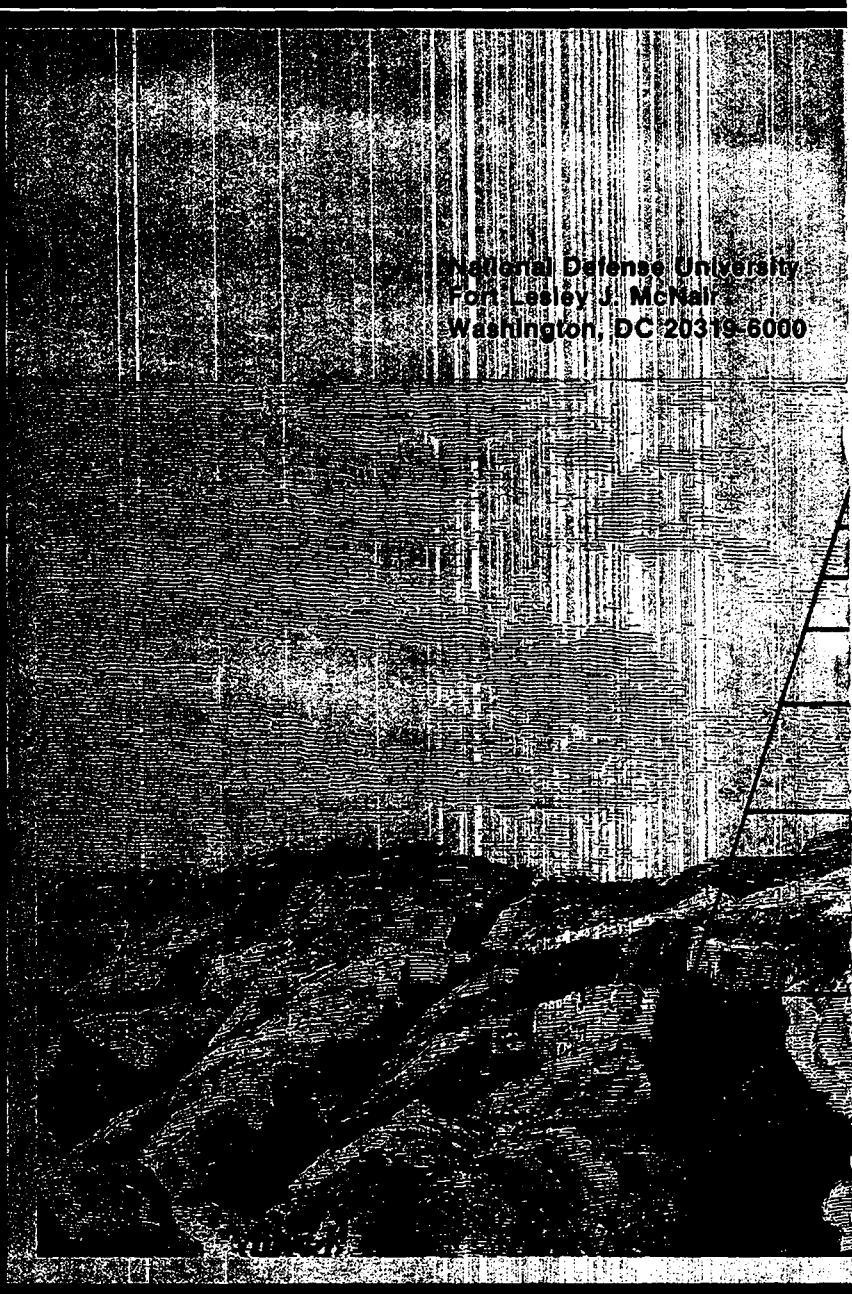
Pat Williams, *Lead Editorial Clerk*
Dorothy M. Mack, *Editorial Clerk*

Carol A. Valentine, *Editorial Clerk*

Lieutenant Monica M. Cain, USN
Deputy Director for Administration

Laura W. Hall, *Executive Secretary*
Miles Brewster, *Office Manager*

Cecelia Giles, *Office Assistant*
Yvette Hemphill, *Office Assistant*



National Defense University
Fort Lesley J. McNair
Washington, DC 20319-6000