

AD-A010 585

THE LONG-RANGE FUTURE OF THE NAVY PHASE II,
1972-1985. VOLUME II

Naval War College
Newport, Rhode Island

19 June 1972

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THE UNITED STATES NAVAL WAR COLLEGE

GROUP RESEARCH PROJECT REPORT



THE LONG-RANGE FUTURE OF THE NAVY

PHASE II, 1972-1985

VOLUME II

CONCLUSIONS

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ADAU 10585

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62

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author)

Naval War College
Newport, Rhode Island

2a. REPORT SECURITY CLASSIFICATION

Unclassified

2b. GROUP

3. REPORT TITLE

The Long-Range Future of the Navy Phase II, 1972-1985. Conclusions, Volume II.

4. DESCRIPTIVE NOTES (Type of report and inclusive dates)

Group Research Project Report

5. AUTHOR(S) (First name, middle initial, last name)

H.H. Abe, et al.

6. REPORT DATE

19 June 1972

7a. TOTAL NO. OF PAGES

62

7b. NO. OF REFS

Numerous

8a. CONTRACT OR GRANT NO.

b. PROJECT NO.

c.

d.

9a. ORIGINATOR'S REPORT NUMBER(S)

9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)

10. DISTRIBUTION STATEMENT

Distribution of this document is unlimited.

11. SUPPLEMENTARY NOTES

12. SPONSORING MILITARY ACTIVITY

Naval War College
Newport, Rhode Island

13. ABSTRACT

This study forms Phase II of a continuing effort to identify future world trends and their implications for the U.S. Navy. *Phase I, completed in 1971, described major world futures without delimitation. This portion, Phase II, attempts to isolate largely American trend lines, based upon the literature as a form of delimitation and definition. Phase II was undertaken by a selected group of students at the Naval War College at the direction of the Chief of Naval Operations.

The purpose of Phase II of The Long Range-Future of the Navy Study is to determine not only what principal trends are generally known and recognized as leading to the future, but also to identify what avenues of inquiry need further study and, specifically, what future research is required to clarify areas of doubt and areas of promise leading to a series of specific naval recommendations which might be eventually presented to the Chief of Naval Operations for his information and consideration. This further delimitation in futures would be the goal of a Phase III study.

*Phase I (AD 759 420)

KEY WORDS

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LINK B

LINK C

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GROUP RESEARCH PROJECT REPORT

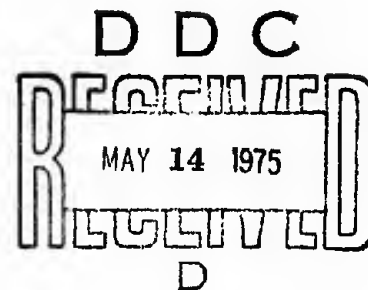
THE LONG RANGE FUTURE OF THE NAVY

1972-1985

PHASE II

VOLUME II--CONCLUSIONS

19 JUNE 1972



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ABSTRACT

THE LONG-RANGE FUTURE OF THE NAVY

This study is an analysis of current trends undertaken for the purpose of identifying those environmental factors which might impact on the Navy in the 1972-1985 time frame. The five environments considered are: international, sociological, corporate, technological, and military. The report is a continuation of "The Long Range Future of the Navy" study which began in the 1970-1971 academic year. Volume 1 contains essays on each of the environments mentioned above, as well as conclusions, implications for national security, and areas for further study. Volume 2 consists of key points, tentative implications for the U.S. Navy, and an epilog, all of which are oriented to future researchers at the U.S. Naval War College and follow-on phases of this study.

Multipolarity is characterized as the most likely international environment to evolve during the forecast period. Significant changes in the post-World War II alliance system and a decline in the relative importance of military power are predicted. From a demographic analysis of the United States, the availability of the traditional teen-age recruit for the Armed Forces is seen to be decreasing, with persons 25-44 years of age being numerically dominant during the forecast period. A discussion of value trends and personal and social characteristics is also presented. The study

suggests that the U.S. position of leadership in technology is becoming less dominant, and problems relating to technology in the 1972-1985 time frame will be those of adoption rather than invention. The long-range planning structures of selected firms were evaluated in an attempt to identify successful methods of achieving goals and responding to change. A list of 58 crisis scenarios is examined to determine the impact of multipolarity on the employment of naval forces.

FOREWORD

This study forms Phase II of a continuing effort to identify future world trends and their implications for the U.S. Navy. Phase I, completed in 1971, described major world futures without delimitation. This portion, Phase II, attempts to isolate largely American trend lines, based upon the literature as a form of delimitation and definition. Phase II was undertaken by a selected group of students at the Naval War College at the direction of the Chief of Naval Operations.

The purpose of Phase II of The Long Range-Future of the Navy Study is to determine not only what principal trends are generally known and recognized as leading to the future, but also to identify what avenues of inquiry need further study and, specifically, what future research is required to clarify areas of doubt and areas of promise leading to a series of specific naval recommendations which might be eventually presented to the Chief of Naval Operations for his information and consideration. This further delimitation in futures would be the goal of a Phase III study.

R. F. Delaney

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INTRODUCTION

Purpose. The purpose of this study is to identify those environmental factors which might impact on the Long-Range Future of the Navy. The year 1985 was arbitrarily selected as the end point of the study. This phase is a delimitation of the material contained in the Phase I report, completed last year. The conclusions and implications drawn are primarily oriented to those factors which are forecast to impact on national security policy in the future.

Method. Phase II of the Long-Range Future of the Navy research project is an interim step in the research cycle. The study is based on a literature survey and interviews with academicians, research institutions, and corporate headquarters. The areas selected for evaluation during this phase fall into five basic environments: international, sociological, corporate, technological, and military. The material was subjected to collation, analysis, group discussion, and distilled to identify trends and/or conclusions in each of the areas selected. Finally the material was collectively synthesized, and implications for national security policy were drawn. These procedures are in keeping with the direction provided by the Politico-Military Sub-Panel of the CNO Executive Panel.

Assumptions. The basic building block of this study is the international political environment. The political spectrum

of possibilities initially evaluated consisted of four possible worlds: world domination by a single power or bloc, cold war bipolarity, multipolarity, and world harmony. Primary emphasis was devoted to the multipolar world since it appears to represent the most likely international environment of the future. Time constraints precluded a detailed investigation of the other possible worlds.

The study does not represent any official point of view and makes no attempt to adhere to existing U.S. Government policy. Comments which allude to a changing force structure should be viewed with caution as they are based solely on the environmental influences projected for 1985 and do not consider worst case military threats.

Limitations. In its present stage the study is incomplete. It lacks economic analysis and a rigorous testing of major trend lines. This phase of the study is broadly oriented toward national security policy implications and not specifically to the U.S. Navy. No attempt has been made to project potential adversaries' technological or military capabilities which could face the United States in 1985. The development of probable U.S. national interests, goals, objectives, and strategies are considered among the next logical steps or phases of this study.

Report Organization. This report has been organized into two volumes. Volume 1 contains essays on each of the

environments mentioned above, and is comprised of seven parts. Part One contains a summary of the key points, conclusions, implications, and areas for further study. The essays and bibliography make up the remaining six parts.

Volume 1 is intended for both internal and external distribution as required. Volume 2, consisting of key points, tentative implications for the U.S. Navy and an epilog, is considered an internal working paper primarily for the use of War College researchers.

EXECUTIVE SUMMARY

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CONCLUSIONS

1. The International Politico-Military Environment

-- THE MOST LIKELY INTERNATIONAL ENVIRONMENT THAT WILL EVOLVE OVER THE NEXT THIRTEEN YEARS IS ONE CHARACTERIZED BY MULTIPOLARITY OR POLYCENTRISM.

Multipolarity implies a movement away from the bipolar world of the 1950s and early 1960s with its two power centers and lack of mobility and flexibility in alliance systems to an environment with several power centers and more flexibility of alignments. This will result from a continuation of political trends already discernible and underway.

Although in terms of strategic and possibly even conventional military forces, the United States and the Soviet Union will be essentially superior to the other power centers, the economic and political strength of several nations or groups of nations will cause the international environment to be truly multipolar. None of the power centers will be able to dominate all of the others. The inherent flexibility of the multipolar environment will allow nations to maneuver in order to maintain a balance of power.

-- THE MAJOR POWER CENTERS WILL BE THE U.S., THE SOVIET UNION, CHINA, WESTERN EUROPE, AND JAPAN.

The relative position of China (PRC) and Western Europe with respect to the other power centers will depend on the pragmatism with which the former charts her course in the

international arena and the latter's success in achieving an increasing degree of economic integration and political viability. There is little doubt that Japan will continue to be strong economically, but her overall "power rating" will depend on her decision with regard to the size of her military forces and her assured resource base.

-- THE FLEXIBILITY OF THE MULTIPOLAR POWER SITUATION
WILL BE TO THE UNITED STATES' ADVANTAGE, ESPECIALLY SINCE
AMERICAN MILITARY FORCES MAY NO LONGER BE SUPERIOR TO THE
SOVIET'S.

The United States will attempt to play the Soviet Union and China against each other so as to gain concessions and to avoid a big power confrontation. More reliance will be placed upon the ability to maneuver about the superpower triangle (United States, Soviet Union, and China) than upon the use of military force. Europe will benefit from the growing accommodation between the United States and the Soviet Union which will be forced upon the latter by the former's flexibility to maneuver. Faced with the Chinese on their eastern front, the Soviets will attempt to decrease tensions in Europe.

-- THE SOVIET UNION WILL CONTINUE HER EFFORTS TO GAIN
CLEAR SUPERIORITY OVER THE U.S. IN TERMS OF MILITARY TECHNOLOGY
AND NUMBER AND TYPE OF STRATEGIC AND CONVENTIONAL MILITARY
FORCES.

Barring a completely unpredictable technological breakthrough, it is unlikely that either the United States or the Soviet Union will develop a preponderant first strike capability vis-a-vis the other. A first strike capability is defined as the ability to launch an initial strategic attack causing such destruction to the enemy's strategic capability that he is precluded from launching an effective retaliatory attack. Although the so called "balance of terror" will continue to exist, the Soviet Union will maintain a significant "surplus" strategic capability in terms of numbers of missiles in order to hold a relative superiority over the United States for prestige and psychological purposes.

During the next thirteen years the Soviet Union will develop a capability to project her power overseas including putting her deterrent to sea. The USSR may possibly get mired down in her own Vietnam. The Soviet leaders will continue to diversify and upgrade their general purpose forces. Their naval strategy will be one enabling them to have a flexible strategy supporting global economic, political and diplomatic interests.

-- THE AMERICAN STRATEGIC COMMITMENT TO WESTERN
EUROPE AND TO JAPAN WILL BECOME INCREASINGLY QUESTIONED BY
ALL OF THE POWER CENTERS.

As a result of the general lessening of Soviet-American tension, it is likely that the Western European nations will shift perceptibly away from a strict alignment with the United States. This shift is encouraged by the fact that the American commitment to NATO will decrease in credibility on both sides of the Atlantic as the Soviet nuclear and conventional capability increases. The current NATO strategy of flexible responses and forward defense needs to be reexamined in light of this trend.

America's commitment will also be increasingly questioned by the Japanese as the Soviet gain a clear superiority in strategic and conventional forces. It is considered likely that Japan will opt for the broader definition of "self-defense" and build a navy capable of defending the sea lanes north of Australia and east of Singapore. She will also develop her own nuclear weapons. This will place her in the same relative position as France, possessing a force de frappe capable of ensuring that Washington does not sacrifice Tokyo in order to avoid the destruction of American cities.

-- THE LIKELIHOOD OF MAJOR MILITARY CONFLICT BETWEEN
POWER CENTERS IS LOW.

The possibility of a large scale confrontation or major conflict between the major power centers is assessed as low. Even this low likelihood, however, should not be ignored since the danger of miscalculation of intentions or objectives could lead to the outbreak of hostilities. A major conflict is defined as a nuclear war or a situation short of nuclear war which leaves the use of nuclear weapons the only alternative for the loser. The above projection is premised on the maintenance of a credible strategic deterrence.

Although the chance of a major military conflict between the power centers is slight, armed conflict will continue to occur. Because of differing and competing ideologies (although the ideological factor seems to be lessening), national and cultural heritages, and competing national objectives, low level military conflict may occur between one power center and a lesser power or between two lesser powers. Overt military intervention by large countries into the internal affairs of smaller nations within their sphere of influence will occur less frequently than in the past because of the rise of nationalism and the ability of countries to migrate to other power centers. Covert assistance in revolutionary wars will continue. Limited wars between smaller powers will continue. Superimposed over all will be the increasing reality of interdependence based on economic and resource considerations.

Although there will be a lessening of direct United States military involvement overseas, the United States may find it necessary to intervene militarily, particularly in the Caribbean area.

-- THE RECOGNITION THAT THE UNITED STATES CANNOT CARRY THE BURDEN OF THE DEFENSE OF THE FREE WORLD WILL CONTINUE AS A TENET OF AMERICAN FOREIGN POLICY FOR THE FORESEEABLE FUTURE.

Since foreign policy goals, domestic concerns and military capabilities must be synchronized to avoid a national incapacity to implement policy objectives, it will be necessary to continue to trim the scope of United States foreign involvement. The Nixon Doctrine and the "Total Force Concept" are steps in this direction. The United States will not be able to act as the policeman of the world. It is clear that this recognition that the United States cannot carry the total burden of the defense of the Free World will continue as a tenet of American foreign policy for the foreseeable future.

The United States will attempt to maintain, in conjunction with her allies, military forces capable of supporting a politically credible "flexible response" strategy. However, even with heavy reliance on her allies, a problem in itself (in the multipolar era, political and military support by allies may be uncertain), the United States government will be hard pressed to maintain a credible flexible response strategy which calls for adequate forces to meet any level of conflict

without the necessity to escalate. There will be gaps on the conflict scale (ranging from counterinsurgency to nuclear war) which will not be adequately covered. Astute diplomacy will have to replace military capabilities in certain levels of confrontation and in certain geographic areas.

-- THE POST-WORLD WAR II ALLIANCE SYSTEM IS UNDER-
GOING, AND WILL CONTINUE TO UNDERGO, SIGNIFICANT CHANGES.

By 1985 the pattern of alliances and power alignments that have evolved since World War II will have undergone a notable transformation as nations perceive either a changing or diminishing threat to their security, as technological and sociological innovation occurs and as the economic situation changes. These factors, acting alone or in concert, will cause some of today's alliances to weaken or to dissolve, while other trends may reinforce and make stronger existing groupings especially in the non-political, non-military areas. The raison d'etre of most alliances and international organizations will continue to be security and economic development. The fear of world domination by nations under the direction of Communism will wane as a raison d'etre for alliances.

-- THERE IS ONLY A SLIGHT POSSIBILITY OF ANY SIGNIFI-
CANT STRATEGIC ARMS CONTROL AGREEMENT OCCURRING WHICH HAS A
SIGNIFICANT MILITARY IMPACT, AND NONE SHOULD BE ANTICIPATED IN
FUTURE PLANS.

Despite the fact that the Soviet Union, the United States and many other countries have spoken out in favor of

strategic arms control, disarmament, and elimination of arms races, it is unlikely that any agreement eliminating the threat of nuclear war will be signed prior to 1985. An agreement is possible which could have political and/or economic significance, but an assured second strike capability will not be surrendered by any state.

Before arms limitation accords with significant military impact can be negotiated, progress will have to be made in two vital areas which have in the past precluded agreement on any major strategic disarmament or arms control issue and will continue to do so in the foreseeable future. The first and most important problem is in the political arena where a lessening of world tension must precede serious and basic arms control bargaining. Nations increase their armaments because they feel insecure. Therefore, before they will agree to disarm in basic arms categories or control arms production in specific areas, the causes of this insecurity must be removed. Some progress has been made in this area but a great deal more is needed.

The second impediment is the issue of international inspection and verification; this, despite impressive technological advances in the state of the art. Notwithstanding the mutual advantage of nuclear disarmament, it is unlikely that meaningful advances will be made prior to an agreement providing for reliable and politically acceptable verification and control procedures.

-- THE GAP IN THE STANDARD OF LIVING BETWEEN THE
CITIZENS OF THE "HAVE" AND OF THE "HAVE NOT" NATIONS WILL
CONTINUE TO GROW.

This growing gap will cause discontent among the inhabitants of the poorer countries. Until the recent past the people of the less developed countries (LDCs) were not fully aware of the relative affluence of their richer neighbors. Modern communications have brought to the LDCs the revolution of rising expectations as well as the sense of rising frustrations which during the next decade will affect greatly political and economic decisions in the developing nations. This influence will occur at precisely the time when the governments of these countries are attempting to limit consumption in order to develop the capital investment necessary for industrialization, cope with population growth, the destabilization of urbanization, the institutionalization of the bureaucracy, rapid changes in values, and growing gaps of technology and education.

-- THE NUMBER AND IMPORTANCE OF REGIONAL ORGANIZATIONS
AMONG DEVELOPING NATIONS WILL CONTINUE TO INCREASE.

The next fifteen years will witness a proliferation of regional organizations. The world as a whole has recently become aware of the important contributions regional cooperation can make to economic and social development. Most third world countries have neither the skilled personnel, the

capital, nor the market to enable them to develop, utilizing only their own resources. It is through regional arrangements which provide for the pooling of these limited resources, and the expansion of markets from a national to a regional basis that these developing nations can realize some measure of success in the difficult task of economic modernization.

-- THE POSITION OF THE U.S. AS THE WORLD'S DOMINANT ECONOMIC POWER WILL DIMINISH.

The decline in the United States' relative position will occur as Japan continues her economic development, as Europe becomes more economically integrated, and as other lesser, but still important economic powers emerge on the international scene. In order to arrest the degradation of her position the United States may exert political pressure on other countries in an effort to gain economic concessions, a tactic which may hinder political relations with allies and lead to newer forms of market and financial competition. This diminution of the United States' relative position will be mitigated somewhat by United States-owned multinational corporations (MNCs) which will account for a significant portion of the growth in other countries. The MNC may well become both the dynamic instrument in the growing international economy, as well as a growing political problem in terms of nationalism and sovereignty.

-- THERE WILL BE A GREATER INTEGRATION OF ALL
DIPLOMATIC TOOLS, INCLUDING MILITARY FORCE, AND GREATER
INVOLVEMENT OF U.S. MILITARY OFFICERS IN DIPLOMACY.

The emphasis on diplomacy and international relations in the intermediate and senior service schools will come to fruition with a generation of military officers who are well versed in these subjects. These officers will appreciate not only the international political environment in which they have to operate but will also understand the nature of military power and its application. This constitutes a pool of trained and experienced public servants available for a wider range of responsibilities in the future. The challenge of the future multipolar world lies in effective orchestration of all the elements of national power.

-- TRADITIONAL FORCE IMPROVEMENT CONCEPTS WILL NO
LONGER BE VALID, AND FUTURE DEVELOPMENT WILL BE DRIVEN
MAINLY BY POLITICO-MILITARY CONSIDERATIONS.

Future capabilities of the Armed Services must be oriented toward politico-military objectives and not just military objectives alone. In some cases, the political advantages offered by a weapon system may outweigh its military disadvantages. Future emphasis must be placed on responsiveness to the National Command Authority, economy, mobility, flexibility, and accuracy. New concepts of data transmission and message handling must be built into every level of command so that

real time flow of vital information can be achieved. Severely reduced budgets will force military managers to use greater imagination in maximizing return on investment. A low overseas military profile with continued U.S. international involvement will require forces which can be moved quickly to crisis locations. These forces must have multi-purpose capabilities to deal with a range of activities from humanitarian relief, through varying intensities of conventional warfare, up to and including nuclear exchange. The future combat environment will frequently entail sanctuaries and targeting constraints. Thus, equipment and techniques for navigation and delivery, whether of ordnance or cargo, will have to provide consistent accuracy in order to minimize errors and the possibility of inadvertent escalation.

-- PROBABLE MILITARY IMPLICATIONS OF A MULTIPOLAR VICE BIPOLAR WORLD ENVIRONMENT ARE:

BUDGET. A smaller share of the national budget is most likely, due to a reducing threat as perceived by the American populace and the United States Congress.

DIPLOMACY. Greater stress will be placed on the use of diplomacy to achieve national objectives. Domestic pressures will most likely not favor the use of military force unless United States' vital interests are at stake.

POWER PROJECTION FORCES. There will be a significant reduction in the use of power projection forces ashore, especially in the Middle East and Mediterranean areas.

PRESENCE FORCES. There will be an increasing use of Naval forces for presence and interposition.

NAVAL STRATEGY. In some world areas smaller expendable warships will be required to provide the greatest number of options to the decision makers. In a given crisis the presence of a large combatant may overwhelm the situation, and the loss of such a ship could have serious diplomatic repercussions.

STRATEGIC DETERRENCE FORCES. The use of some of the current TRIAD of strategic deterrence systems may become constrained by rules of engagement in a multipolar world. Political constraints and possible misinterpretation of United States' intentions may preclude the use of weapons which would overfly a third country enroute to the target.

-- THERE WILL BE RELATIVELY LITTLE CHANGE IN THE NAVY'S STRATEGIC DETERRENT ROLE DURING THE 1972-1985 TIME PERIOD.

In spite of the shift toward a multipolar international environment, there will be a continuing need to provide nuclear deterrence, primarily against the Soviet Union. The triad concept will likely remain, and the Navy's contribution in the form of SLBM's will not change significantly except for

improvements in weapons and launch platforms, most of which are already in the design phase or in the process of programming.

--- TACTICAL NUCLEAR WEAPONS MAY BE USED IN A LIMITED WAR AGAINST A NON-MAJOR POWER WHICH HAS A LIMITED NUCLEAR CAPABILITY.

It is likely that by 1985 a number of non-major powers will have nuclear weapons in their arsenals. Some examples are Israel, India, South Africa, and Brazil. Some countries might be inclined to use low-yield nuclear weapons against deployed United States forces without fear of massive retaliation. It is conceivable that the United States would reply in kind using tactical nuclear weapons against military targets.

-- SURFACE SHIPS WILL BE USED PRIMARILY IN POLITICAL AND LIMITED WAR ROLES.

The role of surface ships in an all-out nuclear war with the Soviets or other major power will be a secondary one. Advancements in nuclear anti-shipping weapons will pose an increasing threat to surface units. At the same time, carrier-based aircraft will encounter increasingly sophisticated defenses as they try to penetrate inland. The three-dimensional threat, sub-surface, surface, and air, will make defense of a carrier task force far more difficult than the enemy's defense of his land bases against an air threat alone.

--- THE CONCEPT OF SEA CONTROL WILL APPLY ONLY TO THE
LOCAL AREA SURROUNDING OPERATING UNITS OF A FLEET.

The relative advantage of submarines and anti-
shipping missiles will be such that fleet defense will have
to be concentrated in order to be effective. The number of
defensive surface and sub-surface units required will be
sizable, and budgetary constraints on fleet size will make
it necessary to assign units for mutual support only in the
geographic area of highest priority. This will leave large
areas of the ocean uncontested, but the risk will probably
have to be accepted. The ability to concentrate forces
quickly in order to achieve local superiority will be of
utmost importance, and presupposes speed, real time intelligence
and responsive command and control techniques.

--- IN HUMANITARIAN EFFORTS (RESCUE AT SEA, DISASTER
RELIEF, ETC.) OR IN CASES WHERE POLITICAL INTERESTS COINCIDE,
IT IS ENTIRELY POSSIBLE THAT AMERICAN NAVAL FORCES WILL
OPERATE JOINTLY WITH EITHER SOVIET OR CHINESE NAVAL FORCES.

Based on the multipolar political trends and the
popular pressure for detente it is not inconceivable that
the next thirteen years will see occasions where the military
forces of the United States will operate in coordination with
those of either the Soviet Union or China in the protection of
common interests, or in the joint exploration of the seas and
their potential. For example, at some future date, the Soviet

Union and the United States may find it in their common interests to have a joint task force operate in a third country's nuclear weapon testing area in order to retard nuclear proliferation or to pressure that country into signing the Nuclear Test Ban Treaty.

2. The Sociological Environment

-- POPULATION WILL NOT REACH CRISIS PROPORTIONS IN THE FORECAST PERIOD.

World-wide population will exceed four billion persons early in the forecast period. It could double in 35 years. Most of the increase will be in the less developed countries. The availability and distribution of food and resources will be of increasing concern to governments.

The total population of the United States will be approximately 250 million in 1985. Crowding, over urbanization, pollution, deterioration of the environment and the preservation of resources will be of increasing concern to Americans.

-- THE YOUTH GROUP IN THE U.S. IS WANING: PERSONS 25-44 YEARS OF AGE WILL PREDOMINATE DURING THE FORECAST PERIOD.

Between 1960 and 1970, population increases in the United States were greatest among those 15 to 24 and 45 to 64. During the 1975-1985 time frame, increases of those between 25 and 44 will be the greatest.

While most population age groups will increase in size during the forecast period, the absolute number of 15 to 24 year olds will decline between 1975 and 1985 so that at the end of the period there will be less than one million more 15 to 24 year old males than there were in 1970. During the 1960s, it was the post-war baby boom that caused a net increase exceeding twelve million and made the 15 to 24 age group dominant. As this group ages toward the 25 to 44 category it will remain the dominant group--exceeded in numbers only by those under 15. The 15 to 25 year olds will be relatively small in number and will actually show a two and one-half million net decrease from the 1960-1970 period. Thus, the relative number of youths who have traditionally been potential military recruits will be significantly diminished. There would appear to be advantages to accrue from programs aimed at older individuals.

-- THE SATISFACTION OF MANPOWER REQUIREMENTS COULD BE EASED BY NARROWING OPPORTUNITIES IN THE CIVILIAN WORK FORCE.

Opportunities in the work force will narrow during the forecast period. Competition will be keen. There are numerous reasons: the absolute number in the work force will increase; teen-agers will increasingly seek employment; greater opportunities will be afforded the various disadvantaged groups; the trend toward female careerism. And the slightest

economic recession would aggravate the situation by further restricting opportunity. To the extent these factors cause dissatisfaction and instability in the civilian work force, they could relieve Navy manpower needs by causing individuals to turn to military service. However, this is a negative appeal and would be offset by any expansion in the civil sector, or sacrifices required as a result of military service. And, growing national wealth and rising levels of education will increase the expectations for which satisfiers will have to be found.

-- EMPHASIS IN THE U.S. WILL CONTINUE TO SHIFT FROM THE MANUAL LABORER TO THE KNOWLEDGE WORKER.

Efficiency in the performance of the manual laborer was, in the past, the principal problem of organization. Predominant was the manual laborer who did what he had been told to do. The center of emphasis is shifting. The personal requirement for increased self-fulfillment and the complexity, importance, and speed required in the making of modern decisions will place a premium on the knowledge worker.

-- EQUAL OPPORTUNITY WILL CONTINUE TO CONCERN AMERICANS.

One of the key issues of the forecast period will be the provision of equal opportunities for access to the affluent life experienced by many and expected by most Americans. The provision of equal opportunity will remain the primary goal

of civil rights and other libertarian groups. Egalitarianism will continue to be sought in concept, while elitism and special or vested interest group supremacy will in fact be the goal.

Programs in housing, education, and training will be stressed as means for achieving the goal. Government will encourage business to participate. Inducements may include: tax rebates for training programs, extra consideration in the award of contracts, and legislation or administrative action requiring business concerns to employ given numbers of individuals from minority groups.

-- TRADITIONAL PREREQUISITES FOR COMMISSIONED AND NON-COMMISSIONED OFFICER STATUS MAY REQUIRE REVISION.

The first requirement for virtually all commissions in the U.S. Armed Forces is a college education. It is the primary credential which initially separates a commissioned from a non-commissioned officer. Because, during the forecast period, there will be more individuals of college-graduate age, the officer corps would seem to enjoy a demographic recruiting advantage. But the fact that more young people are obtaining college degrees will further decrease the demographically-diminished, traditional enlisted recruiting base of 15 to 24 year olds without degrees. Yet the Navy requires highly-skilled non-commissioned officers. And training them is costly, and keeping them is difficult.

There are several alternatives. For one, the "in" and "out" theory could be applied. Contracts rather than enlistments could be offered. The Navy could hire its manpower in much the same manner as does private enterprise. Instead of training all its technicians it could offer jobs to those already trained. For another, the Navy could eliminate the traditional officer and enlisted distinction and replace it with a simple hierarchy designed solely to maintain order and put trained men in jobs for which they are qualified. These innovations would require little more than job descriptions and commensurate pay scales.

-- THE EFFECTS OF CHANGING HUMAN VALUES WILL BECOME INCREASINGLY MANIFEST.

An awareness that economic prosperity and technical competence have not solved, and in numerous instances, have exacerbated social problems in the United States industrial society, has left its impact on the value system being subscribed to by Americans. Growing support for a no-growth or limited measured industrial economy should be expected. Many scholars predict a decline in such values as status, tradition, conformity, institutional leadership, and regard for hard work as a virtue. Self-expression, experimentation, individualism, and romanticism are expected to become more pervasive.

While the impact of changing values can be anticipated and discussed in broad outline as a reordering of national priorities, the full extent and timing of these changes is

uncertain. The degree of uncertainty and the speed of change will, in fact, be cornerstones of the upcoming period of transition and will lead to continued social disquiet.

-- TRENDS IN CHANGING INDIVIDUAL AND SOCIETAL VALUES
WILL STRAIN THE TRADITIONAL NAVY'S INSTITUTIONAL VALUE SYSTEM.

From an analysis of the literature on the trends in values in the United States, the implication for the Navy is that it must continue to prepare itself to adapt--not only to qualitative changes in traditional values, but also to new values which will supplement the old. Again, there are several options. The Navy can identify the characteristics and values it desires in its personnel, and develop programs aimed at attracting them--and favorably presenting them to the general population. Or, the Navy can identify the predominant characteristics and values of the people whose skills it needs and adapt its programs to suit them. The former would protect the traditional values of the Navy and could probably succeed. It is presented here as an alternative because there are those both inside and outside the Navy who apparently believe it is the way things ought to be. On the basis of research for this effort, however, the study group believes the second alternative to be far easier, and more viable, successful, exciting and desirable approach. It is also the one likely to be most acceptable to the general population.

-- DEMANDS FOR LEISURE AND DISCRETIONARY TIME WILL INCREASE.

The pressure for more leisure and discretionary time is emerging as one of the dominant themes in American business and industry. Demands for fewer on-the-job working hours will become the principal pressure points in labor's approach to management during the years of this forecast. These demands are the result of mismanagement. The objective is not less work, it is a clearly defined purpose for work. Failure to eliminate unnecessary jobs and provide meaningful work has led to increased dissatisfaction, low quality work, tardiness, absenteeism, alcoholism and drugs. All have combined to produce meaningless working lives from which escape will be increasingly sought. Basic to this will be the problem of the leisure/productivity equation. But the economy can afford both. Already some 400 companies are on a 4-day, 37/40-hour week basis. The number is growing at the rate of four firms per day and is expected to number 2,200 firms by November 1972. Increases in the absolute number of persons seeking employment will permit fewer working hours and even if only one-third of all expected productivity gains were devoted to increasing leisure, the average worker could have as much as 175-200 hours more free time in 1975 than in 1966 and 350-375 hours extra in 1990. The historical trend is for about one-third of productivity gains to be used to decrease work and increase leisure.

The other two-thirds have been historically used to raise living standards--which poses still another problem for the military.

-- THE USE OF MANPOWER AS REFLECTED ON BOARD PRESENT-DAY NAVY SHIPS WILL BE CONSTRAINED IN THE FUTURE DUE TO POPULATION TRENDS, SOCIETAL VALUES AND DIMINISHED RESOURCES.

Economic considerations have driven commercial ship operators toward automation. Technology now exists to automate most shipboard activities. Improvement in this technology will continue with emphasis on reliability, simplicity and reduced cost. It appears that by 1980, standard equipment on many new commercial ships will include anti-collision devices and automatic systems for navigation, steering, diagnosis of power plant malfunctions, data logging, and damage control. Computerized medical examination of crewmen is being seriously considered.

The trend in warship design must be toward less labor intensive ships. Capital/labor trade-off studies are required, but functions which can be performed better by machines should be automated, leaving the crew free to think and perform higher-level operations of control and decision making. The reduction in crew size will have an effect on ship size. Most maintenance should be performed in port, possibly by contract with commercial firms. The result will be fewer men at sea, and all-officer crews are a distinct possibility.

Additionally, highly skilled enlisted men will reject menial housekeeping chores and boring Navy "make work."

Further, closed circuit communications will develop parallel systems of informal communications between official postures and value systems and unofficial often contradictory systems.

-- ESTABLISHED INSTITUTIONS WILL BE THREATENED BY A GLOBAL CHALLENGE TO AUTHORITY.

A pervasive movement toward greater individual autonomy has appeared in the form of widespread and powerful revolts against established institutions and vested bureaucracies.

There are three interrelated causes: the rising level of affluence in society, the increasing tempo of change, and the revolution in communications and knowledge. Indications point toward a continuation of this revolt, here and abroad.

-- INCREASING LOYALTY TOWARD AND NEED OF THE SPECIALIZED PROFESSIONS WILL REDUCE ORGANIZATIONAL LOYALTIES.

Specialization in a complex world makes the specialist necessary. The specialized professional will be a new kind of man engaged in serial careers. He will derive his rewards from inward standards of excellence, from professional societies, and from the intrinsic satisfaction of his task, not his job; his expectations, not those of his boss. He will have numerous affiliations over a lifetime but remain basically uncommitted to any organization. He will employ his skills and creative energies to solve problems with equipment provided by the

organization, but only as long as the mode interests him. He will take his economic well-being for granted and be supremely confident of his ability to know what needs to be done and to do it. He will not be a good company man. He will, however, assume higher personal levels of responsibility.

-- TRADITIONALISM, VESTED INTERESTS, LOCAL ECONOMIC CONSIDERATIONS AND SIMPLE INERTIA WILL MODERATE RAPID CHANGE.

But these factors will generate friction, not eliminate change. Bureaucratic resistance to change is caused by a fear of the unknown and a desire for stability and security. Both in the United States and in Europe there is a strong resistance to changes which disturb a situation which has worked. But it has worked more to the satisfaction of those involved than those affected. The latter will be increasingly vocal and effective during the forecast period. This movement will proceed at differential rates throughout the world.

-- UNIONIZATION OF THE U.S. ARMED FORCES IS AN INCREASING POSSIBILITY.

Changing values, demands for leisure time, and the emphasis on law and order increase the possibility of a collectivized military. The bureaucracy has not responded as rapidly as desired, and individuals have come to recognize they are most effective when operating through institutions. Although unions in the armed forces are legal, they will most likely manifest themselves in the military more as professional

societies. Military encouragement of professional behavior enhances this probability.

Historically there has been little commonality of interest between organized labor and the military. Congress, in fact, has been the military's union. That situation is changing. The continuing erosion of fringe benefits and impending changes in the military retirement system, at a time when both are improving in the civilian and civil service sectors, is tending to leave the military discouraged. The likelihood exists that increasing numbers will view military unionization as the best method of protecting vested interests.

3. The Corporate Environment.

-- TO AVOID THE WHIPLASH OF "FUTURE SHOCK" INDUSTRY LEADERS ARE ATTEMPTING TO BECOME MANAGERS OF CHANGE.

Industry is significantly increasing its interest in long range (10 to 20 year) planning, world futures, and social change. Most notable among these efforts has been the multi-phase, multi-national study effort by the Hudson Institute. Another major effort was the symposium sponsored by Fortune Magazine in New York City, in May 1971, the central theme of which was "Corporate Strategy in the Seventies." The White House Conference on the "Industrial World Ahead," held in Washington from 7-9 February 1972, was designed to look at business in the 1990 time frame. Finally, the Club of Rome, in concert with M.I.T., has pioneered an environment

resource model of the future. The central purpose of each of these efforts was to identify factors which will impinge upon industry, progress and the human condition in future decades.

-- THE NEED FOR LONG RANGE CORPORATE PLANNING IS NOT UNIVERSALLY ACCEPTED BY ALL FIRMS.

A limited number of firms ranging from small companies through very large multi-national corporations were surveyed during the study. In general, the small firms had virtually no mid or long range plans and lived from day to day, a tendency likely to continue into the future.

Some of the middle sized aerospace companies seemed to be content with today's business, were conservatively managed, and did not care to speculate beyond three to five years. Very large corporations, however, appear to have launched a significant effort to develop long range planning including consideration of political, legislative, economic and social trends, plus an overall strategic analysis of future business prospects.

Lack of forward planning and subsequent shortfalls suggest future consolidation of industry, prime contractors and continued growth toward bigness.

-- SOCIAL RESPONSIBILITIES AND ENVIRONMENTAL INFLUENCES
ARE BEING SERIOUSLY CONSIDERED BY INDUSTRY.

As a segment of its future planning activities, industry will expend considerable effort in the study of changing values, cultural transformation, social responsibilities of corporations, and prototype solutions to problems. Trends discerned by business will increasingly be considered and acted upon by companies through their own organizations both as civic activists and as shrewd marketers. Pressures by federal, state, and local government, the stockholders, populist activists and labor organizations are anticipated in the decades ahead.

-- SOME COMPANIES ARE BEING FORCED INTO MAJOR TRAINING
PROGRAMS TO PROVIDE SKILL LEVELS FOR PRODUCTION LINES.

In view of the changing values of our society and the generally low esteem accorded to manual, semi-skilled jobs some corporations are having difficulty acquiring the production workers with requisite skills. For example, LTV Corp. of Dallas in its quest for suitable, reliable production workers resettled 750 Mexican-American families from the lower Rio Grande Valley to Dallas and trained them in basic industrial skills. The program has been described as an outstanding industrial and social success. Training of the disadvantaged and of teenagers is being accomplished through industry - secondary education cooperative programs. Education is fast becoming an accepted societal role for industry.

Mass production in the future will be structured so as to minimize the boredom and servility of the assembly line. Ford and Volvo are even now working to develop alternates to traditional production methods.

-- AEROSPACE CORPORATIONS ARE BEING FORCED TO DIVERSIFY PRODUCT LINES TO SURVIVE.

The future business potential of most large corporations lie primarily in their "core" skills. For example, engineering and scientific personnel, and some level of production skills must be maintained during economically slack periods. For this reason some of the aerospace companies are turning to other product lines dealing with social and urban problems utilizing the crossover skills of aerospace. Additionally, large companies have shown a tendency to keep core skills employed even at a contractual loss or non-profit. These actions are necessary to maintain motivation, and to reduce overhead on other programs.

-- PRODUCTION OF MILITARY HARDWARE WILL BECOME CONCENTRATED IN THE HANDS OF A FEW LARGE CORPORATIONS.

The traditional concept of free competition in arms manufacture is eroding in the face of increased weapons complexity and cost, and the efficiencies of large scale production. In many cases the nation will be able to afford only one producer of a given type of hardware, and enforced competition will become economically dysfunctional. Procedures

governing military procurement will be basically changed. One possible avenue may develop in such a manner that single producers of expensive hardware are treated as a form of regulated public utility.

4. The Technological Environment.

--- THE U.S. POSITION OF LEADERSHIP IN WORLD TECHNOLOGY IS BECOMING LESS DOMINANT.

Future breakthroughs in technology may come from outside as well as inside the United States. In this age of intense scientific activity, new scientific knowledge is difficult to keep secret. A discovery made in one country will be repeated eventually in others because many scientists throughout the world are looking at parallel possibilities. The very fact that one country is known to have solved a particular problem may spur on others to discover a similar solution. In military technology, the intellectual gap between developed and lesser developed nations may become very narrow. The capability of smaller nations to do great harm is increasing. Available scientific know-how, if concentrated in the upper range of the military technological spectrum, will allow underdeveloped nations to produce a limited number of highly sophisticated weapons and delivery vehicles. Smaller nations may also acquire the capacity to improve on weapons given them by more developed nations. The United States may be in for surprises when innovative

technology comes from unexpected sources. An example would be the development by a Latin American nation of a psychopharmaceutical which would be used extensively for mood or mind control.

--- THE NAVY FACES A FUTURE IN WHICH VARIOUS OTHER NAVIES MAY OCCASIONALLY HAVE TEMPORARY SUPERIORITY IN A PARTICULAR WEAPON SYSTEM.

The proliferation of technology makes it likely that future breakthroughs in weapons development may come from foreign countries. Surprises may appear in the form of advanced and superior weaponry from sources outside the United States, and the Navy will have to plan to minimize the effects of such surprise. This implies a need for greater sensitivity to the military potential of new technology and speedy integration of new weapons into the fleet. It also implies a need for a variety of naval weapons so that temporary inferiority in one type will not seriously affect the fighting capacity of the entire fleet. Accurate and timely intelligence regarding foreign technology will assume vital importance.

-- INDEPENDENT RESEARCH AND DEVELOPMENT BY EACH SERVICE IS PROVING COSTLY, AND DOD FUNDING OF JOINT PROJECTS, GREATER COOPERATION WITH THE CIVILIAN SECTOR, AS WELL AS PROCUREMENT OF FOREIGN TECHNOLOGY, WILL BE THE WAY OF THE FUTURE.

The cutback in space research and cancellation of the SST program have resulted in the loss of valuable sources of technological advances to the military. As a consequence, the military is faced with increasing R&D requirements to meet the state of technology previously forecast for the 1980s. Independent research by the services has been favored in the past but this has proven extremely expensive and resulted in redundant effort. In order to utilize future limited R&D resources more efficiently, all military R&D may come under the control of a joint R&D organization. As a result, all services will have common weapons and weapon systems to a greater degree than they do now. Reasons of economy will also force the services to seek greater technological cooperation with the civilian sector, and more use will be made of military R&D performed in countries friendly to the United States.

The Navy should not fight the trend toward inter-service and interagency cooperation in R&D. Rather, it should take an activist role in proposing and supporting joint projects, thus increasing the possibility that the outcome will be favorable to the Navy. As in many other aspects of military activities, the trend in interservice cooperation for

R&D points toward unification of the services. The military scientific community may not be averse to unification of R&D since it appeals more to professional rather than institutional loyalties.

-- THE U.S. TENDENCY TO OVERDESIGN EQUIPMENT AND OVERSPECIFY MILITARY REQUIREMENTS WILL CONTINUE TO PRODUCE LESS THAN OPTIMUM MILITARY EFFECTIVENESS PER DOLLAR EXPENDED.

Overdesign occurs when fancier and more expensive components add very little to performance, comfort, or safety. In more extreme cases they add nothing at all, or even turn out to be counterproductive because of added weight, increased manning requirements, or proneness to malfunction under field conditions. Overspecification of military requirements occurs when equipment safety factors and performance characteristics far exceed the needs of anticipated operation. This tendency is likely to continue unless drastic changes in the philosophy of hardware acquisition take place.

-- DURING THE PERIOD STUDIED, CHANGE IN NAVAL TECHNOLOGY WILL CONTINUE TO BE RAPID, AND MAJOR IMPROVEMENTS IN WEAPONS AND WEAPONS SYSTEMS CAN BE REALIZED.

Providing that sufficient R&D resources are made available to the military, major improvements in U.S. weapons and weapons systems can be realized within the next thirteen years. Examples of such advances are:

1. Air-to-air and ground-to-air laser weapons to enhance the air defense posture of the fleet.
2. Liquid propellant gun systems that offer higher effectiveness per pound of installation weight than conventional gun systems.
3. Gun projectiles with terminal guidance which will give guns of the fleet greater capabilities.
4. Extensive use of microcircuitry and large scale integrated circuitry to improve avionics in terms of weight, volume, power and performance.
5. Development of new structural materials and heat resistant metals that will have wide application in the construction of aircraft and ships.
6. Weather control to enhance military operations.
7. Remotely piloted vehicles which can serve as weapon platforms for combat operations.
8. Larger and faster hydrofoils and surface effect ships.

-- MISSION ANALYSIS FOR HYDROFOILS AND SURFACE EFFECT SHIPS IS REQUIRED TO DETERMINE THEIR POTENTIAL PAYOFF IN INCREASED FLEET EFFECTIVENESS.

One aspect of hydrofoils and surface effect ships which is absent from the literature surveyed deals with mission analysis for these craft. Since the advantage of speed is accompanied by some severe penalties, including

considerable R&D cost, the potential payoff in fleet effectiveness under various circumstances must be clearly understood. Other alternatives, such as improved aircraft or aircraft-ship combinations and even seaplanes need to be examined. The seaplane, for example, offers a considerable speed advantage with the capability to operate in international waters.

--- VTOL AIRCRAFT WILL BE REQUIRED TO AUGMENT THE
U.S. NAVY'S AIR STRIKE/DEFENSE CAPABILITY.

Assuming that new CVA construction will fall short of currently held requirements, the Navy will have to look toward smaller ships to augment the carrier's air strike/defense capability. VTOL fighter and attack aircraft operating from small ships appear to be the most practical solution for the 1980s.

-- ADMINISTRATIVE COMPETENCE WILL BE CRUCIAL IN
THE MODERN WORLD IN WHICH MILITARY REQUIREMENTS AND
TECHNOLOGICAL OPPORTUNITIES ARE SUBJECT TO A WIDE RANGE
OF CHOICES AND RAPID CHANGE.

Technology is waiting to be picked up and waiting to be developed. Whether or not this is done in the future depends on people and organization. Political commitment and administrative competence are important linking variables which can bring about superiority in military technology in spite of possible overall technological weakness. Conversely,

administrative incompetence and lack of political commitment may bring about inferiority in military technology in spite of overall national technological strength. The Navy needs to assure itself of high level managerial talent in technology. It also needs to examine and streamline its "corporate" structure, adopting measures to reform ingrained inefficient bureaucratic habits.

--- IMPROVED TECHNIQUES FOR MAN-MACHINE COUPLING WILL BE AVAILABLE, BUT THE MILITARY APPLICATION OF THESE TECHNIQUES REQUIRES DEVELOPMENT OF PROCEDURES AND DOCTRINE.

Techniques and equipment will be developed during the 1970s which vastly increase the capability of man to solve complex problems. Increased capability here means more rapid comprehension, better comprehension, the possibility of gaining a useful degree of comprehension in a situation that previously was too complex, speedier solutions, and the possibility of finding solutions that seemed insoluble before. These are accomplished by using the computer as a direct adjunct to the human brain so that the two may interact on a real time basis. The symbiotic effect of such man-machine coupling will be much more powerful than most current applications which place the computer in a passive rather than interactive role.

Almost all future naval operations will be carried out in highly compressed time frames. Commanders at all levels

will have to assimilate large amounts of input data, make decisions, and implement those decisions in a matter of hours, even minutes, depending on the tactical situation. In this environment it will be essential that the human intellect be assisted to the greatest extent possible by computers which can sort, organize, and manipulate information, test alternative courses of action, and communicate executive instructions to subordinate units. The basic tools already exist, but application of these tools requires new attitudes and new ways of thinking. A good deal of research will have to be done by practical-minded military men to make these tools useful in an operational environment. The field of computer technology is one in which the U.S. is likely to maintain a substantial lead during the period studied, and it is essential that this lead be exploited.

-- THE PROBLEMS RELATING TO NAVAL TECHNOLOGY IN THE 1972-1985 TIME FRAME ARE NOT THOSE OF INVENTION BUT THOSE OF ADOPTION.

In surveying the available technology and forecasts for the future, it becomes obvious that present-day technology is not being adopted rapidly enough in naval hardware and naval operations. There is already more available than we can afford to buy. But technology is likely to continue its advance, whether supported by the Navy or not, and the prospect for the future is an ever-widening gap between available

technology and technology of the fleet. It is hard to argue with success, and the Navy has been successful in the past; but as the Navy enters a new era of international relations combined with a rapidly changing technological environment, traditional doctrine seems less relevant and traditional approaches to technology less likely to assure military superiority.

-- THE RAPID PACE OF TECHNOLOGICAL CHANGE EMPHASIZES THE NEED FOR A NAVAL STRATEGY OF TECHNOLOGY.

The Navy will have to develop a strategy to manage technological change in order to keep from being overwhelmed by it. A key feature in developing such a strategy is the emphasis on greater involvement of Naval officers in technology to accomplish the main tasks which are:

1. Minimizing the effect of technological surprise from outside the U.S.
2. Taking an activist role in joint R&D projects.
3. Minimizing the tendency to over-design hardware and overspecify military requirements.
4. Designing systems which are less labor intensive.
5. Developing the full potential of computers to augment human intellect in naval applications.
6. Performing mission analyses for proposed systems.

7. Planning for obsolescence and seeking systems of maximum salvage value which are flexible enough for refit with the latest advances in technology.

8. Bringing politico-military considerations to bear on weapons R&D.

-- SURVEILLANCE AND COMMAND SYSTEMS DEVELOPMENT MUST BE COORDINATED TO COPE WITH THE EVER DECREASING TIME FOR DECISIONS.

Surveillance and command data flow from sensor to decision maker in the future will need to respond to the demands of a rapidly changing naval environment in which intensive use of increasing segments of the electromagnetic spectrum can be anticipated. Satellite sensor and communication technology will be matters of priority to meet the potential multithreat demands of the 1980s.

Synchronous communication satellites and space borne microwave radiometry are two examples of the technology that will match anticipated surveillance and command requirements. Additional surveillance sensor options which will be open by the early 1980s include seismic, acoustic, magnetic, electromagnetic, optical, and infrared technology. Regardless of the discrete technology selected, data acquisition and dissemination in the 1980s must channel through mutually supporting surveillance and command systems.

-- RULES OF ENGAGEMENT ARE PRE-DETERMINED COMMAND AND CONTROL DATA AND SHOULD BE DISPLAYED PROMINENTLY IN COMMAND AND CONTROL CENTERS.

The method of communicating Rules of Engagement, i.e., the printed page in Operations Orders, remains inconsistent with display methods for other command and control data. This is but one example of different perspectives which must be applied to Command information. The variety of challenges which the Navy will face in the future are and will continue to be numerous. Improved display of actions expected of commanders, and rapid display of modifications to required actions will enhance the ability of commanders to cope with the future political and military confrontations.

-- DEVELOPMENTS IN COMMAND, CONTROL, AND COMMUNICATIONS SYSTEMS WILL DEFINE THE LIMITS OF FLEET RESPONSE TO MILITARY AND POLITICAL THREATS.

The size, weight, and cost of Command and Control Systems will decrease in the 1975-1985 period. Simultaneously, software technology will increase in the number of problems, cost and complexity. Mid 1980 Command and Control Systems will include on-line, near real time data processing, mean time between failure (MTBF) will be reduced by an order of magnitude, and tactical communications satellites will provide the central building block for command, control and communications capabilities. The C³ systems that are developed with



the above technology must diffuse the natural boundaries inhibiting operations among naval air, surface, and sub-surface forces, and will be directed to support the functional requirements of war at sea. The penalty for developing discrete Command and Control Systems in support of individual weapons systems will be paid in the limitations of integrated fleet operations. Accordingly, future design requirements for communications links should be established by Command and Control personnel with the broadest perspective of military and political threats facing the Navy.

EPILOG

The following questions which occurred to the researchers during the course of their study are suggested as areas for follow-on investigation; many of the questions are in fact variables, which if changed from the condition of multipolarity, would do a change in model and thus to a new scenario.

1. What if Germany is unified at the price of the withdrawal of West Germany from NATO and from the Common Market?
2. What if the United States suffers a humiliating experience via a future Cuban missile type situation during which the United States is shown to be inferior to the Soviet Union (or China?) in the critical weapon systems?
3. What if a Sino-Soviet War breaks out? What if one of the parties is effectively removed from the international power equation by that war?
4. What if China erupts in internal difficulties and disintegrates into several competing political units?
5. What if the gap between the rich and the poor nations becomes so great that China can become a real leader of the underdeveloped world and confronts the "North" with a bitter "South"?
6. Will Japan negotiate oil agreements with the USSR and political agreements with China in the 1975-85 time frame?

7. Will Europe's economic advance and psychological sense of detente collapse as a result of inability to develop a closer political sense if not unity or as a result of conflict over the role and influence of the multinational corporation or the development of technological impact?
8. Will the Soviet Union in the face of societal change and despite internal and external misgivings find itself economically and socially incapable of mounting large overseas adventures?
9. Will the military alliance system fall into disrepair due to conflicting triangular interests and competing political and economic concerns? In its stead will loose but effective groupings emerge?
10. Will unilateral but not total disarmament occur as a result of a "political" breakthrough in American populist thinking and future electoral success?
11. Will a gap develop in fiscal and economic differential tuning between the United States and the USSR? U.S. defense budgets may become severely constrained in the 70s due to reassessment of national priorities and efforts at solutions, will this phenomenon find a Soviet counterpart in the 80s?
12. What effect will the shift in the United States from the manual laborer to the knowledge worker have on the future of warfare? Will advantages accrue to the labor-intensive ships of the lesser developed countries, including the USSR, to offset the advantages of mechanization? A breakthrough permitting the jamming of electronically controlled equipment at its power source poses a substantial potential threat.

13. What are the possibilities of breakthrough enabling decision makers to digest and enjoy the immediate and constant availability of the reams of learned material available for their use?
14. Will shifts in the structure of the age groupings of the United States result in stability or instability? How will the goals of special and vested interest groups of increasing size blend with the traditional voices of conservatism when drawn together into the work force?
15. Will long-term goals such as "zero population growth" assuage fears and discontent caused by the expanding concern for ecology or will demands for more direct and immediate ameliorizations result in upheaval?
16. What are the personal and social characteristics of the members of the United States Navy? What are its institutional values?
17. To what extent do the personal and social characteristics of the members of the United States Navy coincide with the institutional values of the Navy; with the personal and social characteristics of the society? Is the Navy in tune with the times?
18. With what trends in societal values does the Navy and its membership associate? What trends would it like to encourage, to discourage?
19. What kind of society will flow from future centralization and bureaucracy? Will the need for specialized professionalism create a scarcity of competent generalists or will managerial talents be recognized as the constructs of still another profession?

20. Is the officer and enlisted structure of the armed forces obsolete?
21. To what extent can the military align itself with the interests and goals of the private and other public sectors of society to enhance its position as defender of national security and as a useful instrument of society?
22. What lessons can be learned from the Canadian unification effort which apply to possible unification of the U.S. Armed Forces? Is unification of the Armed Forces to be made necessary by budget, public demand, efficiency and lowered priorities? Is it a sensible solution for America of the 1980's?
23. To what extent is it feasible for subsurface vessels to assume missions presently assigned to surface vessels?
24. What are the implications for the Navy of the worldwide energy and natural resource projections for the future? What is to be the precise function of the Navy in developing and protecting American interests in ocean resources?
25. Is the U.S. really facing an energy crisis in the near future?
26. How should U.S. defense procurement policies be changed to adapt to the corporate and technological environments of the future?
27. Can the Navy afford what it envisions itself to be in the 1980's? Indeed, what does the Navy envision itself to be?

28. What is the likely trend of the Navy budget through 1985? What are the circumstances which will disrupt this trend? What will be the effect of such disruption, and what would the Navy do with more/less money?

29. What sort of public service roles will enhance the image of the Navy without degrading its primary mission of military defense?

30. What will be the U.S. dependence on international trade and resources needed for the production of military equipment?