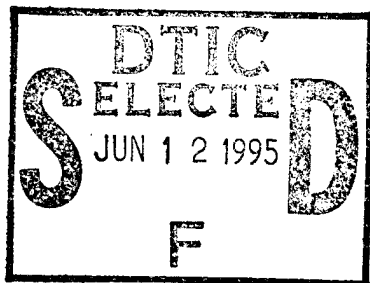


# NAVAL POSTGRADUATE SCHOOL MONTEREY, CALIFORNIA



## THESIS

**DEFENSE POLICY OF JAPAN  
MARITIME SELF-DEFENSE FORCE(JMSDF)  
IN THE EARLY 21ST CENTURY**

by

Mitsuhisa Mashiko

March, 1995

Thesis Advisor:

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DEFENSE POLICY OF JAPAN MARITIME  
SELF-DEFENSE FORCE (JMSDF)  
IN THE EARLY 21ST CENTURY

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Submitted in partial fulfillment  
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## **ABSTRACT**

This thesis analyzes the defense policy of the Japan Maritime Self-Defense Force (JMSDF) in the early 21st century. The primary research question is "Should the defense force structure of the JMSDF in the early 21st century remain the same as it has been in the last 10 years?" To answer this question, I made a brief analysis of current and future prospects for Japan and her neighboring countries in terms of their politics, diplomacy, economy and military. These countries included China, North and South Korea, Russia and the U.S. Finally, I evaluated the cost of baseline and alternative force structure.

The alternative force structure may require some revision of current legal limitations and increased defense expenditures. Japan, however, should undertake this correction not only for her own security needs, but also to make a more equitable contribution to ensure the Japan-U.S. security arrangement viable in the coming decade.



## TABLE OF CONTENTS

|                                         |    |
|-----------------------------------------|----|
| I. INTRODUCTION.....                    | 1  |
| A. BACKGROUND.....                      | 1  |
| B. PURPOSE.....                         | 1  |
| C. FRAMEWORK OF THE RESEARCH.....       | 1  |
| 1. Outline.....                         | 1  |
| 2. Methodology.....                     | 2  |
| 3. Scope.....                           | 2  |
| II. COUNTRY SITUATION AROUND JAPAN..... | 3  |
| A. UNITED STATES OF AMERICA.....        | 3  |
| 1. Politics.....                        | 3  |
| 2. Diplomacy.....                       | 4  |
| 3. Economy.....                         | 4  |
| 4. Military.....                        | 6  |
| B. RUSSIA.....                          | 9  |
| 1. Politics.....                        | 9  |
| 2. Diplomacy.....                       | 10 |
| 3. Economy.....                         | 10 |
| 4. Military.....                        | 12 |
| C. CHINA.....                           | 16 |
| 1. Politics.....                        | 16 |
| 2. Diplomacy.....                       | 17 |
| 3. Economy.....                         | 18 |
| 4. Military.....                        | 21 |
| D. SOUTH KOREA.....                     | 22 |
| 1. Politics.....                        | 22 |
| 2. Diplomacy.....                       | 23 |
| 3. Economy.....                         | 23 |
| 4. Military.....                        | 25 |
| E. NORTH KOREA.....                     | 26 |
| 1. Politics.....                        | 26 |
| 2. Diplomacy.....                       | 26 |
| 3. Economy.....                         | 27 |
| 4. Military.....                        | 29 |



|                                                                      |    |
|----------------------------------------------------------------------|----|
| 5. Nuclear Issue.....                                                | 30 |
| III. COUNTRY SITUATION OF JAPAN.....                                 | 32 |
| A. GEOPOLITICAL CHARACTERISTICS.....                                 | 32 |
| 1. Geographical Characteristics.....                                 | 32 |
| 2. Strategic Characteristics.....                                    | 32 |
| 3. Ocean Nation.....                                                 | 32 |
| 4. Point of Connect with South-Going Policy of Russia.....           | 33 |
| B. POLITICS.....                                                     | 33 |
| 1. Political System.....                                             | 33 |
| 2. Security Policy.....                                              | 34 |
| C. DIPLOMACY.....                                                    | 35 |
| D. ECONOMY.....                                                      | 36 |
| E. DEFENSE.....                                                      | 36 |
| 1. Outline Of Japan's Defense Program.....                           | 36 |
| 2. Defense Expenditures.....                                         | 38 |
| IV. FEATURES OF THE JMSDF.....                                       | 42 |
| A. JMSDF BUDGET.....                                                 | 42 |
| 1. Trends in Defense Expenditures Classified by<br>Organization..... | 42 |
| 2. JMSDF Budget.....                                                 | 43 |
| B. SHIP AND AIRCRAFT EXPANSION IN THE JMSDF.....                     | 45 |
| 1. Ship Expansion.....                                               | 45 |
| 2. Aircraft Expansion.....                                           | 48 |
| C. THE POSTURE OF THE JMSDF IN THE NDPO.....                         | 51 |
| D. THE ROLE OF THE JMSDF.....                                        | 52 |
| 1. General Role of the Military Strength.....                        | 52 |
| 2. General Role of the Naval Strength.....                           | 53 |
| 3. The Current Role of the JMSDF.....                                | 54 |
| E. LIMITATION ABOUT THE JMSDF.....                                   | 55 |
| 1. Legal Limitation.....                                             | 55 |
| 2. Limitation on Japan-U.S. Coordinated Joint Action.....            | 57 |
| 3. Financial Limitation.....                                         | 58 |
| 4. Social Limitation.....                                            | 59 |

|                                                            |    |
|------------------------------------------------------------|----|
| F. WEAKNESS OF THE JMSDF.....                              | 59 |
| 1. Comparison of Fleet Composition.....                    | 60 |
| 2. Comparison of Aircraft Assets.....                      | 60 |
| 3. Summary.....                                            | 60 |
| V. FORECAST OF THE COUNTRY SITUATION AROUND JAPAN.....     | 68 |
| A. THE UNITED STATES OF AMERICA.....                       | 68 |
| 1. Politics.....                                           | 68 |
| 2. Diplomacy.....                                          | 68 |
| 3. Economy.....                                            | 68 |
| 4. Military.....                                           | 68 |
| B. RUSSIA.....                                             | 69 |
| 1. Politics.....                                           | 69 |
| 2. Diplomacy.....                                          | 69 |
| 3. Economy .....                                           | 70 |
| 4. Military.....                                           | 71 |
| C. CHINA.....                                              | 72 |
| 1. Politics.....                                           | 72 |
| 2. Diplomacy.....                                          | 72 |
| 3. Economy.....                                            | 73 |
| 4. Military.....                                           | 74 |
| D. SOUTH KOREA/NORTH KOREA.....                            | 75 |
| 1. Politics.....                                           | 75 |
| 2. Diplomacy.....                                          | 75 |
| 3. Economy.....                                            | 75 |
| 4. Military.....                                           | 76 |
| E. PECULIARITY OF ASIA/PACIFIC REGION.....                 | 76 |
| 1. Impact of Collapse of Russia.....                       | 76 |
| 2. Fluidaization of Power Relationship .....               | 76 |
| 3. Immaturity of Security System.....                      | 77 |
| 4. Geopolitical Characteristic.....                        | 77 |
| F. ENCOUNTERING PHENOMENA OR EVENTS.....                   | 78 |
| G. FACTORS OF USE OF MILITARY FORCE THAT AFFECT JAPAN..... | 78 |
| 1. Russia.....                                             | 78 |

|                                                                                 |     |
|---------------------------------------------------------------------------------|-----|
| 2. China.....                                                                   | 79  |
| 3. United Korea.....                                                            | 79  |
| H. THE CRISIS SITUATION.....                                                    | 79  |
| 1. Direct Threat Scenarios.....                                                 | 79  |
| 2. Indirect Threat Scenarios(Repercussion From Other<br>Regional Conflict)..... | 81  |
| VI. NEW FEATURE OF THE JMSDF.....                                               | 83  |
| A. FACTORS AND CONTINGENCIES FOR THE JMSDF TO<br>CHANGE ITS DEFENSE POLICY..... | 83  |
| 1. Meaning of End of Cold War.....                                              | 83  |
| 2. Emergence of New Power.....                                                  | 83  |
| 3. Decrease of U.S. Pacific Naval Forces.....                                   | 83  |
| 4. New Movement of United Korea.....                                            | 84  |
| 5. Lack of Balance of Maritime Self Defense Force.....                          | 84  |
| B. CHANGE OF LEGAL LIMITATION.....                                              | 84  |
| C. NEW FEATURE OF THE JMSDF.....                                                | 84  |
| 1. Physical Feature of an Alternative Maritime Force<br>Structure.....          | 85  |
| 2. Fleet Comparison.....                                                        | 86  |
| D. COST ESTIMATION OF BASELINE FORCE STRUCTURE.....                             | 86  |
| 1. Ship Assets.....                                                             | 86  |
| 2. Aircraft Assets.....                                                         | 87  |
| 3. Total.....                                                                   | 88  |
| E. COST ESTIMATION OF ALTERNATIVE FORCE<br>STRUCTURE.....                       | 89  |
| 1. Personnel Composition.....                                                   | 89  |
| 2. Financial Evaluation.....                                                    | 91  |
| F. COMPARISON OF TOTAL COSTS.....                                               | 94  |
| 1. Ship Assets.....                                                             | 94  |
| 2. Aircraft Assets.....                                                         | 95  |
| 3. Total.....                                                                   | 96  |
| G. BUDGET ESTIMATION.....                                                       | 97  |
| VII. CONCLUSION.....                                                            | 100 |
| APPENDIX A. GROSS NATIONAL PRODUCT (1981-1991).....                             | 103 |
| APPENDIX B. MILITARY EXPENDITURES (1981-1991).....                              | 104 |

|                                                                                                   |     |
|---------------------------------------------------------------------------------------------------|-----|
| APPENDIX C. TREND OF NAVAL FORCE (NUMBER OF MAJOR SHIP) (U.S.).....                               | 105 |
| APPENDIX D. TREND OF NAVAL FORCE (FULL TON) (U.S.).....                                           | 106 |
| APPENDIX E. TREND OF NAVAL FORCE (NUMBER OF MAJOR SHIP) (U.S. PACIFIC).....                       | 107 |
| APPENDIX F. TREND OF NAVAL FORCE (FULL TON) (U.S. PACIFIC).....                                   | 108 |
| APPENDIX G. TREND OF NAVAL FORCE (NUMBER OF MAJOR SHIP) (RUSSIA).....                             | 109 |
| APPENDIX H. TREND OF NAVAL FORCE (FULL TON)(RUSSIA).....                                          | 110 |
| APPENDIX I. TREND OF NAVAL FORCE (NUMBER OF MAJOR SHIP) (RUSSIA PACIFIC).....                     | 111 |
| APPENDIX J. TREND OF NAVAL FORCE (NUMBER OF MAJOR SHIP) (CHINA).....                              | 112 |
| APPENDIX K. TREND OF NAVAL FORCE (FULL TON) (CHINA).....                                          | 113 |
| APPENDIX L. TREND OF NAVAL FORCE (NUMBER OF MAJOR SHIP) (SOUTH KOREA).....                        | 114 |
| APPENDIX M. TREND OF NAVAL FORCE (FULL TON) (SOUTH KOREA).....                                    | 115 |
| APPENDIX N. TREND OF NAVAL FORCE (NUMBER OF MAJOR SHIP) (NORTH KOREA).....                        | 116 |
| APPENDIX O. TREND OF NAVAL FORCE (FULL TON) (NORTH KOREA).....                                    | 117 |
| APPENDIX P. SHIP FLOW OF EACH COUNTRY AROUND JAPAN .....                                          | 118 |
| APPENDIX Q. TREND OF MILITARY FORCE OF COUNTRIES AROUND JAPAN.....                                | 126 |
| APPENDIX R. BASIC POLICY FOR JAPAN'S NATIONAL DEFENSE.....                                        | 127 |
| APPENDIX S. OUTLINE OF JAPAN'S DEFENSE BUILDUP FOR THE FUTURE.....                                | 128 |
| APPENDIX T. CHANGE IN DEFENSE EXPENDITURES.....                                                   | 129 |
| APPENDIX U. CHANGE IN JAPAN'S MAJOR GENERAL ACCOUNT EXPENDITURES (ORIGINAL BUDGET).....           | 130 |
| APPENDIX V. TREND IN JAPAN'S DEFENSE EXPENDITURES (BY EXPENSES).....                              | 131 |
| APPENDIX W. TREND IN JAPAN'S DEFENSE EXPENDITURES (BY ORGANIZATION).....                          | 132 |
| APPENDIX X. TREND IN EACH SERVICE'S BUDGET AS A PERCENTAGE OF GNP (BY ORGANIZATION) IN JAPAN..... | 133 |

|                                                                           |     |
|---------------------------------------------------------------------------|-----|
| APPENDIX Y. TREND IN JMSDF BUDGET (BY EXPENSES).....                      | 134 |
| APPENDIX Z. TREND IN JMSDF BUDGET (BY 3 COMPONENTS).....                  | 135 |
| APPENDIX AA. JMSDF SHIPBUILDING COST (BY TYPE).....                       | 136 |
| APPENDIX AB. JMSDF AIRCRAFT INVENTORIES.....                              | 137 |
| APPENDIX AC. JMSDF AIRCRAFT PROCURING COST (BY TYPE).....                 | 138 |
| APPENDIX AD. JMSDF SHIP INVENTORIES COMPARED WITH<br>OTHER COUNTRIES..... | 139 |
| APPENDIX AE. ESTIMATE OF SHIPBUILDING FLOW (1995~2020).                   | 140 |
| APPENDIX AF. TREND AND ESTIMATE OF SHIPBUILDING COST ..                   | 145 |
| APPENDIX AG. ESTIMATE OF AIRCRAFT PROCURING FLOW<br>(1995~2020).....      | 152 |
| APPENDIX AH. TREND AND ESTIMATE OF AIRCRAFT<br>PROCURING COST .....       | 155 |
| APPENDIX AI. ESTIMATE OF ESCALATION RATE.....                             | 159 |
| APPENDIX AJ. TREND OF GNP.....                                            | 160 |
| LIST OF REFERENCES.....                                                   | 161 |
| INITIAL DISTRIBUTION LIST.....                                            | 165 |

## **I. INTRODUCTION**

### **A. BACKGROUND**

The East-West confrontation that has keynoted the world military situation since the end of World War II, has come to an end with the collapse of the Soviet Union. The structure of two military powers - the United States and the Soviet Union - confronting each other with enormous military forces, including nuclear weapons, has collapsed. Military structures were built on the assumption of balance of nuclear forces between the United State and Soviet Union and the associated confrontation between the North Atlantic Treaty Organization (NATO) and the Warsaw Pact Organization (WPO). Now, there are movements towards wide-spread arms control and weapon reductions. As the international community is searching for a new world order of peace and security, these movements reduce the possibility of a world scale war breaking out in the future,

The end of the "Cold-War" has influenced each country in many aspects. Plans for reduction of the U.S. military has started. These changes are expected to influence the future role of Japan Maritime Self-Defense Force(JMSDF).

### **B. PURPOSE**

The purpose of this thesis is to analyze the defense policy of JMSDF for the early 21st century. The primary research questions are : Should the force structure of JMSDF in the early 21st century remain the same as it has been during the last 10 years? What possible military situations do the countries in East Asia face, and how might they change in the future? What has been the trend of the military balance in the East Asia? What is the weakness of JMSDF? How do the answers to these questions affect the defense policy of JMSDF?

### **C. FRAMEWORK OF THE RESEARCH**

#### **1. Outline**

There are seven parts included in this thesis. The first part provides background information and introduction to this research. The second part analyzes the country situation surrounding Japan. The third part analyzes the country situation of Japan itself. The

fourth part analyzes current features of JMSDF. The fifth part analyzes potential future situations for countries surrounding Japan. The sixth part examines an alternative force structure of JMSDF and the associated cost implication. The final part presents findings and conclusions.

## **2. Methodology**

Data on JMSDF was collected from the Japan Maritime Staff Office in Tokyo. This data was used to conduct analysis as described in the third and fourth part of this thesis. Additional information from "Jane's Fighting Ships and Aircraft" and data from "The Military Balance 1993-1994" (The International Institute for Strategic Studies) were used in the second part.

## **3. Scope**

The main thrust of this thesis is to examine what is the role of the JMSDF and what might it be in the early 21st century.

The following areas will be examined in this thesis.

- Japan's defense program
- Defense policy of U.S., Russia, North and South Korea
- Forecast of military strength of each country
- Evaluation of JMSDF force structure
- Cost of alternative force structure

## **II. COUNTRY SITUATION AROUND JAPAN**

### **A. UNITED STATES OF AMERICA**

The end of Cold War meant the elimination of "anti-communism." Anti-communism had aspects of fighting together against a common enemy and of defending freedom and democracy. These values were major elements that kept the unity of U.S. society after the WWII. As the result of the elimination of anti-communism, several confrontations and confusing situations have appeared on the surface as a lack of unity among politics, diplomacy, economy, and society.

Although the "Containment Strategy" eventually triumphed, it was not without the cost of large expenditures. This certainly had an effect on changing the U.S. from a creditor nation to a debtor nation. For example, the policy of increased armaments expansion under the Reagan administration affected the trade deficit through linkage of twin deficits.

#### **1. Politics**

Elements relating to policy making include inputs from the President, Congress, the Staff of President, the Staff of Congress, lobbyists, political parties, and public opinion. These elements make up the complicated policy making process. Decentralization of power and a system of "checks and balances" has made the forecasting a nation's policy difficult. Initial impression of the Clinton administration and its economic may be summarized as follows<sup>1</sup>;

The administration's economic policy announced in February, however, roused the nation's support. Clinton's economic plan calls for much greater burden on individuals than his campaign promises indicated. Although the plan calls for a wide range of tax increase despite promises of a tax cut for the middle classes, it raised the public's sense of crisis and succeeded in giving the impression that Clinton was serious about rebuilding America.

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<sup>1</sup> ASIAN SECURITY 1993-1994 (Research Institute For Peace and Security) p38



## **2. Diplomacy**

Current U.S. diplomatic policy is based on the recognition that international cooperation is necessary to create the new world order. Behind this policy, there is a recognition that maintaining a leadership role contributes to the national interest of the U.S. in the long run. 'Asian Security' says<sup>2</sup>;

In a hearing before the Senate, Secretary of State Warren Christopher said that the Clinton administration's foreign policy will rest on three pillars: 1) the elevation of economic security to one of the main goals of foreign policy; 2) the maintenance of military forces sufficient to respond to new security threats; and 3) the encouragement of democratization and market economies.

With respect to the relation with Japan, Masaru Tamamoto says as follows<sup>3</sup>;

The U.S. public is extremely uncertain about the future. In stark contrast to the heady optimism that characterized the Reagan years, the population now seems fixated with pessimism, and that attitude translates into ambivalence with shades of hostility toward Japan.

The U.S. -Japan relationship, firmly anchored since 1945, is in danger of going adrift. During the Cold war, U.S. interests in Japan were rooted in geostrategic calculation. Although geostrategy certainly was critically important, Japan's psychological attachment to the United States also played a crucial role. That bond has now outlived the Cold War. The leadership of both countries must now forge a new rationale accompanied by a new set of rules capable of underpinning a healthy relationship. But the United States is suspicious of Japan's intentions. The truth, however, is that Japanese behavior is largely dependent on U.S. behavior. U.S. policy, then, is crucially important because more than formulation of a new set of Japanese foreign policies is at stake. Japan is again engaged in the fundamental redefinition of its national identity. How the United States behaves will influence the transformation of Japan's national personality.

## **3. Economy**

The restoration of a "Strong America" during the Reagan administration contributed to the collapse of the Soviet Union, however, it also contributed to the "Twin deficits" (the governmental deficit and the current account deficit in the trade areas).

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<sup>2</sup> ASIAN SECURITY 1993-1994 (Research Institute For Peace and Security) p39

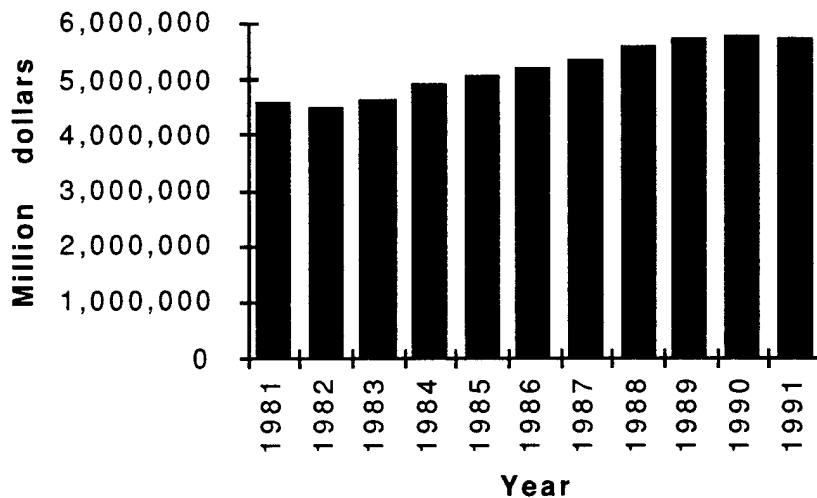
<sup>3</sup> Masaru Tamamoto, "The Japan That Wants to Be Liked: Society and International Participation," in Danny Unger & Paul Blackburn (ed.), *Japan's Emerging Global Role* (INSTITUTE FOR THE STUDY OF DIPLOMACY BOOK, 1993), p40-41

Another aspect of economy was the deterioration of local financing. During the Reagan period, a competence was transferred from central government to the local government, but at the same time, local financing deteriorated because of reductions of government subsidies. This deterioration encouraged active courting of Japanese companies for investment by state and local governments.

The third aspect is the trade policy between the two countries. Because of the dissatisfaction over the progress from international negotiations such as the Uruguay Round and the constant deficit in the U.S.-Japanese balance of trade, there was a strong support for bilateral or unilateral action to force the foreign market open.

The final aspect was the establishment of NAFTA. This agreement has the possibility of expanding not only to Latin America, but to the Asian countries as well.

Figure 1 shows the trend of the U.S. Gross National Product(GNP) during recent decade.

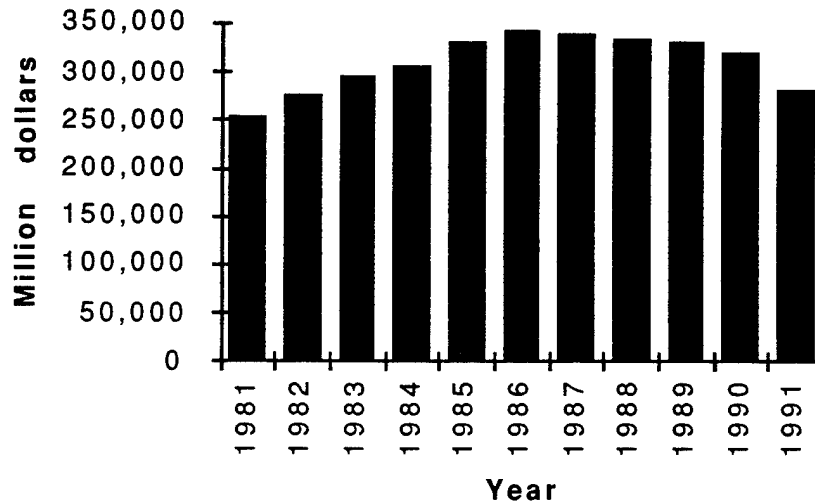


Note: These charts are expressed in U.S. dollars, based on 1991 prices and using a 1991 deflator.

Figure 1  
Trend in Gross National Product(GNP)

From Figure 1, U.S.'s GNP had been increasing steadily until 1990, but began to decrease by 1.2% in 1991 (see Appendix A).

Figure 2 shows the trend in U.S.'s Military Expenditures and it indicates a slight decline since 1987 and large decline of 12.0% in 1991 (see Appendix B).



Note: These charts are expressed in U.S. dollars, based on 1991 prices and using a 1991 deflator.

Figure 2  
Trend in Military Expenditures

#### 4. Military

##### *a. New Defense Strategy<sup>4</sup>*

The United States has made its defense strategy clear. It places priority on addressing, not Soviet threats but regional threats around the world in order to ensure the security of the U.S. as well as its allies. This strategy is supported by the following four pillars.

- Maintenance of effective strategic deterrence
- Maintenance of forward deployment force
- Ability to respond to regional and local contingencies
- Reconstitution of military forces

These defense policies mean that the U.S. will try to prevent other countries from seeking supremacy and that the U.S. will not allow other countries to change the current world order which is lead by the U.S.

---

<sup>4</sup>Defense of Japan 1992(Japan Defense Agency)p17

Figure 3 shows the trend of major naval forces during recent decade. From Figure 3, we can see that U.S. naval forces has been declining since 1989 (see Appendix C, D, P and Q).

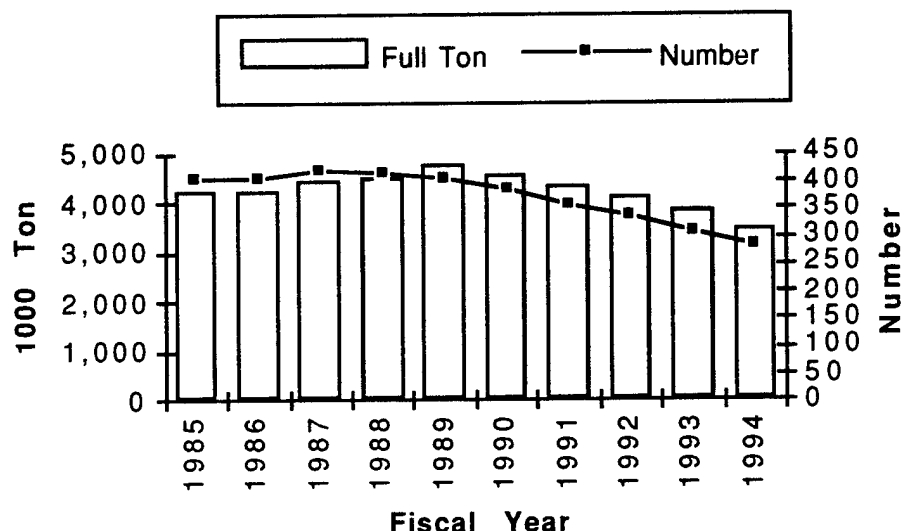


Figure 3  
Trend of Major Naval Forces

#### ***b. Military Strategy in the Asia-Pacific Region***

The U.S. remains as an Asia-Pacific power with national interests in East Asia. The U.S. Department of Defense has stated, "Despite the decade of change that we foresee, our regional interests in Asia will remain similar to those we have pursued in the past. With a total two-way transpacific trade exceeding 300 billion dollars annually, 50 percent more than our transatlantic trade, it is in our own best interest to help preserve peace and stability. The principal elements of our Asian strategy -- forward deployed forces, overseas bases, and bilateral security arrangements -- will remain valid and essential to maintaining regional stability, deterring aggression, and preserving U.S. interest."<sup>5</sup> U.S. interests in this region require a

<sup>5</sup> A Strategic Framework for Asian Pacific Rim; Looking Toward the 21st Century (Department of Defense, 1990) p8

continuing commitment. Therefore forward presence forces in this region are essential to the U.S. Maritime Strategy. "Forward presence forces will be principally maritime. The U.S. plans to keep one Aircraft Carrier Battle Group and an Amphibious Ready Group home ported in Japan and has developed new forward options not dependent upon former bases in the Philippines."<sup>6</sup>

However, 'Asian Security' says, "Despite U.S. assurances that the U.S. military would remain engaged in Asia, there is a growing concern in many countries of the region that cuts in the US defense budget, domestic difficulties and isolationist pressures many causes a larger and quicker departure of U.S. forces than expected."<sup>7</sup>

Figure 4 shows the trend of the U.S.'s major naval forces in the Pacific. From Figure 4, we can see the reduction of naval forces in spite of the U.S.'s strategic presentation (see Appendix E, F P and Q).

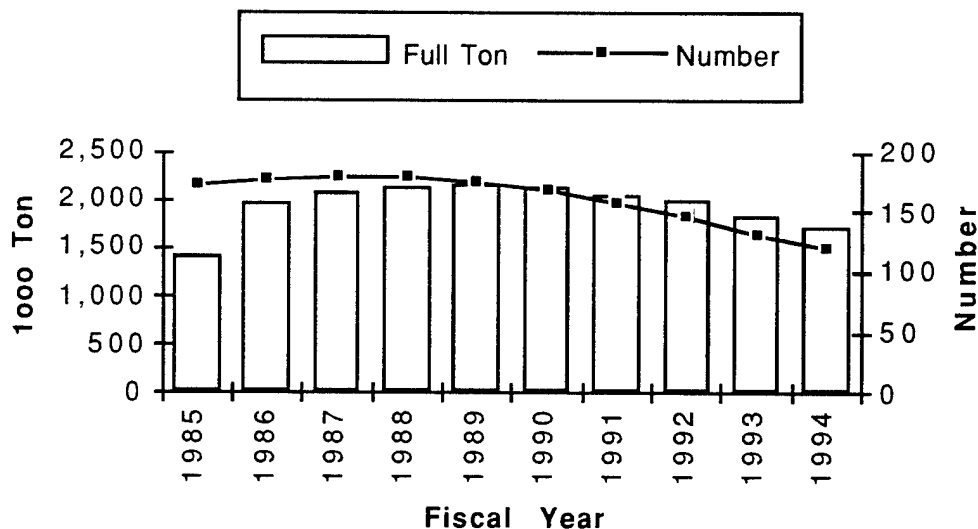


Figure 4  
Trend of Major Naval Forces

<sup>6</sup> The National Military Strategy of the United States (Chairman Joint Chiefs of Staff) p22

<sup>7</sup> ASIAN SECURITY 1993-1994 (Research Institute For Peace and Security) p56

## **B. RUSSIA**

Russia has been in a transition period shifting from totalitarianism to democracy, socialism to capitalism, suppression to freedom. Although the dictatorship and national system of one party rule has collapsed, a new democratic system and the market economy system has not yet begun to function. Russian politics, economy and society has been thrown into a state of confusion.

Despite Russia's touted democracy, so far, only small parts of democracy such as freedom of speech, freedom of press, freedom of conscience, and plural parties have actually materialized. It is known that economic revolution and democratization is more difficult than predicted, and "common illusions" of rapid changes and fast economic recovery seem to have collapsed. Under such conditions, the conservatives consisting of old Soviet Communist Party members, who had failed in the coup d'état on August in 1991, seem to be making a come back while criticizing President Yeltsin.

### **1. Politics**

The success of the economic revolution that President Yeltsin has been forcing seems to be quite marginal. The major difficulty appears to be the lack of a strong administrative system that accomplishes the orders of the president. Although President Yeltsin has managed to maintain power, his influence in the supreme congress is very limited. Many of his frequent Presidential orders were not implemented because of the above mentioned weakness in the administrative system as well as conflicts with the congress.

Although President Yeltsin won the confidence during the national referendum on April 25, 1993, his base of political power seems to be eroding.

There is also the movement toward the federation in Russia and the decentralization of power. 'Asian Security' says<sup>8</sup>,

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<sup>8</sup> ASIAN SECURITY 1993-1994 (Research Institute For Peace and Security) p65-66

By turning to the leaders of the republics and regions within the Russian Federation Yeltsin had gained powerful new allies. But this may also result in new centers of power away from Moscow that he will find it difficult to deal with in the future.

## **2. Diplomacy**

Until recently, Russia has followed a diplomatic policy based on its military power. The Gorbachev government implemented the "New Thinking in Foreign Policy" as a new policy. This policy intended to achieve following objective<sup>9</sup>;

(1) Build up of international environment of détente that enable the domestic economic revolution. (2) Attach greater importance to national interest of each country than ideology and class struggle. (3) Attach greater importance to common(mutual) defense than military expanding defense. (4) Approval of the existence of one world economy system. (5) Attach greater importance to the attitude that respect the whole world benefits common to each country than the framework of class struggle.

Yeltsin upheld the idea of the "New Thinking in Foreign Policy" and engaged with other world leaders in this context.

He said, "Russia aims the establishment of long range cooperation and alliance with the Eastern and Western developed countries." But on the other hand, he also said, "We must not lose the [Face of Great Russia] as the result of it."<sup>10</sup> He has been emphasizing the necessity of constructing a new position in the world while defending the national interests of Russia.

## **3. Economy**

The Russian economic revolution started under quite difficult conditions, and it was meant to be based on the following principles.

- (1) Free price
- (2) Attach importance to the policy of austerity in the field of budget and currency
- (3) "Open economy" and the attitude to acquire international loan.

Since the Russian policy of "market economy" was based on Russian centralism, conflicts between the republics soon appeared.

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<sup>9</sup> Gendai Yougo no Kiso Tishiki (Jiyuu Kokumin Sya, 1992)

<sup>10</sup> Speech at the Supreme Congress in 1992

The lack of basic principles of a market system such as contract negotiations, and confidence building within the former Soviet Union created confusion and conflicts between the regions.

Yeltsin began the rapid liberalization of price in 1992 not for the purpose of economic rationality but for political reasons. The liberation of prices and the distribution of goods from centralized control did not stimulate production. Instead, it deepened the confusion of economy, making living standard of the nation worse.

President Yeltsin has tried to avoid the influence of the military industrial complex. He attempted to shift into the market economy by rapid economic changes. His intention of making progress of economic revolution has been facing the difficulty. 'Asian Security' says<sup>11</sup>;

Monetarist economic reforms to liberalize and stabilize the economy got under way in 1992. Yet because of their reliance on market mechanisms, which did not and still do not exist, the economy has not been responding as predicted.

Economic liberalization involved the removal of prices controls on commodities and services, but not on basic foods, fuel or transportation fares, although bread prices went up 300% and gasoline 500%.

It also reports;<sup>12</sup>

If Russia is beginning to see light at the end of the tunnel, the opening is still a long way off. The inflation rate is falling, but the more difficult drop is still ahead. Pushing greater reforms now will probably result in rapidly rising unemployment, while removing import subsidies and raising energy prices, which are both necessary if the economy is to be stabilized, will mean rising prices.

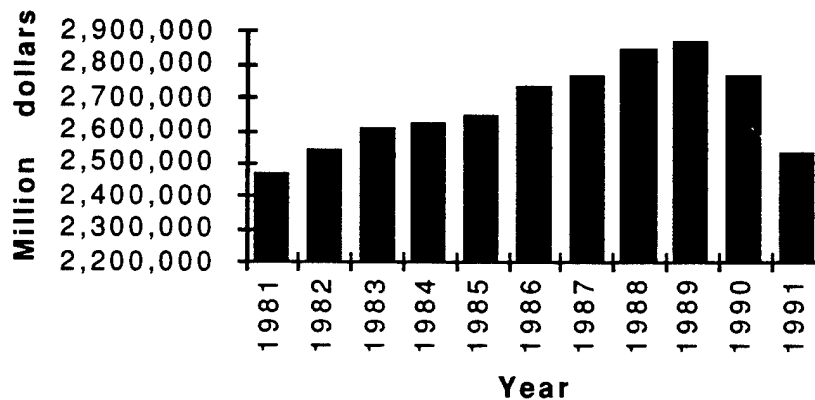
Figure 5 shows the trend of the Russian GNP during recent decade. The GNP increased until 1989, but started to decline in 1990; increasing to 3.6% in 1990 and 8.5% in 1991(see Appendix A).

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<sup>11</sup> ASIAN SECURITY 1993-1994 (Research Institute For Peace and Security) p67

<sup>12</sup> ASIAN SECURITY 1993-1994 (Research Institute For Peace and Security) p69

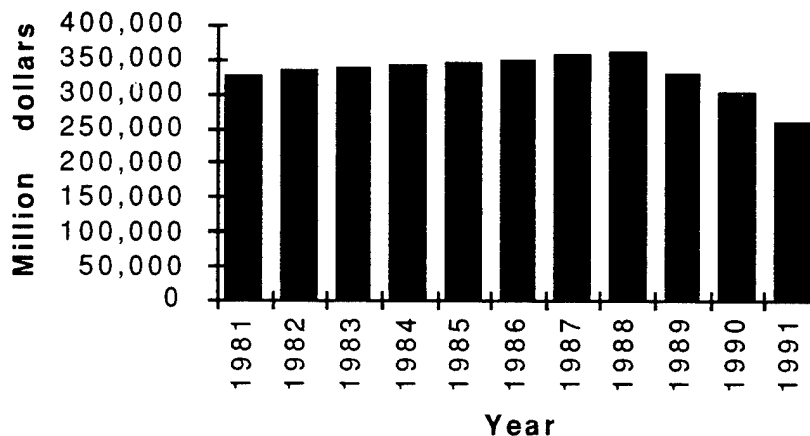




Note: These charts are expressed in U.S. dollars, based on 1991 prices and using a 1991 deflator.

Figure 5  
Trend in Gross National Product(GNP)

Figure 6 shows the similar trend in Military Expenditures. It had increased steadily until 1988, but it started decrease in 1989; 9.1% in 1989, 7.6% in 1990 and 14.4% in 1991 (see Appendix B).



Note: These charts are expressed in U.S. dollars, based on 1991 prices and using a 1991 deflator.

Figure 6  
Trend in Military Expenditures

#### 4. Military

##### *a. General Situation*

Russia, which is to take over a greater part of the former Soviet Union's forces, is in a transitional period. It faces a reduction of

military personnel to 1,500,000, a shift to professional forces, the creation of rapid deployment force and the establishment of new Russian forces.

The Russian General Staff Office announced its new military doctrine on 3 June 1992. It has since been under deliberation of the Russian government and supreme congress. This doctrine was based on following principles.

- Attitude to the war

Eliminate war, use of arms, threat by arms as the means to achieve the political, economical purposes. Eliminate the preemptive use of nuclear and weapons of mass destruction.

- Cause of the war

If there is an invasion into the Russian territory, or military buildup near the Russian border by another country, Russia maintains the right to take necessary action in self defense.

- Political purpose and means to an end

Major purpose of the national security policy is based on the prevention of the war. In order to achieve this purpose, Russia will try to stop the expansion of arms, nuclear experimentation, as well as perform the step by step-reduction of arms to a minimum level.

The Russian Federation National Defense Law was signed by President Yeltsin and came to effect on April 24, 1992. This law set the schedule of reduction of the Russian military. 'Asian Security' says, <sup>13</sup>

According to this plan, troop strength is to be reduced to 1.5 million by the end of the century.

In the first phase (1992) the groundwork for future change was laid, as priority was given to the organizational and legal framework through the establishment for a defense ministry and other measures.

The second stage of the defense program (1993-1995) aims at completing the withdrawal of forces from abroad, reorganizing military districts, the reorganization of rapid deployment forces and the introduction of a composite system of both conscripted and volunteer recruiting

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<sup>13</sup> ASIAN SECURITY 1993-1994 (Research Institute For Peace and Security) p78~79

In the third and final phase (to be completed by the year 2000) the five existing armies will be merged into one, recruiting will rely on volunteers and total troop numbers will fall to 1.5 million.

Although the quantitative scale has also been reduced, qualitative modernization seems to have been continuing. As a whole, rationalization and modernization objectives seems to have been achieved.

Figure 7 shows the trend of Russia's major naval force during recent decade. From Figure 7, we can see the significant quantitative reduction since 1990 (see Appendix G, H, P and Q).

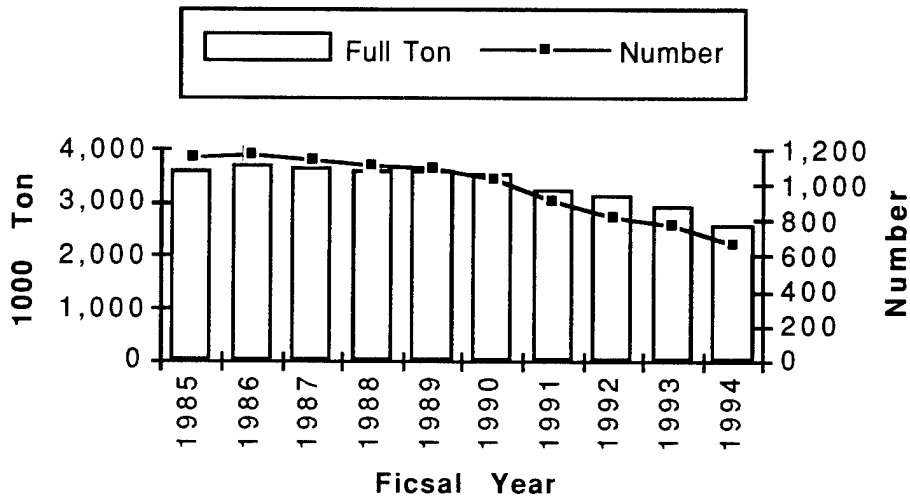


Figure 7  
Trend of Russia's Major Naval Forces

#### ***b. Far East Forces<sup>14</sup>***

Although the scale has been reduced, modernization has been continuing and the rate of reduction in the Far East is less than that observed in Europe. In the Far East region, Russian Ground, Naval, Air Forces deployed at the Maritime Province of Siberia, Sakhalin, the Sea of Okhotsk, Kamchatka Peninsula have been substantial and no other country except for the U.S. can equal that force (see Appendix Q).

<sup>14</sup> Defense of Japan 1994 (Japan Defense Agency) p45

(1) Ground Forces. Russian ground forces in the Far East region have been reduced in scale since 1990, and at present their strength totals 27 army divisions with approximately 240,000 personnel. Part of the army divisions have recently been reorganized to machine-gun and artillery divisions, which are corps for their regional defense. In some of the reduced divisions, personnel is filled at less than 5 percent of full-strength while equipment is almost 100 percent replenished. These divisions can be restored to a full-fledged ordinary division by returning personnel levels to fighting strength.

In qualitative development, state-of-the-art T-80 tanks, first deployed in the Far East in 1990, continue to be sent to the region. Modernization also continues with the deployment of such equipment as armored infantry combat vehicles, multiple-launch rockets, heavy artillery and armored helicopters.

(2) Naval Forces. The Pacific Fleet, the largest of the former Soviet Union's four naval fleets, is primarily based in Vladivostok. The Pacific Fleet comprises approximately 745 ships with total displacement of about 1,890,000 tons, which include some 65 major surface combatants and about 70 submarines (50 of them nuclear submarines) with aggregate displacement of 650,000 tons.

In recent years, the Pacific Fleet has been on the decline in quantitative terms, with the two intermediate size aircraft carriers being taken out of service, and with its activity having been toned down, but it has continued to be modernized with the addition of Oscar-II-class cruise missile-mounted nuclear submarines and construction of Akula-class nuclear-powered attack submarines.

(3) Air Forces. Russia continues to deploy approximately 1,220 combat aircraft in the Far East. Although the number of such aircraft has decreased, the quality continues to be improved as the deployment of fourth-generation fighters, such as the SU-25 Frogfoot and Mig-29 Fulcum continues.

Incidentally, some third-generation fighters, which were taken out of service, are considered to be in storage without being scrapped.

Figure 8 shows the trend of Russian major naval force during recent decade. From Figure 8, one can see the quantitative decline since FY1990 (see Appendix I, P AND Q).

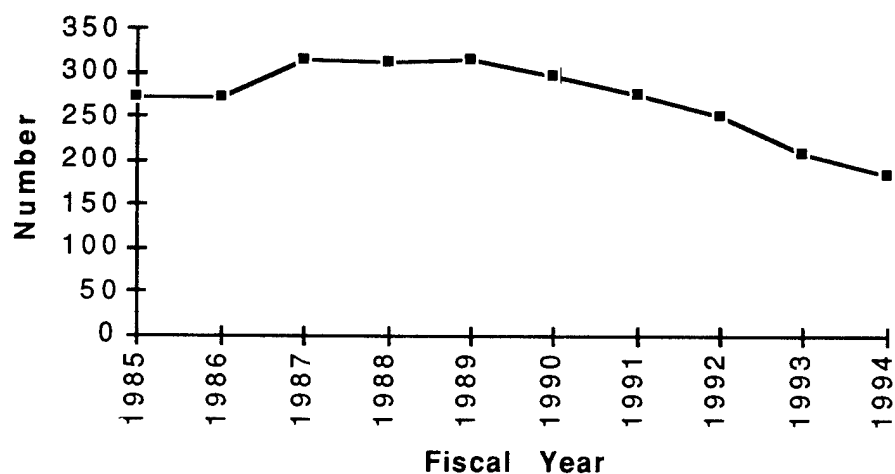


Figure 8  
Trend of Major Naval Forces in Far East

## C. CHINA

### 1. Politics

China changed its policy line from revolution and class struggle to modernization and development of production capability in 1978. When the "Tiananmen incident" happened in 1989, conservatives regained lost ground within the government and reinstated a policy with greater emphasis on ideology of restraint over economic conditions.

The present political posture reflects the balancing of the reformers and conservatives. The main point of the reformers is, "People must become affluent by the construction of the socialism that has the Chinese characteristics." Their policy places importance on an "open economy." On the other hand, the conservatives insist that "too much introduction of the Western economic system destroys the Chinese socialism" and their policy emphasizes, "The restriction of open economy" and "reinforcement of ideology regulation." The reformers are pragmatically seeking utility while the conservatives remain faithful to socialism, revolutionary ideas and shows a more fundamental tendency. Two points common to both parties the

maintenance of Communist Party system, and the acceptance of the partial economic superiority of the Western system.

## **2. Diplomacy**

Recent experience reflects China has been focused on utilitarian and realistic diplomacy with Asian NIEs and ASEAN countries. It may be viewed as peace diplomacy aimed at the relaxation of punishment and avoidance of international isolation resulting from "Tiananmen incident". 'Asian Security' says;<sup>15</sup>

Chinese foreign policy in the recent past has demonstrated two basic patterns - conflict avoidance and active defense - which will probably continue to characterize its behavior.

Here are some major points on Chinese recent diplomatic efforts.

The first is the movement of Sino-Russian rapprochement. The Sino-Soviet talks began between the Parliamentary Vice-Minister for Foreign Affairs in 1982. The relations between the two countries have improved through efforts like the visits of President Gorbachev to China in 1991. The collapse of Soviet Union, however, has made the attitude of China prudent. The Chinese interest in the Spratly Islands made Russia postpone its withdrawal from Gulf of Kamlan. As a whole, China seems to have been promoting the realistic Sino-Russian diplomacy emphasizing the modernization and pursuit of its national interest. Despite these situation, there is another aspect. 'Asian Security' says;<sup>16</sup>

China's policy toward Russia, the most important of the new countries, was not simply economic in nature, but also involved an expansion of military ties.

Although Sino-Russian military cooperation may not lead to a short-term dramatic shift in the balance of power in Asia, it is a long-term threat of considerable concern among other Asian nations.

The second point is the Sino-American relationship. As the result of "Tiananmen incident," the U.S. applied several types of sanctions and the relationship between the two deteriorated.

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<sup>15</sup> ASIAN SECURITY 1993-1994 (Research Institute For Peace and Security) p96

<sup>16</sup> ASIAN SECURITY 1993-1994 (Research Institute For Peace and Security) p97

Recently, there have been signs of improvement in their relationship. These signs include the Chinese abstention from a resolution in the U.N. Security Council and allowing the use of armed force during the Gulf Crisis, and agreement among the EC's Foreign Minister Conference to remove the sanctions against the China in 1990. In spite of such a improvement, the Sino-American relationship has been complicated by the problem about the extension of most-favored-nation treatment. High levels of chinese distrust still exists within the U.S. Congress .

The third point is the Sino-Japan relationship. The Sino-Japan relationship has been improving since the normalization of diplomacy in 1972. Although it cooled down temporarily as the result of the "Tiananmen incident," a Cabinet meeting has been held every year since 1979, and Japan has been participating through economic cooperation and technical cooperation in broad fields. China has had strong concern about possible Japanese defense buildups and increased wariness over the dispatch of Japan Self-Defense Forces to the Persian Gulf and Cambodia. Although China needs Japanese capital, technological know-how, plant and business management in order to accelerate the modernization, China has considered any advance of Japan in Asia to be a threat against China.

The fourth point is the diplomatic effort with neighboring countries. China has established diplomatic relations with Indonesia, Singapore, Brunei and Vietnam since 1990, and Korea in 1992.

### **3. Economy**

China's recent economic policy has been based on the basic policy confirmed at the 13th Communist Party Congress in 1987. In this basic policy, acceleration and deepening of the economic revolution in the future was adopted and self-rehabilitation policy was changed to accept loans, investments and aid from foreign countries. As a result, foreign capital from NICs and Japan has been introduced vigorously. The rapid acceptance of open market policies caused the overheating of economy, inflation and widening of income disparity. As a result, the conservatives temporarily came into power and

established economic restraint policy in September 1988. This caused economic decline in 1989 and 1990. The reformers have come into power and the economy has again accelerated. "By the end of 1992, the growth rate had reached a remarkable 12.8%, and the amazing transformation of the Chinese economy attracted worldwide attention."<sup>17</sup> Inflation soon followed. Moreover, the Chinese constitution was amended and a shift to the "Socialistic Market Economy System" was specified on 8th National People's Congress held in 1993.

There are some factors obstructive to the economic development. According to the analysis by Social Science House of China published in the "Economic Research" in 1990, these factors are;

- The pressure of population explosion to the society
- The environmental pollution and destruction of nature
- The arrival of the agricultural burden to the limit

Five factors published in the "Half Moon Story" are;

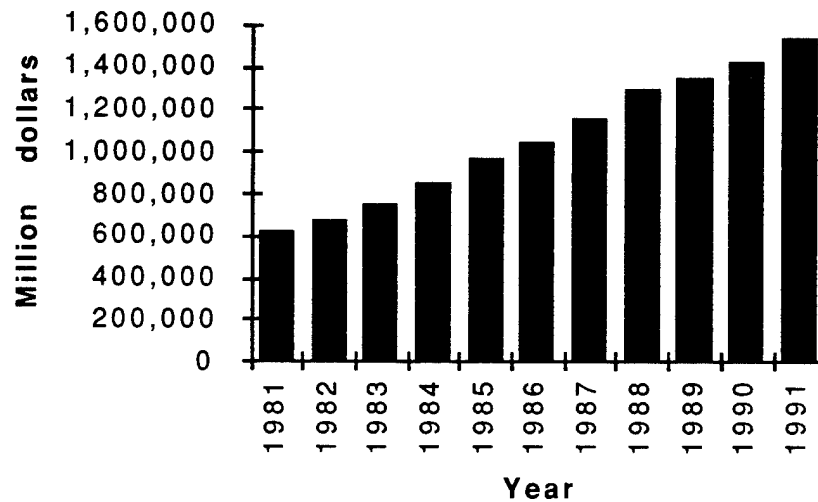
- The abnormality of distribution
- The difficulty of distribution
- The low rate of economic efficiency and danger of economic expansion
- The blind development of economy
- The potential pressure of inflation

Figure 9 shows the trend of GNP during recent decade. It shows the China's GNP has been steadily increasing about average rate of 9.4% (see Appendix A).

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<sup>17</sup> ASIAN SECURITY 1993-1994 (Research Institute For Peace and Security) p88

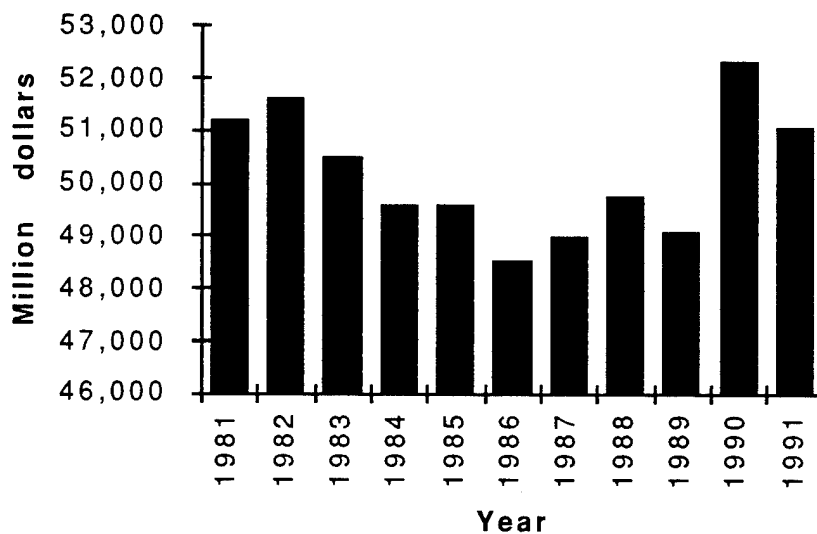




Note: These charts are expressed in U.S. dollars, based on 1991 prices and using a 1991 deflator.

Figure 9  
Trend in Gross National Product(GNP)

Figure 10 shows the trend in military expenditures. Military expenditures had decreased until 1986, but it started to increase after 1987. In 1990 it grew almost by 6.6% (see Appendix B).



Note: These charts are expressed in U.S. dollars, based on 1991 prices and using a 1991 deflator.  
Source: World Military Expenditures and Arms Transfers 1991-1992 (U.S. Arms Control and Disarmament Agency)

Figure 10  
Trend in Military Expenditures

#### **4. Military<sup>18</sup>**

In an effort to eliminate disadvantages from redundancy of its military structure and to be ready for expanding to modern warfare, China is continuously moving to shift the emphasis of its military posture from people's warfare focusing on guerrilla warfare, which took advantage of its existing vast territory and huge population, to warfare by regular forces primarily dependent on integrated operational capabilities and quick response capabilities through coordinated operations of all services and branches. As part of the policy, China is modernizing its equipment and introducing foreign technologies while basically depending upon indigenous research and development. In recent years, China has demonstrated a policy that advocates the modernization of naval and air forces with special emphasis.

##### **a. Nuclear Weapon**

China has been continuing efforts to develop its own nuclear weapons since the 1950s as a means of securing deterrents and having a greater voice in the international community. China has ICBMs, approximately 100 IRBMs, and approximately 120 TU-16 medium-range bombers. At the same time, China is developing SLBMs and has deployed new IRBMs. China has been focusing on the enrichment and diversification of the nuclear weapons and carried out underground nuclear tests on October, 1993 and on June, 1994 despite the request to stop from the international society.

##### **b. Ground Forces**

China's ground forces total approximately 2,300,000. It is the largest in the world in size, but remains short of firepower and maneuverability on the whole. As part of the modernization of its armed forces, China has reduced its ground forces by more than one million personnel through organizational lining stream and has reorganized them into seven military regions from the previous 11 military regions. In an effort to improve operational capabilities, the army corps, which comprise infantry divisions and other elements, has been reorganized into group armies which integrate infantry, artillery and armor.

##### **c. Naval Forces**

The navy consists of three fleets - the North Sea, East Sea and South Sea Fleets - and possesses approximately 1,080 ships (approximately 80 submarines) with total displacement of approximately 950,000 tons and approximately 880 combat aircraft. Most of the ships are old and small, but modernization efforts are under way through the construction and deployment of LUHU class destroyers JIANGWEI class frigate capable of carrying helicopters as well as the latest missiles.

As the result of the change in defense policy, the navy may be playing a large role rather than the pervious coastal defense role. Construction of modern navy has been underway since the latter half of 1970s. One of the basic direction of the modernization is the construction of navy that can support the advance of China to the ocean and the other is the construction of mobile fleets consisting of SSBNs, Missile Frigates, Missile Destroyers and Helicopter Carriers.

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<sup>18</sup> Defense of Japan 1994 (Japan Defense Agency) p51

Figure 11 shows the trend of the major naval forces of China. From this figure, one can see that despite the decline in number of ships, full tonnage has increased in FY1992. This means that China has shifted to the construction of larger ships (see Appendix J, K, P and Q).

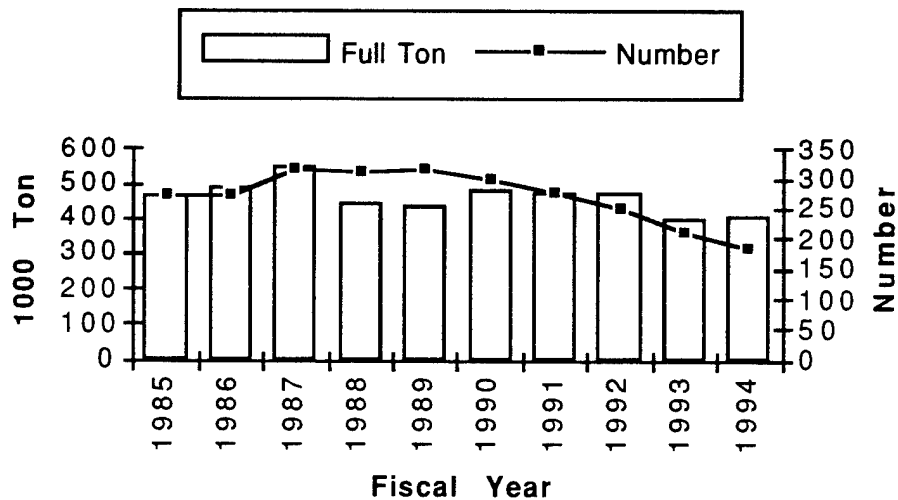


Figure 11  
Trend of Major Naval Forces

#### **d. Air Forces**

The air force possesses approximately 5,290 combat aircraft, but its mainstay aircraft are old. They represent the older generation models after first-generation and second-generation fighters of the former Soviet Union. Lately, the Chinese air force has been striving to modernize its aircraft by developing and modifying the latest fighters such as the F-8II and incorporating the SU-27 fighter from Russia since 1992.

### **D. SOUTH KOREA**

#### **1. Politics**

It has not been long since South Korea has changed into democratic state. Main events are described below;

1985 : The declaration of democratization by No Tae-woo.

1988 : The first peaceful transfer of government to No Tae-woo.

1990 : The birth of Democratic Liberal Party

1993 : The civilian Kim Young-Sam became the president.

Although the history of democracy is not long, South Korea has steadily established its democracy .

## **2. Diplomacy**

Recently, South Korea has substantially improved their relations with the former Soviet Union, East European countries, China and other socialist countries. Main events are described below;

1981 : President Chun Doo-Hwan visited the U.S. at the first time.

1984 : President Chun Doo-Hwan visited Japan as the first president.

1990 : Established diplomatic relations with former Soviet Union.

1991 : Joined to the U.N. at the same time with North Korea.

1992 : Established diplomatic relation with China.

1992 : Signed the treaty about basic relations with Russia.

## **3. Economy**

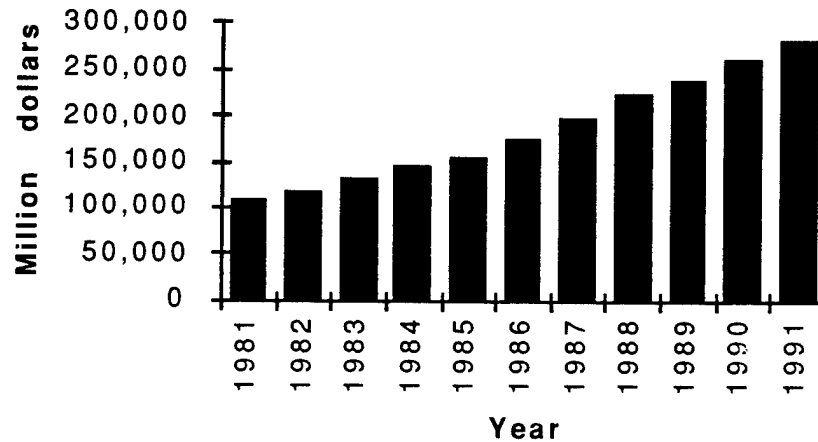
From 1986 to 1988, Korea expanded exports supported by the weak won (currency), cheap crude oil and low interest rate and recorded a high rates of economic growth(approximately 12~13 %). They maintained a trade surplus of 9,800 million dollars in 1987 and 14,300 million dollars in 1988. Since 1989, the trade balance deteriorated as a result of the rapid revaluation of the won against the dollar. Trade deficits recorded 4,900 million dollars in 1990, 9,650 million dollars in 1991, and 5,500 million dollars in 1992. Despite these trade deficits, the real economic growth rate was healthy 8.4 %, supported by construction and investments in plant and equipment. The GNP per capita was 6,498 dollars in 1991. 'Asian Security, however, says;<sup>19</sup>

South Korea must deal with a number of extremely difficult economic problems from overcoming the 'Korean syndrome' (to adjusting the structure) of the economy. Given the nation's high expectations of the economy, these are the areas that President Kim's economic planning team are working on.

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<sup>19</sup> ASIAN SECURITY 1993-1994 (Research Institute For Peace and Security) p151

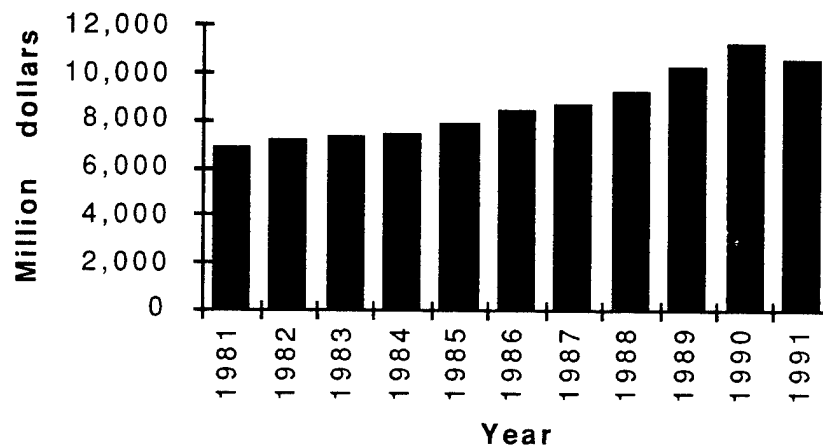
Figure 12 shows the trend of the GNP during recent decade. South Korea's GNP has been steadily increasing about average rate of 10.0% (see Appendix A).



Note: These charts are expressed in U.S. dollars, based on 1991 prices and using a 1991 deflator.

Figure 12  
Trend in Gross National Product(GNP)

Figure 13 shows the trend in military expenditure. Military expenditures have been steadily increasing since 1981, most notably by 10.0% in 1990 (see Appendix B).



Note: These charts are expressed in U.S. dollars, based on 1991 prices and using a 1991 deflator.

Figure 13  
Trend in Military Expenditures

#### 4. Military<sup>20</sup>

South Korea has several defensive disadvantages. Its capital, Seoul, where a quarter of the country's population is concentrated, is situated very close to the demilitarized zone(DMZ). It is surrounded by sea on three sides and it encompasses numerous islets along its long coastline.

South Korea, perceiving North Korea's military buildup with enormous ground forces as a serious threat, has been spending around 4 percent of its gross national product on national defense every year. In recent years, in addition to efforts to modernize its army, South Korea has been trying to modernize its naval and air forces by vigorously carrying out plans to introduce submarines, helicopter-carrying destroyers, P-3C antisubmarine patrol aircraft and F-16 fighters.

South Korea's military forces is comprised of ground forces of 22 divisions with approximately 550,000 personnel, naval forces of approximately 230 ships with total displacement of 140,000 tons and two marine divisions, and air forces of approximately 490 combat aircraft, most of which are F-4 and F-5 fighters, but include F-16 fighters (see Appendix P).

Figure 14 shows the trend of major naval ship assets. From this figure one can see an increase since FY1988 (see Appendix L, M, P and Q).

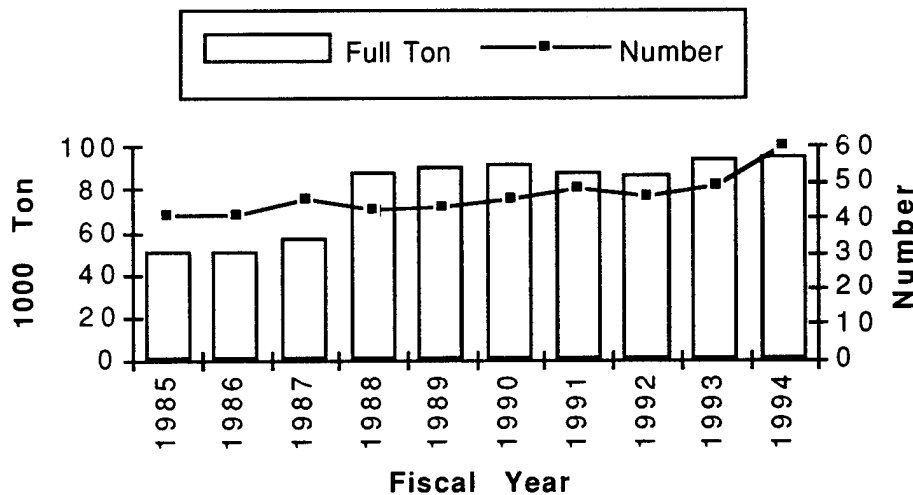


Figure 14  
Trend of Major Naval Force

<sup>20</sup> Defense of Japan 1994 (Japan Defense Agency) p42

## **E. NORTH KOREA**

### **1. Politics**

In contrast to the movement toward democratization in former Soviet Union, East European countries and China, North Korea has been adhering to the despotic political system by Kim Il-Sung. Main political events are described below;

1966 : Declaration of the independent policy course

1967 : Declaration of basic policy outline consisting of "*chuch'e* thought"

1972 : Amendment of the Constitution

1973 : "5 great principles" presented by Kim Il-Sung

1980 : Kim Jong-Il became the second leader

1991 : Kim Il-Sung became the head of military forces  
Joined the U.N.

1994 : Death of Kim Il-Sung and succession by Kim Jong-Il

As a result of the admission into the U.N., North Korea became one of the members in the international society. It became impossible for North Korea to maintain its isolation. The increase number of exchanges between South Korea and an improvement of relationship with Western countries have inevitably brought more accurate information about liberalized economic systems and its development into North Korea.

In addition to above, the death of Kim Il-Sung, coupled with lack of popularity of Kim Jong-Il, could lead to a sudden change in North Korea's direction.

### **2. Diplomacy**

Before 1990, North Korea tried to establish a close relationship with China and former Soviet Union by utilizing and balancing the alliances with each country. As the result of the establishment of diplomatic relations between South Korea and former Soviet Union in 1990, and South Korea and China in 1992, the relationship between North Korea and China and Russia has become deteriorated. On account of this, North Korea has been forced to pay for imported goods with international currency. As a result North Korea has fallen

into awful financial predicament. In order to resolve these situation, North Korea is trying to establish a diplomatic relations with Japan. Major events are described below;

1991 : The 1st round of Japan-North Korea diplomatic relations normalization negotiation

1991 : Joined to the U.N. at the same time with South Korea

1991 : The 5th round of talks between South and North Korea prime ministers ("A statement of mutual agreement on reconciliation, non aggression and interchange-cooperation")

1992 : The 1st round of talks between the U.S. and North Korea vice-minister

### **3. Economy**

'Asian Security says;<sup>21</sup>

North Korea is one of the most secretive nations in the world, particularly with regard to its economy. There are practically no statistics of any kind issued, and those that are released are suspect. Nevertheless, it has been clear for some time that the North Korean economy is in a disastrous condition.

North Korean economic growth rate is estimated to be negative since 1990. 'Asian Security says;<sup>22</sup>

South Korean estimates are that in 1990 GNP shrank 3.7%, in 1991 it dropped 5.2%, and in 1992 there was a further slow-down of 7.6%. These estimates put the 1992 GNP at 21.1 billion won, down from the dismal 22.9 billion won achieved in 1991.

Although the national budget growth rate in 1990 exceeded that of 1989, there are no clear numbers that prove the results. The situation seems to have transferred from depression to extreme poverty. Also, as a result of bad weather over the years, North Korea has been facing a lack of food.

Moreover, as the relation between North Korea and Russia became cool, North Korea has experienced serious shortages of fuel and power. The movement of ships or vehicles has decreased and net working rate of factories decreased by 50%. The country's third

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<sup>21</sup> ASIAN SECURITY 1992-93 (Research Institute For Peace and Security) p147

<sup>22</sup> ASIAN SECURITY 1993-94 (Research Institute For Peace and Security) p157

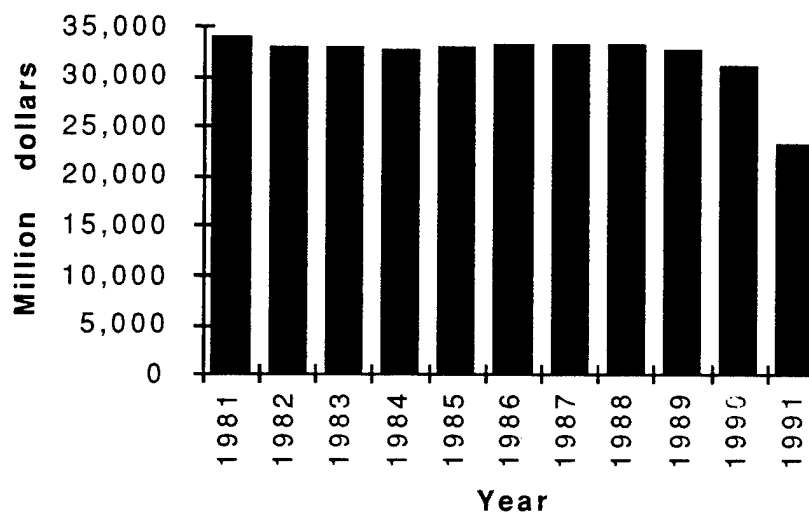


Seven-year Plan (from 1987 to 1993) seems to have fallen short of the goal by about 50%.

While visiting to China in 1991, Kim IL-Sung asked China for economic support. China agreeded to less than half of North Korea's request in order to tighten the economic relationship with South Korea. As a result of the cooling of the relationship between Russia and China, who were North Korea's major trading partners, the domestic economy has turned worse. In order to resolve this problem, North Korea has approached Japan. However, it seems to be difficult to get the support from Japan because of unsolved problems such as post WWII compensation and nuclear inspection.

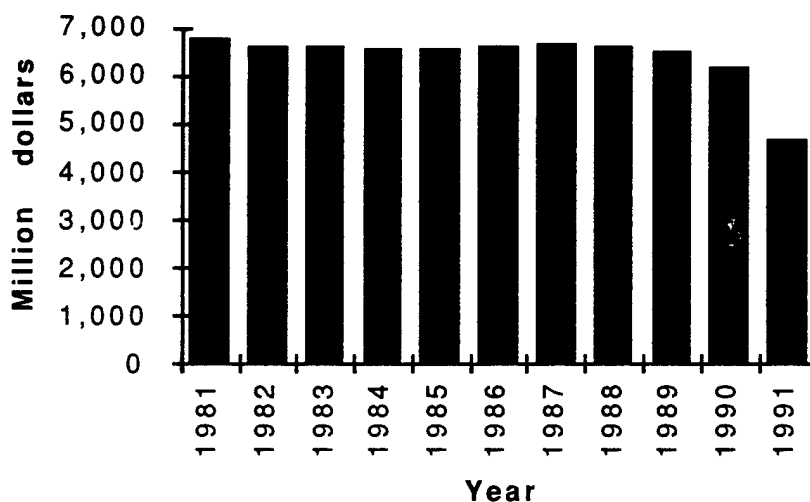
Figure 15 shows the trend of the GNP during recent decade. North Korea's GNP has remained stagnant for the last eight years, but decreased and actually started to decline since 1989. It fell in 1991 by 24.6% (see Appendix A).

Figure 16 shows the trend in military expenditure. From this figure one sees that the North Korea's military expenditures has remained constant until 1988, but started to decrease in 1989 and fell significantly in 1991 by 24.6% (see Appendix B).



Note: These charts are expressed in U.S. dollars, based on 1991 prices and using a 1991 deflator.

Figure 15  
Trend in Gross National Product(GNP)



Note: These charts are expressed in U.S. dollars, based on 1991 prices and using a 1991 deflator.

Figure 16  
Trend in Military Expenditures

#### 4. Military<sup>23</sup>

North Korea has enhanced its military forces since 1962 under four-point military lines: 'The whole people will be armed,' 'The whole country will be fortified,' 'All soldiers will be trained as cadre. Each person will be capable of performing the duties of his immediate superior,' 'All arms will be modernized.' Although North Korea is believed to be suffering from serious economic downturn, it is considered essential to allocate national resources to military forces with special emphasis (see Appendix P).

##### **a. Ground Forces**

The North Korea's ground forces comprise 26 divisions of approximately 1 million personnel, and it seems that the 2/3 of them are deployed at near the DMZ. Its war potential consists mainly of the infantry, but its armored forces and firepower includes 3000 tanks. The 240mm multiple rocket launchers and 170mm cannons seem to be increasingly deployed along the DMZ. There are also special forces that are trained for a guerrilla war.

##### **b. Naval Forces**

North Korea's naval forces is comprised of approximately 620 ships with a total displacement of 85,000 tons. The navy is made up mainly of small ships such as missile speed boats ships. There are 21 of

<sup>23</sup> Defense of Japan 1994 (Japan Defense Agency) p37

old-type Romeo class submarines, and approximately 60 Mizet submarines and approximately 100 of air-cushion landing crafts that seem to be used to support special forces.

Figure 17 shows the trend of major naval force during the recent decade. From this figure one can see that naval forces have been increasing since FY1990 (see Appendix N, O, P and Q).

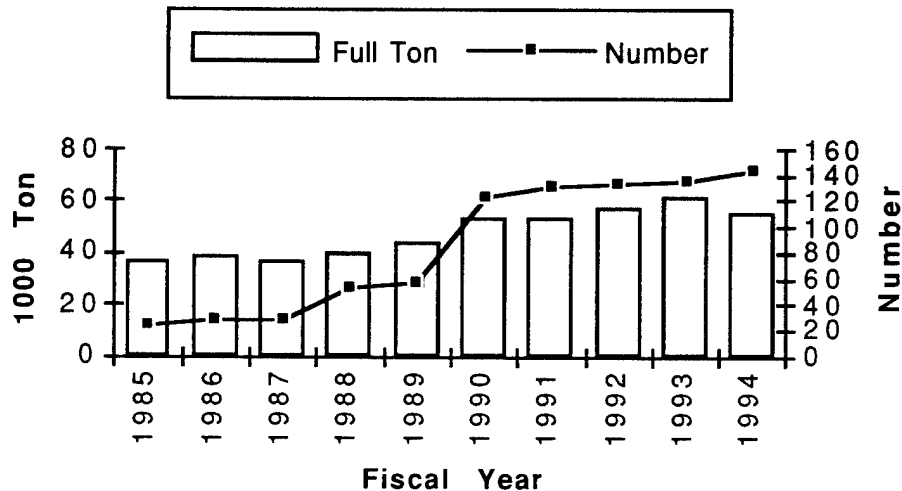


Figure 17  
Trend of Major Naval Force

### **c. Air Forces**

Air Forces possess approximately 810 combat aircraft, most of them are old, made in China and the former Soviet Union, but also possess 4th generation aircraft such as MIG-29 and SU-25.

### **5. Nuclear Issue**

Although North Korea signed the Nuclear Non-proliferation Treaty (NPT) in 1985, it has not signed a safeguard agreement with the International Atomic Energy Agency (IAEA), which is obligatory under the above-mentioned treaty. Suspicion is growing that North Korea may be aiming to develop nuclear weapons of its own. Main events are described below:

1992 : Conclusion of safeguard agreement (Apr)

The 1st inspection by IAEA (May)

1993 : Declaration of withdrawal from the IAEA (Mar)

Reservation of withdrawal from the IAEA (Jun)

IAEA resolved the requirement for execution of safeguard agreement (Oct)

UNGA resolved the requirement for acceptance of the inspection by IAEA (Nov)

1994 : IAEA inspected 7 facilities but could not confirm the fact (Mar)

Declaration by the chairman of UNSC (Mar)

North Korea rejected the Declaration (Apr)

North Korea withdrew from the IAEA (July)

North Korea is believed to have produced and deployed missiles of the Scud B type as well as the Scud C type, which is a modification of Scud B with a longer range, and to have exported them to the Middle East. North Korea is now reported to be developing a new type of missile, Nodong I, which has a range about 1,000 km.

### **III. COUNTRY SITUATION OF JAPAN**

#### **A. GEOPOLITICAL CHARACTERISTICS**

It is important to consider the strategic position in order to analyze country situation of Japan.

##### **1. Geographical Characteristics**

Geographical Characteristics of Japan are summarized as follows.

- \* Japan is located at the northeastern end of rimland that surround the Eurasian Continent, at the point of contact of Sea Power and Land Power.
- \* Japan is a highly developed industrial island nation that lacks resources.
- \* Land is long and narrow to the east-west along the continent, and as a result it lacks the deepness for defense.
- \* Japan has close proximity to the Korean Peninsula.

##### **2. Strategic Characteristics**

Strategic Characteristic of Japan are summarized as follows.

- \* Japan is located at the point of contact of U.S. and Russian power in North-East Asia.
- \* Economic power and technological power is indispensable to the existence and prosperity of advanced nations, and valuable to the economic development and modernization of developing countries.

##### **3. Ocean Nation**

Japan is surrounded by oceans. There are two major factors for Japan to develop as an ocean nation. One is that Japan has had a geopolitical condition and the other is that Japan has lacked the resources for industry and food, thus Japan has had to depend upon imports from foreign countries. Since these factors will not change, it is indispensable for Japan to seek a way to develop as an ocean nation. The following statement is applicable to Japan.<sup>24</sup>

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<sup>24</sup> Lee G. Corder, "Regional Resilience, The Imperative for Maritime Security Cooperation in Southeast Asia," in *Naval War College Review* (Spring 1994), p40

Southeast Asian sea lines of communication (SLOCs) lie at the confluence of Pacific and Indian Ocean trade routes and form the strategic heart of the region. The SLOCs are vital to the national security interests of all the regional states and to several major external states.

#### **4. Point of Connection with South-Going Policy of Russia**

On the process of developing as a modern nation since the Meiji Restoration, Japan has faced several national crises. Geopolitical elements of Japan have influenced such crises. For example, Japan faced directly the 19th century's south-going policy of Russia. After WWII, Japan has developed as a member of western nations. As a result of the end of the Cold War and collapse of former Soviet Union, the pressure of Russia's south-going policy has decreased.

### **B. POLITICS**

#### **1. Political System**

Japan has been developing a stable political system, adopting democratic and economic policies based on liberalism and capitalism. The cabinet is based on a parliamentary system and the cabinet party had been the LDP (Liberal Democratic Party) and the parties out of power had been the JSP (Japan Socialist Party), DSP (Democratic Socialist Party), TCP (Japan Communist Party), Koumeitou, and other small parties. This system has continued since 1955 and had not changed in about 40 years. However, as the result of a murky financial accounting problem and factional dispute, the LDP was removed from the government in August, 1993 and a Coalition cabinet emerged. In a short time from the birth of the coalition cabinet, two Prime Ministers changed. In June 1994, the LDP-JSP coalition cabinet emerged and a JSP-member, Tomiichi Murayama, became the Prime Minister. These two parties had been opponents to each other for a long time. Reorganization of the parties out of power had proceeded and "Shin-Shin-Tou", was finally established in Dec, 1994. As a result of this reorganization, "Shin-Shin-Tou" became the second largest party, consisting of 214 members (LDP: 295, JSP: 140, JCP: 26, Koumeitou: 12, other 4 small parties: 24, non-party: 28).

The basis of this new cabinet is not firm and several conflicts remain unsolved. The future of this cabinet cannot be forecasted

easily. Moreover, it is not clear if the birth of the "Shin-Shin Tou" means a new movement toward the Two-Party system.

## **2. Security Policy**

Security policy of Japan consists of three elements, deterrence through the Japan-U.S. Security Treaty, defense efforts of Japan itself, and diplomatic efforts to secure international relations. Japan has been making an effort to keep a strong connection with the U.S. by firmly maintaining the Japan-U.S. security cooperation, as well as maintaining a minimum defense capability, in order to keep good relations with other countries. The Japan-U.S. Security Treaty has some key aspect for security of Japan. These are;

- \* Japan-U.S. Security Treaty provides the stable political basis for firm relation of alliance and cooperation.
- \* A close cooperation, between Japan and the U.S. has contributed to the stability and development of the Asia/Pacific region.
- \* The difference in military capability between Japan and Russia is large. The deterrent through Japan-U.S. Security Treaty is essential for the maintenance of peace and stability of Japan.

Norman D. Levin describes the interests of both countries on this treaty.<sup>25</sup>

Japanese leaders adopted a two-pronged strategy to meet these interests: (1) to concentrate on expanding foreign markets for Japanese exports to foster economic development, while nurturing Japanese industries and gaining control over high-value-added technologies critical to Japanese industrial competitiveness; and (2) to minimize military expenditures and maintain a low political profile, relying on the United States to guarantee Japan's external security. U.S. threefold interests were equally clear: (1) to prevent communist expansion and domination of the Asia Pacific region by any hostile power or group of powers; (2) to maintain U.S. access to and through the region; and (3) to foster the spread of market-oriented economics and liberal democratic political system through out the region.

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<sup>25</sup> Norman D. Levin, "Prospects for U.S.-Japanese Security Cooperation," in Danny Unger & Paul Blackburn (ed.), *Japan's Emerging Global Role* (INSTITUTE FOR THE STUDY OF DIPLOMACY BOOK, 1993), P72

### C. DIPLOMACY

Japan is said to be the world's second largest economy. However, Japan is a country that lacks almost all of the natural resources necessary to support its economy. In order to maintain prosperity, Japan has to depend not only on the peace and prosperity of the world but also on its effort to keep good diplomatic relation with other countries. Countries like Japan, who lack resources cannot exist only as a beneficiary who responds passively to the movement of the world. Japan has been increasingly prompted to play an increased role as a political and economical leader in the advanced countries. However, Masaru Tamamoto says;<sup>26</sup>

Japan's postwar diplomacy has been marked by apologies; its diplomatic language is filled with words that such as earnest effort, goodwill, and understanding, often to the bafflement of U.S. diplomats who cannot tell whether Japan's promise to make an earnest effort is yes or no.

Japan has to support the position as a member of the democratic countries taking care of promoting international dialogue, helping peaceful settlements of regional conflicts such as the Middle East, the Korean Peninsula, Indochina area, South Africa and South America. It is also important to assist in the modernization of East European countries and to support economic and technological efforts for developing countries. Adequate responses to the new order of political systems, arms reduction issues, and international economical systems of Post-Cold War period are basic diplomatic themes Japan must address. Despite the need of these responsibilities, Japan's diplomacy is not sufficient. There is one example as follows;<sup>27</sup>

It was the Gulf crisis that sparked heated domestic debates about Japan's role in the international community, particularly regarding world peace and security. The Japanese people disagreed among themselves concerning the seriousness of the issue. Setting aside the Japanese hostage issue, the crisis had only a limited impact on the daily

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<sup>26</sup> Masaru Tamamoto, "The Japan That Wants to Be Liked," in Danny Unger & Paul Blackburn (ed.), *Japan's Emerging Global Role* (INSTITUTE FOR THE STUDY OF DIPLOMACY BOOK, 1993), P49

<sup>27</sup> Yoshio Okagawa, "Japan's Global Responsibilities," in Danny Unger & Paul Blackburn (ed.), *Japan's Emerging Global Role* (INSTITUTE FOR THE STUDY OF DIPLOMACY BOOK, 1993), P55~56



lives of most Japanese. For this reason many people were inclined to act as if the crisis were someone else's concern. Public opinion was divided, and the proponents of "one-nation (unilateral) pacifism" hindered the Japanese government from fully participating in international crisis

#### **D. ECONOMY**

The Japanese economy suffered serious damages during the first oil crisis in 1973. Restructuring of the economy helped to create a stronger export sector, stronger Yen and increased economic growth. The average real economic growth rate of this period was 5.2% annually and exceeded the forecasted rate of 3.5 % by the government. The growth rate, however, has been declining since 1991 (4.0% in 1991 and 1.3% in 1992) as a result of the "collapse of bubble" and the strong Yen. The growth rate of 1994 forecasted by the government in January was 2.4%, but average growth rates forecasted by 15 private enterprises in July was 0.95% and many enterprises used optimistic estimates. Today, there seems to be only a gradual economic recovery.

#### **E. DEFENSE**

##### **1. Outline Of Japan's Defense Program**

The defense policy that Japan pursues is based on the "Basic Policy for National Defense" adopted by Japan's National Defense Council (NDC), and approved by the Cabinet in May 1957 (see Appendix R). Defense buildup plans were put into effect based on this 1957 policy.

In order to implement its basic policy, Japan developed Defense Buildup Plan that was divided into four parts. These plans stressed the importance of improving fighting capabilities of the Japan Self-Defense Force (JSDF) and preparing the military for potential crises.

With the completion of the Fourth Defense Buildup Plan in 1976, the "National Defense Program Outline (NDPO)" was adopted by the NDC and approved by the Cabinet in October 1976. The NDPO stipulates the appropriate level of defense capability Japan should maintain in peacetime and provides the guideline for improving Japan's defense capability, if necessary. Japan's military development since FY1977 has improved in accordance with the NDPO.

Since the NDPO was adopted by the Cabinet, the Government has ceased to formulate future defense plans. Instead, it was decided that a 'single-year formula' should be adopted so an annual review of Japan's defense posture could be made prior to the establishment of new policy.

In October 1976, the government shifted to the policy of a "Defense Buildup for the Time Being", which placed a ceiling on defense expenditures of 1% of the GNP.

In September 1985, the government drafted the Mid-Term Defense Program and implemented it during the period from FY1986 through FY1990. This was elevated to the status of a government plan by subjecting mid-term estimates by the Japan Defense Agency (JDA) to the National Security Council (NSC) for the purpose of ensuring tighter civilian control.

In January 1987, the government decided on a "Defense Buildup for the Future," replacing "Defense Buildup for the Time Being" (see Appendix S). This meant an amendment to the annual 1% of GNP expenditure limitation.

After the Mid-Term Program was completed in FY 1990, the "Basic Policy on Defense Planning in and after FY1991" was adopted by the NDC and approved by the Cabinet on December 19, 1990. In this policy, "Defense Buildup for the Future" was stated as follows;

#### **Defense Buildup for the Future**

4. Although continued careful attention must be paid to the movements in international society as above stated in 3, it could be understood, after all, that the trend toward stabilization of international relations, which was the premise of the formulation of the Outline, is now emerging much more than ever. With this understanding of the relevant situation, it is proper for us, under the basic policy outlined in 1 above, to continue to make efforts to improve an efficient and moderate defense capability in accordance with the basic principles of the Outline while maintaining the credibility of the Japan-U.S. Security Arrangements. These efforts will play an important role in preventing aggression against Japan and at the same time contribute to ensuring peace and stability in the region surrounding Japan.

In accordance with this policy, the "Mid-Term Defense Program (FY1991-1995)" was adopted by the NDC and approved by the Cabinet on December 20, 1990.

In this program, 'Program Review' was stated as follows;

**Program Review and Others**

5. The Program shall be reviewed whenever necessary in implementing it, and the program is subject to revision as necessary after three years within total amount of funding set forth in this program, taking into account the international situation, the trend of technological standards, economic and fiscal conditions and other factors in Japan.

The "Amendment of the Mid-Term Defense Program (FY1991-1995)" was adopted by the NDC and approved by the Cabinet on December 18, 1992, one year prior to the planning in order to reflect the internal and external demands placed on upon the JSDF. Total defense expenditures were reduced by 580 billion Yen.

**2. Defense Expenditures**

***a. Trends in Defense Expenditures***

From Figure 18 , the ratio of the Defense Expenditures to GNP has been under 1% of GNP since FY1967 except in FY 1987 through FY1989. The ratios in FY1987 through FY 1989 were 1.004, 1.013, and 1.006 % of GNP (see Appendix T). In general defense expenditures to GNP ratio increased during the 1980's and decreased since FY1990.

With respect to the ratio of defense expenditures to national budget, it decreased from 11.32% in FY1958 to 5.13% in FY1981. From FY1981 to FY1988 the ratio increased to 6.53% then turned down again till FY1993 and settling at 6.41% in FY1994.

In comparison to the growth rate of other major budget items (Social Welfare, Education and Science, and Public Works) from previous fiscal years, the growth rate of defense expenditure exceeded those of other major budget items for the first time in 1981. This trend continued until FY1989 (see Figure 19 and Appendix U). From FY1982 through FY1988 the growth rate of the defense expenditures exceeded that experienced by other major budget items. However

since FY1991, the growth of defense expenditures was minimized in comparison to all of other expenditures. It showed a trend of declining, 3.8% in 1992, 1.95% in 1993, and 0.90% in 1994 and 0.855% in 1995.

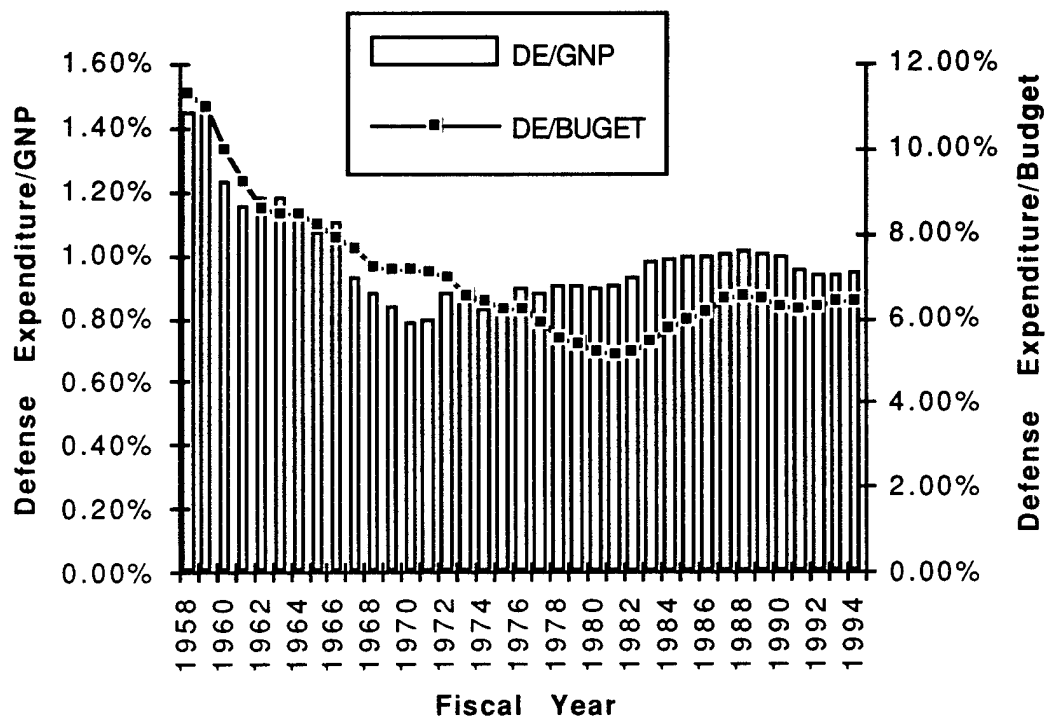


Figure 18  
Trend in Defense Expenditure(DE)/GNP and DE/Budget

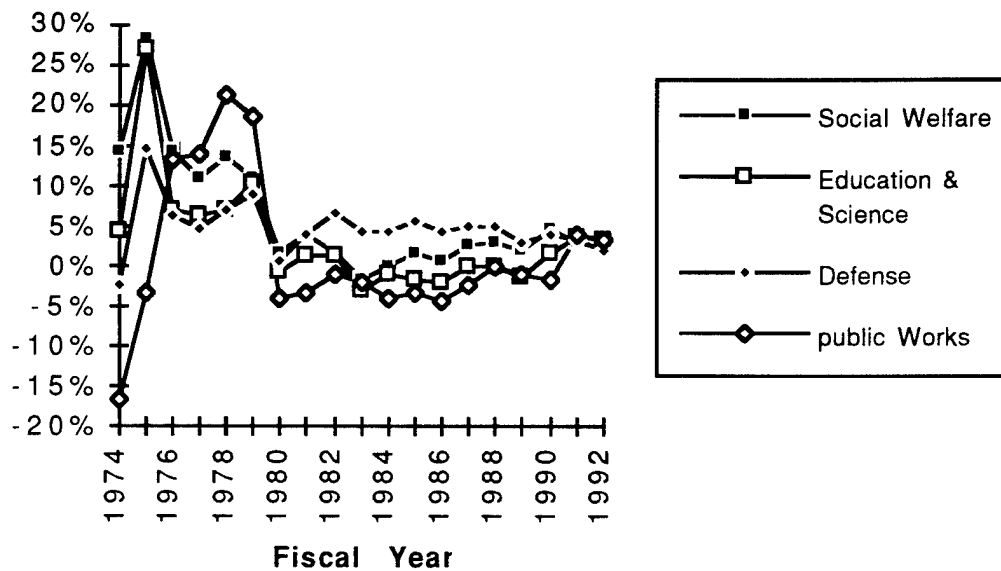
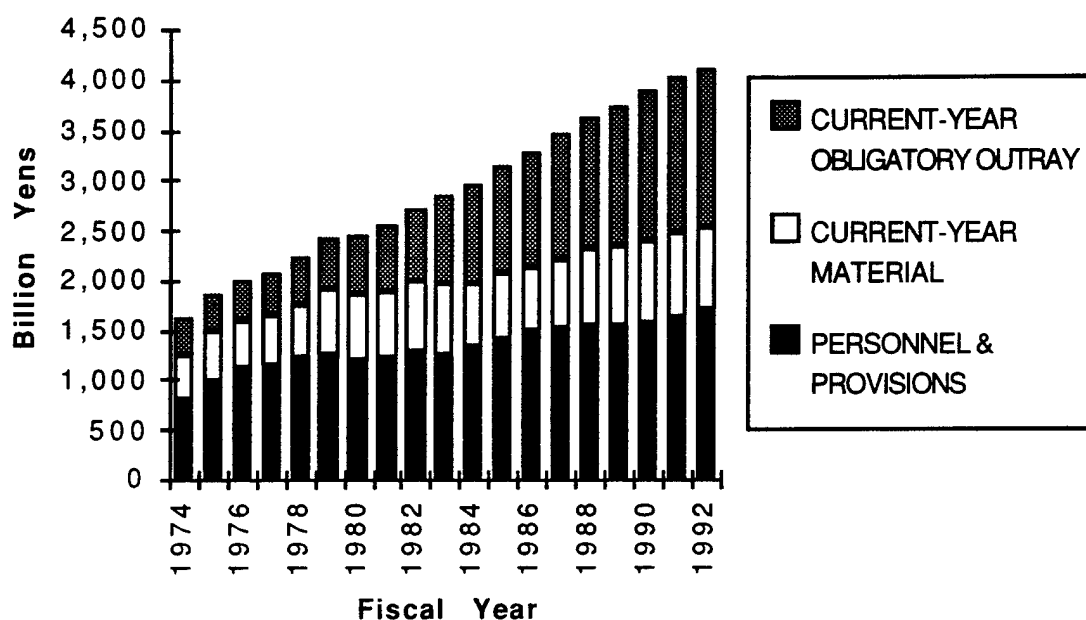


Figure 19  
Growth Rate in Major Account Expenditures  
***b. Trends in Defense Expenditures Classified by Expenses***

Figure 20 shows the trend in defense expenditures classified by expenses. 'Personnel and provisions expenses' are outlays for salaries and meals for JSDF personnel. 'Current-year obligatory outlays' are expenses for contract development and continued projects previously approved by the Diet in preceding fiscal years. 'Current-year materials expenses' are allocated for the repair and improvement of equipment, the purchase of oil, the education/training of JSDF personnel and for the procurement of new equipment. From Figure 20, one can see that the growth rate from previous years of current-year obligatory expenses were higher than those of other expenses (see Appendix V).

Figure 21 illustrates defense expenditures classified by expenses categories. From this figure one can see that the share of current-year obligatory outlays has been increasing on a yearly basis since FY1979. On the other hand, the shares of personnel and

provisions expenses and current-year materials expenses have been decreasing (see Appendix V).



Note: This chart is expressed in real Yens, based on FY1985 prices and a FY1985 deflator.

Figure 20  
Trend in Defense Expenditures by Expenses

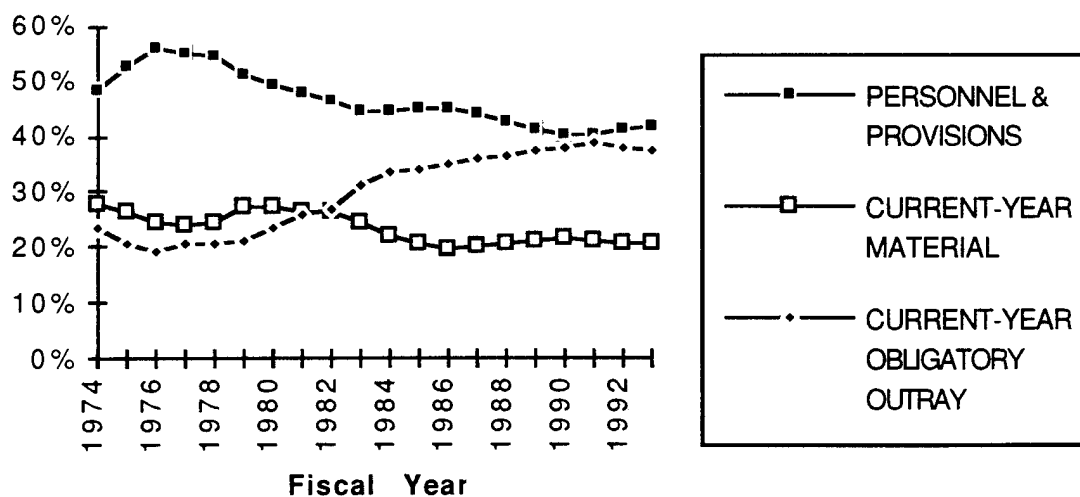


Figure 21  
Share trends in Defense Expenditures by Expenses

#### IV. FEATURES OF THE JMSDF

##### A. JMSDF BUDGET

###### 1. Trends in Defense Expenditures Classified by Organization

Figure 22 shows the trends of the service budgets since FY1974 and Figure 23 shows their share trends. Figure 22 indicates a steady budget growth for each service. Trend from Figure 23 reflect a decrease of approximately 5% of the JGSDF (normally 35%) in recent years. About 24% of defense expenditure is the JMSDF budget and about 25% is the JASDF budget (see Appendix W and X).

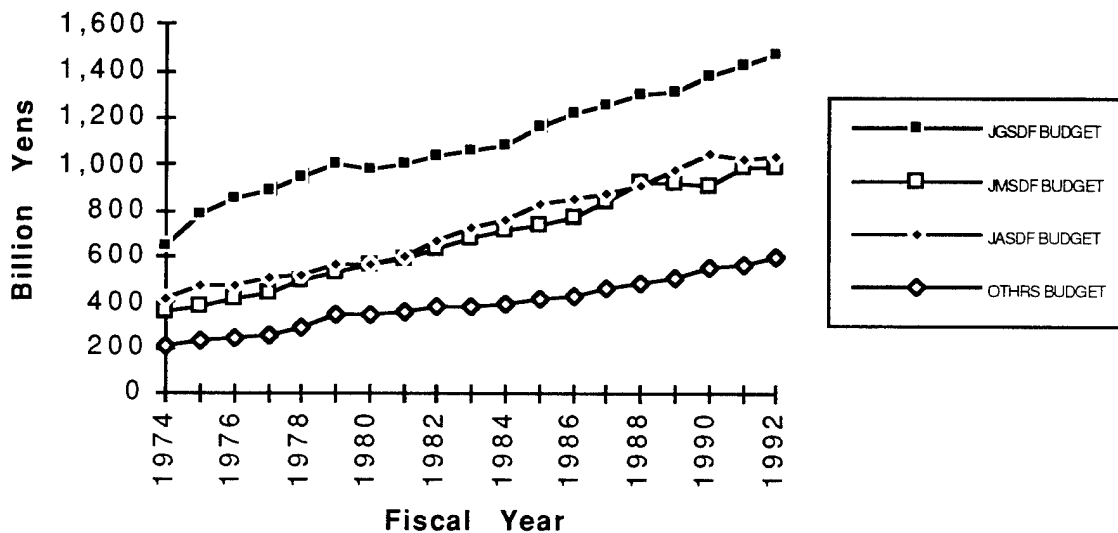


Figure 22  
Trends in Defense Expenditures by Organization

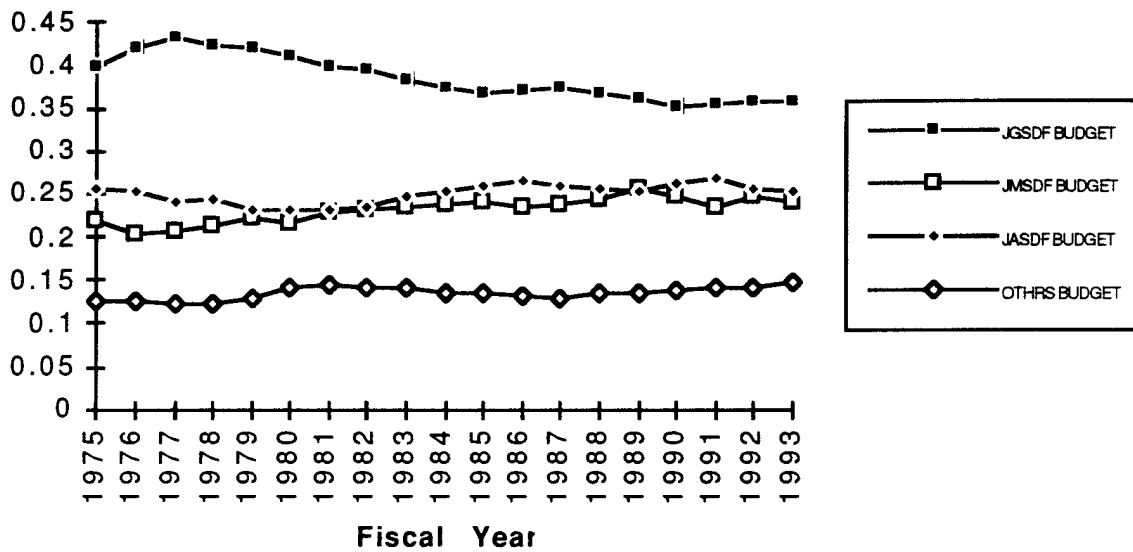


Figure 23  
Share Trends in Defense Expenditures by Organization

## 2. JMSDF Budget

The JMSDF budget is approximately 24% of the entire defense budget. Figure 24 shows the share trend in the JMSDF budget classified by expenses (personnel and provisions, current-year obligatory outlays, and current-year materials) (see Appendix Y). Figure 25 shows the share trend in the JMSDF budget classified by three components, personnel and provisions, front-line, and others. Front-line expenses are outlays for the procurement of ships and aircraft, etc. Since the late 1970's current-year obligatory outlay expenses and front-line expenses are larger than the other expenses of the JMSDF budget (Figure 24 and Figure 25). The priority of the JMSDF budget was shipbuilding and aircraft procurement expenses (see Figure 26 and Appendix Z).



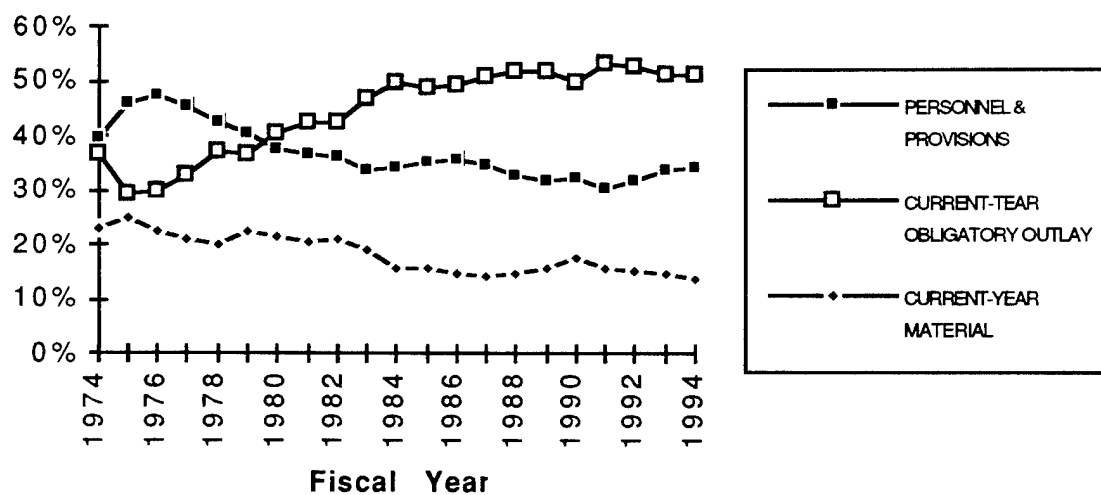


Figure 24  
Share Trend in JMSDF Budget by Expenses

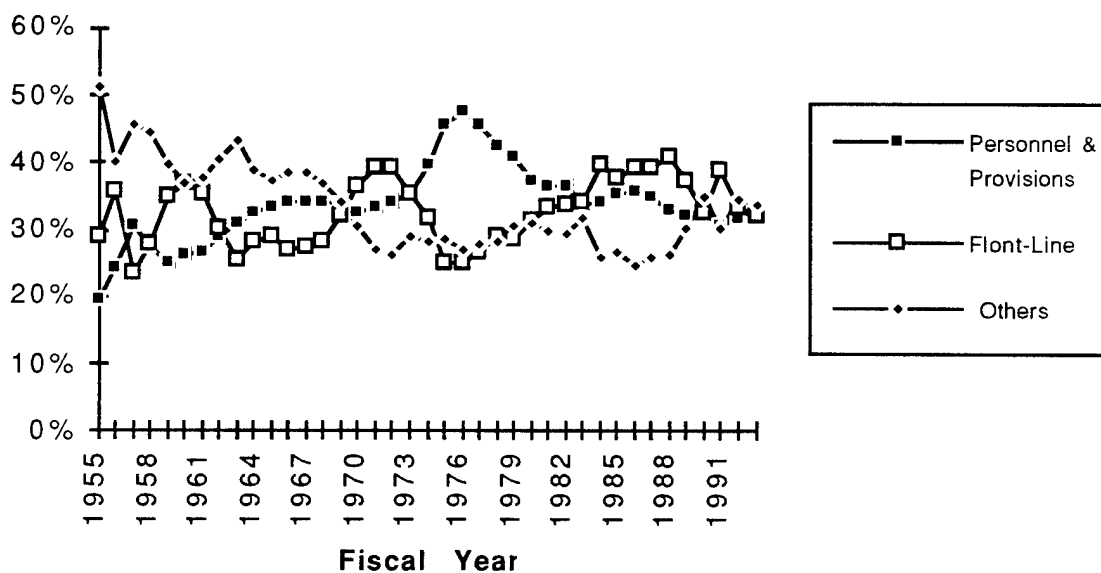


Figure 25  
Share Trend in JMSDF Budget by 3 Components

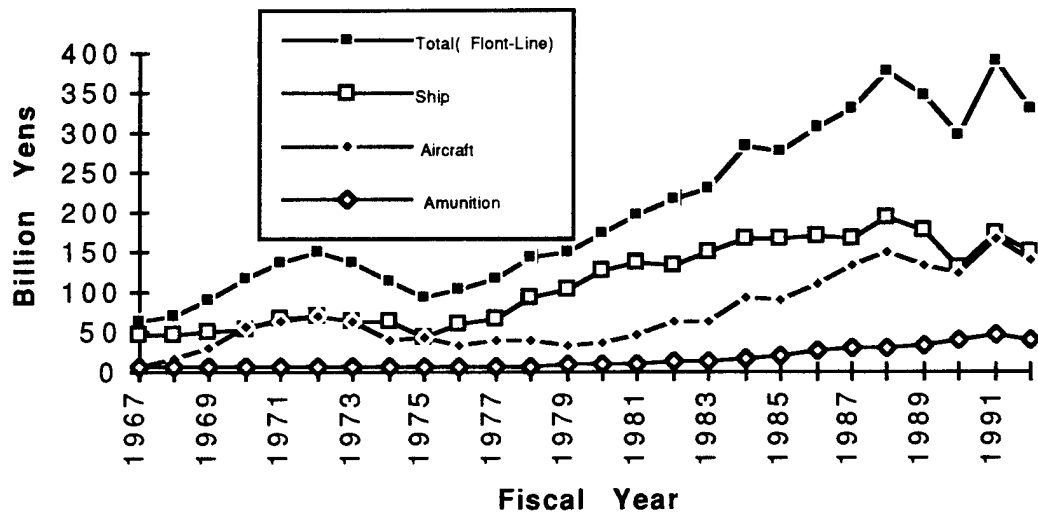


Figure 26  
Trends in JMSDF Front-line Expenses

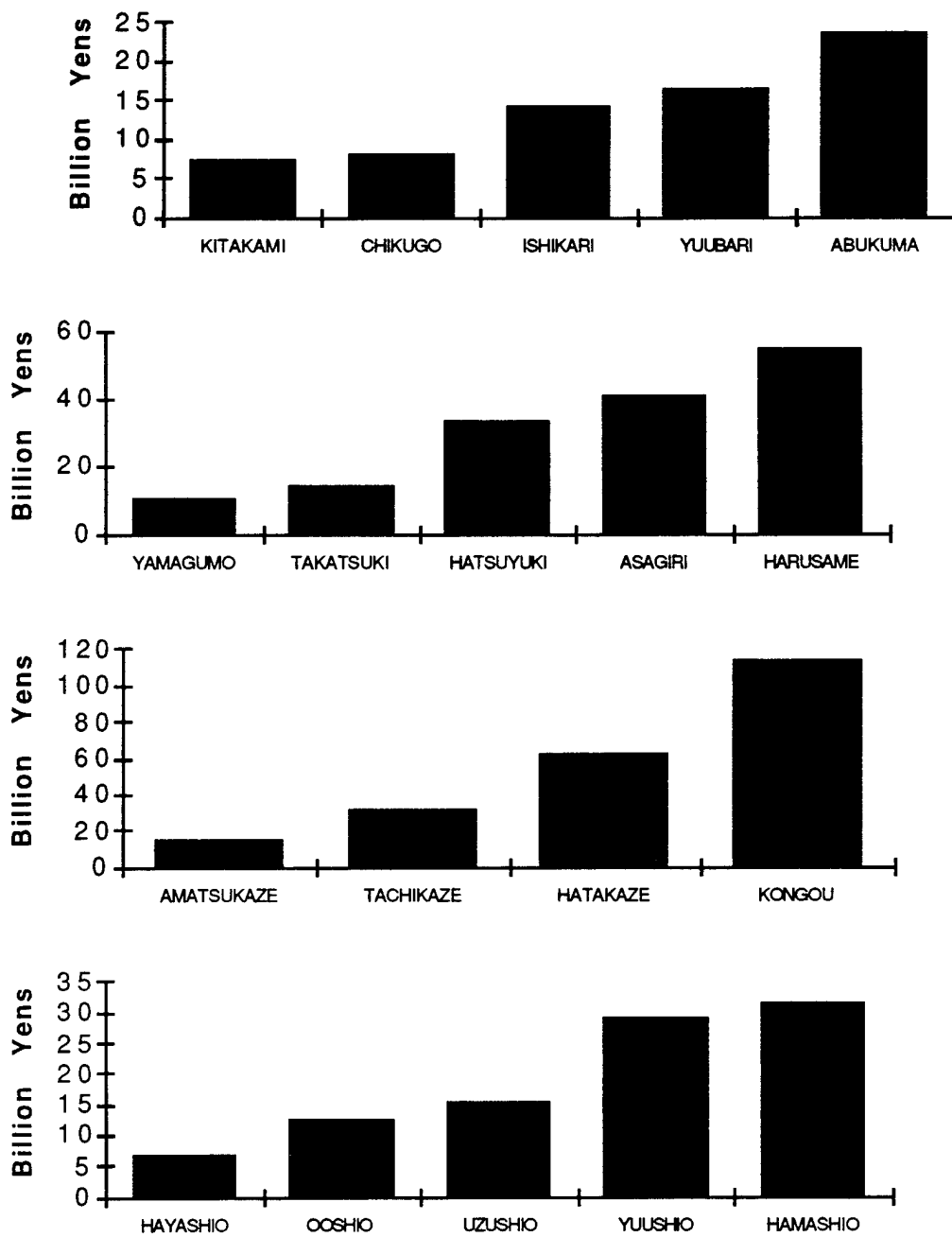
## B. SHIP AND AIRCRAFT EXPANSION IN THE JMSDF

### 1. Ship Expansion

In the JMSDF, new ship types have been created every 7 to 10 years on average for the last 40 years (see Table 1). The ship expansion pace has been fast and new ship types bring increased costs.

Figure 27 shows trends in shipbuilding costs for the different types of ships (Escort Vessel : DE, Destroyer : DD, Guided Missile Destroyer : DDG, Submarine : SS). In every type the real building cost per ship increased substantially. For example, in DE, the real building cost of ABUKUMA is 3.2 times as that of KITAKAMI. In the same manner, in DD, the HARUSAME's cost is 5.4 times of YAMAGUMO's, in DDG, the KONGO's costs is 8 times of AMATSUKAZE's, in SS, the HARUSHIO's cost is 4.8 times of HAYASHIO's (see Appendix AA).





Note: These charts are expressed in real Yen, based on FY1985 prices and a 1985 deflator.

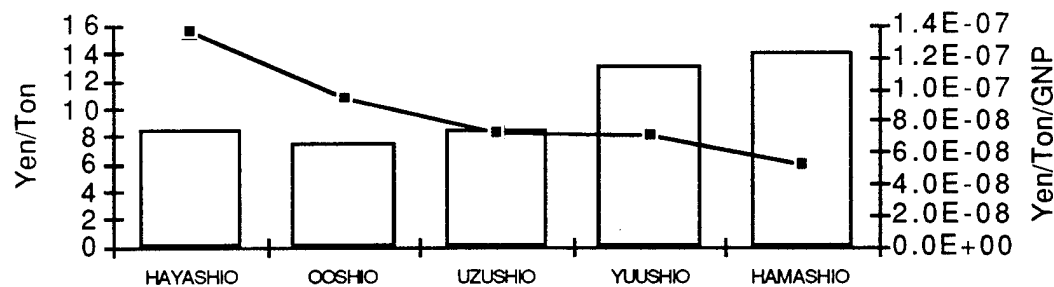
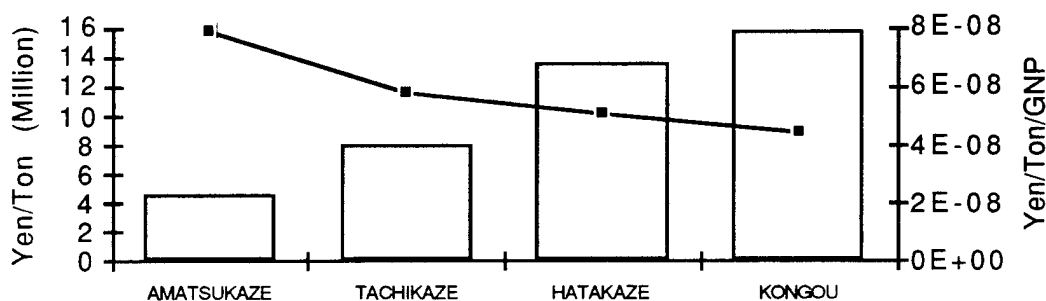
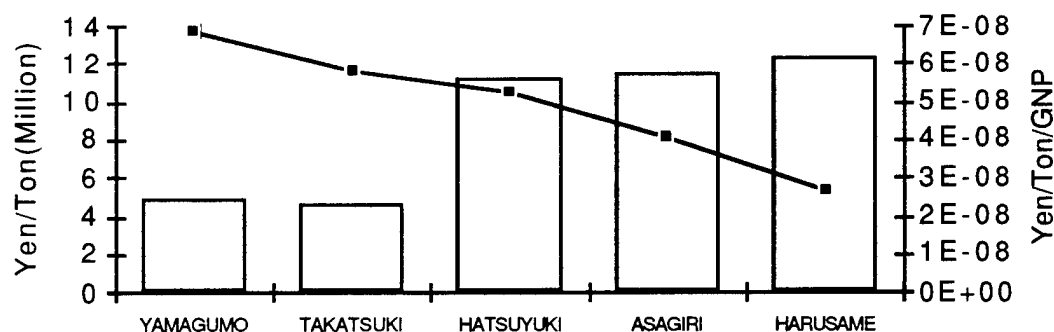
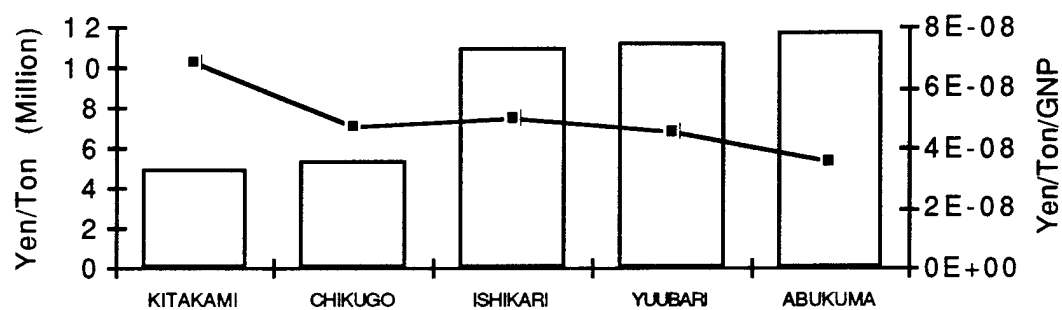
Figure 27

Trend of Shipbuilding Cost (by Ship type)

In terms of the real building cost per ship per standard displacement ton, there is an ascendant trend like in the real building cost per ship (see Figure 28). There is a noticeable increase in the real building cost per ship per standard displacement ton between CHIKUGO and ISHIKARI in DE, between TAKATSUKI and HATSUYUKI in DD, between TACHIKAZE and HATAKAZE in DDG, and between UZUSHIO and YUUSHIO in SS. This difference represents significant qualitative improvement in ship's systems. In addition, the JMSDF started to equip missile weapon systems on all new ships. This high technology ship modernization with high technology effort started in the late 1970's. Ship modernization with highly efficient systems had an impact on the real ship building costs. As a result, the real ship building costs rose dramatically.

## **2. Aircraft Expansion**

In the JMSDF almost all combat aircraft are Anti-Submarine Warfare (ASW) aircraft. From Figure 29 (also see Appendix AB), we can see the trend of ASW aircraft. New types of aircraft have been acquired about every 12 years in both fixed-wing aircraft and helicopter platforms. There were sudden increases of the real costs between HSS-2 and HSS-2B, and between HSS-2B and SH-60J in helicopters and between P-2J and P-3C in fixed-wing aircraft. The real cost of HSS-2B is 2.5 times as that of HSS-2, SH-60J cost is 1.58 times as that of HSS-2B and P-3C cost is 2.3 times as that of P-2J cost (see Figure 30 and Appendix AC). P-3C's were equipped with computerized systems that could manage and process a lot of collected tactical information in a short time. HSS-2B's were equipped with enhanced capabilities to manage information, such as the tactical data display system (TDDS). SH-60J's based on SH-60B, included a newly developed Automatic Flight Management System (AFMS), and other tactical data management equipment. The sudden rise of real aircraft procurement cost reflected an enhancement of capability and performance. Acquisitions of P-3Cs and HSS-2Bs began in the late 1970's and that of SH-60J began in the late 1980's.



Note : 1. Yen/Ton in these charts are expressed in real Yens, based on FY1985 prices and using a FY1985 deflator.  
 2. Line graph is measured by the right-hand scale.

Figure 28  
 Trend of Yen/Ton and Yen/Ton/GNP

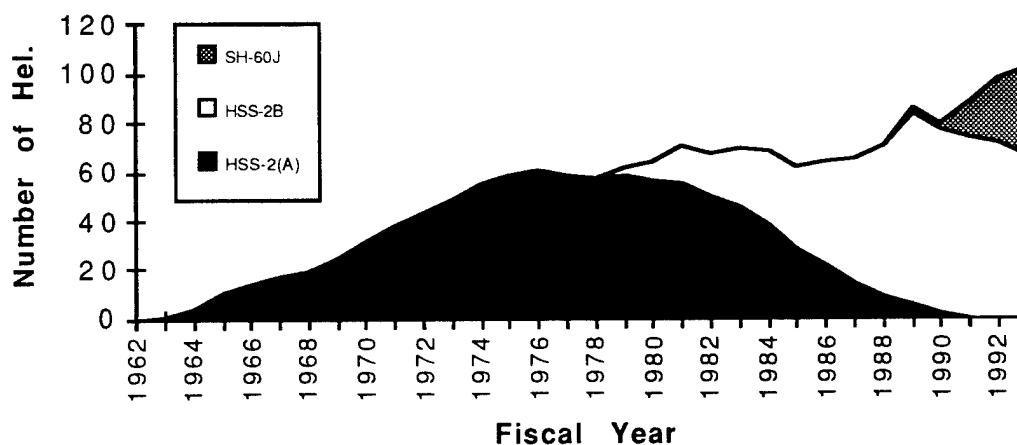
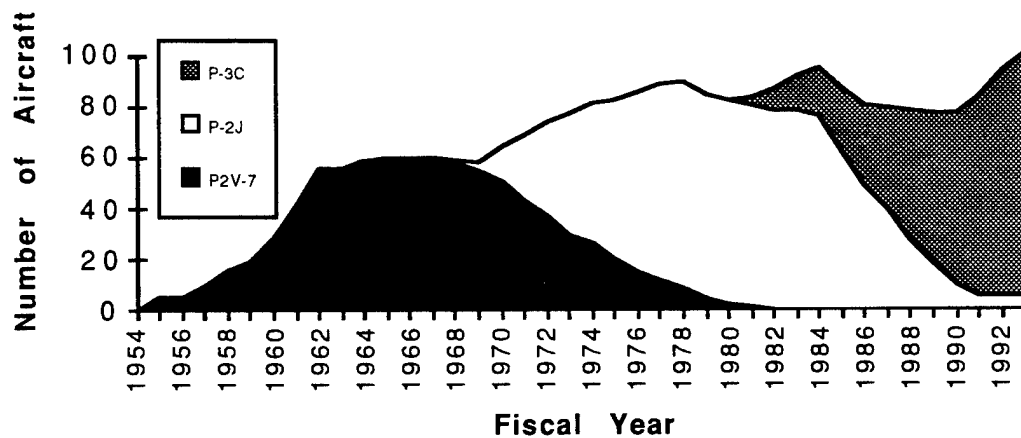
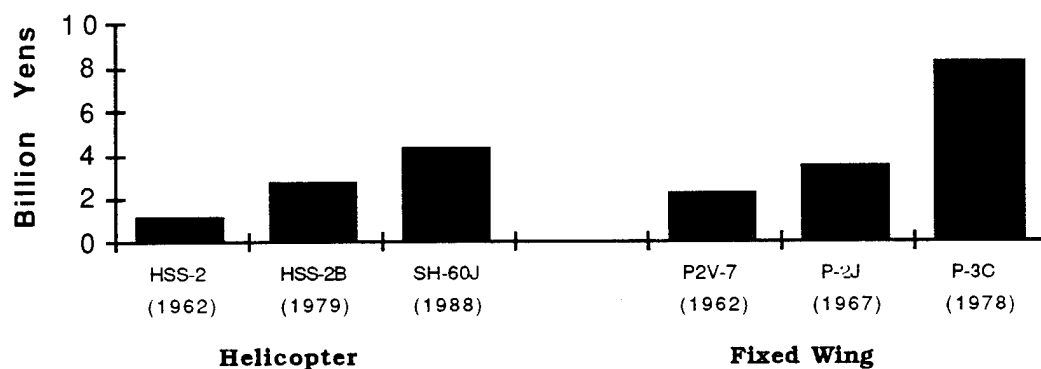


Figure 29  
Trend of ASW Aircraft Inventories



Note : (Number) is the fiscal year when the aircraft was procured.  
This chart is expressed in real Yens, based on FY1985 prices and a FY1985 deflator.

Figure 30  
Aircraft Cost Trend (by Type)

### C. THE POSTURE OF THE JMSDF IN THE NDPO

The following refers to the posture of the JMSDF in the National Defense Program Outline(NDPO).

1. The JMSDF must possess one fleet escort force as a mobile operating ship unit in order to quickly respond to aggressive action and such situations at sea. The fleet escort force must be able to maintain at least one escort flotilla on alert at all times.

2. The JMSDF must possess, as ship units assigned to coastal surveillance and defense, surface anti-submarine capability of at least one ship division in operational readiness at all times in each assigned sea district.

3. The JMSDF must maintain submarine units, anti-submarine helicopter units and minesweeping units, providing the capability for surveillance and defense missions as well as minesweeping at important harbors and major strains when such necessity arises.

4. The JMSDF must maintain fixed-wing anti-submarine aircraft units in order to provide the capability of carrying out missions of surveillance and patrol of the nearby seas and ship protection.

Description of the actual scales of organization and primary equipment under the foregoing concepts are given in its attachment (see Table 2).

|                                                                                                                                                                                                                                           |                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| <u>Basic Units</u><br>Anti-submarine Surface-Ship Units<br>(for mobile operation)<br>Anti-submarine Surface-Ship Units<br>(Regional District units)<br>Submarine Units<br>Mine sweeping Units<br>Land-based Anti-submarine Aircraft Units | 4 Escort Flotilla<br>10 Divisions<br>6 Divisions<br>2 Flotilla<br>16 Squadrons |
| <u>Main Equipment</u><br>Anti-submarine surface Ships<br>Submarines<br>Combat Aircrafts                                                                                                                                                   | Approx. 60 Ships<br>16 Submarines<br>Approx. 220 Aircrafts                     |

Table 2 Inventory Level in JMSDF by NDPO



## **D. THE ROLE OF THE JMSDF**

### **1. General Role of the Military Strength**

Thomas E. Seal says,<sup>28</sup>

Raw military power is still the bottom line in international politics. All elements of power are important, but a wealthy state with little military power has limited influence over a poorer one with a substantial military establishment. Japan and Germany may have wealth and influence, but they could not move Saddam out of Kuwait; nor can mere expression of outrage end tragedies such as those being played out today in the Balkans and the Horn of Africa. Unless the values of a target state leave it vulnerable to economic pressure or moral suction, military force will remain the final option for influencing the actions of that state.

A summary of the general role of the military strength is as follows.

#### **a. Essential Role**

- \* Maintain military strength to defend own country

#### **b. Secondary Role**

##### **(1) Diplomatic role**

- \* Provide a means to resolve the international issues
- \* Exercise of influence on diplomacy
- \* Represent the nation
- \* Protect overseas property and interests, including protection of residents
- \* Provide military power for international peace

##### **(2) Political role**

- \* Symbol of an independent country, demonstration of national prestige
- \* Intelligence gathering

##### **(3) Social Role**

- \* Military power to maintain public order
- \* Military power against terrorism
- \* Military power to maintain public welfare

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<sup>28</sup> Thomas E. Seal, "Continuity and Change in U.S. Security Strategy," in *Naval War College Review* (Spring 1994), p31

## **2. General Role of the Naval Strength**

Prior to the discussion about the role of the JMSDF, it is necessary to recognize the general role of naval strength as a vital link in Japan's defensive posture.

"A navy is characterized by the roles it is designed to assume. The many roles and mission of navies can be broadly grouped under three categories or types of Navies. These are: power projection navies, those capable of offensive operations against another countries; coastal-defense navies, those designed to defend the country against likely enemies; and constabulary navies, whose major function is surveillance of territorial seas and exclusive economic zones to protect political and economic claims. Under this scheme, navies are defined by their highest capabilities; for instance, power-projection navies also have coastal-defense and constabulary functions and coastal defense navies perform constabulary functions"<sup>29</sup>.

I summarize the content of this analysis;

### **Power Projection**

Navies with significant offensive capabilities -- that is, a force - or power projection mission -- are designed to attack enemy's territory, either by launching weapons of great destructive power from afar or by directly attacking the enemy's coast by landing troops and weapons (amphibious assault) . Power projection navies can be used either as independent forces or to support other combat operations, such as those carried out by armies and air forces. Few countries can maintain navies that are capable of projecting their power around the world, as these require the largest, most powerful, and therefore most expensive ships. The superpowers (the U.S. and Russia) have ocean-wide power projection navies, and the United Kingdom (U.K.) and France can use their small nuclear ballistic-missile submarine fleets for this purpose to a more limited degree.

Many navies, however, have some capability for limited force projection through amphibious assault operations. The potential for success in such amphibious operations will depend on the defensive capabilities of the nation being attacked. For large-scale amphibious on well-defended coasts, landing ships must be supported by ships and air forces (usually operating from aircraft carriers) that bombard the enemy coast. Ownership of a few landing ships of varying capabilities does not, therefore, constitute a true amphibious assault capability. These limited forces might, however, be successfully used against small, lightly defended land targets.

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<sup>29</sup> Porpoises Among the Whales: Small Navies in Asia and Pacific (Joseph R. Morgan) p7

### **Coastal Defense**

Defense against attack from the sea is the most common justification for maintaining a navy. The size and makeup of a coastal defense navy depends upon a number of factors, including the capabilities of potential enemies; length and vulnerability of coastline; susceptibility of coastal installations (such as ports and naval bases) to attack; and the financial resources available to the nation. Navies designed exclusively for coastal defense against potential enemies of limited power can consist of small ships with limited range; such vessels do not require large crew or extensive maintenance facilities. Where the coastal geography is suitable, inexpensive defensive weapons such as mines may be used, thereby reducing the number of ships needed. In most cases, aircraft based on land supplement the defensive capabilities or the surface naval forces. And small submarines can be used with good effort to defend strategic waterways, such as narrow straits and approaches to ports. Land-based guns and missiles, which are relatively affordable even for small, weak coastal states, can reduce the need for surface ships and submarines.

There is another description about the Navy's role. Robert M. Soofer says,<sup>30</sup>

Former Secretary of Defense Dick Cheney's regional defense strategy contained four critical elements useful for guiding defense planning and the development of U.S. military forces: Strategic deterrence and defense, forward presence, crisis response, and reconstitution. While the Navy has a role in supporting each of these elements, its forces and capabilities are particularly well suited for the forward presence and crisis response missions.

### **3. The Current Role of the JMSDF**

From the geopolitical characteristics described in Section III-A, and the posture of the JMSDF described in previous subsection, the current role of the JMSDF is developed:

#### ***a. Maritime Defense Strength as Self Defense Measure***

##### **(1) Prevention of Invasions**

- \* Prevent the landing invasion from the sea.
- \* Provide coastal defense
- \* Protection of important harbors and straits

##### **(2) Securing the Safety of Maritime Traffic**

- \* Protection of important ships on the SLOCs
- \* Defeat enemy forces that attempt to intercept and obstruct the SLOCs

##### **(3) Patrol**

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<sup>30</sup> Robert M. Soofer, "Ballistic Missile Defense from the Sea," in *Naval War College Review* (Spring 1994), p61

- \* Conduct patrol operations around Japan
- \* Maintain a wide area of patrol
- \* Collection and analysis of intelligence
- (4) Protection of lives and properties
  - \* Provide necessary action to protect citizens overseas and their properties

***b. Removal of Threats Cooperating with U.S. Navy***

- (1) Participate in cooperative actions against the large-scale attack on Japan
- (2) Securing the safety of maritime traffic
  - \* Defeat enemy forces that attempt attack the SLOCs

***c. Maintenance of Regional Military Balance***

- (1) Prevent invasion from occurring
  - \* Presence
  - \* Showing of deterrent function on the sea
- (2) Maintain order in the Asia/Pacific region
- (3) Maintain consideration about the apprehensions of neighboring countries against Japan

***d. Contribution to Maintain the International Order***

- (1) Ensure regional security
- (2) Provide cooperation to the Peace-Keeping Operation (PKO) of U.N.

**E. LIMITATION ABOUT THE JMSDF**

As a result of internal limitations, the JMSDF has a unique characteristics compared with general navies. This section analyzes these limitations.

**1. Legal Limitation**

***a. Constitution and Right of Self-Defense***

According to the 'Defense of Japan' the relation between constitution and right of self-defense is described as follows;<sup>31</sup>

After the WWII, Japan was resolved to ensure that the horrors of war would never be replaced, and has since made tenacious efforts to

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<sup>31</sup> Defense of Japan 1994 (Japan Defense Agency) p62

establish itself as a peace-loving nation. The establishment of peace for all time is a sincere wish shared by the Japanese people. The Constitution, upholding pacifism, sets forth in Article 9 the renunciation of war, non-possession of war potential and denial of the right of belligerency of the state. As long as Japan is a sovereign state, it is recognized beyond doubt that the provision in the article does not deny the inherent right of self-defense that Japan is entitled to maintain as a sovereign nation.

Since the self-defense right is not denied, the government remains firm in the belief that the Constitution does not inhibit the possession of the minimum level of armed strength necessary to exercise the right of self-defense<sup>32</sup>. On the basis of such understanding, the government has adopted an exclusively defense-oriented policy as its basic policy of national defense and has maintained self-defense as an armed organization, and has taken steps to improve its capabilities and to ensure their efficient operation. These measures do not present any constitutional problem ..., it is unconstitutional to possess what is referred to as offensive weapons that, from their own performance, are to be used exclusively for the total destruction of other countries, since it immediately exceeds the limit of the minimum level of self-defense necessary. Therefore, for instance, the SDF is not allowed to possess ICBMs, long-range strategic bombers or offensive aircraft.

As a result, JMSDF can not possess the following equipment under current legal limitation:

- \* Offensive aircraft carrier

#### ***b. Three Non-Nuclear Principles***

Another legal limitation is the "Three Non-Nuclear principles." "Defense of Japan" also describes this as follows;

Three Non-Nuclear principles refer to the principles of 'not possessing nuclear weapons, not producing them and not permitting their introduction in Japan.' Japan adheres to the Three Non-Nuclear Principles as the fixed line of national policy.

The Atomic Energy Law also prohibits Japan from manufacturing or possessing nuclear weapons. Furthermore, Japan ratified the Treaty on Non-Proliferation of Nuclear Weapon in June 1976, and placed itself under obligation, as a non-nuclear weapons state, not to produce or acquire nuclear weapons.<sup>33</sup>

As a result, JMSDF can not possess the following equipment under current legal limitation:

- \* Nuclear powered vessels and submarines
- \* Nuclear weapons (SLBM, Tomahawk Missile, etc.)

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<sup>32</sup> Underline is inserted by author.

<sup>33</sup> Defense of Japan 1994 (Japan Defense Agency) p65

In addition, Norman D. Levin says,<sup>34</sup>

Important aspects of continuity should not be overlooked, however. Although Japan is no longer the too weak to defend itself against external danger, its unique and largely self-imposed limitations constrain its ability to provide single-handedly for its own defense. This is most obvious in the nuclear area, where Japan lacks any deterrent or second-strike capability, and it is also true regarding Japan's conventional capabilities: the Self-Defense Force remain uniquely unbalanced, for example, with no "offensive" weapons or power projection capabilities, and shackled by a host of political, technical, operational, and resource limitations

## **2. Limitation on Japan-U.S. Coordinated Joint Action**

As described in Section III-B-2, the deterrent provided by the U.S. through Japan-U.S. Security Treaty is a core element of Japan's security posture. The significance of the Japan-U.S. security arrangements are "(1) Direct contribution to Japan's security, (2) Contributions to the maintenance of peace and security of the Far East, (3) Core of Japan-U.S. relations, and (4) Broad basis of foreign relations"<sup>35</sup> Despite their significance, there are also some limitation on coordinated joint action. Norman D. Levin continues,<sup>36</sup>

U.S.-Japan security ties-like the broader U.S.-Japan relationship - are nonetheless facing a rocky road. The collapse of the Soviet Union has only removed the sense of shared threat that gave immediacy to bilateral security cooperation, but it also has generated a whole new set of national preoccupations. Moreover, U.S. views toward Japan are experiencing a new and potentially dangerous volatility. The growing perception of Japan as a "threat" and potential "enemy" increasingly compares with earlier U.S. perceptions of the former Soviet Union and exacerbates the task of maintaining close cooperative relations. Such views are rogue factors in future U.S. security policy toward Japan.

### **a. Requirement for Japan's Larger Share of Responsibility**

As described in Section II-A, the U.S. has been reducing its military forces, and as a result of this reduction, there is a growing

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<sup>34</sup> Norman D. Levin, "Prospects for U.S.-Japanese Security Cooperation" in Danny Unger & Paul Blackburn (ed.), *Japan's Emerging Global Role* (INSTITUTE FOR THE STUDY OF DIPLOMACY BOOK, 1993), P80

<sup>35</sup> Defense of Japan 1994 (Japan Defense Agency) p67~69

<sup>36</sup> Norman D. Levin, "Prospects for U.S.-Japanese Security Cooperation" in Danny Unger & Paul Blackburn (ed.), *Japan's Emerging Global Role* (INSTITUTE FOR THE STUDY OF DIPLOMACY BOOK, 1993), P81

requirement for Japan to assume a larger share of responsibility. This attitude will continue toward and during the 21st century.

Japan's government decided to assume all of the burden of stationing USFJ from FY1995. As a result, these costs will put increased pressure on defense expenditures.

#### **b. Reduction of U.S. Forces in Japan(USFJ)**

The U.S. formulated the "East Asia Strategic Initiative (EASI)" during the Bush administration. This called for a phased reorganization and rationalization of U.S. forces in the East Asia/Pacific region. The plans initial stage (1990-1992) was completed as scheduled. As part of the reorganization plan and the termination of the U.S.-Philippines agreement over military bases, the U.S. withdrew all of its forces from the Philippines in 1992. Under the second phase (1993-1995), reduction of about 700 personnel stationed in Japan will be to be carried out."<sup>37</sup> Despite the announcement of U.S. intentions to continue deploying Marine Corps and Air Force personnel in Japan, the U.S. has been reducing its forces, and this trend is expected to continue.

#### **c. Instability of U.S. Force's Coming and Helping**

As the unstable situation of Korean Peninsula and Middle East, etc. cannot be immediately resolved, the possibility of attack to Japan as the result of spread of these disputes seems to be higher rather than the possibility of an isolated attack directly on Japan. If an attack on Japan is the result of disputes from other regions, the reduced U.S. naval forces will be inadequate to respond to the multi-front conflict. Japan cannot deny the possibility of delay of the arrival of adequate U.S. Forces or possible lack of support due to reduced reserve forces.

### **3. Financial Limitation**

As the financial characteristics of Japan, JSDF, and JMSDF were illustrated in the previous sections, there is a financial limitation on the development of JMSDF. If Japan maintains the current defense

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<sup>37</sup> Defense of Japan 1994 (Japan Defense Agency) p57

policy even into the 21st century, these trends will continue. There is an approximate 3% economic growth rate, and defense expenditures are approximately 1% of GNP. The JMSDF share of about 24% of defense budget, and about 40% share of front-line expenditures. Moreover, an increase of personnel and maintenance costs and increase of the unit price of equipment are also predicted.

#### **4. Social Limitation**

##### ***a. Limitation on National Consciousness***

National consciousness about defense is not based on international awareness in Japan. Despite the recognition by 80% of Japanese people over the necessity of the SDF, only 6% recognize the necessity for expansion of defense capabilities<sup>38</sup>.

Since Japan is the only country that has suffered the effects of nuclear weapons, the fear for nuclear weapons development has been inside the feeling of the Japanese people. This allergy has been disturbing even the peaceful development of nuclear energy, and the Japanese people are extremely passive about the use of nuclear power in defense issues.

##### ***b. Limitation on Human Resources***

A long-term downward trend of the young population is another factor of social limitation. One of Japan's societal feature places a great value on attending college. As a result of securing high quality high school graduates has become increasingly difficult. Moreover, the current young population prefer individual life styles and dislike the constraints imposed by the life of SDF, etc. The trend of "*Umi Banare*"(Life apart from onboard) seems to increase in the future.

#### **F. WEAKNESS OF THE JMSDF**

We know the general role of the naval strength and the current role of the JMSDF through Section IV-D. The major premise that enables Japan to remove threats is a cooperative action with U.S. Navy based on the Japan-U.S. Security Treaty. This is one limitation

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<sup>38</sup> This number comes from "Public Opinion Survey Regarding the SDF and Defense Issue" conducted in FY1993(Jan. 13-23, 1994)



illustrated in a previous section. Moreover, there is a weakness of the JMSDF when comparing the fleet composition and aircraft assets.

### **1. Comparison of Fleet Composition**

When comparing fleet composition, assets can be categorized into Aircraft Carriers (CV), Ballistic Missile Submarines (SSBN), Other submarines (SS), Cruisers, Destroyers (DD) and Frigates (FF), Mine Warfare Ships (M/W), Amphibious Warfare Ships (A/W), and others.

Figure 31 and 32 shows fleet compositions with the numbers of ships, and displacement (full load tons) in natural logarithms in accordance to the above categories (see Appendix AD). From Figure 31, it is clear that the U.S. Pacific Fleet is approximately one half of the entire Navy (submarines are one-third), and the Russian Pacific Fleet makes up one-third of the entire Russian Navy. The French Navy, the U.K. Navy and the JMSDF take similar shapes. From Figure 32, we can see obviously that all of the countries above, except for Japan, have well balanced fleet compositions. The JMSDF lacks strategic capability against other countries as well as air cover in areas beyond the regions covered-areas by the fighters of JASDF.

### **2. Comparison of Aircraft Assets**

Figure 33 show the aircraft asset comparison of each navy. They are categorized into Bomber (BBR) and Fighter (FTR), Anti-submarine Warfare (ASW) Aircraft and Maritime Reconnaissance (MR) aircraft, Electronic Warfare (EW) aircraft, Airborne Early Warning (AEW) aircraft, Commando (CDO) aircraft, and Mine Countermeasure (MCM) aircraft. From Figure 33, we can recognize that major features of the JMSDF are ASW, MR, and MCM aircraft. From Table 3, we can see the qualitative aspects of each countries' aircraft inventories.

### **3. Summary**

In comparison with the general navy, in respect to both its role and composition, Japan's lack of balance is directly results from:

- \* Lack of strategic weapons (ex: SSBN)
- \* Lack of Aircraft Carrier capabilities

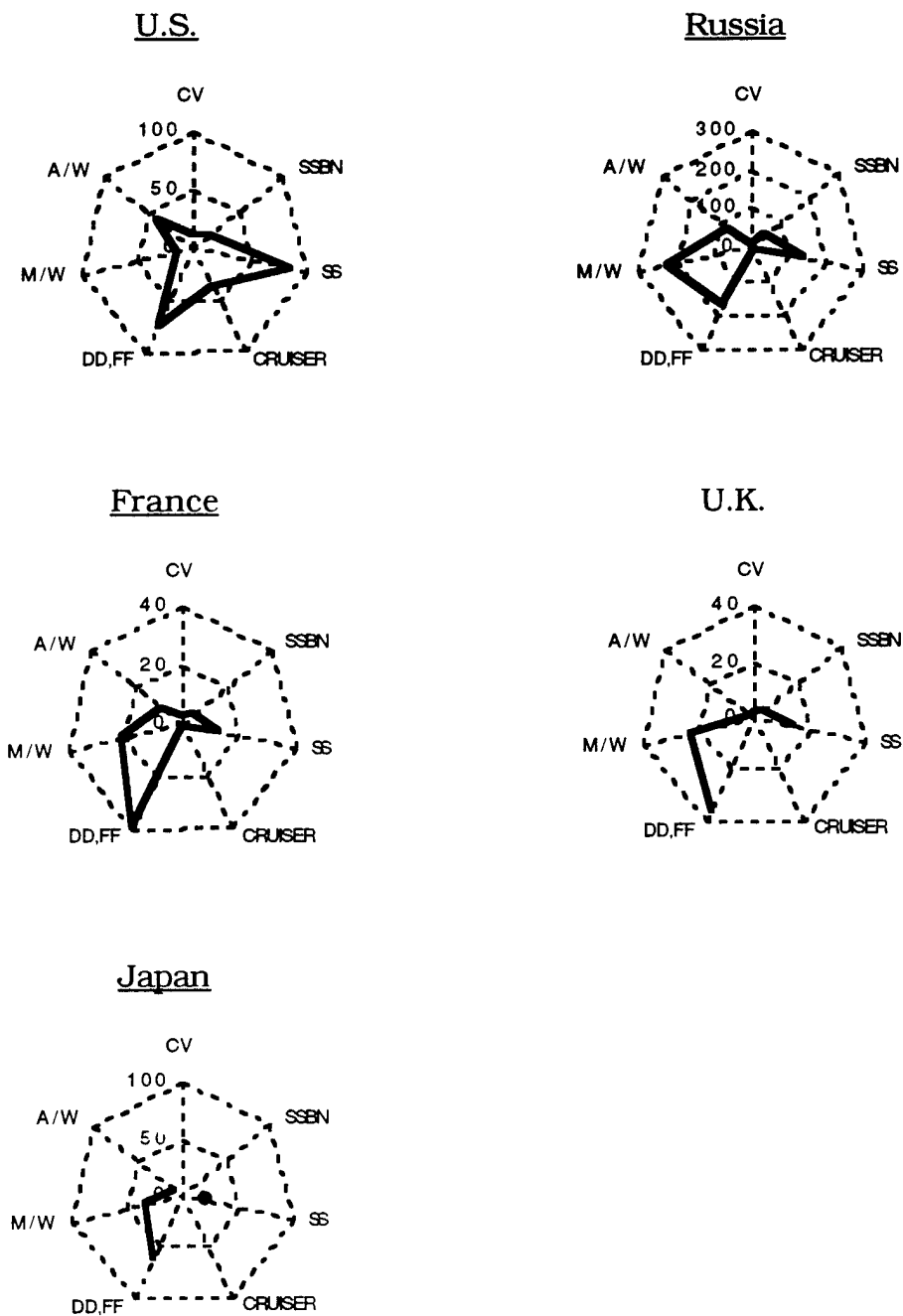
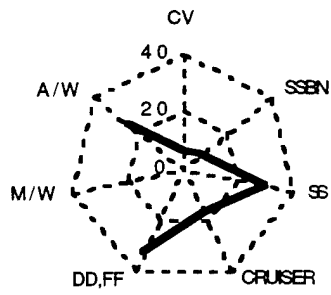
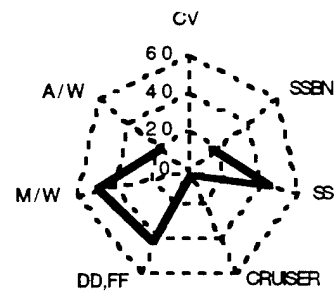


Figure 31  
Fleet Composition (Part 1)  
(Number of Ships)

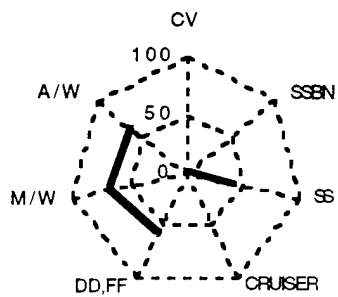
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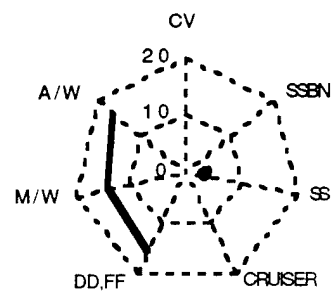
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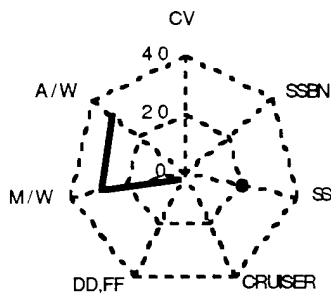
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### South Korea



### North Korea



### Japan

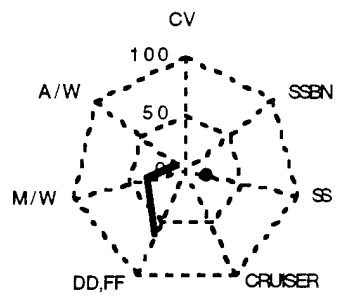


Figure 31  
Fleet Composition (Part 2)  
(Number of Ships)

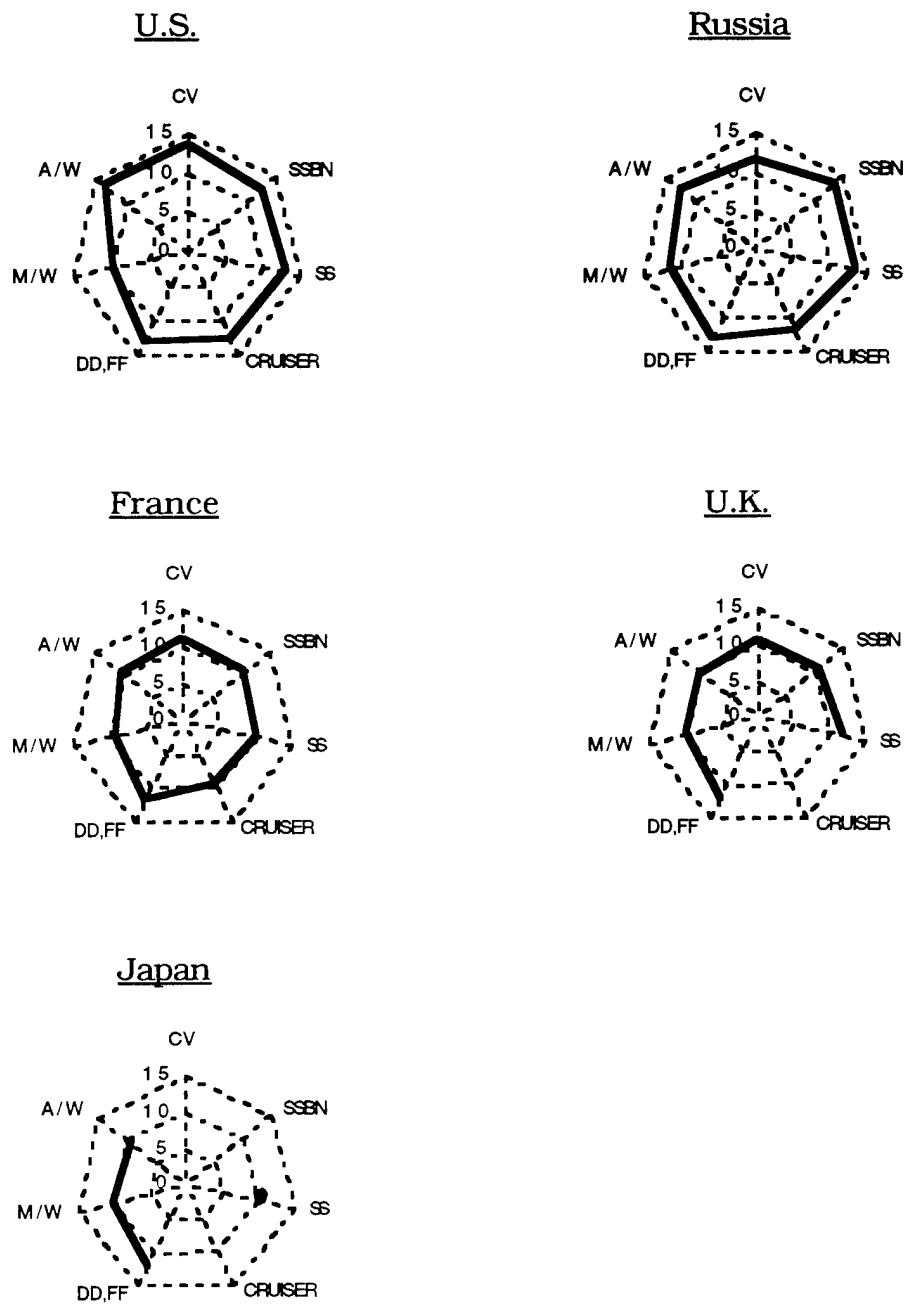
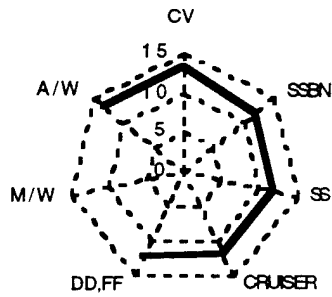
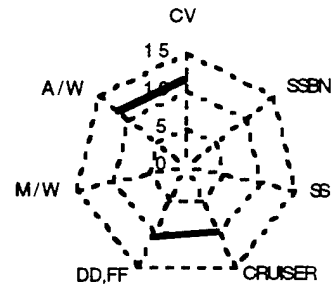


Figure 32  
Fleet Composition (Part 1)  
(Displacement, Full Ton: In Natural Log)

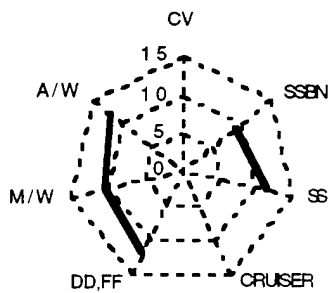
### U.S. Pacific



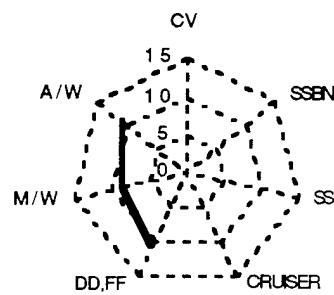
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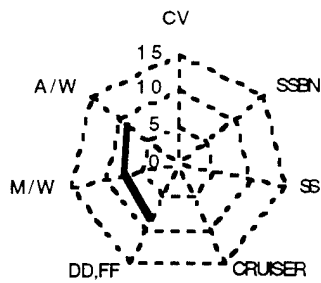
### China



### South Korea



### North Korea



### Japan

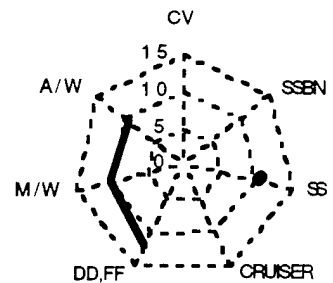


Figure 32  
Fleet Composition (Part 2)  
(Displacement, Full Ton: In Natural Log)

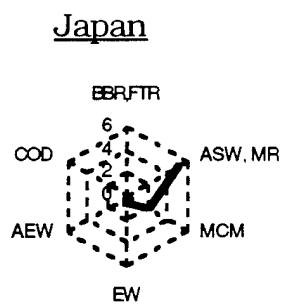
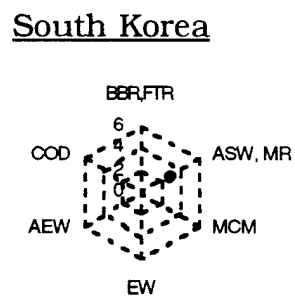
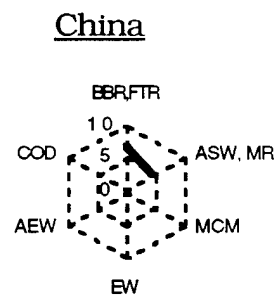
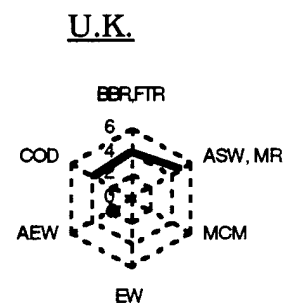
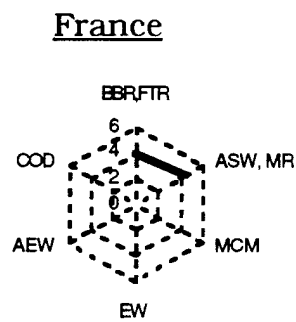
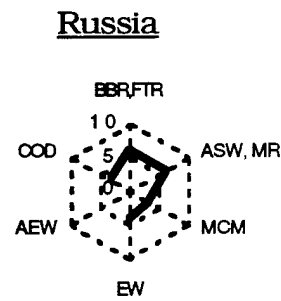
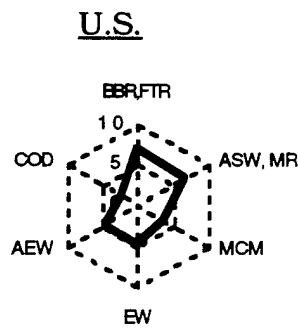


Figure 33  
Aircraft Asset Comparison  
(Number of Aircraft ; in Natural Log.)

| AIRCRAFT: | US                                                                                                                                   | RUSSIA                                                                                                        | FRANCE                                                                                                | UK                                                                                  | CHINA                    | NORTH KOREA       | SOUTH KOREA | JAPAN                                                                   |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------|-------------------|-------------|-------------------------------------------------------------------------|
| BOMBER    |                                                                                                                                      | TU-26<br>TU-22<br>TU-16                                                                                       | 140<br>15<br>33                                                                                       |                                                                                     | H-6<br>H-6D<br>H-8       | 30<br>30AE<br>130 |             |                                                                         |
| STRIKE    |                                                                                                                                      |                                                                                                               | SUPER ETENDAO                                                                                         | 38                                                                                  |                          |                   |             |                                                                         |
| FTR       | F-14 A<br>F-14 A PLUS<br>F-14 D<br>F/A-18 A<br>F/A-18 C<br>A-6 E                                                                     | 300 SU-17<br>70 SU-24<br>58 SU-26<br>159 MIG 23/27<br>245<br>332                                              | 115 ORLÉANS<br>100<br>70<br>40                                                                        | 12 SEAHARRIER<br>HUNTER                                                             | 37 J-5/6/7/8<br>12 Q-5   | 800<br>100        |             |                                                                         |
| ASW       | S-3A/B                                                                                                                               | 113 TU-142<br>IL-38<br>BE-12                                                                                  | 50 ALIZE<br>36<br>89                                                                                  | 18                                                                                  |                          |                   | S-2E        | 15 P-3C<br>P-2J<br>67<br>6                                              |
| MR        | P-3B/C                                                                                                                               | 321 TU-22<br>SU-24<br>AN-12<br>IL-20                                                                          | ATLANTIC<br>ATLANTIQUE<br>GARONN                                                                      | 16<br>9<br>5                                                                        | EX SOV BE-4<br>RS-5      | 15<br>5           |             |                                                                         |
| EW        | EA-6B<br>EA-3<br>EP-3                                                                                                                | 107 TU-95<br>TU-16<br>17<br>110                                                                               |                                                                                                       |                                                                                     |                          |                   |             | EP-3C<br>2                                                              |
| AEW       | EC-130Q                                                                                                                              | 10<br>110                                                                                                     |                                                                                                       |                                                                                     |                          |                   |             |                                                                         |
| COMMAND   |                                                                                                                                      |                                                                                                               |                                                                                                       |                                                                                     |                          |                   |             |                                                                         |
| TRS       | F/A-18-B<br>F/A-18-D<br>F-5E/F/T-38<br>F-16-N<br>TF-16-N<br>A-4E/F<br>TA-4F/J<br>TE-28<br>T-28/C<br>T-39D/N<br>TA-7C<br>T-44<br>T-45 | 29 TU-16<br>41 TU-26<br>20 TU-95<br>22 SU-25<br>4 SU-27<br>39 MIG-29<br>67<br>2<br>142<br>18<br>9<br>57<br>30 | ETENDAO<br>ALIZE<br>225 ZEPHYR<br>NORD 262<br>NAVALO<br>XN-3J<br>FALTYE 880<br>MS-760<br>FALCON 10MER | 10 SEAHARRIER<br>8 JETSTREAM<br>12 CHIMPANK<br>13 T-2<br>2 T-3<br>10<br>4<br>7<br>3 | 5<br>10<br>14<br>15<br>4 |                   |             | KM-2<br>P-3C<br>T-5<br>TC-4C-80<br>YS-11T<br>13<br>10<br>24<br>23<br>10 |
| MSC       |                                                                                                                                      | 80                                                                                                            | 110                                                                                                   | 41                                                                                  | 13                       | 5                 |             | 14                                                                      |

Table 3a Contents of Aircraft Assets (1/2)

| HELICOPTERS | US                                      | RUSSIA                                   | FRANCE                     | UK                             | CHINA                      | NORTH KOREA | SOUTH KOREA              | JAPAN                   |
|-------------|-----------------------------------------|------------------------------------------|----------------------------|--------------------------------|----------------------------|-------------|--------------------------|-------------------------|
| ASW         | SH-60B<br>SH-60F<br>SH-60F/G<br>SH-3G/H | 140 ML-14<br>71 KA-25<br>70 KA-27<br>149 | 93 LYNX<br>88 SA-321<br>88 | 28 SEA KING<br>12 LYNX         | 51 SA-321<br>76 Z 5<br>Z 9 |             | HUGHES<br>SA-316<br>LYNX | 25 HSS-2A/B<br>10<br>12 |
| MCM         | RH-53D<br>MH-53E                        | 10 ML-14<br>31                           | 25                         |                                |                            |             |                          | MH-53E<br>10            |
| EW          |                                         |                                          |                            |                                |                            |             |                          |                         |
| ABW         |                                         | KA-25                                    | 25                         | SEA KING                       | 10                         |             |                          |                         |
| COMMAND     |                                         | KA-27                                    | 25                         | SEA KING                       | 36                         |             |                          |                         |
| TRG         | CH-46                                   | 30                                       | SA-313<br>SA-316/318       | 2 SEA KING<br>8 GAZELLE HT-2/3 | 24<br>26                   |             |                          | HSS-2B<br>OH-6D/J       |
| MSC         |                                         | 398                                      | 30                         | 35                             | 0                          | 60          | 0                        | 12<br>12<br>17          |

Source: The Military Balance 1993-1994 (The International Institute for Strategic Studies)

Table 3b Contents of Aircraft Assets (2/2)



## **V. FORECAST OF THE COUNTRY SITUATION AROUND JAPAN**

This section will describe the forecast of country situation around Japan based on the situation described in Chapter II.

### **A. THE UNITED STATES OF AMERICA**

#### **1. Politics**

In Chapter II, the complicated characteristics and mechanisms of policy making process was illustrated. In light of these characteristics, and history shows that a periodic change of the balance of power within each element, the basic structure seems to be unchanged. It is most likely that it will remain so even in the early 21st century.

#### **2. Diplomacy**

Based upon the fundamental idea of diplomacy, the U.S. will maintain a leadership role in order to achieve international cooperation. Although the probability that the U.S. will take a complete nonintervention policy is low, the opposite extreme of "the policeman of the international world" will be unlikely.

#### **3. Economy**

The "Twin deficits" will most likely be resolved and the U.S. economy will recover from the recession as the result of effective use of resources distributed from disarmament, the increase in international competitive power based on the supremacy of technology, and the beneficial effects of NAFTA. Although the recovery speed is not fast, the U.S. economy will continue on a steady growth.

#### **4. Military**

The principles of the new defense strategy can be expected to prevent a big reduction in military capability when compared to that of Cold War era and the early 21st century. Nevertheless, as a result of the reduced prospect of world wide war, military forces are expected to be reduced by more than 25%. This would increase the need for allied countries to expand their defensive capabilities.

With respect to the Asian region, the U.S. will maintain the regional security arrangement based on bilateral alliances. Kenneth B. Pyle says,<sup>39</sup>

Although U.S. decline is presumed, the security role is still needed. This dependence on the alliance implies resentment over the continued deference to U.S. political leadership, but Japan grudgingly for the time being pays that price. The point that needs to be emphasized is that the United States still has the ability to shape the institutional structure of a new regional order.

With the exception of Japan, forward deployment forces of other countries will be reduced drastically.

## **B. RUSSIA**

### **1. Politics**

With the dissatisfactions that the nation has been experiencing, it is not likely that any kind of strong political power will emerge from a reformer's coup. We cannot deny the existence of dangers such as the rise of anti foreign nationalism, a resurgence by the conservatives, and military coup d'état, etc.

Although the 'Democratic Russia', and the supportive nucleus of President Yeltsin have split, he still maintains the support by approximately 40% of the nation, and has not fully lost his power. However, as the probability of the success of economic revolution and establishment of market economy decreases, the power of the president will also decline.

Despite these downfalls, there is no other strong leader who can establish the order of a confused Russian economy and society at this point, Yeltsin might keep the position into the early 21st century.

### **2. Diplomacy**

#### ***a. Diplomacy with the U.S.***

The agreement at Camp David in Feb., 1992 seems to provide the basis for the dissolution of mutual hostile relations, and the start of cooperative relation.

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<sup>39</sup> Kenneth B. Pyle, "Japan and the Future of Collective Security," in Danny Unger & Paul Blackburn(ed.), *Japan's Emerging Global Role* (INSTITUTE FOR THE STUDY OF DIPLOMACY BOOK, 1993), p113

### ***b. Diplomacy with China***

If the efforts of mutual arms reductions along the border and the mutual trust-building efforts continues, then normal bilateral Sino-Japanese relationships can be developed and maintained.

### ***c. Diplomacy with Korea***

The treaty of friendship has been concluded in August, 1992 with South Korea, emphasizing economic aspects. Russo-North Korean relations, both political and economic have become estranged because of Russia's decision to maintain diplomatic ties with South Korea.

### ***d. Diplomacy with Japan***

The Russian diplomatic strategy with Japan, which declared the non-separation of politics and economy for the resolution of the northern islands issue, has secured the economic support from Japan.

Although there is a high probability that Russia will return two islands(*Habomai, Shikotan*), the likelihood that Russia will return the other two islands(*Kunashiri, Etorofu*) remains remote due to their strategic consideration to maintain the Sea of Okhotsk as a submarine sanctuary. As a result, drastic improvement of Japan-Russia relation may not be achieved in near future.

## **3. Economy**

As we saw in the Chapter II, the economic situation of Russia has worsened year by year. The bread prices went up 300% and gasoline 500%. There is little probability that the Russian economy will make substantial progress within the near future. There are two ways to revitalize the economy; the first is to continue to reduce the military expenditures, and the second is to promote liberalization. It is difficult to predict when the Russian economy will recover from current quagmire. It will not be surprising if the recovery is to take more than 10 years.

#### **4. Military**

The new Russian Federation National Defense Law in 1992 states that Russia is committed to the reduction of its military forces until year 2000. Vladimir I. Ivarov says,<sup>40</sup>

Among potential sources of military threats to Russian security, the military doctrine mentions:

- \* Territorial claims to the Russian Federation
- \* Potential for local wars and military conflicts close to Russian borders
- \* The use of nuclear weapons, including unauthorized use
- \* The proliferation of weapons of mass destruction and the means of their delivery, and advanced military technologies that can change the balance of forces
- \* The erosion of strategic stability as a result of quantitative and qualitative military buildup
- \* Enlargement of military blocs and alliances threatening the military security of the Russian Federation

The new doctrine emphasizes defensive characteristics as compared offensive doctrine of the former Soviet Union.

##### **a. General**

- (1) Reduction of quantitative production capability
- (2) Slimming of military force
- (3) Qualitative improvement
- (4) Increase of defense capability in the Pacific region

##### **b. Strategic Nuclear Forces**

- (1) Qualitative improvement of SLBM
- (2) Capability improvement of strategic bombers

##### **c. Ground Forces**

- (1) Maintenance of the quantity of Far East Forces
- (2) Maintenance of high fighting capability

##### **d. Naval Forces**

- (1) Qualitative improvement and quantitative reduction of vessels(including submarines).
- (2) Improvement of offensive capability by adopting SLBM

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<sup>40</sup> Vladimir I. Ivanov, "Russia's New Military Doctrine: Implications for Asia," in Michael D. Bellows(ed.), *Asia In The 21st Century :Evolving Strategic Priorities* (INSTITUTE FOR NATIONAL STRATEGIC STUDIES, 1994), p211~212

#### ***e. Air Forces***

- (1) Qualitative improvement by introducing 4th generation aircraft
- (2) Development of high quality aircraft

### **C. CHINA**

#### **1. Politics**

The present political condition illustrates one that balances the concerns of reformers and the conservatives. Some observers say that a conclusion to this power struggle must occur before making any accurate prediction for the future of China. On the other hand, other observers say that this struggle only represents a power conflict. They suggest that a pure form of socialism and a spirit of communism become extinct with the trauma of the Great Proletarian Cultural Revolution. As the first generation of revolutionary leaders disappear in the near future, a more pragmatic and nationalistic socialism will be pursued. The report of the central committee of the 14th Party Congress held in October, 1992 embodies this outline. This report reaffirms the creation of "a socialist market economy" characterized by "socialism with Chinese characteristics." Major points of this report are;

- \* Acceleration of economic revolution by centering the establishment of socialist market economy
- \* Promotion of outward-opening policy, and the use of foreign capital, resources, technology , and management experience
- \* Reinforcement of Defense Capability
- \* Accomplishment of autonomous and independent peaceful diplomacy

Important issues facing Chinese politics toward the early 21st century are the decline of leadership as a result of the political corruption, increased pressures toward democratization, and the movement of Sinocentrism.

#### **2. Diplomacy**

We saw four aspects of Chinese current diplomacy in previous chapters. On the whole, China has been seeking to escape from the

international isolation and eliminate criticisms from the U.S. It has also placed emphasis on its economy rather than its ideology. In order to accomplish its modernization it needs international help. China seems to have developed diplomacy that is intended to improve and reinforce its relationship with developed Western countries. Major points in the early 21st century are;

- \* Obtain economic and technological support from Japan and the U.S.
- \* Promote improvement of relations with South-East Asian countries and Russia in order to prevent the expansion of influences of Japan and the U.S..
- \* With respect to the relation with Taiwan, there is less probability of unity.

Xu Xiaojun says, "In analyzing Chinese foreign policy, one must understand that in order for China to continue its economic development, it must have good relations with other countries."<sup>41</sup>

### **3. Economy**

Xu Xiaojun says, "Developing its national economy is the centerpiece of China's grand strategy for the remainder of this century and the first half of the 21st century."<sup>42</sup>

In the early 21st century, Chinese economic policy in the coastal areas will likely succeed by introducing the capital from Japan and the Western countries. Only a limited success, however, is expected in the non-coastal area of China. As a result of the significant difference in the internal growth among the regions and between the rich and the poor, dissatisfaction among the Chinese people could increase and lead to political instability.

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<sup>41</sup> Xu Xiaojun, "China's Grand Strategy for the 21st Century," in Michael D. Bellows(ed.), *Asia In The 21st Century :Evolving Strategic Priorities* (INSTITUTE FOR NATIONAL STRATEGIC STUDIES, 1994), p40

<sup>42</sup> Ibid. p27

#### 4. Military

As the Chinese government has been declaring that "Taiwan is peculiar land of China," and "China does not ignore the independence of Taiwan," China may only be able to resolve this problem using military strength. Strong naval military capabilities are necessary to prevent the independence of Taiwan. The decline of the Russian threat has provided a great opportunity to develop and maintain this naval capability. In relation to the development of its economy, China seems to be continuing to develop its military strength and is paying particular importance on naval capability. Table 4 shows the flow of China's Naval Strategy.

|                   | 1949-1979                     |                               | 1980-2000                   | 2001-beyond                          |                                      |
|-------------------|-------------------------------|-------------------------------|-----------------------------|--------------------------------------|--------------------------------------|
| Strategic Concept | Active Defense (Maoist)       |                               | Active Defense (modern)     | Forward Defense                      |                                      |
| Term              | coastal                       | inshore                       | offshore                    | mid-distance                         | far-distance                         |
| Other Name        | inshore                       | coastal near shore            |                             |                                      | long-distance, high seas, blue-water |
| Chinese Name      | <i>yanhai</i><br><i>haian</i> | <i>binhai</i><br><i>jinan</i> | <i>jinhai</i>               | <i>zhonghai</i>                      | <i>yuanhai</i><br><i>yuanyang</i>    |
| Definition 1      |                               |                               | 0 - 200nm                   | 200 - 600nm                          | 600+nm                               |
| Definition 2      | 100km - 12nm                  |                               | 12 - 350nm                  |                                      | 350+nm                               |
| Definition 3      | territorial sea               |                               | EEZ+ continental shelf      |                                      | beyond                               |
| Definition 4      |                               |                               | inside the 1st island chain | between the 1st and 2nd island chain | beyond                               |

Definition 1 from Military Terms of the PLA, p.430.

Definition 2 and 3 from Li Qianyan.

Definition 4 is a summary of Adm. Liu Huaqing's statement and A History of the PLA Navy.

Source: Alexander Chieh-cheng Huang, "The Chinese Navy's Offshore Active Defense Strategy-Conceptualization and Implications," in *Naval War College Review*, Summer 1994, p19

Table 4 The "Offshore Concept in Chinese Naval Strategy

Characteristics that can be predicted from the above table are:

- \* Global operational radius
- \* Independent sea and air control capability

- \* Strong rapid response capability
- \* Strong amphibious capability
- \* Certain degree of Nuclear threat

#### **D. SOUTH KOREA/NORTH KOREA**

As we saw in the current situation, South Korea has steadily established democracy in a short period, and has been developing economically. On the other hand, North Korea has remained in international isolation. In particular the poor economic condition of North Korea since the end of Cold War seems to have even worsened. Without active economic support of foreign countries, North Korea might resort to some drastic measure. Current investment initiatives lead by South Korea might lay foundation for peaceful unification of the two Koreas.

##### **1. Politics**

A "New Korea" will probably try to reconstruct the South Korea style domestic political system and include some opposition parties.

##### **2. Diplomacy**

A reunited Korea would make an effort to improve its international position by strengthening relations with ASEAN, European countries as well as expanding exchanges with Russia and China, but the core of these efforts will focus on the friendship with the U.S. and Japan.

##### **3. Economy**

The absorption and unity with North Korea may weaken the economy of South Korea. The costs of unification may largely depend upon the unification timing and level of success of the pre-unification investment by the South to North Korea. However, the factors that reduce the costs of unification to South Korea (e.g. later unification date, successful pre-unification investment to North) could also reduce the probability of the unification itself.



#### **4. Military**

As a result of the unity, the strength of the military of the new Korea will increase. "Threat" is evaluated by "ability" and "intention", and Korea will definitely increase its ability. Fortunately, current Korean intentions do not threaten other countries. However, security arrangement in Asia region is different from those of Europe. Up to this point, bilateral security arrangements have been most common to obtain. If each of these countries (Japan, China, and New Korea) seeks the supreme position in this region, then the military strength will be a major element of this competition. In such a situation, despite its peaceful intention, Korea must be identified as "potential threat". Moreover, if New Korea has Nuclear Arms capability and a method of delivery then it will become a stronger "potential threat" than that of the era of North/South Korea.

#### **E. PECULIARITY OF ASIA/PACIFIC REGION**

In order to forecast the total situation of this region, it is necessary to identify the characteristics of the environment in the Asia/Pacific region. Here are some characteristic of the environment in the Asia/Pacific region. Although the Cold-War had ended, this area can not be treated as same as the Europe.

##### **1. Impact of Collapse of Russia**

Unlike the western countries, those in the Pacific have not been developing advanced defense systems simply to meet the military threat of former Soviet Union. The collapse of former Soviet Union, however, did not mean the dramatic change of security environment. The level of military tension has not decreased rapidly. On the contrary, Asian countries have been trying to pay more attention to the security issues and the development of military power after the end of Cold War.

##### **2. Fluidization of Power Relationship**

One important characteristic of the period of the Cold War is the efforts of Asian nations to construct their own nation and establish their identity. This constitutes one reason why the Asian region has

become the stage for a fierce leadership struggle between the East and the West. As a result of the end of the Cold War, power relationships have become fluid. Lee G. Cordner says,<sup>43</sup>

The security environment in Southeast Asia is both complex and fluid. Changes in the involvement of external powers, the emergence of regional powers, the continued existence of established bilateral and multilateral alliances, and proposals for new groupings all contribute to an atmosphere of uncertainty.

Young Asian countries have begun to seek their own security policies and attempted seriously to deal with their own security issues. Economic development and political motivation for military development described above are one characteristic.

### **3. Immaturity of Security System**

Tension across the Demilitarized Zone (DMZ) in the Korean Peninsula and the probability of uncontrolled nuclear proliferation shows the precarious nature of Asian securities. At this moment, it is difficult to make firm predictions concerning the timing and method of Korean unification. China continues to have unresolved problems despite its possible economic development and modernization. In Indochina, the war in Cambodia has finally ended, and Vietnam and other nations are about to enter a period of economic construction. Conflicts among several nations over the territorial claims to islands scattered off the coast of Vietnam may develop into a military clash. All this shows that a fully stabilized political and military situation does not yet exist in this region.

### **4. Geopolitical Characteristic**

As described on the part of geopolitical characteristics of Japan, the North-East Asian and North-West Pacific are areas of interests that the U.S., Russia and China have been concentrating. Russia and China are demonstrating the characteristics of a oceanic nation. Moreover, these three nations have nuclear weapons. The U.S. will continue to have interest in this region, not only from the security viewpoint but

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<sup>43</sup> Lee G. Cordner, "Regional Resilience-The Imperative for Maritime Security Cooperation in Southeast Asia," in *Naval War College Review*, Spring 1994, p45

also in light of its growing trade interests. Lee G. Cordner continues,<sup>44</sup>

The United States continues to have in the region many national interests, which can be summarized as follows: Preventing the domination of Asia and the Pacific, either politically or militarily, by a single state or group of states; maintaining U.S. access to resources and markets and strengthening U.S. economic competitiveness-an objective to which the integrity of the SLOCs is central; supporting the security of friends and allies; and encouraging the development of democratic institutions, freedoms, self-determination, and human rights.

#### **F. ENCOUNTERING PHENOMENA OR EVENTS**

In general, several types of likely dangers are discussed. Some of these are "(1) the question that whether the five permanent members of the United Nations Security Council will continue to have the will and ability to play a constructive role in the international community, (2) localized military clashes and (3) proliferation of weapons and arms-related technologies."<sup>45</sup>

#### **G. FACTORS OF USE OF MILITARY FORCE THAT AFFECT JAPAN**

This section consider factors that cause the use of military force that might affect Japan.

##### **1. Russia**

- (1) The imbalance of power in the Far East region
- (2) The decline of military strength of the U.S. in the Far East region
- (3) The aggravation of Japan-Russia relation (territorial issue, economic support issue, etc.)
- (4) The spread of dispute in the other regions
- (5) The conversion to the policy by force as a result of the rise of the conservatives or the military authorities
- (6) The spread of domestic disputes

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<sup>44</sup> Lee G. Cordner, "Regional Resilience-The Imperative for Maritime Security Cooperation in Southeast Asia," in *Naval War College Review*, Spring 1994, p45

<sup>45</sup> Advisory Group on Defense Issues, "The Modality of the Security and Defense Capability of Japan - The Outlook for the 21st Century-", 1994, p4

## **2. China**

- (1) The imbalance of military power in the Far East region
- (2) The decline of military strength of the U.S. and Russia in the Far East region
- (3) The aggravation of Japan-China relations
- (4) The spread of dispute in the other regions
- (5) The resolution of the territorial issues

## **3. United Korea**

- (1) The unbalance of power in the Far East region
- (2) The aggravation of Japan-United Korea relation (territorial issues, economic support issues, etc.)
- (3) The transformation of the domestic issues (economic slump, etc.)
- (4) The spread of regional disputes

## **H. THE CRISIS SITUATION**

Taking previous sections of this chapter into consideration, the following "what if" scenarios are constructed for the possible crisis situation in the early 21st century.

### **1. Direct Threat Scenarios**

#### ***a. Invasion by Russia***

(1) Probability of Occurrence. There seems little probability of this type invasion occurring in the period, however, we can not fully discount the possibility in the period beyond.

(2) Degree of Threat. In light of its professed intentions, there seems no threat, however, Japan cannot help feeling threatened from the aspect of their enormous military capability. Although military capability seems to decrease quantitatively, military industries will be kept operational in order to export arms. Russia will maintain a high qualitative ability in this region.

(3) Propriety of Coping. There is little need of a defense capability to cope with this type threat because of the small probability of its occurrence in the target era. However, since this type invasion requires a great deal of defense capability, the basic

defense capability that enables Japan to respond rapidly to the change of intention of Russia must be maintained.

***b. Invasion by China***

(1) Probability of Occurrence. The probability of this invasion is not high, however, this threat has the highest probability of all the possible direct invasions.

(2) Degree of Threat. China is the only communist country in the region, and its Sinocentrism based policy could become a great threat to the neighboring countries. There are several unsolved issues between China and Japan such as possession issue of Senkaku Island, and continental shelf issue in the East China Sea. Modernization and the outright expansion of the naval strength of China is likely to become a significant threat to South-West Islands and maritime traffic of Japan.

(3) Propriety of Coping. With respect to the Sino-Japan dispute based on territorial issues, there may be a possibility that the national interest of Japan and that of the U.S. will not match. As a result, it is difficult for Japan to expect the U.S.'s full military support. In this case, Japan will have to maintain a certain degree of defense capability so Japan can resolve this issue by itself.

***c. Invasion by United Korea***

(1) Probability of Occurrence. There is a little probability of this type of invasion in the target era.

(2) Degree of Threat. There is a little threat. A new Korea would be likely to keep good relations with Japan and the U.S. in order to focus its military strength against China and Russia. However, there is a territorial issue concerning *Takesima* island, and there is also historical anti-Japan feeling among Korean people. There is a probability that these two issues could be combined and develop into a dispute between both countries.

(3) Propriety of Coping. There is little necessity of coping. However, the modernization of New Korea will influence the balance of power in East Asia, and directly influence the defense of

Japan. We will have to pay close attention to the movement of a united Korea.

## **2. Indirect Threat Scenarios (Repercussion From Other regional Conflict)**

### ***a. Limitation of Use of Specific Sea Area***

(This is a scenario that the regional disputes concerning territorial and ocean resources will threaten the safety of maritime traffic of Japan)

(1) Probability of Occurrence. This scenario has a higher probability than any other threat scenarios considered here. For example, a dispute in the South China Sea arising from the Spratly Island issue may spread and influence the maritime traffic of Japan.

(2) Degree of Threat. As described in Chapter III, the Japanese economy relies largely on maritime transportation. The security of maritime traffic is vital to the survival of Japan. Japanese sea lanes are spread all over the world, and any regional dispute will have serious implications for Japan.

(3) Propriety of Coping. Japan needs to respond to this type situation based upon the region and degree of the dispute. It is difficult for Japan to secure the safety of maritime traffic only by its defense capability. Therefore, it is important to closely coordinate with the U.S. and try to resolve the dispute by multinational military action lead by the U.N. Needless to say, but such action must be the last result after every effort to resolve the dispute through diplomatic and economic actions.

### ***b. Participation to the Peace-Keeping Operations (PKO)***

(1) Probability of Occurrence. There seems to be high probability of occurrence of regional disputes. PKOs lead by the U.N. have a great role in the resolution of that dispute. Japan will be required to provide both monetary and human contribution to PKOs.

(2) Degree of Threat. This threat is not direct one, however, there is anxiety that Japan will be isolated as the results of insufficient human contributions.

(3) Propriety of Coping. The peace and security of Japan is closely related to the stability of the world, specifically Asia region. As a result, the participation to PKO contributes to the defense of Japan. Japan must avoid becoming isolated in the international society by neglecting its duties as a major but non-super power country.

## **VI. NEW FEATURE OF THE JMSDF**

### **A. FACTORS AND CONTINGENCIES FOR THE JMSDF TO CHANGE ITS DEFENSE POLICY**

This section summarizes the factors and contingencies described in previous chapters that might influence the future JMSDF policy.

#### **1. Meaning of End of Cold War**

As a result of the end of the Cold-War, the U.S. has been reducing its military forces including those in the Asia/Pacific region. During the Cold-War, the U.S. needed Japan to be an ally against the Eastern Countries, especially Russia. However, from U.S. perspective and despite many common interests, the end of Cold-War means a reduction of the imperative need of Japan for U.S. since the overriding common threat had decreased. Moreover, the secondary demand for Japan's cooperation which has been put aside during the Cold War era has taken a more prominent role.

From Japan's public perspective, the apparent decreased threat means less support for U.S. initiatives. Japan, however, actually needs more U.S. support in the event of potential regional conflicts.

#### **2. Emergence of New Power**

China's GNP and economic development has been increasing at an outstanding rate. Supported by economic developments, China has been reorganizing and modernizing its military forces. In the area of the naval force, China may be changing from coastal defense to ocean navy (see Table 4, p.72).

#### **3. Decrease of U.S. Pacific Naval Forces**

As we saw in Chapter II, major U.S. naval forces have been decreasing since 1989. The number of ships in 1994 fell to 66% of that in 1988 and the total tonnage decreased to 80% of that in 1988. During the same period the U.S. public has become more concerned with domestic issues than international events. As a result, the U.S. is expected to be less willing to respond to the regional conflicts of Japanese concern.



#### **4. New Movement of United Korea**

The Korean peninsula may be united within 10 ~ 15 years. This means an emergence of powerful military country in this region. Keeping good relations with a united Korea is essential to the security issue of Japan.

#### **5. Lack of Balance of Maritime Self Defense Force**

As we saw in Chapter IV, U.S. and Japanese naval physical assets are complementary reflecting the Cold-War era strategy. As a result, Japan individually lacks a balanced force when compared with other medium sized countries. In light of the fact Japan might not receive timely U.S. cooperation in the regional conflict, Japan might consider developing more balanced forces to reduce the probability of such predicament.

### **B. CHANGE OF LEGAL LIMITATION**

As we saw in previous chapter, legal limitations, including the Constitution, hinder the development of a more balanced JMSDF. Not only in regards to the military area but also in the other related areas, legal limitations have been a large barrier for Japan to respond positively and promptly to the U.S. requests. Until recently, the U.S. could accept these limitation, however, now the U.S. may find the alliance less beneficial if Japan continues to adhere to these legal limitations. Following changes in legal context regarding JSDF could enhance the Japan's security. Necessary changes may include:

- \* Position the JSDF as a normal military force in the Constitution.
- \* Three Non-Nuclear Principles must be changed to permit nuclear powered vessel and submarines.

### **C. NEW FEATURE OF THE JMSDF**

In order to improve the maritime defense capability under the circumstances described above, I will examine the feature and the costs of an alternative force structure of JMSDF.

## 1. Physical Feature of an Alternative Maritime Force Structure

### a. Ship Assets

| TYPE       |      | NUMBER | STD TON | CREW |
|------------|------|--------|---------|------|
| SUBMARINE  | SSBN | 4      | 8,000   | 100  |
|            | SS   | 12     | 4,000   | 60   |
| CARRIER    | DDV  | 2      | 15,000  | 300  |
| DESTROYER  | DDH  | 4      | 5,000   | 180  |
|            | DDG  | 8      | 7,000   | 180  |
|            | DD   | 20     | 5,000   | 150  |
|            | DD   | 30     | 3,000   | 130  |
| MINE       | MST  | 4      | 8,000   | 120  |
|            | MSO  | 6      | 1,500   | 60   |
|            | MSC  | 45     | 550     | 40   |
| AMPHIBIOUS | LST  | 4      | 8,000   | 100  |
|            | LST  | 6      | 4,000   | 60   |
| SUPPORT    | AOE  | 4      | 10,000  | 100  |
|            | ATF  | 2      | 8,000   | 100  |
|            | ASR  | 2      | 3,500   | 100  |
|            | ATSS | 2      | 4,000   | 30   |
|            | ATS  | 2      | 3,000   | 100  |
|            | AOS  | 4      | 3,000   | 100  |
|            | AGS  | 4      | 3,000   | 50   |
|            | ARC  | 2      | 5,000   | 100  |
|            | ASE  | 2      | 4,000   | 50   |
|            | AGB  | 1      | 10,000  | 100  |
|            | TV   | 3      | 4,000   | 130  |

Table 5 New Feature of Ship Asset

### b. Aircraft Assets

| TYPE   |     | NUMBER | CLUE |
|--------|-----|--------|------|
| FTR    | VFA | 40     | 1    |
| ASW    | VP  | 60     | 10   |
|        | SH  | 100    | 3    |
| EW     | EP  | 6      | 10   |
| MCM    | MH  | 12     | 7    |
| OTHERS |     |        |      |
| TPT    | VC  | 8      | 4    |
| RESQ   | US  | 7      | 10   |
| RESQ   | UH  | 21     | 3    |
| MULTI  | UP  | 4      | 5    |
| TRG    | -   | 80     | 2    |

Table 6 New Feature of Aircraft Asset

## 2. Fleet Comparison

Figure 34 shows the comparison of fleet composition with displacement tons in natural logarithms. The new feature represents a balanced military.

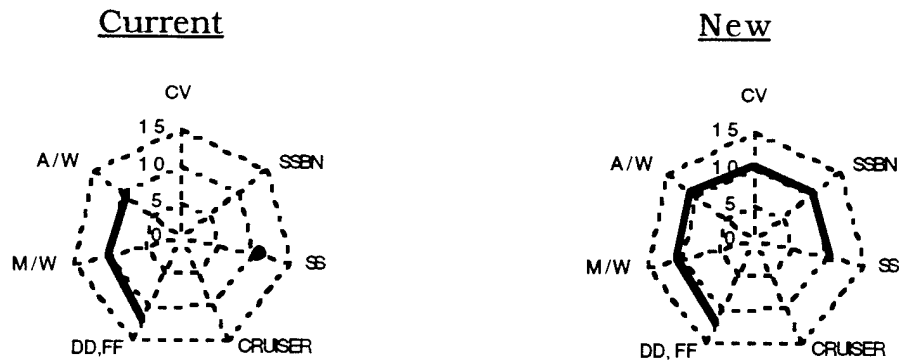


Figure 34  
Comparison of Fleet Composition (Ton) (Natural Log)

## D. COST ESTIMATION OF BASE LINE FORCE STRUCTURE

This section estimates the costs of the base line force structure if the JMSDF were to continue the same defense policy at the same composition levels into the early 21st century. I will consider time between FY2010~2020 as a period of estimation.

### 1. Ship Assets

Table 7 shows the estimated cost of ship assets. This table is calculated based upon Appendix AE and Appendix AF

(Unit: Constant 1000 Yen in 1985 year Yen)

| TYPE         | Baseline Force Structure | Retirement during 2010-2020 | Ship of Requirement | Estimated Price | Total Price          |
|--------------|--------------------------|-----------------------------|---------------------|-----------------|----------------------|
| SS           | 16                       | 12                          | 12                  | 73,778,657      | 885,343,885          |
| DDH          | 4                        | 2                           | 2                   | 111,677,445     | 223,354,891          |
| DDG          | 8                        | 3                           | 3                   | 234,534,151     | 703,602,454          |
| DD           | 20                       | 9                           | 9                   | 108,149,242     | 973,343,177          |
| DD (*DE)     | 30                       | 16                          | 16                  | 81,054,702      | 1,296,875,226        |
| MST          | 4                        | 0                           | 0                   | -               | -                    |
| MSO          | 6                        | 3                           | 3                   | 46,735,466      | 140,206,398          |
| MSC          | 33                       | 10                          | 10                  | 9,805,065       | 98,050,653           |
| LST          | 4                        | 0                           | 0                   | -               | -                    |
| LST          | 2                        | 2                           | 2                   | 19,040,702      | 38,081,403           |
| AOE          | 4                        | 3                           | 3                   | 30,217,951      | 90,653,853           |
| ASR          | 2                        | 1                           | 1                   | 3,343,452       | 3,343,452            |
| ATS          | 2                        | 1                           | 1                   | 37,512,094      | 37,512,094           |
| AOS          | 2                        | 0                           | 0                   | -               | -                    |
| AGS          | 4                        | 2                           | 2                   | 17,461,435      | 34,922,870           |
| ARC          | 1                        | 1                           | 1                   | 43,585,981      | 43,585,981           |
| ASE          | 2                        | 1                           | 1                   | 51,693,799      | 51,693,799           |
| AGB          | 1                        | 1                           | 1                   | -               | -                    |
| TV           | 3                        | 1                           | 1                   | 63,635,271      | 63,635,271           |
| <b>TOTAL</b> |                          |                             |                     |                 | <b>4,684,205,408</b> |

Note: AGB is built by the budget of Education Agency.

Table 7 Cost Estimation of Ship Asset (Baseline)

**2. Aircraft Assets**

Table 8 shows the estimated cost of aircraft assts. This table is calculated based upon Appendix AG and Appendix AH.

(Unit: Constant 1000 Yen in 1985 year Yen)

| TYPE         | Baseline force structure | Retirement during 2010-2020 | Aircraft of Requirement | Estimated Price | Total Price          |
|--------------|--------------------------|-----------------------------|-------------------------|-----------------|----------------------|
| VP           | 80                       | 41                          | 41                      | 24,939,277      | 1,022,510,369        |
| SH           | 100                      | 24                          | 24                      | 10,362,632      | 248,703,158          |
| EP           | 5                        | 5                           | 5                       | 25,828,731      | 129,143,657          |
| MH           | 11                       | 6                           | 6                       | 13,415,135      | 80,490,808           |
| VC           | 4                        | 0                           | 0                       | 9,255,173       | 0                    |
| US           | 7                        | 3                           | 3                       | 15,474,666      | 46,423,997           |
| UH           | 21                       | 8                           | 8                       | 7,884,388       | 63,075,107           |
| UP           | 2                        | 2                           | 2                       | 30,528,119      | 61,056,239           |
| TRG. etc     | 80                       | 55                          | 55                      |                 | 68,418,916           |
| <b>TOTAL</b> | <b>310</b>               | <b>144</b>                  | <b>144</b>              |                 | <b>1,719,822,250</b> |

Table 8 Cost Estimation of Aircraft Assets (Baseline)

### 3. Total

The total estimated budget is calculated as follows;

#### a. Personnel and Provisions

(Unit : Constant 1000 Yen in 1985 year Yen)

| 1993 BUDGET<br>(Real) | Budget /Person |        | Escalation<br>Rate<br>(%/Year) | Number of<br>Personnel<br>in 2015 | Expenses<br>in 2015 | Expenses<br>2010~2020 |
|-----------------------|----------------|--------|--------------------------------|-----------------------------------|---------------------|-----------------------|
|                       | 1993           | 2015   |                                |                                   |                     |                       |
| 329,059,411           | 7,074          | 13,846 | 3.1                            | 46,085                            | 638,092,910         | 6,380,929,100         |

Note: Escalation Rate is a average between 1985 and 1993 and calculated from Appendix Z(see Appendix A).  
Number of personnel in 2015 (45,085) is estimated to be same as that in 1994.

Table 9 Personnel and Provisions Expense (2010~2020)

#### b. Front Line

(1) Ship Asset : 4,684,205,407 (1000 Yen)

(2) Aircraft Asset : 1,719,822,250 (1000 Yen)

(3) Ammunition

(Unit: Constant 1000 Yen in 1985 year Yen)

| 1993 BUDGET<br>(Real) | Escalation<br>Rate<br>(%/Year) | Expense<br>in<br>2015 | Expense<br>2010~2020 |
|-----------------------|--------------------------------|-----------------------|----------------------|
| 41,097,536            | 9.2                            | 284,914,026           | 2,849,140,256        |

Note: Escalation Rate is a average between 1985 and 1993 and calculated from Appendix Z(see Appendix A).

Table 10 Ammunition Expense (2010~2020)

#### c. Others

(Unit: Constant 1000 Yen in 1985 year Yen)

| 1993 BUDGET<br>(Real) | Escalation<br>Rate<br>(%/Year) | Expense<br>in<br>2015 | Expense<br>2010~2020 |
|-----------------------|--------------------------------|-----------------------|----------------------|
| 331,655,062           | 7.1                            | 1,499,874,732         | 14,998,747,321       |

Note: Escalation Rate is a average between 1985 and 1993 and calculated from Appendix Z(see Appendix A).

Table 11 Other Expense (2010~2020)

#### d. Total

(Unit: Constant 1000 Yen in 1985 year Yen)

|                        | Expenses       | Relevant Table |
|------------------------|----------------|----------------|
| Ship Assets            | 4,684,205,407  | Table 11       |
| Aircraft Assets        | 1,719,822,250  | Table 12       |
| Personnel & Provisions | 6,380,929,100  | Table 13       |
| Ammunitions            | 2,849,140,256  | Table 14       |
| Others                 | 14,998,747,321 | Table 15       |
| Total                  | 30,532,845,336 |                |

Table 12 Estimate of Total Expenses(2010~2020)

## E. COST ESTIMATION OF ALTERNATIVE FORCE STRUCTURE

### 1. Personnel Composition

Personnel composition of the new feature are estimated as follows;

#### *a. On Board Members*

Table 13 shows the estimates of total crew number on board. Estimation is based upon current manning level and the recent trend of crew automation. New crew size for the period considered is assumed, on the average, 70-80% of the current manning level.

| TYPE         |      | NUMBER OF SHIP | CREW NUMBER | TOTAL CREW NUMBER |
|--------------|------|----------------|-------------|-------------------|
| SUBMARINE    | SSBN | 4              | 100         | 400               |
|              | SS   | 12             | 60          | 720               |
| CARRIER      | DDV  | 2              | 300         | 600               |
| DESTROYER    | DDH  | 4              | 180         | 720               |
|              | DDG  | 8              | 180         | 1,440             |
|              | DD   | 20             | 150         | 3,000             |
|              | DD   | 30             | 130         | 3,900             |
| MINE         | MST  | 4              | 120         | 480               |
|              | MSO  | 6              | 60          | 360               |
|              | MSC  | 45             | 40          | 1,800             |
| AMPHIBIOUS   | LST  | 4              | 100         | 400               |
|              | LST  | 6              | 60          | 360               |
| SUPPORT      | AOE  | 4              | 100         | 400               |
|              | ATF  | 2              | 100         | 200               |
|              | ASR  | 2              | 100         | 200               |
|              | ATSS | 2              | 30          | 60                |
|              | ATS  | 2              | 100         | 200               |
|              | AOS  | 4              | 100         | 400               |
|              | AGS  | 4              | 50          | 200               |
|              | ARC  | 2              | 100         | 200               |
|              | ASE  | 2              | 50          | 100               |
|              | AGB  | 1              | 100         | 100               |
|              | TV   | 3              | 130         | 390               |
| OTHERS       |      |                |             | 3,000             |
| <b>TOTAL</b> |      |                |             | <b>19,630</b>     |

Table 13 Estimation of On Board Personnel

#### *b. Aviation Members*

(1) Crew. Table 14 shows the estimated requirements of total numbers for aviation crews. Air crew manning estimation is assumed as the same as the current level.

| TYPE         |     | NUMBER | CREW | Coeffi. | TOTAL MEMBER |
|--------------|-----|--------|------|---------|--------------|
| FTR          | VFA | 40     | 1    | 2.0     | 80           |
| ASW          | VP  | 60     | 10   | 1.5     | 900          |
|              | SH  | 100    | 3    | 2.0     | 600          |
| EW           | EP  | 6      | 10   | 1.5     | 90           |
| MCM          | MH  | 12     | 7    | 2.0     | 168          |
| OTHERS       |     |        |      |         |              |
| TPT          | VC  | 8      | 4    | 1.2     | 38           |
| RESQ         | US  | 7      | 10   | 1.5     | 105          |
| RESQ         | UH  | 21     | 3    | 2.0     | 126          |
| MULTI        | UP  | 4      | 5    | 1.5     | 30           |
| TRG          | -   | 80     | 2    | 1.5     | 195          |
| <b>TOTAL</b> |     |        |      |         | <b>2,332</b> |

Table 14 Estimation of Aviation Crew Personnel

(2) Maintenance. Table 15 shows the estimated requirements of the total number of aviation maintenance personnel. Maintenance manning estimation is assumed as the same as the current level.

| TYPE         |     | NUMBER | Coeffi. | TOTAL MEMBER |
|--------------|-----|--------|---------|--------------|
| FTR          | VFA | 40     | 15      | 600          |
| ASW          | VP  | 60     | 20      | 1,200        |
|              | SH  | 100    | 14      | 1,400        |
| EW           | EP  | 6      | 20      | 120          |
| MCM          | MH  | 12     | 14      | 168          |
| OTHERS       |     | -      | -       | -            |
| TPT          | VC  | 8      | 20      | 160          |
| RESQ         | US  | 7      | 20      | 140          |
| RESQ         | UH  | 21     | 14      | 294          |
| MULTI        | UP  | 4      | 20      | 80           |
| TRG          | -   | 80     | 5       | 400          |
| <b>TOTAL</b> |     |        |         | <b>4,487</b> |

Table 15 Estimation of Aviation Maintenance Personnel

(3) Others. Head Quarter, etc. :5,000

(This number is base upon the current level.)

**c. Total Member**

Table 16 shows the estimated total manpower level for an alternative force structure. Manpower level of 'ON SHORE', 'COMMON' and 'RESERVE' are based on the current level.

| TYPE         | TOTAL<br>MANPOWER<br>LEVEL |
|--------------|----------------------------|
| ON BOARD     | 19,630                     |
| AVIATION     | 11,819                     |
| ON SHORE     | 11,000                     |
| COMMON       | 2,000                      |
| RESERVE      | 2,000                      |
| <b>TOTAL</b> | <b>46,449</b>              |

Table 16 Total Manpower Level of an Alternative Force Structure

From this computation, the estimated total manpower requirement of JMSDF are calculated to be almost the same as the current level(46,085 in 1994).

## **2. Financial Evaluation**

In Chapter III and IV, the trend of defense expenditures and ship and aircraft expansion and their cost were illustrated. Taking these trends into account, the financial impact of the new features of JMSDF are calculated.

### **a. Ship Assets**

Using FY2010 ~ 2020 as the period of evaluation (see Appendix AE), necessary estimates and cost calculation are shown in following table (see Appendix AF).

Comparing this table with table 7(Cost estimation of the alternative structure), estimated cost of an alternative structure will increase by 61.3% (i.e.  $(7,556,233,582 - 4,684,205,408) / 4,684,205,408 = 0.6131$ ).



(Unit: Constant 1000 Yen in 1985 year Yen )

| TYPE         | Alternative Force Structure | Baseline Force at 2010 | Retirement During 2010-2020 | Required Ships for Alternative | Estimated Price per Ship | TOTAL PRICE          |
|--------------|-----------------------------|------------------------|-----------------------------|--------------------------------|--------------------------|----------------------|
| SSBN         | 4                           | 0                      |                             | 4                              | 400,646,244              | 1,602,584,976        |
| SS           | 12                          | 16                     | 12                          | 8                              | 73,778,657               | 590,229,257          |
| DDV          | 2                           | 0                      |                             | 2                              | 242,469,243              | 484,938,486          |
| DDH          | 4                           | 4                      | 2                           | 2                              | 111,677,445              | 223,354,891          |
| DDG          | 8                           | 8                      | 3                           | 5                              | 234,534,151              | 1,172,670,757        |
| DD           | 20                          | 20                     | 9                           | 9                              | 108,149,242              | 973,343,177          |
| DD (*DE)     | 30                          | 30                     | 16                          | 16                             | 81,054,702               | 1,296,875,226        |
| MST          | 4                           | 4                      | 0                           | 0                              | -                        | -                    |
| MSO          | 6                           | 6                      | 3                           | 3                              | 46,735,466               | 140,206,398          |
| MSC          | 45                          | 33                     | 10                          | 22                             | 9,805,065                | 215,711,437          |
| LST          | 4                           | 4                      | 0                           | 0                              | -                        | -                    |
| LST          | 6                           | 2                      | 2                           | 6                              | 19,040,702               | 114,244,210          |
| AOE          | 4                           | 4                      | 3                           | 3                              | 30,217,951               | 90,653,853           |
| ATF          | 2                           | 0                      |                             | 2                              | 91,590,506               | 183,181,011          |
| ASR          | 2                           | 2                      | 1                           | 1                              | 62,735,355               | 62,735,355           |
| ATSS         | 2                           | 0                      |                             | 2                              | 34,304,960               | 68,609,919           |
| ATS          | 2                           | 2                      | 1                           | 1                              | 37,512,094               | 37,512,094           |
| AOS          | 4                           | 2                      | 0                           | 2                              | 30,979,316               | 61,958,632           |
| AGS          | 4                           | 4                      | 2                           | 2                              | 17,461,435               | 34,922,870           |
| ARC          | 2                           | 1                      | 1                           | 2                              | 43,585,981               | 87,171,962           |
| ASE          | 2                           | 2                      | 1                           | 1                              | 51,693,799               | 51,693,799           |
| AGB          | 1                           | 1                      | 1                           | 1                              | -                        | -                    |
| TV           | 3                           | 3                      | 1                           | 1                              | 63,635,271               | 63,635,271           |
| <b>TOTAL</b> |                             |                        |                             |                                |                          | <b>7,556,233,582</b> |

Note : AGB is built by the budget of Education Agency.

Table 17 Cost Estimation of Ship Assets

### ***b. Aircraft Assets***

Using FY2010 ~ 2020 as the period of evaluation(see Appendix AG), necessary estimates and its cost calculation are shown in following table (see Appendix AH).

Comparing this table with Table 8(Cost estimation of the alternative structure), the estimated cost of an alternative structure will increase by 3.3%(i.e.(1,776,642,085 - 1,719,822,250 / 1,719,822,250 = 0.0331)).

(Unit: Constant 1000 Yen in 1985 year Yen)

| TYPE         | Alternative Force Structure | Baseline Force Structure at 2010 | Retirement During 2010-2020 | Required Ships for Alternative | Estimated Price per Ship | TOTAL PRICE          |
|--------------|-----------------------------|----------------------------------|-----------------------------|--------------------------------|--------------------------|----------------------|
| VFA          | 40                          | 0                                |                             | 40                             | 10,070,248               | 402,809,919          |
| VP           | 60                          | 80                               | 41                          | 21                             | 24,939,277               | 523,724,823          |
| SH           | 100                         | 100                              | 24                          | 24                             | 10,362,632               | 248,703,158          |
| EP           | 6                           | 5                                | 5                           | 6                              | 25,828,731               | 154,972,388          |
| MH           | 12                          | 11                               | 6                           | 7                              | 13,415,135               | 93,905,942           |
| VC           | 8                           | 4                                | 0                           | 4                              | 9,255,173                | 37,020,691           |
| US           | 7                           | 7                                | 3                           | 4                              | 15,474,666               | 61,898,662           |
| UH           | 21                          | 21                               | 8                           | 8                              | 7,884,388                | 63,075,107           |
| UP           | 4                           | 2                                | 2                           | 4                              | 30,528,119               | 122,112,477          |
| TRG. etc     | 80                          | 80                               | 55                          | 55                             |                          | 68,418,916           |
| <b>TOTAL</b> | <b>338</b>                  | <b>310</b>                       | <b>144</b>                  | <b>173</b>                     |                          | <b>1,776,642,085</b> |

Table 18 Cost Estimation of Aircraft Assets

### c Personnel and Provisions

Table 19 shows the cost estimation of personnel & provisions. This table was made using estimated number of personnel instead of using number of personnel in 1994.

(Unit : Constant 1000 Yen in 1985 year Yen)

| 1993 BUDGET<br>(Real) | Budget /Person |        | Escalation Rate<br>(%/Year) | Number of Personnel<br>in 2015 | Expenses    | Expenses      |
|-----------------------|----------------|--------|-----------------------------|--------------------------------|-------------|---------------|
|                       | 1993           | 2015   |                             |                                | in 2015     | 2010~2020     |
| 329,059,411           | 7,074          | 13,846 | 3.1                         | 46,449                         | 643,134,214 | 6,431,342,144 |

Note: Escalation Rate is a average between 1985 and 1993 and calculated from appendix Z(see Appendix A).

Table 19 Personnel and Provisions Expense (2010~2020)

### d. Front Line

These costs were calculated in the same way as the base line structure and cost of ammunitions was assumed to be the same.

- (1) Ship Asset : 7,5556,233,582 (1000 Yen)
- (2) Aircraft Asset : 1,776,642,085 (1000 Yen)
- (3) Ammunition

(Unit: Constant 1000 Yen in 1985 year Yen)

| 1993 BUDGET<br>(Real) | Escalation Rate<br>(%/Year) | Expense in 2015 | Expense 2010~2020 |
|-----------------------|-----------------------------|-----------------|-------------------|
| 41,097,536            | 9.2                         | 284,914,026     | 2,849,140,256     |

Note: Escalation Rate is a average between 1985 and 1993 and calculated from Appendix Z(see Appendix A).

Table 20 Ammunition Expense (2010~2020)

**e. Others**

These costs were calculated in the same manner as the base line structure.

(Unit: Constant 1000 Yen in 1985 year Yen)

| 1993 BUDGET<br>(Real) | Escalation<br>Rate<br>(%/Year) | Expense<br>in<br>2015 | Expense<br>2010~2020 |
|-----------------------|--------------------------------|-----------------------|----------------------|
| 331,655,062           | 7.1                            | 1,499,874,732         | 14,998,747,321       |

Note: Escalation Rate is a average between 1985 and 1993 and calculated from Appendix Z(see Appendix A1).

**Table 21 Other Expense (2010~2020)**

**f. Total**

(Unit: Constant 1000 Yen in 1985 year Yen)

|                        | Expenses       | Relevant Table |
|------------------------|----------------|----------------|
| Ship Assets            | 7,556,233,582  | Table 17       |
| Aircraft Assets        | 1,776,642,085  | Table 18       |
| Personnel & Provisions | 6,431,342,144  | Table 19       |
| Ammunitions            | 2,849,140,256  | Table 20       |
| Others                 | 14,998,747,321 | Table 21       |
| Total                  | 33,612,105,389 |                |

**Table 22 Estimate of Total Expenses(2010~2020)**

From Table 22, an annualized average of 3,361,200 million Yen is calculated to accomplish the new alternative structure of JMSDF.

**F. COMPARISON OF TOTAL COSTS**

**1. Ship Assets**

Table 23 shows the difference in ship costs for the two force structures. From this Table, it is apparent that almost 70% of increased costs are related to the buildup of SSBN and DDV (Right class CV that operates VFA).

(Unit: Constant 1000 Yen in 1985 year Yen)

| TYPE         | TOTAL PRICE          |                      |                      |        |
|--------------|----------------------|----------------------|----------------------|--------|
|              | Baseline             | Alternative          | Difference           | %      |
| SSBN         | 0                    | 1,602,584,976        | 1,602,584,976        | 55.8%  |
| SS           | 885,343,885          | 590,229,257          | -295,114,628         | -10.3% |
| DDV          | 0                    | 484,938,486          | 484,938,486          | 16.9%  |
| DDH          | 223,354,891          | 223,354,891          | 0                    | 0.0%   |
| DDG          | 703,602,454          | 1,172,670,757        | 469,068,303          | 16.3%  |
| DD           | 973,343,177          | 973,343,177          | 0                    | 0.0%   |
| DD (*DE)     | 1,296,875,226        | 1,296,875,226        | 0                    | 0.0%   |
| MST          | -                    | -                    | -                    | -      |
| MSO          | 140,206,398          | 140,206,398          | 0                    | 0.0%   |
| MSC          | 98,050,653           | 215,711,437          | 117,660,784          | 4.1%   |
| LST          | -                    | -                    | -                    | -      |
| LST          | 38,081,403           | 114,244,210          | 76,162,807           | 2.7%   |
| AOE          | 90,653,853           | 90,653,853           | 0                    | 0.0%   |
| ATF          | 0                    | 183,181,011          | 183,181,011          | 6.4%   |
| ASR          | 3,343,452            | 62,735,355           | 59,391,903           | 2.1%   |
| ATSS         | 0                    | 68,609,919           | 68,609,919           | 2.4%   |
| ATS          | 37,512,094           | 37,512,094           | 0                    | 0.0%   |
| AOS          | 0                    | 61,958,632           | 61,958,632           | 2.2%   |
| AGS          | 34,922,870           | 34,922,870           | 0                    | 0.0%   |
| ARC          | 43,585,981           | 87,171,962           | 43,585,981           | 1.5%   |
| ASE          | 51,693,799           | 51,693,799           | 0                    | 0.0%   |
| AGB          | -                    | -                    | -                    | -      |
| TV           | 63,635,271           | 63,635,271           | 0                    | 0.0%   |
| <b>TOTAL</b> | <b>4,684,205,407</b> | <b>7,556,233,581</b> | <b>2,872,028,174</b> |        |

Table 23 Comparison of Total Costs of Ship Assets

## 2. Aircraft Assets

Table 24 shows the difference in aircraft costs for the two structures. From this table, it is clear that the increased procurement cost of VFA is almost offset by the reduction of the procurement cost of VP aircraft. This trade off minimizes the cost difference between the two force structure for the aircraft.

(Unit: Constant 1000 Yen in 1985 year Yen)

| TYPE         | TOTAL PRICE          |                      |                   |         |
|--------------|----------------------|----------------------|-------------------|---------|
|              | Baseline             | Alternative          | Difference        | %       |
| VFA          | 0                    | 402,809,919          | 402,809,919       | 708.9%  |
| VP           | 1,022,510,369        | 523,724,823          | -498,785,546      | -877.8% |
|              | 248,703,158          | 248,703,158          | 0                 | 0.0%    |
|              | 129,143,657          | 154,972,388          | 25,828,731        | 45.5%   |
|              | 80,490,808           | 93,905,942           | 13,415,134        | 23.6%   |
| CV           | 0                    | 37,020,691           | 37,020,691        | 65.2%   |
| US           | 46,423,997           | 61,898,662           | 15,474,665        | 27.2%   |
|              | 63,075,107           | 63,075,107           | 0                 | 0.0%    |
| UP           | 61,056,239           | 122,112,477          | 61,056,238        | 107.5%  |
| . etc.       | 68,418,916           | 68,418,916           | 0                 | 0.0%    |
| <b>TOTAL</b> | <b>1,719,822,250</b> | <b>1,776,642,085</b> | <b>56,819,830</b> |         |

Table 24 Comparison of Total Costs of Aircraft

### 3. Total

Table 25 shows the comparison of total costs of 'Baseline' and 'Alternative'. From this table the cost of alternative force structure increases by 9.73% compared with baseline structure (i.e.  $(33,612,105,388 - 30,632,844,334) / 30,632,844,334 = 0.0973$ ). A noticeable increase of 96.4% is indicated and is due to the increased cost of the ship assets. Approximately 70% of the increased cost of ship assets were based upon the increased buildup of SSBN and DDV.

(Unit: Constant 1000 Yen in 1985 year Yen)

|                        | TOTAL PRICE           |                       |                      |       |
|------------------------|-----------------------|-----------------------|----------------------|-------|
|                        | Baseline              | Alternative           | Difference           | %     |
| Ship Assets            | 4,684,205,407         | 7,556,233,582         | 2,872,028,175        | 96.4% |
| Aircraft Assets        | 1,719,822,250         | 1,776,642,085         | 56,819,835           | 1.9%  |
| Personnel & Provisions | 6,380,929,100         | 6,431,342,144         | 50,413,044           | 1.7%  |
| Ammunitions            | 2,849,140,256         | 2,849,140,256         | 0                    | 0.0%  |
| Others                 | 14,998,747,321        | 14,998,747,321        | 0                    | 0.0%  |
| <b>Total</b>           | <b>30,632,844,334</b> | <b>33,612,105,388</b> | <b>2,979,261,054</b> |       |

Table 25 Comparison of Total Costs

## G. BUDGET ESTIMATION

From Chapter IV, it was observed that the JMSDF budget remained about 25 % of the Defense Expenditures for last 20 years. If a similar budget composition continues, then the total JSDF budget will be around 13.44 trillion Yen(i.e.  $3.36 * 4 = 13.44$  trillion). Table 26 shows the estimation of the JMSDF budget. For the computation of this table, a real GNP growth rate of 3.6% (average between 1985 and 1993) is used for the period of 1995~2020(see Appendix A1).

From this table, the annualized average real GNP will become 930.38 trillion Yen for 2010-2020. This amounts to an annualized average JMSDF budget of 2.28 trillion Yen for the same period. This is less than the required expenditure (3.36 trillion Yen) to implement the alternative force structure. Required defense expenditures becomes 1.44 % of GNP (i.e.  $13.44/930.38=0.0144$ ). This figure exceeds the current level of defense expenditure.

With respect to budget requirements, the baseline structure becomes 1.32% of GNP (i.e.  $3.06*4/930.38=0.0132$ ). This figure is calculated mainly from the difference of escalation rate between GNP and total assets. As long as economic conditions and the increasing rate of costs continue at current level, the JSDF will encounter budget problems regardless if the JSDF maintains its current baseline force structure.

As a result, the increase of cost for an alternative force structure shows only 0.12% of GNP (i.e.  $0.0144-0.0132=0.0012$ ). This amount is possible and not surprising .

Table 27 shows the Defense Expenditure of other countries. In comparison with other countries, the new share rate is reasonable.

(Unit: Constant 10<sup>8</sup> Yen in 1985 year Yen)

| Fiscal Year     | Real GNP   | Defense Expenditure              | JMSDF BUDGET |
|-----------------|------------|----------------------------------|--------------|
|                 |            | DE/GNP=0.979%<br>(AVE.('85~'93)) | 25 % Of GNP  |
| 1994            | 4,399,389  | 43,070                           | 10,768       |
| 1995            | 4,557,766  | 44,621                           | 11,155       |
| 1996            | 4,721,846  | 46,227                           | 11,557       |
| 1997            | 4,891,833  | 47,891                           | 11,973       |
| 1998            | 5,067,939  | 49,615                           | 12,404       |
| 1999            | 5,250,384  | 51,401                           | 12,850       |
| 2000            | 5,439,398  | 53,252                           | 13,313       |
| 2001            | 5,635,216  | 55,169                           | 13,792       |
| 2002            | 5,838,084  | 57,155                           | 14,289       |
| 2003            | 6,048,255  | 59,212                           | 14,803       |
| 2004            | 6,265,992  | 61,344                           | 15,336       |
| 2005            | 6,491,568  | 63,552                           | 15,888       |
| 2006            | 6,725,265  | 65,840                           | 16,460       |
| 2007            | 6,967,374  | 68,211                           | 17,053       |
| 2008            | 7,218,200  | 70,666                           | 17,667       |
| 2009            | 7,478,055  | 73,210                           | 18,303       |
| 2010            | 7,747,265  | 75,846                           | 18,961       |
| 2011            | 8,026,166  | 78,576                           | 19,644       |
| 2012            | 8,315,108  | 81,405                           | 20,351       |
| 2013            | 8,614,452  | 84,335                           | 21,084       |
| 2014            | 8,924,573  | 87,372                           | 21,843       |
| 2015            | 9,245,857  | 90,517                           | 22,629       |
| 2016            | 9,578,708  | 93,776                           | 23,444       |
| 2017            | 9,923,541  | 97,151                           | 24,288       |
| 2018            | 10,280,789 | 100,649                          | 25,162       |
| 2019            | 10,650,897 | 104,272                          | 26,068       |
| 2020            | 11,034,330 | 108,026                          | 27,007       |
| AVE.(2010~2020) | 9,303,790  | 91,084                           | 22,771       |

Table 26 Estimate of JMSDF Budget

|    | COUNTRY        | DEFENSE<br>EXPENDITURE<br>(1985 PRICE)<br>(million dollar) | DEFENSE<br>EXPENDITURE<br>/person (1985 price)<br>(dollar) | DE/GNP(GDP)<br>(%) |
|----|----------------|------------------------------------------------------------|------------------------------------------------------------|--------------------|
| 1  | UNITED STATES  | 242,717                                                    | 964                                                        | 5.3                |
| 2  | RUSSIA         | 39,680                                                     | 268                                                        | 9.9                |
| 3  | CHINA          | 22,364                                                     | 19                                                         | 5.0                |
| 4  | FRANCE         | 21,898                                                     | 385                                                        | 3.4                |
| 5  | UNITED KINGDOM | 20,726                                                     | 366                                                        | 4.0                |
| 6  | GERMANY        | 19,252                                                     | 251                                                        | 2.4                |
| 7  | JAPAN          | 16,901                                                     | 136                                                        | 1.0                |
| 8  | SAUDI ARABIA   | 14,535                                                     | 1,371                                                      | 11.8               |
| 9  | ITALY          | 10,690                                                     | 186                                                        | 2.0                |
| 10 | KUWAIT         | 10,185                                                     | 5,000                                                      | 62.4               |
| 11 | CANADA         | 7,790                                                      | 288                                                        | 2.0                |
| 12 | INDIA          | 7,550                                                      | 9                                                          | 2.5                |
| 13 | SOUTH KOREA    | 7,189                                                      | 160                                                        | 3.8                |
| 14 | TAIWAN         | 5,373                                                      | 253                                                        | 4.8                |
| 15 | NORTH KOREA    | 5,087                                                      | 214                                                        | 25.7               |
| 16 | AUSTRALIA      | 4,335                                                      | 254                                                        | 2.4                |
| 17 | CROATIA        | 4,330                                                      | 913                                                        | 24.1               |
| 18 | UKRAINE        | 4,320                                                      | 82                                                         | 3.8                |
| 19 | U.A.E          | 4,249                                                      | 2,418                                                      | 14.6               |
| 20 | ISRAEL         | 3,984                                                      | 783                                                        | 11.1               |

Source: The Military Balance 1993-1994

Table 27 Defense Expenditure of High-Ranking Countries(1992)



## VII. CONCLUSION

As I stated at the outset, the primary research question was "Should the force structure of JMSDF in the early 21st century remain the same as it has been in the last 10 years?"

To answer this question, I made a brief country analysis of Japan and her neighboring countries in terms of their politics, diplomacy, economy and military. The neighboring countries analyzed included China, North and South Korea, Russia and the U.S. This analysis was followed by future prospect for these countries in the early 21st century in terms of the same four variables. Based upon the above country analysis, I developed a series of hypothetical threat scenarios and examined them in terms of their likelihood, degree of threat and propriety of facing the threat.

### *Changed Paradigm*

Japan faces a more vexing situation in its dealing with her neighbor and the U.S. in this post Cold-War era. During Cold-War, the U.S. and Japan faced a common threat of expanding communism and formed a strong security arrangement. In particular, the U.S. Naval Forces Pacific and JMSDF comprised a complementary force structure. However, with the disappearance of such clear common interests, the physical complementarity of the two forces could no longer by itself shape and bond security relations. Although there is no clear evidence that the U.S. will depart from Japan, it may not be possible to secure the same level of U.S. commitment to the security of Japan.

### *Japanese Public Apathy*

When the Japanese public continues to remain reluctant over any overseas military undertakings, Japan's ability to respond as an ally to the U.S. and as a responsible member of the international community will be diminished. Another repeat of Gulf-episode could hasten the rethinking of the U.S. security commitment to Japan.

### *Emergence of Regional Power*

Looking into the early 21st century, we see many changes in the geo-political equation in North East Asia. For example, the emergence of China as a superpower and the unification of Korea seem increasingly likely in the coming period. Moreover, as many countries, with their increased national power, insist on mutually conflicting territorial claims around the vital sealanes in Asia, Japan faces more a difficult and complicated security picture.

### *Need for New Force Structure*

A combination of analyses suggests that JMSDF should seek a force structure more appropriate for the post Cold-War period. The structure developed in the last 10 years is the result of the special Japan-U.S. relationship forged during the Cold-War when the U.S. Navy provided key support for the JMSDF operation. With the disappearance of a clear-cut common threat from Communism and the downsizing of the U.S. Navy, Japan may not be able to count on the same level of support and commitment from the U.S. Navy. This may be especially true as the threat becomes more regionalized and where clear U.S. interests are not involved. All of this suggest that JMSDF should develop a more balanced and independent force structure even if its mission remains the same as before. This may require some revision of current legal limitations and increased defense expenses. Japan should undertake this correction not only for her own security needs, but also to make a more equal contribution to ensure the Japan-U.S. Security arrangement viable in the coming decade.

### *A Hypothetical Alternative Force Structure*

An alternative JMSDF force structure is constructed in Chapter VI that achieves a more balanced ship and aircraft mix. This alternative is clearly only one of many possibilities and developed mainly as a feasibility exercise. The costs and manpower requirements for the alternative are estimated taking into account recent JMDF costs and manpower experience. The result suggests

that even though it may cost more than the base case, the alternative is certainly feasible without much sacrifice to the Japanese national economy.

The manpower requirement for this alternative is similar to the baseline structure, the cost is expected to be 9.73% higher than the baseline. However, the level is still only 1.44% of GNP suggesting that this alternative is certainly within the reach of Japanese economy.

# APPENDIX A. GROSS NATIONAL PRODUCT (1981-1991)

(Million dollars - FY1991 constant)

|      | U.S.      | Soviet Union | China     | North Korea | South Korea | Japan     |
|------|-----------|--------------|-----------|-------------|-------------|-----------|
| 1981 | 4,574,000 | 2,470,000    | 623,400   | 33,890      | 109,800     | 2,216,000 |
| 1982 | 4,470,000 | 2,541,000    | 677,800   | 33,030      | 117,700     | 2,291,000 |
| 1983 | 4,639,000 | 2,601,000    | 747,300   | 32,960      | 132,500     | 2,355,000 |
| 1984 | 4,916,000 | 2,622,000    | 856,500   | 32,710      | 144,800     | 2,457,000 |
| 1985 | 5,057,000 | 2,642,000    | 965,300   | 32,810      | 154,900     | 2,584,000 |
| 1986 | 5,197,000 | 2,734,000    | 1,045,000 | 33,040      | 174,900     | 2,652,000 |
| 1987 | 5,351,000 | 2,764,000    | 1,160,000 | 33,210      | 197,600     | 2,768,000 |
| 1988 | 5,565,000 | 2,843,000    | 1,291,000 | 33,110      | 222,200     | 2,940,000 |
| 1989 | 5,714,000 | 2,870,000    | 1,347,000 | 32,550      | 237,200     | 3,082,000 |
| 1990 | 5,765,000 | 2,767,000    | 1,424,000 | 30,890      | 259,300     | 3,242,000 |
| 1991 | 5,695,000 | 2,531,000    | 1,528,000 | 23,300      | 280,900     | 3,386,000 |

Source: World Military Expenditures and Arms Transfers 1991-1992 (U.S. Arms Control and Disarmament Agency)

(Million dollars - FY1991 constant)

|      | U.S.    | Soviet Union | China  | North Korea | South Korea | Japan  |
|------|---------|--------------|--------|-------------|-------------|--------|
| 1981 | 253,600 | 327,800      | 51,220 | 6,778       | 6,829       | 20,660 |
| 1982 | 276,100 | 334,400      | 51,620 | 6,607       | 7,153       | 21,890 |
| 1983 | 294,400 | 338,600      | 50,480 | 6,592       | 7,313       | 22,990 |
| 1984 | 306,500 | 341,000      | 49,580 | 6,543       | 7,385       | 23,950 |
| 1985 | 331,600 | 345,800      | 49,560 | 6,563       | 7,851       | 25,210 |
| 1986 | 341,300 | 349,400      | 48,510 | 6,609       | 8,442       | 26,410 |
| 1987 | 339,300 | 356,800      | 48,970 | 6,641       | 8,627       | 27,780 |
| 1988 | 332,300 | 361,700      | 49,740 | 6,622       | 9,272       | 29,110 |
| 1989 | 329,900 | 328,700      | 49,080 | 6,510       | 10,220      | 30,280 |
| 1990 | 318,400 | 303,700      | 52,330 | 6,178       | 11,240      | 31,460 |
| 1991 | 280,300 | 260,000      | 51,040 | 4,660       | 10,580      | 32,560 |

Source: World Military Expenditures and Arms Transfers 1991-1992 (U.S. Arms Control and Disarmament Agency)

APPENDIX C. TREND OF NAVAL FORCE  
(NUMBER OF MAJOR SHIP) (U.S.)

|                    | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--------------------|------|------|------|------|------|------|------|------|------|------|
| SSBN               | 37   | 36   | 37   | 37   | 36   | 36   | 32   | 25   | 21   | 17   |
| SSGN               |      |      |      |      |      |      |      |      |      |      |
| SSG                |      |      |      |      |      |      |      |      |      |      |
| SSN                | 96   | 98   | 97   | 96   | 97   | 94   | 81   | 83   | 87   | 85   |
| SS                 | 4    | 4    | 4    | 4    | 3    |      |      |      |      |      |
| CARRIER            | 14   | 14   | 15   | 15   | 15   | 15   | 15   | 14   | 12   | 11   |
| BATTLE SHIP        | 2    | 2    | 3    | 3    | 4    | 4    | 2    |      |      |      |
| CRUISER            | 30   | 32   | 36   | 37   | 40   | 41   | 43   | 49   | 50   | 37   |
| DESTROYER          | 68   | 68   | 68   | 68   | 68   | 59   | 49   | 40   | 38   | 40   |
| FRIGATE            | 94   | 90   | 94   | 91   | 75   | 74   | 63   | 56   | 35   | 35   |
| MINE WARFARE FORCE | 3    | 3    | 5    | 4    | 4    | 4    | 8    | 8    | 12   | 15   |
| AMPHIBIOUS FORCE   | 60   | 60   | 60   | 61   | 63   | 61   | 62   | 63   | 55   | 42   |
| Total              | 408  | 407  | 419  | 416  | 405  | 388  | 355  | 338  | 310  | 282  |

Note : 1. MINE WARFARE FORCE count MSCs and above.  
: 2. AMPHIBIOUS FORTH count LSMs and above.

Source: JANE'S FIGHTING SHIP 1985-1986 ~ 1994-1995

# APPENDIX D. TREND OF NAVAL FORCE (FULL TON) (U.S.)

|                     | 1985      | 1986      | 1987      | 1988      | 1989      | 1990      | 1991      | 1992      | 1993      | 1994      |
|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| SSBN                | 368,250   | 370,500   | 389,250   | 389,250   | 391,500   | 402,000   | 369,000   | 332,250   | 309,750   | 287,250   |
| SSB                 |           |           |           |           |           |           |           |           |           |           |
| SSGN                |           |           |           |           |           |           |           |           |           |           |
| SSG                 | 520,639   | 534,493   | 542,841   | 543,895   | 725,759   | 552,898   | 491,425   | 508,933   | 541,254   | 534,398   |
| SS                  | 11,070    | 11,070    | 11,070    | 11,070    | 8,176     | 1,274,671 | 1,274,671 | 1,220,460 | 1,059,434 | 978,493   |
| CARRIER             | 1,141,526 | 1,141,526 | 1,237,912 | 1,237,912 | 1,237,912 | 1,274,671 | 1,274,671 | 1,220,460 | 1,059,434 | 978,493   |
| BATTLE SHIP         | 114,706   | 114,706   | 172,059   | 172,059   | 229,412   | 229,412   | 114,706   | 456,067   | 465,533   | 351,375   |
| CRUISER             | 276,139   | 295,319   | 333,679   | 343,269   | 370,675   | 380,339   | 399,271   | 456,067   | 465,533   | 329,646   |
| DESTROYER           | 460,011   | 460,011   | 460,011   | 460,011   | 460,011   | 413,936   | 365,201   | 319,126   | 310,316   | 139,342   |
| FRIGATE             | 352,377   | 337,586   | 352,377   | 341,224   | 297,726   | 294,151   | 253,260   | 223,823   | 139,342   | 18,725    |
| MINE WAREFARE FORCE | 2,340     | 2,340     | 4,964     | 3,652     | 3,652     | 4,184     | 9,432     | 10,496    | 14,818    | 828,585   |
| AMPHIBIOUS FORCE    | 967,236   | 970,812   | 970,812   | 986,538   | 1,042,796 | 1,022,072 | 1,045,074 | 1,049,435 | 1,001,799 | 828,585   |
| TOTAL               | 4,214,294 | 4,238,363 | 4,474,975 | 4,488,880 | 4,767,619 | 4,573,663 | 4,322,040 | 4,120,590 | 3,842,246 | 3,467,814 |

Note : 1. MINE WAREFARE FORCE count LSMs and above.

: 2. Amphibious Force count LSMs and above.

Source : JANE'S FIGHTING SHIP 1985-1986 ~ 1994-1995

APPENDIX E. TREND OF NAVAL FORCE (NUMBER OF MAJOR SHIP)  
(U.S. PACIFIC)

|                    | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--------------------|------|------|------|------|------|------|------|------|------|------|
| SSBN               | 6    | 8    | 8    | 8    | 8    | 8    | 8    | 8    | 8    | 8    |
| SSGN               |      |      |      |      |      |      |      |      |      |      |
| SSG                |      |      |      |      |      |      |      |      |      |      |
| SSN                | 36   | 40   | 37   | 37   | 37   | 36   | 30   | 28   | 28   | 30   |
| SS                 | 3    | 3    | 3    | 3    | 3    |      |      |      |      |      |
| CARRIER            | 6    | 6    | 7    | 7    | 7    | 7    | 7    | 7    | 7    | 6    |
| BATTLE SHIP        | 1    | 1    | 1    | 2    | 2    | 2    | 1    |      |      |      |
| CRUISER            | 18   | 18   | 21   | 21   | 25   | 24   | 25   | 27   | 28   | 17   |
| DESTROYER          | 29   | 29   | 29   | 29   | 29   | 27   | 24   | 18   | 17   | 20   |
| FRIGATE            | 43   | 42   | 43   | 41   | 33   | 31   | 28   | 25   | 13   | 13   |
| MINE WARFARE FORCE |      |      |      |      |      | 2    | 3    | 3    | 2    |      |
| AMPHIBIOUS FORCE   | 31   | 31   | 31   | 32   | 32   | 32   | 32   | 31   | 29   | 25   |
| Total              | 173  | 178  | 180  | 180  | 176  | 169  | 158  | 147  | 132  | 119  |

Note : 1. MINE WARFARE FORCE count MSCs and above.  
: 2. AMPHIBIOUS FORTH count LSMs and above.

Source: JANE'S FIGHTING SHIP 1985-1986 ~ 1994-1995



# APPENDIX F. TREND OF NAVAL FORCE (FULL TON) (U.S. PACIFIC)

|                     | 1985      | 1986      | 1987      | 1988      | 1989      | 1990      | 1991      | 1992      | 1993      | 1994      |
|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| SSBN                | 112,500   | 150,000   | 150,000   | 150,000   | 150,000   | 150,000   | 150,000   | 150,000   | 150,000   | 150,000   |
| SSB                 |           |           |           |           |           |           |           |           |           |           |
| SSGN                |           |           |           |           |           |           |           |           |           |           |
| SSG                 |           |           |           |           |           |           |           |           |           |           |
| SSN                 | 195,237   | 211,084   | 202,164   | 206,731   | 209,358   | 205,058   | 175,018   | 168,385   | 183,562   | 183,562   |
| SS                  | 8,176     | 8,176     | 8,176     | 8,176     | 8,176     |           |           |           |           |           |
| CARRIER             |           | 491,237   | 582,724   | 582,244   | 582,244   | 582,224   | 593,274   | 609,156   | 528,513   | 533,412   |
| BATTLE SHIP         | 57,353    | 57,353    | 57,353    | 114,706   | 114,706   | 114,706   | 57,353    |           |           |           |
| CRUISER             | 167,427   | 168,425   | 197,195   | 197,195   | 233,176   | 224,855   | 234,321   | 253,194   | 262,660   | 162,335   |
| DESTROYER           | 197,648   | 197,648   | 197,648   | 197,648   | 197,648   | 187,998   | 173,523   | 144,573   | 139,748   | 165,014   |
| FRIGATE             | 159,325   | 156,309   | 160,186   | 152,671   | 129,998   | 122,084   | 111,680   | 99,666    | 52,376    | 52,376    |
| MINE WAREFARE FORCE |           |           |           |           |           | 2,624     | 3,936     | 3,936     | 2,092     |           |
| AMPHIBIOUS FORCE    | 512,620   | 516,196   | 516,196   | 531,922   | 531,922   | 535,498   | 542,774   | 560,191   | 521,191   | 474,235   |
| TOTAL               | 1,410,286 | 1,956,428 | 2,071,642 | 2,141,293 | 2,157,228 | 2,125,047 | 2,041,879 | 1,989,101 | 1,840,142 | 1,720,934 |

Note : 1. MINE WAREFARE FORCE count LSMs and above.

: 2. Amphibious Force count LSMs and above.

Source : JANE'S FIGHTING SHIP 1985-1986 ~ 1994-1995

APPENDIX G. TREND OF NAVAL FORCE (NUMBER OF MAJOR SHIP)  
(RUSSIA)

|                    | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--------------------|------|------|------|------|------|------|------|------|------|------|
| SSBN               | 77   | 77   | 74   | 63   | 63   | 63   | 60   | 59   | 54   | 48   |
| SSB                | 15   | 15   | 15   | 14   | 12   |      |      |      |      |      |
| SSGN               | 50   | 51   | 52   | 51   | 52   | 52   | 42   | 38   | 30   | 22   |
| SSG                | 18   | 16   | 16   | 16   | 16   | 16   | 15   | 12   | 7    | 5    |
| SSN                | 70   | 73   | 71   | 82   | 85   | 81   | 64   | 67   | 65   | 53   |
| SS                 | 148  | 149  | 138  | 127  | 123  | 120  | 95   | 77   | 69   | 65   |
| CARRIER            | 4    | 4    | 4    | 4    | 4    | 5    | 5    | 5    | 4    | 2    |
| BATTLE SHIP        |      |      |      |      |      |      |      |      |      |      |
| CRUISER            | 42   | 42   | 43   | 44   | 43   | 36   | 31   | 29   | 24   | 14   |
| DESTROYER          | 72   | 71   | 65   | 61   | 57   | 53   | 39   | 38   | 36   | 33   |
| FRIGATE            | 197  | 198  | 192  | 192  | 190  | 180  | 169  | 158  | 149  | 139  |
| MINE WARFARE FORCE | 377  | 386  | 382  | 379  | 364  | 346  | 306  | 267  | 257  | 220  |
| AMPHIBIOUS FORCE   | 80   | 84   | 85   | 82   | 83   | 84   | 79   | 76   | 75   | 72   |
| Total              | 1150 | 1166 | 1137 | 1115 | 1092 | 1036 | 905  | 826  | 770  | 673  |

Note : 1. MINE WARFARE FORCE count MSCs and above.

: 2. AMPHIBIOUS FORTH count LSMs and above.

Source: JANE'S FIGHTING SHIP 1985-1986 ~ 1994-1995

# APPENDIX H. TREND OF NAVAL FORCE (FULL TON)(RUSSIA)

|                     | 1985      | 1986      | 1987      | 1988      | 1989      | 1990      | 1991      | 1992      | 1993      | 1994      |
|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| SSBN                | 820,600   | 850,700   | 825,050   | 740,850   | 734,550   | 766,250   | 740,600   | 731,150   | 683,150   | 624,200   |
| SSB                 | 44,250    | 44,250    | 44,250    | 41,300    | 35,400    |           |           |           |           |           |
| SSGN                | 302,150   | 314,650   | 327,150   | 322,150   | 337,650   | 345,350   | 301,550   | 287,650   | 251,600   | 215,000   |
| SSG                 | 64,600    | 61,600    | 61,600    | 61,600    | 61,600    | 61,600    | 57,750    | 46,200    | 26,950    | 19,250    |
| SSN                 | 390,200   | 408,500   | 399,300   | 479,200   | 504,900   | 487,400   | 403,900   | 433,400   | 436,300   | 374,500   |
| SS                  | 330,430   | 339,010   | 318,861   | 292,411   | 286,287   | 281,790   | 249,892   | 225,844   | 207,246   | 198,548   |
| CARRIER             | 162,000   | 162,000   | 162,000   | 162,000   | 162,000   | 229,500   | 229,500   | 229,500   | 189,000   | 112,000   |
| BATTLE SHIP         |           |           |           |           |           |           |           |           |           |           |
| CRUISER             | 502,000   | 502,000   | 513,200   | 524,400   | 514,300   | 393,900   | 329,050   | 313,650   | 267,050   | 186,750   |
| DESTROYER           | 324,520   | 336,330   | 333,380   | 312,780   | 313,770   | 307,270   | 266,250   | 266,450   | 259,500   | 243,774   |
| FRIGATE             | 329,170   | 332,150   | 324,270   | 323,340   | 321,310   | 310,570   | 299,120   | 289,620   | 278,120   | 263,900   |
| MINE WAREFARE FORCE | 130,175   | 132,725   | 132,725   | 130,675   | 128,495   | 122,739   | 115,279   | 102,137   | 99,247    | 92,879    |
| AMPHIBIOUS FORCE    | 201,292   | 217,612   | 221,692   | 222,652   | 226,732   | 239,332   | 241,790   | 240,954   | 235,634   | 233,234   |
| TOTAL               | 3,601,387 | 3,701,527 | 3,663,478 | 3,613,358 | 3,626,994 | 3,545,701 | 3,234,681 | 3,166,555 | 2,933,797 | 2,564,035 |

Note : 1. MINE WAREFARE FORCE count LSMs and above.  
: 2. Amphibious Force count LSMs and above.

Source : JANE'S FIGHTING SHIP 1985-1986 ~ 1994-1995

APPENDIX I. TREND OF NAVAL FORCE (NUMBER OF MAJOR SHIP)  
(RUSSIA PACIFIC)

|                    | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--------------------|------|------|------|------|------|------|------|------|------|------|
| SSBN               | 24   | 25   | 25   | 25   | 23   | 23   | 24   | 23   | 21   | 18   |
| SSGN               | 20   | 20   | 20   | 19   | 22   | 24   | 19   | 17   | 10   | 9    |
| SSG                | 4    | 4    | 4    | 4    | 4    | 4    | 3    |      |      | 10   |
| SSN                | 22   | 24   | 25   | 25   | 27   | 25   | 15   | 14   | 18   | 17   |
| SS                 | 50   | 40   | 30   | 30   | 30   | 29   | 28   | 20   | 23   | 19   |
| CARRIER            | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 1    |      |
| BATTLE SHIP        |      |      |      |      |      |      |      |      |      |      |
| CRUISER            | 13   | 12   | 12   | 12   | 16   | 12   | 9    | 8    | 7    | 4    |
| DESTROYER          | 19   | 21   | 18   | 18   | 15   | 10   | 12   | 12   | 11   | 10   |
| FRIGATE            | 11   | 11   | 56   | 56   | 56   | 51   | 42   | 46   | 33   | 33   |
| MINE WARFARE FORCE | 85   | 90   | 100  | 100  | 100  | 95   | 102  | 88   | 67   | 48   |
| AMPHIBIOUS FORCE   | 22   | 23   | 22   | 22   | 19   | 22   | 20   | 20   | 19   | 17   |
| Total              | 272  | 272  | 314  | 313  | 314  | 297  | 276  | 250  | 210  | 185  |

Note : 1. MINE WARFARE FORCE count MSCs and above.

: 2. AMPHIBIOUS FORCE count LSMs and above.

Source: JANE'S FIGHTING SHIP 1985-1986 ~ 1994-1995

APPENDIX J. TREND OF NAVAL FORCE (NUMBER OF MAJOR SHIP)  
(CHINA)

|                    | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--------------------|------|------|------|------|------|------|------|------|------|------|
| SSBN               | 2    | 2    | 4    | 1    | 1    | 1    | 1    | 1    | 1    | 1    |
| SSB                | 1    | 1    | 1    | 1    | 1    |      |      |      |      |      |
| SSG                | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    |
| SSN                | 3    | 3    | 3    | 2    | 2    | 4    | 4    | 5    | 5    | 5    |
| SS                 | 104  | 109  | 102  | 51   | 52   | 55   | 56   | 53   | 39   | 38   |
| CARRIER            |      |      |      |      |      |      |      |      |      |      |
| BATTLE SHIP        |      |      |      |      |      |      |      |      |      |      |
| CRUISER            |      |      |      |      |      |      |      |      |      |      |
| DESTROYER          | 19   | 18   | 18   | 18   | 18   | 19   | 15   | 17   | 16   | 18   |
| FRIGATE            | 30   | 31   | 36   | 35   | 33   | 40   | 39   | 40   | 39   | 38   |
| MINE WARFARE FORCE | 26   | 30   | 190  | 196  | 182  | 183  | 183  | 185  | 67   | 68   |
| AMPHIBIOUS FORCE   | 50   | 60   | 64   | 77   | 75   | 80   | 82   | 80   | 58   | 62   |
| Total              | 236  | 255  | 419  | 382  | 365  | 383  | 381  | 382  | 226  | 231  |
| (FAST ATTACK CRAFT | 827  | 827  | 862  | 851  | 801  | 852  | 820  | 818  | 456  | 451  |

Note : 1. MINE WARFARE FORCE count MSCs and above.

: 2. AMPHIBIOUS FORTH count LSMs and above.

Source: JANE'S FIGHTING SHIP 1985-1986 ~ 1994-1995

# APPENDIX K. TREND OF NAVAL FORCE (FULL TON) (CHINA)

|                     | 1985    | 1986    | 1987    | 1988    | 1989    | 1990    | 1991    | 1992    | 1993    | 1994    |
|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| SSBN                | 16,000  | 16,000  | 32,000  | 8,000   | 8,000   | 8,000   | 8,000   | 8,000   | 8,000   | 8,000   |
| SSB                 | 2,950   | 2,950   | 2,950   | 2,950   | 2,950   |         |         |         |         |         |
| SSGN                |         |         |         |         |         |         |         |         |         |         |
| SSG                 | 1,700   | 1,700   | 2,100   | 2,100   | 2,100   | 2,100   | 2,100   | 2,100   | 2,100   | 2,100   |
| SSN                 | 15,000  | 15,000  | 15,000  | 10,000  | 10,000  | 20,000  | 20,000  | 25,000  | 25,000  | 25,000  |
| SS                  | 183,686 | 193,119 | 180,309 | 86,696  | 88,809  | 95,148  | 97,261  | 92,054  | 76,747  | 71,804  |
| CARRIER             |         |         |         |         |         |         |         |         |         |         |
| BATTLE SHIP         |         |         |         |         |         |         |         |         |         |         |
| CRUISE              |         |         |         |         |         |         |         |         |         |         |
| DESTROYER           | 63,210  | 61,170  | 61,170  | 62,800  | 59,540  | 63,210  | 55,050  | 62,390  | 58,720  | 66,590  |
| FRIGATE             | 52,268  | 54,088  | 62,412  | 60,488  | 57,728  | 70,780  | 68,184  | 70,760  | 70,180  | 68,426  |
| MINE WAREFARE FORCE | 14,160  | 16,520  | 56,840  | 54,480  | 58,730  | 62,600  | 62,600  | 63,220  | 30,043  | 30,353  |
| AMPHIBIOUS FORCE    | 115,708 | 130,478 | 137,968 | 153,808 | 149,658 | 157,658 | 160,438 | 152,278 | 126,000 | 135,080 |
| TOTAL               | 454,682 | 491,025 | 550,749 | 441,322 | 437,515 | 479,496 | 473,633 | 475,802 | 396,790 | 407,353 |

Note : 1. MINE WAREFARE FORCE count LSMs and above.

: 2. Amphibious Force count LSMs and above.

Source : JANE'S FIGHTING SHIP 1985-1986 ~ 1994-1995

APPENDIX L. TREND OF NAVAL FORCE (NUMBER OF MAJOR SHIP)  
(SOUTH KOREA)

|                    | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--------------------|------|------|------|------|------|------|------|------|------|------|
| SSBN               |      |      |      |      |      |      |      |      |      |      |
| SSGN               |      |      |      |      |      |      |      |      |      |      |
| SSG                |      |      |      |      |      |      |      |      |      |      |
| SSN                |      |      |      |      |      |      |      |      |      |      |
| SS                 |      |      |      |      |      |      |      |      | 1    | 2    |
| Midget Sub         | 1    | 1    | 1    | 3    | 3    | 3    | 6    | 7    | 4    | 11   |
| CARRIER            |      |      |      |      |      |      |      |      |      |      |
| BATTLE SHIP        |      |      |      |      |      |      |      |      |      |      |
| CRUISER            |      |      |      |      |      |      |      |      |      |      |
| DESTROYER          | 11   | 11   | 11   | 9    | 9    | 9    | 9    | 9    | 9    | 8    |
| FRIGATE            | 6    | 6    | 9    | 6    | 7    | 7    | 7    | 7    | 9    | 9    |
| MINE WARFARE FORCE | 8    | 8    | 9    | 9    | 9    | 11   | 12   | 9    | 11   | 14   |
| AMPHIBIOUS FORCE   | 15   | 15   | 15   | 15   | 15   | 15   | 14   | 14   | 15   | 16   |
| Total              | 41   | 41   | 45   | 42   | 43   | 45   | 48   | 46   | 49   | 60   |
| (CORVETTES)        |      |      |      |      |      |      |      |      |      |      |
| (FAST ATTACK CRAFT | 8    | 16   | 13   | 12   | 24   | 26   | 26   | 26   | 26   | 27   |
|                    | 73   | 73   | 73   | 79   | 79   | 79   | 77   | 77   | 77   | 118  |

Note : 1. MINE WARFARE FORCE count MSCs and above.

: 2. AMPHIBIOUS FORTH count LSMs and above.

Source: JANE'S FIGHTING SHIP 1985-1986 ~ 1994-1995

# APPENDIX M. TREND OF NAVAL FORCE (FULL TON)(SOUTH KOREA)

|                     | 1985   | 1986   | 1987   | 1988   | 1989   | 1990   | 1991   | 1992   | 1993   | 1994   |
|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| SSBN                |        |        |        |        |        |        |        |        |        |        |
| SSB                 |        |        |        |        |        |        |        |        |        |        |
| SSGN                |        |        |        |        |        |        |        |        |        |        |
| SSG                 |        |        |        |        |        |        |        |        |        |        |
| SSN                 |        |        |        |        |        |        |        |        | 1,285  | 2,570  |
| SS                  |        |        |        |        |        |        |        |        | 700    | 1,189  |
| NIDGET SS           | 175    | 175    | 175    | 525    | 525    | 525    | 1,050  | 1,225  |        |        |
| CARRIER             |        |        |        |        |        |        |        |        |        |        |
| BATTLE SHIP         |        |        |        |        |        |        |        |        |        |        |
| CRUSER              |        |        |        |        |        |        |        |        |        |        |
| DESTROYER           | 37,030 | 37,030 | 37,030 | 30,930 | 30,930 | 30,930 | 30,930 | 30,900 | 30,390 | 27,610 |
| FRIGATE             | 12,880 | 12,880 | 19,420 | 12,980 | 15,260 | 15,260 | 15,260 | 15,260 | 20,100 | 20,100 |
| MINE WAREFARE FORCE |        |        |        | 3,480  | 3,480  | 4,520  | 5,040  | 3,480  | 4,520  | 6,130  |
| AMPHIBIOUS FORCE    |        |        |        | 40,305 | 40,305 | 40,305 | 36,225 | 36,225 | 37,320 | 41,250 |
| TOTAL               | 50,085 | 50,085 | 56,625 | 88,220 | 90,500 | 91,540 | 88,505 | 87,090 | 94,315 | 98,849 |
| COLVETTES           |        |        | 14,820 | 13,680 | 28,740 | 30,640 | 30,640 | 30,640 | 30,640 | 32,364 |

Note : 1. MINE WAREFARE FORCE count LSMs and above.

: 2. Amphibious Force count LSMs and above.

Source : JANE'S FIGHTING SHIP 1985-1986 ~ 1994-1995





# APPENDIX O. TREND OF NAVAL FORCE (FULL TON) (NORTH KOREA)

|                     | 1985   | 1986   | 1987   | 1988   | 1989   | 1990   | 1991   | 1992   | 1993   | 1994   |
|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| SSBN                |        |        |        |        |        |        |        |        |        |        |
| SSB                 |        |        |        |        |        |        |        |        |        |        |
| SSGN                |        |        |        |        |        |        |        |        |        |        |
| SSG                 |        |        |        |        |        |        |        |        |        |        |
| SSN                 |        |        |        |        |        |        |        |        |        |        |
| SS                  | 32,850 | 32,850 | 32,850 | 34,680 | 36,510 | 38,340 | 38,340 | 42,000 | 45,750 | 38,430 |
| MIDGET SS           |        |        |        |        |        | 3,600  | 4,230  | 4,320  | 4,320  | 5,400  |
| CARRIER             |        |        |        |        |        |        |        |        |        |        |
| BATTLE SHIP         |        |        |        |        |        |        |        |        |        |        |
| CRUISER             |        |        |        |        |        |        |        |        |        |        |
| DESTROYER           |        |        |        |        |        |        |        |        |        |        |
| FRIGATE             | 3,000  | 6,000  | 3,000  | 3,000  | 4,845  | 4,845  | 4,845  | 4,845  | 4,845  | 4,845  |
| MINE WAREFARE FORCE |        |        |        |        |        |        |        |        |        |        |
| AMPHIBIOUS FORCE    | 580    | 870    | 1,160  | 870    | 870    | 1,740  | 1,740  | 1,740  | 1,740  | 1,740  |
| TOTAL               | 36,430 | 39,720 | 37,010 | 40,050 | 43,965 | 53,020 | 53,650 | 57,400 | 61,150 | 54,910 |

Note : 1. MINE WAREFARE FORCE count LSMs and above.

: 2. Amphibious Force count LSMs and above.

Source : JANE'S FIGHTING SHIP 1985-1986 ~ 1994-1995

## 811

811

[illegible]

AROUND JAPAN (1985-1994) (3/8)

[illegible]

## APPENDIX P. SHIP FLOW OF EACH COUNTRY AROUND JAPAN (1985~1994) (4/8)

| RUSIA | CLASS | 1993 |  |  |  |  |  |  |  |  |  |  |  | 1994 |  |  |  |  |  |  |  |  |  |  |  | 1995 |  |  |  |  |  |  |  |  |  |  |  | 1996 |  |  |  |  |  |  |  |  |  |  |  | 1997 |  |  |  |  |  |  |  |  |  |  |  | 1998 |  |  |  |  |  |  |  |  |  |  |  | 1999 |  |  |  |  |  |  |  |  |  |  |  | 2000 |  |  |  |  |  |  |  |  |  |  |  | 2001 |  |  |  |  |  |  |  |  |  |  |  | 2002 |  |  |  |  |  |  |  |  |  |  |  | 2003 |  |  |  |  |  |  |  |  |  |  |  | 2004 |  |  |  |  |  |  |  |  |  |  |  | 2005 |  |  |  |  |  |  |  |  |  |  |  | 2006 |  |  |  |  |  |  |  |  |  |  |  | 2007 |  |  |  |  |  |  |  |  |  |  |  | 2008 |  |  |  |  |  |  |  |  |  |  |  | 2009 |  |  |  |  |  |  |  |  |  |  |  | 2010 |  |  |  |  |  |  |  |  |  |  |  | 2011 |  |  |  |  |  |  |  |  |  |  |  | 2012 |  |  |  |  |  |  |  |  |  |  |  | 2013 |  |  |  |  |  |  |  |  |  |  |  | 2014 |  |  |  |  |  |  |  |  |  |  |  | 2015 |  |  |  |  |  |  |  |  |  |  |  | 2016 |  |  |  |  |  |  |  |  |  |  |  | 2017 |  |  |  |  |  |  |  |  |  |  |  | 2018 |  |  |  |  |  |  |  |  |  |  |  | 2019 |  |  |  |  |  |  |  |  |  |  |  | 2020 |  |  |  |  |  |  |  |  |  |  |  | 2021 |  |  |  |  |  |  |  |  |  |  |  | 2022 |  |  |  |  |  |  |  |  |  |  |  | 2023 |  |  |  |  |  |  |  |  |  |  |  | 2024 |  |  |  |  |  |  |  |  |  |  |  | 2025 |  |  |  |  |  |  |  |  |  |  |  | 2026 |  |  |  |  |  |  |  |  |  |  |  | 2027 |  |  |  |  |  |  |  |  |  |  |  | 2028 |  |  |  |  |  |  |  |  |  |  |  | 2029 |  |  |  |  |  |  |  |  |  |  |  | 2030 |  |  |  |  |  |  |  |  |  |  |  | 2031 |  |  |  |  |  |  |  |  |  |  |  | 2032 |  |  |  |  |  |  |  |  |  |  |  | 2033 |  |  |  |  |  |  |  |  |  |  |  | 2034 |  |  |  |  |  |  |  |  |  |  |  | 2035 |  |  |  |  |  |  |  |  |  |  |  | 2036 |  |  |  |  |  |  |  |  |  |  |  | 2037 |  |  |  |  |  |  |  |  |  |  |  | 2038 |  |  |  |  |  |  |  |  |  |  |  | 2039 |  |  |  |  |  |  |  |  |  |  |  | 2040 |  |  |  |  |  |  |  |  |  |  |  | 2041 |  |  |  |  |  |  |  |  |  |  |  | 2042 |  |  |  |  |  |  |  |  |  |  |  | 2043 |  |  |  |  |  |  |  |  |  |  |  | 2044 |  |  |  |  |  |  |  |  |  |  |  | 2045 |  |  |  |  |  |  |  |  |  |  |  | 2046 |  |  |  |  |  |  |  |  |  |  |  | 2047 |  |  |  |  |  |  |  |  |  |  |  | 2048 |  |  |  |  |  |  |  |  |  |  |  | 2049 |  |  |  |  |  |  |  |  |  |  |  | 2050 |  |  |  |  |  |  |  |  |  |  |  | 2051 |  |  |  |  |  |  |  |  |  |  |  | 2052 |  |  |  |  |  |  |  |  |  |  |  | 2053 |  |  |  |  |  |  |  |  |  |  |  | 2054 |  |  |  |  |  |  |  |  |  |  |  | 2055 |  |  |  |  |  |  |  |  |  |  |  | 2056 |  |  |  |  |  |  |  |  |  |  |  | 2057 |  |  |  |  |  |  |  |  |  |  |  | 2058 |  |  |  |  |  |  |  |  |  |  |  | 2059 |  |  |  |  |  |  |  |  |  |  |  | 2060 |  |  |  |  |  |  |  |  |  |  |  | 2061 |  |  |  |  |  |  |  |  |  |  |  | 2062 |  |  |  |  |  |  |  |  |  |  |  | 2063 |  |  |  |  |  |  |  |  |  |  |  | 2064 |  |  |  |  |  |  |  |  |  |  |  | 2065 |  |  |  |  |  |  |  |  |  |  |  | 2066 |  |  |  |  |  |  |  |  |  |  |  | 2067 |  |  |  |  |  |  |  |  |  |  |  | 2068 |  |  |  |  |  |  |  |  |  |  |  | 2069 |  |  |  |  |  |  |  |  |  |  |  | 2070 |  |  |  |  |  |  |  |  |  |  |  | 2071 |  |  |  |  |  |  |  |  |  |  |  | 2072 |  |  |  |  |  |  |  |  |  |  |  | 2073 |  |  |  |  |  |  |  |  |  |  |  | 2074 |  |  |  |  |  |  |  |  |  |  |  | 2075 |  |  |  |  |  |  |  |  |  |  |  | 2076 |  |  |  |  |  |  |  |  |  |  |  | 2077 |  |  |  |  |  |  |  |  |  |  |  | 2078 |  |  |  |  |  |  |  |  |  |  |  | 2079 |  |  |  |  |  |  |  |  |  |  |  | 2080 |  |  |  |  |  |  |  |  |  |  |  | 2081 |  |  |  |  |  |  |  |  |  |  |  | 2082 |  |  |  |  |  |  |  |  |  |  |  | 2083 |  |  |  |  |  |  |  |  |  |  |  | 2084 |  |  |  |  |  |  |  |  |  |  |  | 2085 |  |  |  |  |  |  |  |  |  |  |  | 2086 |  |  |  |  |  |  |  |  |  |  |  | 2087 |  |  |  |  |  |  |  |  |  |  |  | 2088 |  |  |  |  |  |  |  |  |  |  |  | 2089 |  |  |  |  |  |  |  |  |  |  |  | 2090 |  |  |  |  |  |  |  |  |  |  |  | 2091 |  |  |  |  |  |  |  |  |  |  |  | 2092 |  |  |  |  |  |  |  |  |  |  |  | 2093 |  |  |  |  |  |  |  |  |  |  |  | 2094 |  |  |  |  |  |  |  |  |  |  |  | 2095 |  |  |  |  |  |  |  |  |  |  |  | 2096 |  |  |  |  |  |  |  |  |  |  |  | 2097 |  |  |  |  |  |  |  |  |  |  |  | 2098 |  |  |  |  |  |  |  |  |  |  |  | 2099 |  |  |  |  |  |  |  |  |  |  |  | 2100 |  |  |  |  |  |  |  |  |  |  |  | 2101 |  |  |  |  |  |  |  |  |  |  |  | 2102 |  |  |  |  |  |  |  |  |  |  |  | 2103 |  |  |  |  |  |  |  |  |  |  |  | 2104 |  |  |  |  |  |  |  |  |  |  |  | 2105 |  |  |  |  |  |  |  |  |  |  |  | 2106 |  |  |  |  |  |  |  |  |  |  |  | 2107 |  |  |  |  |  |  |  |  |  |  |  | 2108 |  |  |  |  |  |  |  |  |  |  |  | 2109 |  |  |  |  |  |  |  |  |  |  |  | 2110 |  |  |  |  |  |  |  |  |  |  |  | 2111 |  |  |  |  |  |  |  |  |  |  |  | 2112 |  |  |  |  |  |  |  |  |  |  |  | 2113 |  |  |  |  |  |  |  |  |  |  |  | 2114 |  |  |  |  |  |  |  |  |  |  |  | 2115 |  |  |  |  |  |  |  |  |  |  |  | 2116 |  |  |  |  |  |  |  |  |  |  |  | 2117 |  |  |  |  |  |  |  |  |  |  |  | 2118 |  |  |  |  |  |  |  |  |  |  |  | 2119 |  |  |  |  |  |  |  |  |  |  |  | 2120 |  |  |  |  |  |  |  |  |  |  |  | 2121 |  |  |  |  |  |  |  |  |  |  |  | 2122 |  |  |  |  |  |  |  |  |  |  |  | 2123 |  |  |  |  |  |  |  |  |  |  |  | 2124 |  |  |  |  |  |  |  |  |  |  |  | 2125 |  |  |  |  |  |  |  |  |  |  |  | 2126 |  |  |  |  |  |  |  |  |  |  |  | 2127 |  |  |  |  |  |  |  |  |  |  |  | 2128 |  |  |  |  |  |  |  |  |  |  |  | 2129 |  |  |  |  |  |  |  |  |  |  |  | 2130 |  |  |  |  |  |  |  |  |  |  |  | 2131 |  |  |  |  |  |  |  |  |  |  |  | 2132 |  |  |  |  |  |  |  |  |  |  |  | 2133 |  |  |  |  |  |  |  |  |  |  |  | 2134 |  |  |  |  |  |  |  |  |  |  |  | 2135 |  |  |  |  |  |  |  |  |  |  |  | 2136 |  |  |  |  |  |  |  |  |  |  |  | 2137 |  |  |  |  |  |  |  |  |  |  |  | 2138 |  |  |  |  |  |  |  |  |  |  |  | 2139 |  |  |  |  |  |  |  |  |  |  |  | 2140 |  |  |  |  |  |  |  |  |  |  |  | 2141 |  |  |  |  |  |  |  |  |  |  |  | 2142 |  |  |  |  |  |  |  |  |  |  |  | 2143 |  |  |  |  |  |  |  |  |  |  |  | 2144 |  |  |  |  |  |  |  |  |  |  |  | 2145 |  |  |  |  |  |  |  |  |  |  |  | 2146 |  |  |  |  |  |  |  |  |  |  |  | 2147 |  |  |  |  |  |  |  |  |  |  |  | 2148 |  |  |  |  |  |  |  |  |  |  |  | 2149 |  |  |  |  |  |  |  |  |  |  |  | 2150 |  |  |  |  |  |  |  |  |  |  |  | 2151 |  |  |  |  |  |  |  |  |  |  |  | 2152 |  |  |  |  |  |  |  |  |  |  |  | 2153 |  |  |  |  |  |  |  |  |  |  |  | 2154 |  |  |  |  |  |  |  |  |  |  |  | 2155 |  |  |  |  |  |  |  |  |  |  |  | 2156 |  |  |  |  |  |  |  |  |  |  |  | 2157 |  |  |  |  |  |  |  |  |  |  |  | 2158 |  |  |  |  |  |  |  |  |  |  |  | 2159 |  |  |  |  |  |  |  |  |  |  |  | 2160 |  |  |  |  |  |  |  |  |  |  |  | 2161 |  |  |  |  |  |  |  |  |  |  |  | 2162 |  |  |  |  |  |  |  |  |  |  |  | 2163 |  |  |  |  |  |  |  |  |  |  |  | 2164 |  |  |  |  |  |  |  |  |  |  |  | 2165 |  |  |  |  |  |  |  |  |  |  |  | 2166 |  |  |  |  |  |  |  |  |  |  |  | 2167 |  |  |  |  |  |  |  |  |  |  |  | 2168 |  |  |  |  |  |  |  |  |  |  |  | 2169 |  |  |  |  |  |  |  |  |  |  |  | 2170 |  |  |  |  |  |  |  |  |  |  |  | 2171 |  |  |  |  |  |  |  |  |  |  |  | 2172 |  |  |  |  |  |  |  |  |  |  |  | 2173 |  |  |  |  |  |  |  |  |  |  |  | 2174 |  |  |  |  |  |  |  |  |  |  |  | 2175 |  |  |  |  |  |  |  |  |  |  |  | 2176 |  |  |  |  |  |  |  |  |  |  |  | 2177 |  |  |  |  |  |  |  |  |  |  |  | 2178 |  |  |  |  |  |  |  |  |  |  |  | 2179 |  |  |  |  |  |  |  |  |  |  |  | 2180 |  |  |  |  |  |  |  |  |  |  |  | 2181 |  |  |  |  |  |  |  |  |  |  |  | 2182 |  |  |  |  |  |  |  |  |  |  |  | 2183 |  |  |  |  |  |  |  |  |  |  |  | 2184 |  |  |  |  |  |  |  |  |  |  |  | 2185 |  |  |  |  |  |  |  |  |  |  |  | 2186 |  |  |  |  |  |  |  |  |  |  |  | 2187 |  |  |  |  |  |  |  |  |  |  |  | 2188 |  |  |  |  |  |  |  |  |  |  |  | 2189 |  |  |  |  |  |  |  |  |  |  |  | 2190 |  |  |  |  |  |  |  |  |  |  |  | 2191 |  |  |  |  |  |  |  |  |  |  |  | 2192 |  |  |  |  |  |  |  |  |  |  |  | 2193 |  |  |  |  |  |  |  |  |  |  |  | 2194 |  |  |  |  |  |  |  |  |  |  |  | 2195 |  |  |  |  |  |  |  |  |  |  |  | 2196 |  |  |  |  |  |  |  |  |  |  |  | 2197 |  |  |  |  |  |  |  |  |  |  |  | 2198 |  |  |  |  |  |  |  |  |  |  |  | 2199 |  |  |  |  |  |  |  |  |  |  |  | 2200 |  |  |  |  |  |  |  |  |  |  |  | 2201 |  |  |  |  |  |  |  |  |  |  |  | 2202 |  |  |  |  |  |  |  |  |  |  |  | 2203 |  |  |  |  |  |  |  |  |  |  |  | 2204 |  |  |  |  |  |  |  |  |  |  |  | 2205 |  |  |  |  |  |  |  |  |  |  |  | 2206 |  |  |  |  |  |  |  |  |  |  |  | 2207 |  |  |  |  |  |  |  |  |  |  |  | 2208 |  |  |  |  |  |  |  |  |  |  |  | 2209 |  |  |  |  |  |  |  |  |  |  |  | 2210 |  |  |  |  |  |  |  |  |  |  |  | 2211 |  |  |  |  |  |  |  |  |  |  |  | 2212 |  |  |  |  |  |  |  |  |  |  |  | 2213 |  |  |  |  |  |  |  |  |  |  |  | 2214 |  |  |  |  |  |  |  |  |  |  |  | 2215 |  |  |  |  |  |  |  |  |  |  |  | 2216 |  |  |  |  |  |  |  |  |  |  |  | 2217 |  |  |  |  |  |  |  |  |  |  |  | 2218 |  |  |  |  |  |  |  |  |  |  |  | 2219 |  |  |  |  |  |  |  |  |  |  |  | 2220 |  |  |  |  |  |  |  |  |  |  |  | 2221 |  |  |  |  |  |  |  |  |  |  |  | 2222 |  |  |  |  |  |  |  |  |  |  |  | 2223 |  |  |  |  |  |  |  |  |  |  |  | 2224 |  |  |  |  |  |  |  |  |  |  |  | 2225 |  |  |  |  |  |  |  |  |  |  |  | 2226 |  |  |  |  |  |  |  |  |  |  |  | 2227 |  |  |  |  |  |  |  |  |  |  |  | 2228 |  |  |  |  |  |  |  |  |  |  |  | 2229 |  |  |  |  |  |  |  |  |  |  |  | 2230 |  |  |  |  |  |  |  |  |  |  |  | 2231 |  |  |  |  |  |  |  |  |  |  |  | 2232 |  |  |  |  |  |  |  |  |  |  |  | 2233 |  |  |  |  |  |  |  |  |  |  |  | 2234 |  |  |  |  |  |  |  |  |  |  |  | 2235 |  |  |  |  |  |  |  |  |  |  |  | 2236 |  |  |  |  |  |  |  |  |  |  |  | 2237 |  |  |  |  |  |  |  |  |  |  |  | 2238 |  |  |  |  |  |  |  |  |  |  |  | 2239 |  |  |  |  |  |  |  |  |  |  |  | 2240 |  |  |  |  |  |  |  |  |  |  |  | 2241 |  |  |  |  |  |  |  |  |  |  |  | 2242 |  |  |  |  |  |  |  |  |  |  |  | 2243 |  |  |  |  |  |  |  |  |  |  |  | 2244 |  |  |  |  |  |  |  |  |  |  |  | 2245 |  |  |  |  |  |  |  |  |  |  |  | 2246 |  |  |  |  |  |  |  |  |  |  |  | 2247 |  |  |  |  |  |  |  |  |  |  |  | 2248 |  |  |  |  |  |  |  |  |  |  |  | 2249 |  |  |  |  |  |  |  |  |  |  |  | 2250 |  |  |  |  |  |  |  |  |  |  |  | 2251 |  |  |  |  |  |  |  |  |  |  |  | 2252 |  |  |  |  |  |  |  |  |  |  |  | 2253 |  |  |  |  |  |  |  |  |  |  |  | 2254 |  |  |  |  |  |  |  |  |  |  |  | 2255 |  |  |  |  |  |  |  |  |  |  |  | 2256 |  |  |  |  |  |  |  |  |  |  |  | 2257 |  |  |  |  |  |  |  |  |  |  |  | 2258 |  |  |  |  |  |  |  |  |  |  |  | 2259 |  |  |  |  |  |  |  |  |  |  |  | 2260 |  |  |  |  |  |  |  |  |  |  |  | 2261 |  |  |  |  |  |  |  |  |  |  |  | 2262 |  |  |  |  |  |  |  |  |  |  |  | 2263 |  |  |  |  |  |  |  |  |  |  |  | 2264 |  |  |  |  |  |  |  |  |  |  |  | 2265 |  |  |  |  |  |  |  |  |  |  |  | 2266 |  |  |  |  |  |  |  |  |  |  |  | 2267 |  |  |  |  |  |  |  |  |  |  |  | 2268 |  |  |  |  |  |  |  |  |  |  |  | 2269 |  |  |  |  |  |  |  |  |  |  |  | 2270 |  |  |  |  |  |  |  |  |  |  |  | 2271 |  |  |  |  |  |  |  |  |  |  |  | 2272 |  |  |  |  |  |  |  |  |  |  |  | 2273 |  |  |  |  |  |  |  |  |  |  |  | 2274 |  |  |  |  |  |  |  |  |  |  |  | 2275 |  |  |  |  |  |  |  |  |  |  |  | 2276 |  |  |  |  |  |  |  |  |  |  |  | 2277 |  |  |  |  |  |  |  |  |  |  |  | 2278 |  |  |  |  |  |  |  |  |  |  |  | 2279 |  |  |  |  |  |  |  |  |  |  |  | 2280 |  |  |  |  |  |  |  |  |  |  |  | 2281 |  |  |  |  |  |  |  |  |  |  |  | 2282 |  |  |  |  |  |  |  |  |  |  |  | 2283 |  |  |  |  |  |  |  |  |  |  |  | 2284 |  |  |  |  |  |  |  |  |  |  |  | 2285 |  |  |  |  |  |  |  |  |  |  |  | 2286 |  |  |  |  |  |  |  |  |  |  |  | 2287 |  |  |  |  |  |  |  |  |  |  |  | 2288 |  |  |  |  |  |  |  |  |  |  |  | 2289 |  |  |  |  |  |  |  |  |  |  |  | 2290 |  |  |  |  |  |  |  |  |  |  |  | 2291 |  |  |  |  |  |  |  |  |  |  |  | 2292 |  |  |  |  |  |  |  |  |  |  |  | 2293 |  |  |  |  |  |  |  |  |  |  |  | 2294 |  |  |  |  |  |  |  |  |  |  |  | 2295 |  |  |  |  |  |  |  |  |  |  |  | 2296 |  |  |  |  |  |  |  |  |  |  |  | 2297 |  |  |  |  |  |  |  |  |  |  |  | 2298 |  |  |  |  |  |  |  |  |  |  |  | 2299 |  |  |  |  |  |  |  |  |  |  |  | 2300 |  |  |  |  |  |  |  |  |  |  |  | 2301 |  |  |  |  |  |  |  |  |  |  |  | 2302 |  |  |  |  |  |  |  |  |  |  |  | 2303 |  |  |  |  |  |  |  |  |  |  |  | 2304 |  |  |  |  |  |  |  |  |  |  |  | 2305 |  |  |  |  |  |  |  |  |  |  |  | 2306 |  |  |  |  |  |  |  |  |  |  |  | 2307 |  |  |  |  |  |  |  |  |  |  |  | 2308 |  |  |  |  |  |  |  |  |  |  |  | 2309 |  |  |  |  |  |  |  |  |  |  |  | 2310 |  |  |  |  |  |  |  |  |  |  |  | 2311 |  |  |  |  |  |  |  |  |  |  |  | 2312 |  |  |  |  |  |  |  |  |  |  |  | 2313 |  |  |  |  |  |  |  |  |  |  |  | 2314 |  |  |  |  |  |  |  |  |  |  |  | 2315 |  |  |  |  |  |  |  |  |  |  |  | 2316 |  |  |  |  |  |  |  |  |  |  |  | 2317 |  |  |  |  |  |  |  |  |  |  |  | 2318 |  |  |  |  |  |  |  |  |  |  |  | 2319 |  |  |  |  |  |  |  |  |  |  |  | 2320 |  |  |  |  |  |  |  |  |  |  |  | 2321 |  |  |  |  |  |  |  |  |  |  |  | 2322 |  |  |  |  |  |  |  |  |  |  |  | 2323 |  |  |  |  |  |  |  |  |  |  |  | 2324 |  |  |  |  |  |  |  |  |  |  |  | 2325 |  |  |  |  |  |  |  |  |  |  |  | 2326 |  |  |  |  |  |  |  |  |  |  |  | 2327 |  |  |  |  |  |  |  |  |  |  |  | 2328 |  |  |  |  |  |  |  |  |  |  |  | 2329 |  |  |  |  |  |  |  |  |  |  |  | 2330 |  |  |  |  |  |  |  |  |  |  |  | 2331 |  |  |  |  |  |  |  |  |  |  |  | 2332 |  |  |  |  |  |  |  |  |  |  |  | 2333 |  |  |  |  |  |  |  |  |  |  |  | 2334 |  |  |  |  |  |  |  |  |  |  |  | 2335 |  |  |  |  |  |  |  |  |  |  |  | 2336 |  |  |  |  |  |  |  |  |  |  |  | 2337 |  |  |  |  |  |  |  |  |  |  |  | 2338 |  |  |  |  |  |  |  |  |  |  |  | 2339 |  |  |  |  |  |  |  |  |  |  |  | 2340 |  |  |  |  |  |  |  |  |  |  |  | 2341 |  |  |  |  |  |  |  |  |  |  |  | 2342 |  |  |  |  |  |  |  |  |  |  |  | 2343 |  |  |  |  |  |  |  |  |  |  |  | 2344 |  |  |  |  |  |  |  |  |  |  |  | 2345 |  |  |  |  |  |  |  |  |  |  |  | 2346 |  |  |  |  |  |  |  |  |  |  |  | 2347 |  |  |  |  |  |  |  |  |  |  |  | 2348 |  |  |  |  |  |  |  |  |  |  |  | 2349 |  |  |  |  |  |  |  |  |  |  |  | 2350 |  |  |  |  |  |  |  |  |  |  |  | 2351 |  |  |  |  |  |  |  |  |  |  |  | 2352 |  |  |  |  |  |  |  |  |  |  |  | 2353 |  |  |  |  |  |  |  |  |  |  |  | 2354 |  |  |  |  |  |  |  |  |  |  |  | 2355 |  |  |  |  |  |  |  |  |  |  |  | 2356 |  |  |  |  |  |  |  |  |  |  |  | 2357 |  |  |  |  |  |  |  |  |  |  |  | 2358 |  |  |  |  |  |  |  |  |  |  |  | 2359 |  |  |  |  |  |  |  |  |  |  |  | 2360 |  |  |  |  |  |  |  |  |  |  |  | 2361 |  |  |  |  |  |  |  |  |  |  |  | 2362 |  |  |  |  |  |  |  |  |  |  |  | 2363 |  |  |  |  |  |  |  |  |  |  |  | 2364 |  |  |  |  |  |  |  |  |  |  |  | 2365 |  |  |  |  |  |  |  |  |  |  |  | 2366 |  |  |  |  |  |  |  |  |  |  |  | 2367 |  |  |  |  |  |  |  |  |  |  |  | 2368 |  |  |  |  |  |  |  |  |  |  |  | 2369 |  |  |  |  |  |  |  |  |  |  |  | 2370 |  |  |  |  |  |  |  |  |  |  |  | 2371 |  |  |  |  |  |  |  |  |  |  |  | 2372 |  |  |  |  |  |  |  |  |  |  |  | 2373 |  |  |  |  |  |  |  |  |  |  |  | 2374 |  |  |  |  |  |  |  |  |  |  |  | 2375 |  |  |  |  |  |  |  |  |  |  |  | 2376 |  |  |  |  |  |  |  |  |  |  |  | 2377 |  |  |  |  |  |  |  |  |  |  |  | 2378 |  |  |  |  |  |  |  |  |  |  |  | 2379 |  |  |  |  |  |  |  |  |  |  |  | 2380 |  |  |  |  |  |  |  |  |  |  |  | 2381 |  |  |  |  |  |  |  |  |  |  |  | 2382 |  |  |  |  |  |  |  |  |  |  |  | 2383 |  |  |  |  |  |  |  |  |  |  |  | 2384 |  |  |  |  |  |  |  |  |  |  |  | 2385 |  |  |  |  |  |  |  |  |  |  |  | 2386 |  |  |  |  |  |  |  |  |  |  |  | 2387 |  |  |  |  |  |  |  |  |  |  |  | 2388 |  |  |  |  |  |  |  |  |  |  |  | 2389 |  |  |  |  |  |  |  |  |  |  |  | 2390 |  |  |  |  |  |  |  |  |  |  |  | 2391 |  |  |  |  |  |  |  |  |  |  |  | 2392 |  |  |  |  |  |  |  |  |  |  |  | 2393 |  |  |  |  |  |  |  |  |  |  |  | 2394 |  |  |  |  |  |  |  |  |  |  |  | 2395 |  |  |  |  |  |  |  |  |  |  |  | 2396 |  |  |  |  |  |  |  |  |  |  |  | 2397 |  |  |  |  |  |  |  |  |  |  |  | 2398 |  |  |  |  |  |  |  |  |  |  |  | 2399 |  |  |  |  |  |  |  |  |  |  |  | 2400 |  |  |  |  |  |  |  |  |  |  |  | 2401 |  |  |  |  |  |  |  |  |  |  |  | 2402 |  |  |  |  |  |  |  |  |  |  |  | 2403 |  |  |  |  |  |  |  |  |  |  |  | 2404 |  |  |  |  |  |  |  |  |  |  |  | 2405 |  |  |  |  |  |  |  |  |  |  |  | 2406 |  |  |  |  |  |  |  |  |  |  |  | 2407 |  |  |  |  |  |  |  |  |  |  |  | 2408 |  |  |  |  |  |  |  |  |  |  |  | 2409 |  |  |  |  |  |  |  |  |  |  |  | 2410 |  |  |  |  |  |  |  |  |  |  |  | 2411 |  |  |  |  |  |  |  |  |  |  |  | 2412 |  |  |  |  |  |  |  |  |  |  |  | 2413 |  |  |  |  |  |  |  |  |  |  |  | 2414 |  |  |  |  |  |  |  |  |  |  |  | 2415 |  |  |  |  |  |  |  |  |  |  |  | 2416 |  |  |  |  |  |  |  |  |  |  |  | 2417 |  |  |  |  |  |  |  |  |  |  |  | 2418 |  |  |  |  |  |  |  |  |  |  |  | 2419 |  |  |  |  |  |  |  |  |  |  |  | 2420 |  |  |  |  |  |  |  |  |  |  |  | 2421 |  |  |  |  |  |  |  |  |  |  |  | 2422 |  |  |  |  |  |  |  |  |  |  |  | 2423 |  |  |  |  |  |  |  |  |  |  |  | 2424 |  |  |  |  |  |  |  |  |  |  |  | 2425 |  |  |  |  |  |  |  |  |  |  |  | 2426 |  |  |  |  |  |  |  |  |  |  |  | 2427 |  |  |  |  |  |  |  |  |  |  |  | 2428 |  |  |  |  |  |  |  |  |  |  |  | 2429 |  |  |  |  |  |  |  |  |  |  |  | 2430 |  |  |  |  |  |  |  |  |  |  |  | 2431 |  |  |  |  |  |  |  |  |  |  |  | 2432 |  |  |  |  |  |  |  |  |  |  |  | 2433 |  |  |  |  |  |  |  |  |  |  |  | 2434 |  |  |  |  |  |  |  |  |  |  |  | 2435 |  |  |  |  |  |  |  |  |  |  |  | 2436 |  |  |  |  |  |  |  |  |  |  |  | 2437 |  |  |  |  |  |  |  |  |  |  |  | 2438 |  |  |  |  |  |  |  |  |  |  |  | 2439 |  |  |  |  |  |  |  |  |  |  |  | 2440 |  |  |  |  |  |  |  |  |  |  |  | 2441 |  |  |  |  |  |  |  |  |  |  |  | 2442 |  |  |  |  |  |  |  |  |  |  |  | 2443 |  |  |  |  |  |  |  |  |  |  |  | 2444 |  |  |  |  |  |  |  |  |  |  |  | 2445 |  |  |  |  |  |  |  |  |  |  |  | 2446 |  |  |  |  |  |  |  |  |  |  |  | 2447 |  |  |  |  |  |  |  |  |  |  |  | 2448 |  |  |  |  |  |  |  |  |  |  |  | 2449 |  |  |  |  |  |  |  |  |  |  |  | 2450 |  |  |  |  |  |  |  |  |  |  |  | 2451 |  |  |  |  |  |  |  |  |  |  |  | 2452 |  |  |  |  |  |  |  |  |  |  |  | 2453 |  |  |  |  |  |  |  |  |  |  |  | 2454 |  |  |  |  |  |  |  |  |  |  |  | 2455 |  |  |  |  |  |  |  |  |  |  |  | 2456 |  |  |  |  |  |  |  |  |  |  |  | 2457 |  |  |  |  |  |  |  |  |  |  |  | 2458 |  |  |  |  |  |  |  |  |  |  |  | 2459 |  |  |  |  |  |  |  |  |  |  |  | 2460 |  |  |  |  |  |  |  |  |  |  |  | 2461 |  |  |  |  |  |  |  |  |  |  |  | 2462 |  |  |  |  |  |  |  |  |  |  |  | 2463 |  |  |  |  |  |  |  |  |  |  |  | 2464 |  |  |  |  |  |  |  |  |  |  |  | 2465 |  |  |  |  |  |  |  |  |  |  |  | 2466 |  |  |  |  |  |  |  |  |  |  |  | 2467 |  |  |  |  |  |  |  |  |  |  |  | 2468 |  |  |  |  |  |  |  |  |  |  |  | 2469 |  |  |  |  |  |  |  |  |  |  |  | 2470 |  |  |  |  |  |  |  |  |  |  |  | 2471 |  |  |  |  |  |  |  |  |  |  |  | 2472 |  |  |  |  |  |  |  |  |  |  |  | 2473 |  |  |  |  |  |  |  |  |  |  |  | 2474 |  |  |  |  |  |  |  |  |  |  |  | 2475 |  |  |  |  |  |  |  |  |  |  |  | 2476 |  |  |  |  |  |  |  |  |  |  |  | 2477 |  |  |  |  |  |  |  |  |  |  |  | 2478 |  |  |  |  |  |  |  |  |  |  |  | 2479 |  |  |  |  |  |  |  |  |  |  |  | 2480 |  |  |  |  |  |  |  |  |  |  |  | 2481 |  |  |  |  |  |  |  |  |  |  |  | 2482 |  |  |  |  |  |  |  |  |  |  |  | 2483 |  |  |  |  |  |  |  |  |  |  |  | 2484 |  |  |  |  |  |  |  |  |  |  |  | 2485 |  |  |  |  |  |  |  |  |  |  |  | 2486 |  |  |  |  |  |  |  |  |  |  |  | 2487 |  |  |  |  |  |  |  |  |  |  |  | 2488 |  |  |  |  |  |  |  |  |  |  |  | 2489 |  |  |  |  |  |  |  |  |  |  |  | 2490 |  |  |  |  |  |  |  |  |  |  |  | 2491 |  |  |  |  |  |  |  |  |  |  |  | 2492 |  |  |  |  |  |  |  |  |  |  |  | 2493 |  |  |  |  |  |  |  |  |  |  |  | 2494 |  |  |  |  |  |  |  |  |  |  |  | 2495 |  |  |  |  |  |  |  |  |  |  |  | 2496 |  |  |  |  |  |  |  |  |  |  |  | 2497 |  |  |  |  |  |  |  |  |  |  |  | 2498 |  |  |  |  |  |  |  |  |  |  |  | 2499 |  |  |  |  |  |  |  |  |  |  |  | 2500 |  |  |  |  |  |  |  |  |  |  |  | 2501 |  |  |  |  |  |  |  |  |  |  |  | 2502 |  |  |  |  |  |  |  |  |  |  |  | 2503 |  |  |  |  |  |  |  |  |  |  |  | 2504 |  |  |  |  |  |  |  |  |  |  |  | 2505 |  |  |  |  |  |  |  |  |  |  |  | 2506 |  |  |  |  |  |  |  |  |  |  |  | 2507 |  |  |  |  |  |  |  |  |  |  |  | 2508 |  |  |  |  |  |  |  |  |  |  |  | 2509 |  |  |  |  |  |  |  |  |  |  |  | 2510 |  |  |  |  |  |  |  |  |  |  |  | 2511 |  |  |  |  |  |  |  |  |  |  |  | 2512 |  |  |  |  |  |  |  |  |  |  |  | 2513 |  |  |  |  |  |  |  |  |  |  |  | 2514 |  |  |  |  |  |  |  |  |  |  |  | 2515 |  |  |  |  |  |  |  |  |  |  |  | 2516 |  |  |  |  |  |  |  |  |  |  |  | 2517 |  |  |  |  |  |  |  |  |  |  |  | 2518 |  |  |  |  |  |  |  |  |  |  |  | 2519 |  |  |  |  |  |  |  |  |  |  |  | 2520 |  |  |  |  |  |  |  |  |  |  |  | 2521 |  |  |  |  |  |  |  |  |  |  |  | 2522 |  |  |  |  |  |  |  |  |  |  |  | 2523 |  |  |  |  |  |  |  |  |  |  |  | 2524 |  |  |  |  |  |  |  |  |  |  |  | 2525 |  |  |  |  |  |  |  |  |  |  |  | 2526 |  |  |  |  |  |  |  |  |  |  |  | 2527 |  |  |  |  |  |  |  |  |  |  |  | 2528 |  |  |  |  |  |  |  |  |  |  |  | 2529 |  |  |  |  |  |  |  |  |  |  |  | 2530 |  |  |  |  |  |  |  |  |  |  |  | 2531 |  |  |  |  |  |  |  |  |  |  |  | 2532 |  |  |  |  |  |  |  |  |  |  |  | 2533 |  |  |  |  |  |  |  |  |  |  |  | 2534 |  |  |  |  |  |  |  |  |  |  |  | 2535 |  |  |  |  |  |  |  |  |  |  |  | 2536 |  |  |  |  |  |  |  |  |  |  |  | 2537 |  |  |  |  |  |  |  |  |  |  |  | 2538 |  |  |  |  |  |  |  |  |  |  |  | 2539 |  |  |  |  |  |  |  |  |  |  |  | 2540 |  |  |  |  |  |  |  |  |  |  |  | 2541 |  |  |  |  |  |  |  |  |  |  |  | 2542 |  |  |  |  |  |  |  |  |  |  |  | 2543 |  |  |  |  |  |  |  |  |  |  |  | 2544 |  |  |  |  |  |  |  |  |  |  |  | 2545 |  |  |  |  |  |  |  |  |  |  |  | 2546 |  |  |  |  |  |  |  |  |  |  |  | 2547 |  |  |  |  |  |  |  |  |  |  |  | 2548 |  |  |  |  |  |  |  |  |  |  |  | 2549 |  |  |  |  |  |  |  |  |  |  |  | 2550 |  |  |  |  |  |  |  |  |  |  |  | 2551 |  |  |  |  |  |  |  |  |  |  |  | 2552 |  |  |  |  |  |  |  |  |  |  |  | 2553 |  |  |  |  |  |  |  |  |  |  |  | 2554 |  |  |  |  |  |  |  |  |  |  |  | 2555 |  |  |  |  |  |  |  |  |  |  |  | 2556 |  |  |  |  |  |  |  |  |  |  |  | 2557 |  |  |  |  |  |  |  |  |  |  |  | 2558 |  |  |  |  |  |  |  |  |  |  |  | 2559 |  |  |  |  |  |  |  |  |  |  |  | 2560 |  |  |  |  |  |  |  |  |  |  |  | 2561 |  |  |  |  |  |  |  |  |  |  |  | 2562 |  |  |  |  |  |  |  |  |  |  |  | 2563 |  |  |  |  |  |  |  |  |  |  |  | 2564 |  |  |  |  |  |  |  |  |  |  |  | 2565 |  |  |  |  |  |  |  |  |  |  |  | 2566 |  |  |  |  |  |  |  |  |  |  |  | 2567 |  |  |  |  |  |  |  |  |  |  |  | 2568 |  |  |  |  |  |  |  |  |  |  |  | 2569 |  |  |  |  |  |  |  |  |  |  |  | 2570 |  |  |  |  |  |  |  |  |  |  |  | 2571 |  |  |  |  |  |  |  |  |  |  |  | 2572 |  |  |  |  |  |  |  |  |  |  |  | 2573 |  |  |  |  |  |  |  |  |  |  |  | 2574 |  |  |  |  |  |  |  |  |  |  |  | 2575 |  |  |  |  |  |  |  |  |  |  |  | 2576 |  |  |  |  |  |  |  |  |  |  |  | 2577 |  |  |  |  |  |  |  |  |  |  |  | 2578 |  |  |  |  |  |  |  |  |  |  |  | 2579 |  |  |  |  |  |  |  |  |  |  |  | 2580 |  |  |  |  |  |  |  |  |  |  |  | 2581 |  |  |  |  |  |  |  |  |  |  |  | 2582 |  |  |  |  |  |  |  |  |  |  |  | 2583 |  |  |  |  |  |  |  |  |  |  |  | 2584 |  |  |  |  |  |  |  |  |  |  |  | 2585 |  |  |  |  |  |  |  |  |  |  |  | 2586 |  |  |  |  |  |  |  |  |  |  |  | 2587 |  |  |  |  |  |  |  |  |  |  |  | 2588 |  |  |  |  |  |  |  |  |  |  |  | 2589 |  |  |  |  |  |  |  |  |  |  |  | 2590 |  |  |  |  |  |  |  |  |  |  |  | 2591 |  |  |  |  |  |  |  |  |  |  |  | 2592 |  |  |  |  |  |  |  |  |  |  |  | 2593 |  |  |  |  |  |  |  |  |  |  |  | 2594 |  |  |  |  |  |  |  |  |  |  |  | 2595 |  |  |  |  |  |  |  |  |  |  |  | 2596 |  |  |  |  |  |  |  |  |  |  |  | 2597 |  |  |  |  |  |  |  |  |  |  |  | 2598 |  |  |  |  |  |  |  |  |  |  |  | 2599 |  |  |  |  |  |  |  |  |  |  |  | 2600 |  |  |  |  |  |  |  |  |  |  |  | 2601 |  |  |  |  |  |  |  |  |  |  |  | 2602 |  |  |  |  |  |  |  |  |  |  |  | 2603 |  |  |  |  |  |  |  |  |  |  |  | 2604 |  |  |  |  |  |  |  |  |  |  |  | 2605 |  |  |  |  |  |  |  |  |  |  |  | 2606 |  |  |  |  |  |  |  |  |  |  |  | 2607 |  |  |  |  |  |  |  |  |  |  |  | 2608 |  |  |  |  |  |  |  |  |  |  |  | 2609 |  |  |  |  |  |  |  |  |  |  |  | 2610 |  |  |  |  |  |  |  |  |  |  |  | 2611 |  |  |  |  |  |  |  |  |  |  |  | 2612 |  |  |  |  |  |  |  |  |  |  |  | 2613 |  |  |  |  |  |  |  |  |  |  |  | 2614 |  |  |  |  |  |  |  |  |  |  |  | 2615 |  |  |  |  |  |  |  |  |  |  |  | 2616 |  |  |  |  |  |  |  |  |  |  |  | 2617 |  |  |  |  |  |  |  |  |  |  |  | 2618 |  |  |  |  |  |  |  |  |  |  |  | 2619 |  |  |  |  |  |  |  |  |  |  |  | 2620 |  |  |  |  |  |  |  |  |  |  |  | 2621 |  |  |  |  |  |  |  |  |  |  |  | 2622 |  |  |  |  |  |  |  |  |  |  |  | 2623 |  |  |  |  |  |  |  |  |  |  |  | 2624 |  |  |  |  |  |  |  |  |  |  |  | 2625 |  |  |  |  |  |  |  |  |  |  |  | 2626 |  |  |  |  |  |  |  |  |  |  |  | 2627 |  |  |  |  |  |  |  |  |  |  |  | 2628 |  |  |  |  |  |  |  |  |  |  |  | 2629 |  |  |  |  |  |  |  |  |  |  |  | 2630 |  |  |  |  |  |  |  |  |  |  |  | 2631 |  |  |  |  |  |  |  |  |  |  |  | 2632 |  |  |  |  |  |  |  |  |  |  |  | 2633 |  |  |  |  |  |  |  |  |  |  |  | 2634 |  |  |  |  |  |  |  |  |  |  |  | 2635 |  |  |  |  |  |  |  |  |  |  |  | 2636 |  |  |  |  |  |  |  |  |  |  |  | 2637 |  |  |  |  |  |  |  |  |  |  |  | 2638 |  |  |  |  |  |  |  |  |  |  |  | 2639 |  |  |  |  |  |  |  |  |  |  |  | 2640 |  |  |  |  |  |  |  |  |  |  |  | 2641 |  |  |  |  |  |  |  |  |  |  |  | 2642 |  |  |  |  |  |  |  |  |  |  |  | 2643 |  |  |  |  |  |  |  |  |  |  |  | 2644 |  |  |  |  |  |  |  |  |  |  |  | 2645 |  |  |  |  |  |  |  |  |  |  |  | 2646 |  |  |  |  |  |  |  |  |  |  |  | 2647 |  |  |  |  |  |  |  |  |  |  |  | 2648 |  |  |  |  |  |  |  |  |  |  |  | 2649 |  |  |  |  |  |  |  |  |  |  |  | 2650 |  |  |  |  |  |  |  |  |  |  |  | 2651 |  |  |  |  |  |  |  |  |  |  |  | 2652 |  |  |  |  |  |  |  |  |  |  |  | 2653 |  |  |  |  |  |  |  |  |  |  |  | 2654 |  |  |  |  |  |  |  |  |  |  |  | 2655 |  |  |  |  |  |  |  |  |  |  |  | 2656 |  |  |  |  |  |  |  |  |  |  |  | 2657 |  |  |  |  |  |  |  |  |  |  |  | 2658 |  |  |  |  |  |  |  |  |  |  |  | 2659 |  |  |  |  |  |  |  |  |  |  |  | 2660 |  |  |  |  |  |  |  |  |  |  |  | 2661 |  |  |  |  |  |  |  |  |  |  |  | 2662 |  |  |  |  |  |  |  |  |  |  |  | 2663 |  |  |  |  |  |  |  |  |  |  |  | 2664 |  |  |  |  |  |  |  |  |  |  |  | 2665 |  |  |  |  |  |  |  |  |  |  |  | 2666 |  |  |  |  |  |  |  |  |  |  |  | 2667 |  |  |  |  |  |  |  |  |  |  |  | 2668 |  |  |  |  |  |  |  |  |  |  |  | 2669 |  |  |  |  |  |  |  |  |  |  |  | 2670 |  |  |  |  |  |  |  |  |  |  |  | 2671 |  |  |  |  |  |  |  |  |  |  |  | 2672 |  |  |  |  |  |  |  |  |  |  |  | 2673 |  |  |  |  |  |  |  |  |  |  |  | 2674 |  |  |  |  |  |  |  |  |  |  |  | 2675 |  |  |  |  |  |  |  |  |  |  |  | 2676 |  |  |  |  |  |  |  |  |  |  |  | 2677 |  |  |  |  |  |  |  |  |  |  |  | 2678 |  |  |  |  |  |  |  |  |  |  |  | 2679 |  |  |  |  |  |  |  |  |  |  |  | 2680 |  |  |  |  |  |  |  |  |  |  |  | 2681 |  |  |  |  |  |  |  |  |  |  |  | 2682 |  |  |  |  |  |  |  |  |  |  |  | 2683 |  |  |  |  |  |  |  |  |  |  |  | 2684 |  |  |  |  |  |  |  |  |  |  |  | 2685 |  |  |  |  |  |  |  |  |  |  |  | 2686 |  |  |  |  |  |  |  |  |  |  |  | 2687 |  |  |  |  |  |  |  |  |  |  |  | 2688 |  |  |  |  |  |  |  |  |  |  |  | 2689 |  |  |  |  |  |  |  |  |  |  |  | 2690 |  |  |  |  |  |  |  |  |  |  |  | 2691 |  |  |  |  |  |  |  |  |  |  |  | 2692 |  |  |  |  |  |  |  |  |  |  |  | 2693 |  |  |  |  |  |  |  |  |  |  |  | 2694 |  |  |  |  |  |  |  |  |  |  |  | 2695 |  |  |  |  |  |  |  |  |  |  |  | 2696 |  |  |  |  |  |  |  |  |  |  |  | 2697 |  |  |  |  |  |  |  |  |  |  |  | 2698 |  |  |  |  |  |  |  |  |  |  |  | 2699 |  |  |  |  |  |  |  |  |  |  |  | 2700 |  |  |  |  |  |  |  |  |  |  |  | 2701 |  |  |  |  |  |  |  |  |  |  |  | 2702 |  |  |  |  |  |  |  |  |  |  |  | 2703 |  |  |  |  |  |  |  |  |  |  |  | 2704 |  |  |  |  |  |  |  |  |  |  |  | 2705 |  |  |  |  |  |  |  |  |  |  |  | 2706 |  |  |  |  |  |  |  |  |  |  |  | 2707 |  |  |  |  |  |  |  |  |  |  |  | 2708 |  |  |  |  |  |  |  |  |  |  |  | 2709 |  |  |  |  |  |  |  |  |  |  |  | 2710 |  |  |  |  |  |  |  |  |  |  |  | 2711 |  |  |  |  |  |  |  |  |  |  |  | 2712 |  |  |  |  |  |  |  |  |  |  |  | 2713 |  |  |  |  |  |  |  |  |  |  |  | 2714 |  |  |  |  |  |  |  |  |  |  |  | 2715 |  |  |  |  |  |  |  |  |  |  |  | 2716 |  |  |  |  |  |  |  |  |  |  |  | 2717 |  |  |  |  |  |  |  |  |  |  |  | 2718 |  |  |  |  |  |  |  |  |  |  |  | 2719 |  |  |  |  |  |  |  |  |  |  |  | 2720 |  |  |  |  |  |  |  |  |  |  |  | 2721 |  |  |  |  |  |  |  |  |  |  |  | 2722 |  |  |  |  |  |  |  |  |  |  |  | 2723 |  |  |  |  |  |  |  |  |  |  |  | 2724 |  |  |  |  |  |  |  |  |  |  |  | 2725 |  |  |  |  |  |  |  |  |  |  |  | 2726 |  |  |  |  |  |  |  |  |  |  |  | 2727 |  |  |  |  |  |  |  |  |  |  |  | 2728 |  |  |  |  |  |  |  |  |  |  |  | 2729 |  |  |  |  |  |  |  |  |  |  |  | 2730 |  |  |  |  |  |  |  |  |  |  |  | 2731 |  |  |  |  |  |  |  |  |  |  |  | 2732 |  |  |  |  |  |  |  |  |  |  |  | 2733 |  |  |  |  |  |  |  |  |  |  |  | 2734 |  |  |  |  |  |  |  |  |  |  |  | 2735 |  |  |  |  |  |  |  |  |  |  |  | 2736 |  |  |  |  |  |  |  |  |  |  |  | 2737 |  |  |  |  |  |  |  |  |  |  |  | 2738 |  |  |  |  |  |  |  |  |  |  |  | 2739 |  |  |  |  |  |  |  |  |  |  |  | 2740 |  |  |  |  |  |  |  |  |  |  |  | 2741 |  |  |  |  |  |  |  |  |  |  |  | 2742 |  |  |  |  |  |  |  |  |  |  |  | 2743 |  |  |  |  |  |  |  |  |  |  |  | 2744 |  |  |  |  |  |  |  |  |  |  |  | 2745 |  |  |  |  |  |  |  |  |  |  |  | 2746 |  |  |  |  |  |  |  |  |  |  |  | 2747 |  |  |  |  |  |  |  |  |  |  |  | 2748 |  |  |  |  |  |  |  |  |  |  |  | 2749 |  |  |  |  |  |  |  |  |  |  |  | 2750 |  |  |  |  |  |  |  |  |  |  |  | 2751 |  |  |  |  |  |  |  |  |  |  |  | 2752 |  |  |  |  |  |  |  |  |  |  |  | 2753 |  |  |  |  |  |  |  |  |  |  |  | 2754 |  |  |  |  |  |  |  |  |  |  |  | 2755 |  |  |  |  |  |  |  |  |  |  |  | 2756 |  |  |  |  |  |  |  |  |  |  |  | 2757 |  |  |  |  |  |  |  |  |  |  |  | 2758 |  |  |  |  |  |  |  |  |  |  |  | 2759 |  |  |  |  |  |  |  |  |  |  |  | 2760 |  |  |  |  |  |  |  |  |  |  |  | 2761 |  |  |  |  |  |  |  |  |  |  |  | 2762 |  |  |  |  |  |  |  |  |  |  |  | 2763 |  |  |  |  |  |  |  |  |  |  |  | 2764 |  |  |  |  |  |  |  |  |  |  |  | 2765 |  |  |  |  |  |  |  |  |  |  |  | 2766 |  |  |  |  |  |  |  |  |  |  |  | 2767 |  |  |  |  |  |  |  |  |  |  |  | 2768 |  |  |  |  |  |  |  |  |  |  |  | 2769 |  |  |  |  |  |  |  |  |  |  |  | 2770 |  |  |  |  |  |  |  |  |  |  |  | 2771 |  |  |  |  |  |  |  |  |  |  |  | 2772 |  |  |  |  |  |  |  |  |  |  |  | 2773 |  |  |  |  |  |  |  |  |  |  |  | 2774 |  |  |  |  |  |  |  |  |  |  |  | 2775 |  |  |  |  |  |  |  |  |  |  |  | 2776 |  |  |  |  |  |  |  |  |  |  |  | 2777 |  |  |  |  |  |  |  |  |  |  |  | 2778 |  |  |  |  |  |  |  |  |  |  |  | 2779 |  |  |  |  |  |  |  |  |  |  |  | 2780 |  |  |  |  |  |  |  |  |  |  |  | 2781 |  |  |  |  |  |  |  |  |  |  |  | 2782 |  |  |  |  |  |  |  |  |  |  |  | 2783 |  |  |  |  |  |  |  |  |  |  |  | 2784 |  |  |  |  |  |  |  |  |  |  |  | 2785 |  |  |  |  |  |  |  |  |  |  |  | 2786 |  |  |  |  |  |  |  |  |  |  |  | 2787 |  |  |  |  |  |  |  |  |  |  |  | 2788 |  |  |  |  |  |  |  |  |  |  |  | 2789 |  |  |  |  |  |  |  |  |  |  |  | 2790 |  |  |  |  |  |  |  |  |  |  |  | 2791 |  |  |  |  |  |  |  |  |  |  |  | 2792 |  |  |  |  |  |  |  |  |  |  |  | 2793 |  |  |  |  |  |  |  |  |  |  |  | 2794 |  |  |  |  |  |  |  |  |  |  |  | 2795 |  |  |  |  |  |  |  |  |  |  |  | 2796 |  |  |  |  |  |  |  |  |  |  |  | 2797 |  |  |  |  |  |  |  |  |  |  |  | 2798 |  |  |  |  |  |  |  |  |  |  |  | 2799 |  |  |  |  |  |  |  |  |  |  |  | 2800 |  |  |  |  |  |  |  |  |  |  |  | 2801 |  |  |  |  |  |  |  |  |  |  |  | 2802 |  |  |  |  |  |  |  |  |  |  |  | 2803 |  |  |  |  |  |  |  |  |  |  |  | 2804 |  |  |  |  |  |  |  |  |  |  |  | 2805 |  |  |  |  |  |  |  |  |  |  |  | 2806 |  |  |  |  |  |  |  |  |  |  |  | 2807 |  |  |  |  |  |  |  |  |  |  |  | 2808 |  |  |  |  |  |  |  |  |  |  |  | 2809 |  |  |  |  |  |  |  |  |  |  |  | 2810 |  |  |  |  |  |  |  |  |  |  |  | 2811 |  |  |  |  |  |  |  |  |  |  |  | 2812 |  |  |  |  |  |  |  |  |  |  |  | 2813 |  |  |  |  |  |  |  |  |  |  |  | 2814 |  |  |  |  |  |  |  |  |  |  |  | 2815 |  |  |  |  |  |  |  |  |  |  |  | 2816 |  |  |  |  |  |  |  |  |  |  |  | 2817 |  |  |  |  |  |  |  |  |  |  |  | 2818 |  |  |  |  |  |  |  |  |  |  |  | 2819 |  |  |  |  |  |  |  |  |  |  |  | 2820 |  |  |  |  |  |  |  |  |  |  |  | 2821 |  |  |  |  |  |  |  |  |  |  |  | 2822 |  |  |  |  |  |  |  |  |  |  |  | 2823 |  |  |  |  |  |  |  |  |  |  |  | 2824 |  |  |  |  |  |  |  |  |  |  |  | 2825 |  |  |  |  |  |  |  |  |  |  |  | 2826 |  |  |  |  |  |  |  |  |  |  |  | 2827 |  |  |  |  |  |  |  |  |  |  |  | 2828 |  |  |  |  |  |  |  |  |  |  |  | 2829 |  |  |  |  |  |  |  |  |  |  |  | 2830 |  |  |  |  |  |  |  |  |  |  |  | 2831 |  |  |  |  |  |  |  |  |  |  |  | 2832 |  |  |  |  |  |  |  |  |  |  |  | 2833 |  |  |  |  |  |  |  |  |  |  |  | 2834 |  |  |  |  |  |  |  |  |  |  |  | 2835 |  |  |  |  |  |  |  |  |  |  |  | 2836 |  |  |  |  |  |  |  |  |  |  |  | 2837 |  |  |  |  |  |  |  |  |  |  |  | 2838 |  |  |  |  |  |  |  |  |  |  |  | 2839 |  |  |  |  |  |  |  |  |  |  |  | 2840 |  |  |  |  |  |  |  |  |  |  |  | 2841 |  |  |  |  |  |  |  |  |  |  |  | 2842 |  |  |  |  |  |  |  |  |  |  |  | 2843 |  |  |  |  |  |  |  |  |  |  |  | 2844 |  |  |  |  |  |  |  |  |  |  |  | 2845 |  |  |  |  |  |  |  |  |  |  |  | 2846 |  |  |  |  |  |  |  |  |  |  |  | 2847 |  |  |  |  |  |  |  |  |  |  |  | 2848 |  |  |  |  |  |  |  |  |  |  |  | 2849 |  |  |  |  |  |  |  |  |  |  |  | 2850 |  |  |  |  |  |  |  |  |  |  |  | 2851 |  |  |  |  |  |  |  |  |  |  |  | 2852 |  |  |  |  |  |  |  |  |  |  |  | 2853 |  |  |  |  |  |  |  |  |  |  |  | 2854 |  |  |  |  |  |  |  |  |  |  |  | 2855 |  |  |  |  |  |  |  |  |  |  |  | 2856 |  |  |  |  |  |  |  |  |  |  |  | 2857 |  |  |  |  |  |  |  |  |  |  |  | 2858 |  |  |  |  |  |  |  |  |  |  |  | 2859 |  |  |  |  |  |  |  |  |  |  |  | 2860 |  |  |  |  |  |  |  |  |  |  |  | 2861 |  |  |  |  |  |  |  |  |  |  |  | 2862 |  |  |  |  |  |  |  |  |  |  |  | 2863 |  |  |  |  |  |  |  |  |  |  |  | 2864 |  |  |  |  |  |  |  |  |  |  |  | 2865 |  |  |  |  |  |  |  |  |  |  |  | 2866 |  |  |  |  |  |  |  |  |  |  |  | 2867 |  |  |  |  |  |  |  |  |  |  |  | 2868 |  |  |  |  |  |  |  |  |  |  |  | 2869 |  |  |  |  |  |  |  |  |  |  |  | 2870 |  |  |  |  |  |  |  |  |  |  |  | 2871 |  |  |  |  |  |  |  |  |  |  |  | 2872 |  |  |  |  |  |  |  |  |  |  |  | 2873 |  |  |  |  |  |  |  |  |  |  |  | 2874 |  |  |  |  |  |  |  |  |  |  |  | 2875 |  |  |  |  |  |  |  |  |  |  |  | 2876 |  |  |  |  |  |  |  |  |  |  |  | 2877 |  |  |  |  |  |  |  |  |  |  |  | 2878 |  |  |  |  |  |  |  |  |  |  |  | 2879 |  |  |  |  |  |  |  |  |  |  |  | 2880 |  |  |  |  |  |  |  |  |  |  |  | 2881 |  |  |  |  |  |  |  |  |  |  |  | 2882 |  |  |  |  |  |  |  |  |  |  |  | 2883 |  |  |  |  |  |  |  |  |  |  |  | 2884 |  |  |  |  |  |  |  |  |  |  |  | 2885 |  |  |  |  |  |  |  |  |  |  |  | 2886 |  |  |  |  |  |  |  |  |  |  |  | 2887 |  |  |  |  |  |  |  |  |  |  |  | 2888 |  |  |  |  |  |  |  |  |  |  |  | 2889 |  |  |  |  |  |  |  |  |  |  |  | 2890 |  |  |  |  |  |  |  |  |  |  |  | 2891 |  |  |  |  |  |  |  |  |  |  |  | 2892 |  |  |  |  |  |  |  |  |  |  |  | 2893 |  |  |  |  |  |  |  |  |  |  |  | 2894 |  |  |  |  |  |  |  |  |  |  |  | 2895 |  |  |  |  |  |  |  |  |  |  |  | 2896 |  |  |  |  |  |  |  |  |  |  |  | 2897 |  |  |  |  |  |  |  |  |  |  |  | 2898 |  |  |  |  |  |  |  |  |  |  |  | 2899 |  |  |  |  |  |  |  |  |  |  |  | 2900 |  |  |  |  |  |  |  |  |  |  |  | 2901 |  |  |  |  |  |  |  |  |  |  |  | 2902 |  |  |  |  |  |  |  |  |  |  |  | 2903 |  |  |  |  |  |  |  |  |  |  |  | 2904 |  |  |  |  |  |  |  |  |  |  |  | 2905 |  |  |  |  |  |  |  |  |  |  |  | 2906 |  |  |  |  |  |  |  |  |  |  |  | 2907 |  |  |  |  |  |  |  |  |  |  |  | 2908 |  |  |  |  |  |  |  |  |  |  |  | 2909 |  |  |  |  |  |  |  |  |  |  |  | 2910 |  |  |  |  |  |  |  |  |  |  |  | 2911 |  |  |  |  |  |  |  |  |  |  |  | 2912 |  |  |  |  |  |  |  |  |  |  |  | 2913 |  |  |  |  |  |  |  |  |  |  |  | 2914 |  |  |  |  |  |  |  |  |  |  |  | 2915 |  |  |  |  |  |  |  |  |  |  |  | 2916 |  |  |  |  |  |  |  |  |  |  |  | 2917 |  |  |  |  |  |  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## APPENDIX P. SHIP FLOW OF EACH COUNTRY AROUND JAPAN (1985~1994) (8/8)

[illegible]

Note: \* means Ton is expressed by STD Ton  
Source: JAMES FIGHTING SHIP 1985-1986 - 1994-1995

# **APPENDIX Q. TREND OF MILITARY FORCE OF COUNTRIES AROUND JAPAN**

| Country              | Force                  | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|----------------------|------------------------|------|------|------|------|------|------|------|------|------|------|
| U.S.                 | <b>Seventh Fleet</b>   |      |      |      |      |      |      |      |      |      |      |
|                      | Total Number           | 70   | 70   | 70   | 70   | 70   | 70   | 60   | 60   | 60   | 60   |
|                      | Total Ton(million)     | 70   | 70   | 70   | 70   | 70   | 70   | 65   | 65   | 65   | 65   |
|                      | Air Craft              | 230  | 230  | 230  | 230  | 230  | 200  | 130  | 140  | 140  | 140  |
|                      | <b>In Korea</b>        |      |      |      |      |      |      |      |      |      |      |
|                      | Divisions              | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    |
|                      | Total Number(million)  | 3    | 3.2  | 3.1  | 3.2  | 3.2  | 3.2  | 3.2  | 3    | 2.6  | 2.6  |
|                      | Air Craft              | 100  | 100  | 100  | 100  | 100  | 110  | 90   | 90   | 80   | 80   |
|                      | <b>In Japan</b>        |      |      |      |      |      |      |      |      |      |      |
|                      | Divisions              | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    |
|                      | Total Number(million)  | 2.3  | 2.4  | 2.5  | 2.6  | 2.7  | 2.6  | 2.1  | 2.3  | 2.4  | 2.6  |
|                      | Air Craft              | 170  | 190  | 190  | 220  | 220  | 220  | 220  | 220  | 190  | 200  |
| Russia<br>(Far East) | <b>Ground Force</b>    |      |      |      |      |      |      |      |      |      |      |
|                      | Divisions              | 41   | 41   | 43   | 43   | 43   | 41   | 38   | 36   | 33   | 27   |
|                      | Total Number(million)  | 37   | 27   | 39   | 39   | 39   | 36   | 34   | 32   | 29   | 24   |
|                      | <b>Naval Vessels</b>   |      |      |      |      |      |      |      |      |      |      |
|                      | Total Number           | 835  | 840  | 840  | 845  | 840  | 830  | 820  | 780  | 760  | 745  |
|                      | Total Ton(million)     | 178  | 185  | 185  | 190  | 190  | 194  | 212  | 207  | 192  | 189  |
|                      | <b>Air Force</b>       |      |      |      |      |      |      |      |      |      |      |
| China                | <b>Combat Aircraft</b> | 2200 | 2390 | 2390 | 2430 | 2430 | 2240 | 2060 | 1860 | 1430 | 1220 |
|                      | <b>Ground Force</b>    |      |      |      |      |      |      |      |      |      |      |
|                      | Divisions              | 135  | 135  | 120  | 120  | 120  | 120  | 120  | 120  | 120  | 100  |
|                      | Total Number(million)  | 316  | 297  | 211  | 230  | 230  | 230  | 230  | 230  | 230  | 230  |
|                      | <b>Naval Vessels</b>   |      |      |      |      |      |      |      |      |      |      |
|                      | Total Number           | 1740 | 1730 | 1870 | 2000 | 1980 | 2060 | 2010 | 1910 | 1060 | 1080 |
|                      | Total Ton(million)     | 91.4 | 87.7 | 98.3 | 94.6 | 94.5 | 100  | 98   | 98   | 91   | 95   |
| South Korea          | <b>Air Force</b>       |      |      |      |      |      |      |      |      |      |      |
|                      | <b>Combat Aircraft</b> | 6010 | 6100 | 6200 | 6200 | 6000 | 6050 | 6080 | 6140 | 6170 | 6160 |
|                      | <b>Ground Force</b>    |      |      |      |      |      |      |      |      |      |      |
|                      | Divisions              | 22   | 21   | 21   | 21   | 21   | 21   | 21   | 21   | 22   | 22   |
|                      | Total Number(million)  | 54   | 52   | 52   | 54.2 | 54.2 | 55   | 55   | 55   | 55   | 55   |
|                      | <b>Naval Vessels</b>   |      |      |      |      |      |      |      |      |      |      |
|                      | Total Number           | 140  | 150  | 160  | 160  | 170  | 180  | 180  | 180  | 220  | 230  |
| North Korea          | Total Ton(million)     | 9.9  | 9    | 11   | 10.4 | 11.3 | 11.4 | 11.6 | 11   | 12.8 | 14   |
|                      | Marine (million)       | 2    | 2.2  | 2.3  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  |
|                      | <b>Air Force</b>       |      |      |      |      |      |      |      |      |      |      |
|                      | <b>Combat Aircraft</b> | 440  | 350  | 360  | 380  | 390  | 380  | 470  | 420  | 470  | 490  |
|                      | <b>Ground Force</b>    |      |      |      |      |      |      |      |      |      |      |
|                      | Divisions              | 39   | 33   | 33   | 32   | 26   | 31   | 25   | 25   | 30   | 26   |
|                      | Total Number(million)  | 70   | 75   | 75   | 75   | 75   | 93   | 93   | 93   | 100  | 113  |
| North Korea          | <b>Naval Vessels</b>   |      |      |      |      |      |      |      |      |      |      |
|                      | Total Number           | 500  | 510  | 520  | 510  | 520  | 590  | 590  | 620  | 620  | 620  |
|                      | Total Ton(million)     | 6.8  | 7    | 7.2  | 6.6  | 7.1  | 7.4  | 7.3  | 8.1  | 8.8  | 8.5  |
|                      | <b>Air Force</b>       |      |      |      |      |      |      |      |      |      |      |
|                      | <b>Combat Aircraft</b> | 740  | 700  | 750  | 740  | 770  | 770  | 790  | 800  | 810  | 810  |
|                      | <b>Ground Force</b>    |      |      |      |      |      |      |      |      |      |      |
|                      | Divisions              | 39   | 33   | 33   | 32   | 26   | 31   | 25   | 25   | 30   | 26   |
|                      | Total Number(million)  | 70   | 75   | 75   | 75   | 75   | 93   | 93   | 93   | 100  | 113  |

Note : 1 Data available from "Military Balance"etc.

2 Combat aircraft include navy and marine corps aircraft.

Source : Defense of Japan 1985~1994 (Japan Defense Agency)

## APPENDIX R. BASIC POLICY FOR JAPAN'S NATIONAL DEFENSE

The objective of national defense is to prevent direct and indirect aggression, but once invaded, to repel such action, thereby preserving the independence and peace of Japan founded upon democratic principles.

To achieve this objective, the government of Japan hereby establishes the following principles:

1. To support the activities of the United Nations and promote international cooperation, thereby contributing to the realization of world peace.
2. To promote public welfare and enhance the people's love for the country, thereby establishing the sound basis essential to Japan's security.
3. To develop progressively the effective defense capabilities necessary for self-defense, with regard to the nation's resources and the prevailing domestic situation.
4. To deal with external aggression on the basis of the Japan-U.S. security arrangements, pending the effective functioning of the United States in the future in deterring and repelling such aggression.

Source : Defense of Japan (Defense Agency, Japan)

## APPENDIX S. OUTLINE OF JAPAN'S DEFENSE BUILDUP FOR THE FUTURE

1. First of all, Japan will stick steadfastly to its exclusive defense policy under the peace constitution. At the same time, Japan, holding fast to the Japan-U.S., Security Arrangements, will continue maintaining the basic defense policy it has pursued over the past years, including the moderate improvement of its defense capability.
2. The defense-related expenditure for each fiscal year during the enforcement period of the Mid-Term Defense Program is decided within the framework of required expenses set forth in this program. And the total amount of expenses is set the actual ceiling of defense expenditure for the five years of the program that was scheduled to be prepared anew three years henceforth.
3. As regards defense-related expenditures in and after fiscal 1991, it will be decided, by the time in the Mid-Term Defense program is completed, in accordance with Japan's basic policy as a peace-loving nation by taking into consideration factors such as the international situation, and economic and fiscal situation.
4. Furthermore, considering that the decision on "Defense Buildup for the Time Being" in 1976 has so far played a vital role as a guideline for the defense buildup expenses, the government, with this well in mind, will continue holding in high esteem the spirit of the decision calling for a moderate defense buildup.

Source : Summary of Defense of Japan 1988 (Defense Agency, Japan)

# APPENDIX T. CHANGE IN DEFENSE EXPENDITURES

(Unit:100 million YEN. %)

| FY           | 1958    | 1959    | 1960    | 1961    | 1962    | 1963    | 1964    | 1965    |
|--------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Defence (DE) | 1,485   | 1,560   | 1,569   | 1,803   | 2,085   | 2,412   | 2,751   | 3,014   |
| GNP          | 102,470 | 107,620 | 127,480 | 156,200 | 176,700 | 203,900 | 240,700 | 281,600 |
| BUDGET       | 13,121  | 14,192  | 15,697  | 19,528  | 24,268  | 28,500  | 32,554  | 36,581  |
| Ratio(%)     |         |         |         |         |         |         |         |         |
| (1)DE/GNP    | 1.45%   | 1.45%   | 1.23%   | 1.15%   | 1.18%   | 1.18%   | 1.14%   | 1.07%   |
| (2)DE/BUGET  | 11.32%  | 10.99%  | 10.00%  | 9.23%   | 8.59%   | 8.46%   | 8.45%   | 8.24%   |

| FY           | 1966    | 1967    | 1968    | 1969    | 1970    | 1971    | 1972    | 1973      |
|--------------|---------|---------|---------|---------|---------|---------|---------|-----------|
| Defence (DE) | 3,407   | 3,809   | 4,221   | 4,838   | 5,695   | 6,709   | 8,002   | 9,355     |
| GNP          | 308,500 | 409,500 | 478,400 | 578,600 | 724,400 | 843,200 | 905,500 | 1,098,000 |
| BUDGET       | 43,143  | 49,509  | 58,185  | 67,395  | 79,497  | 94,143  | 114,677 | 142,841   |
| Ratio(%)     |         |         |         |         |         |         |         |           |
| (1)DE/GNP    | 1.10%   | 0.93%   | 0.88%   | 0.84%   | 0.79%   | 0.80%   | 0.88%   | 0.85%     |
| (2)DE/BUGET  | 7.90%   | 7.69%   | 7.25%   | 7.18%   | 7.16%   | 7.13%   | 6.98%   | 6.55%     |

| FY           | 1974      | 1975      | 1976      | 1977      | 1978      | 1979      | 1980      | 1981      |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Defence (DE) | 10,930    | 13,273    | 15,124    | 16,906    | 19,010    | 20,945    | 22,302    | 24,000    |
| GNP          | 1,315,000 | 1,585,000 | 1,681,000 | 1,928,500 | 2,106,000 | 2,320,000 | 2,478,000 | 2,648,000 |
| BUDGET       | 170,994   | 212,888   | 242,960   | 285,143   | 342,950   | 386,001   | 425,888   | 467,881   |
| Ratio(%)     |           |           |           |           |           |           |           |           |
| (1)DE/GNP    | 0.83%     | 0.84%     | 0.90%     | 0.88%     | 0.90%     | 0.90%     | 0.90%     | 0.91%     |
| (2)DE/BUGET  | 6.39%     | 6.23%     | 6.22%     | 5.93%     | 5.54%     | 5.43%     | 5.24%     | 5.13%     |

| FY           | 1982      | 1983      | 1984      | 1985      | 1986      | 1987      | 1988      | 1989      |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Defence (DE) | 25,861    | 27,542    | 29,346    | 31,371    | 33,435    | 35,174    | 37,003    | 39,198    |
| GNP          | 2,772,000 | 2,817,000 | 2,960,000 | 3,146,000 | 3,367,000 | 3,504,000 | 3,652,000 | 3,897,000 |
| BUDGET       | 496,808   | 503,796   | 506,272   | 524,996   | 540,886   | 541,010   | 566,997   | 604,142   |
| Ratio(%)     |           |           |           |           |           |           |           |           |
| (1)DE/GNP    | 0.93%     | 0.98%     | 0.99%     | 0.997%    | 0.993%    | 1.004%    | 1.013%    | 1.006%    |
| (2)DE/BUGET  | 5.21%     | 5.47%     | 5.80%     | 5.98%     | 6.18%     | 6.50%     | 6.53%     | 6.49%     |

| FY           | 1990      | 1991      | 1992      | 1993      | 1994      |
|--------------|-----------|-----------|-----------|-----------|-----------|
| Defence (DE) | 41,593    | 43,860    | 45,518    | 46,406    | 46,835    |
| GNP          | 4,172,000 | 4,596,000 | 4,837,000 | 4,953,000 | 4,940,000 |
| BUDGET       | 662,368   | 703,474   | 722,180   | 723,548   | 730,817   |
| Ratio(%)     |           |           |           |           |           |
| (1)DE/GNP    | 0.997%    | 0.954%    | 0.941%    | 0.937%    | 0.948%    |
| (2)DE/BUGET  | 6.28%     | 6.23%     | 6.30%     | 6.41%     | 6.41%     |

Source: BOUEI HANDBOOK (Asagumo Shinbunsha)

note: 1. BUDGET is shown by Original Budget.

2. GNP is Shown by Initial forecasted GNP.

3. Defense Expenditure and Budget of FY1994 are Government Plan

APPENDIX U. CHANGE IN JAPAN'S MAJOR GENERAL ACCOUNT  
EXPENDITURES (ORIGINAL BUDGET)

(Unit: 100 million Yen Expressed in Nominal Term)

| Fiscal Year         | 1973    | 1974    | 1975    | 1976    | 1977    | 1978    | 1979    | 1980    | 1981    | 1982    | 1983    |
|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Social Welfare      | 21,154  | 28,919  | 39,282  | 48,076  | 56,919  | 67,811  | 76,266  | 82,124  | 88,369  | 90,848  | 91,398  |
| Education & Science | 15,708  | 19,633  | 26,401  | 30,292  | 34,301  | 38,516  | 42,997  | 45,250  | 47,420  | 48,637  | 48,186  |
| Defense             | 9,355   | 10,930  | 13,273  | 15,124  | 16,906  | 19,010  | 20,945  | 22,302  | 24,000  | 25,861  | 27,542  |
| public Works        | 28,408  | 28,407  | 29,095  | 35,272  | 42,810  | 54,501  | 65,401  | 66,554  | 66,554  | 66,554  | 66,554  |
| Others              | 68,221  | 83,105  | 104,837 | 114,196 | 134,207 | 163,112 | 180,392 | 209,659 | 241,537 | 264,906 | 270,116 |
| Total               | 142,846 | 170,994 | 212,888 | 242,960 | 285,143 | 342,950 | 386,001 | 425,889 | 467,880 | 496,806 | 503,796 |

| Fiscal Year         | 1984    | 1985    | 1986    | 1987    | 1988    | 1989    | 1990    | 1991    | 1992    | 1993    | 1994    |
|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Social Welfare      | 93,210  | 95,736  | 98,346  | 100,896 | 103,845 | 108,947 | 116,148 | 122,132 | 127,378 | 131,457 | 134,816 |
| Education & Science | 48,665  | 48,409  | 48,445  | 48,497  | 48,581  | 49,371  | 51,129  | 53,944  | 56,834  | 58,205  | 59,578  |
| Defense             | 29,346  | 31,371  | 33,435  | 35,174  | 37,003  | 39,198  | 41,593  | 43,860  | 45,518  | 46,406  | 46,835  |
| public Works        | 65,200  | 63,689  | 62,233  | 60,824  | 60,824  | 61,974  | 62,147  | 65,897  | 69,409  | 73,354  | 77,546  |
| Others              | 269,849 | 285,792 | 298,426 | 295,618 | 316,744 | 344,653 | 391,350 | 417,641 | 423,041 | 414,126 | 412,042 |
| Total               | 506,270 | 524,997 | 540,885 | 541,009 | 566,997 | 604,143 | 662,367 | 703,474 | 722,180 | 723,548 | 730,817 |

Source : Kaijijueitai Yosan Jomuteiyou (kaijoubakuryoukanbu)

# APPENDIX V. TREND IN JAPAN'S DEFENSE EXPENDITURES (BY EXPENSE)

(Unit: 1000 Yen, Expressed in nominal term)

| FISCAL YEAR                    | 1974          | 1975          | 1976          | 1977          | 1978          | 1979          | 1980          |
|--------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| PERSONNEL & PROVISIONS         | 529,646,420   | 702,088,220   | 847,656,901   | 930,391,598   | 1,034,505,944 | 1,076,450,985 | 1,099,977,831 |
| CURRENT-YEAR MATERIAL          | 304,785,726   | 352,767,151   | 372,498,221   | 408,649,106   | 468,851,617   | 572,411,176   | 607,885,174   |
| CURRENT-YEAR OBLIGATORY OUTLAY | 258,591,749   | 272,466,501   | 292,195,474   | 351,572,621   | 397,672,032   | 445,627,130   | 522,339,473   |
| TOTAL                          | 1,093,023,895 | 1,327,321,872 | 1,512,350,596 | 1,690,613,325 | 1,901,029,593 | 2,094,489,291 | 2,230,202,478 |

| FISCAL YEAR                    | 1981          | 1982          | 1983          | 1984          | 1985          | 1986          | 1987          |
|--------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| PERSONNEL & PROVISIONS         | 1,144,369,784 | 1,205,311,648 | 1,225,824,750 | 1,309,441,289 | 1,413,952,438 | 1,508,551,282 | 1,543,867,016 |
| CURRENT-YEAR MATERIAL          | 631,062,141   | 679,339,320   | 673,185,236   | 642,070,591   | 649,725,434   | 665,137,387   | 708,593,611   |
| CURRENT-YEAR OBLIGATORY OUTLAY | 624,586,984   | 701,484,503   | 855,224,397   | 983,132,904   | 1,073,470,276 | 1,169,860,401 | 1,264,973,154 |
| TOTAL                          | 2,400,018,909 | 2,586,135,471 | 2,754,234,383 | 2,934,644,784 | 3,137,148,148 | 3,343,549,070 | 3,517,433,781 |

| FISCAL YEAR                    | 1988          | 1989          | 1990          | 1991          | 1992          | 1993          |
|--------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| PERSONNEL & PROVISIONS         | 1,578,864,769 | 1,613,580,741 | 1,668,028,636 | 1,756,766,471 | 1,880,769,818 | 1,939,563,630 |
| CURRENT-YEAR MATERIAL          | 770,487,217   | 838,074,880   | 908,434,203   | 929,152,825   | 938,151,236   | 958,180,670   |
| CURRENT-YEAR OBLIGATORY OUTLAY | 1,530,975,954 | 1,467,178,674 | 1,582,878,247 | 1,700,115,710 | 1,732,918,169 | 1,747,894,974 |
| TOTAL                          | 3,880,327,940 | 3,918,834,295 | 4,159,341,086 | 4,386,035,006 | 4,551,839,223 | 4,645,639,274 |

Source : Kaiyouseijitai Yosan Jimteiyou (Kaiyoubakuryoukanbu)



APPENDIX W. TREND IN JAPAN'S DEFENSE EXPENDITURES  
(BY ORGANIZATION)

(Unit : 1000 Yen, Expressed in nominal term)

| FISCAL YEAR  | 1974          | 1975          | 1976          | 1977          | 1978          | 1979          | 1980          |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| JGSDF BUDGET | 436,063,610   | 556,630,000   | 651,653,279   | 714,429,431   | 799,065,903   | 859,871,056   | 887,274,653   |
| JMSDF BUDGET | 238,992,567   | 268,047,521   | 314,051,000   | 357,156,190   | 421,108,858   | 454,003,847   | 509,657,110   |
| JASDF BUDGET | 279,999,635   | 335,587,135   | 362,179,754   | 413,594,535   | 437,841,542   | 482,653,097   | 514,435,291   |
| OTHS BUDGET  | 137,968,083   | 167,057,216   | 184,466,563   | 205,433,169   | 243,013,290   | 297,961,291   | 318,835,424   |
| TOTAL        | 1,093,023,895 | 1,327,321,872 | 1,512,350,596 | 1,690,613,325 | 1,901,029,593 | 2,094,489,291 | 2,230,202,478 |

| FISCAL YEAR  | 1981          | 1982          | 1983          | 1984          | 1985          | 1986          | 1987          |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| JGSDF BUDGET | 944,307,702   | 986,020,584   | 1,027,337,475 | 1,077,538,962 | 1,161,200,110 | 1,249,516,952 | 1,286,199,804 |
| JMSDF BUDGET | 553,162,912   | 602,902,259   | 654,037,117   | 705,983,574   | 733,266,575   | 793,286,424   | 861,548,204   |
| JASDF BUDGET | 564,635,120   | 633,668,319   | 699,426,640   | 758,720,730   | 827,518,662   | 870,559,587   | 898,284,910   |
| OTHS BUDGET  | 337,913,175   | 363,544,309   | 373,433,151   | 392,401,518   | 415,162,801   | 430,186,107   | 471,400,863   |
| TOTAL        | 2,400,018,909 | 2,586,135,471 | 2,754,234,383 | 2,934,644,784 | 3,137,148,148 | 3,343,549,070 | 3,517,433,781 |

| FISCAL YEAR  | 1988          | 1989          | 1990          | 1991          | 1992          | 1993          | 1994          |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| JGSDF BUDGET | 1,330,266,311 | 1,379,272,640 | 1,474,852,513 | 1,563,154,276 | 1,633,400,000 | 1,667,540,000 | 1,702,702,000 |
| JMSDF BUDGET | 940,748,823   | 971,559,836   | 976,022,583   | 1,085,383,204 | 1,100,200,000 | 1,084,906,000 | 1,110,515,000 |
| JASDF BUDGET | 934,169,264   | 1,030,049,496 | 1,121,705,999 | 1,118,218,270 | 1,153,200,000 | 1,178,963,000 | 1,133,515,000 |
| OTHS BUDGET  | 495,143,542   | 537,952,323   | 586,759,991   | 619,279,256   | 665,100,000   | 709,230,000   | 736,816,000   |
| TOTAL        | 3,700,327,940 | 3,918,834,295 | 4,159,341,086 | 4,386,035,006 | 4,551,900,000 | 4,640,639,000 | 4,683,548,000 |

Source : Kaijouietai Yosan Jimuteiyou (Kaijoubakuryoukanbu)

APPENDIX X. TREND IN EACH SERVICE'S BUDGET AS A  
PERCENTAGE OF GNP (BY ORGANIZATION) IN JAPAN

| FISCAL YEAR    | 1974   | 1975   | 1976   | 1977   | 1978   | 1979   | 1980   |
|----------------|--------|--------|--------|--------|--------|--------|--------|
| JGSD F BUDGET  | 0.332% | 0.351% | 0.388% | 0.370% | 0.379% | 0.371% | 0.358% |
| JMSDF BUDGET   | 0.182% | 0.169% | 0.187% | 0.185% | 0.200% | 0.196% | 0.206% |
| JASDF BUDGET   | 0.213% | 0.212% | 0.215% | 0.214% | 0.208% | 0.208% | 0.208% |
| OTHER'S BUDGET | 0.105% | 0.105% | 0.110% | 0.107% | 0.115% | 0.128% | 0.129% |
| TOTAL          | 0.831% | 0.837% | 0.900% | 0.877% | 0.903% | 0.903% | 0.900% |

| FISCAL YEAR    | 1981   | 1982   | 1983   | 1984   | 1985   | 1986   | 1987   |
|----------------|--------|--------|--------|--------|--------|--------|--------|
| JGSD F BUDGET  | 0.357% | 0.356% | 0.365% | 0.364% | 0.369% | 0.371% | 0.367% |
| JMSDF BUDGET   | 0.209% | 0.170% | 0.232% | 0.239% | 0.233% | 0.236% | 0.246% |
| JASDF BUDGET   | 0.213% | 0.229% | 0.248% | 0.256% | 0.263% | 0.259% | 0.256% |
| OTHER'S BUDGET | 0.128% | 0.131% | 0.133% | 0.133% | 0.132% | 0.128% | 0.135% |
| TOTAL          | 0.906% | 0.933% | 0.978% | 0.991% | 0.997% | 0.993% | 1.004% |

| FISCAL YEAR    | 1988   | 1989   | 1990   | 1991   | 1992   | 1993   | 1994   |
|----------------|--------|--------|--------|--------|--------|--------|--------|
| JGSD F BUDGET  | 0.364% | 0.354% | 0.354% | 0.340% | 0.338% | 0.337% | 0.345% |
| JMSDF BUDGET   | 0.258% | 0.249% | 0.234% | 0.236% | 0.227% | 0.219% | 0.225% |
| JASDF BUDGET   | 0.256% | 0.264% | 0.269% | 0.243% | 0.238% | 0.238% | 0.229% |
| OTHER'S BUDGET | 0.136% | 0.138% | 0.141% | 0.135% | 0.138% | 0.143% | 0.149% |
| TOTAL          | 1.013% | 1.006% | 0.997% | 0.954% | 0.941% | 0.937% | 0.948% |

Source : Kaijijijieitai Yosan Jimuteiyoyu

# APPENDIX Y. TREND IN JMSEF BUDGET (BY EXPENSES)

| FISCAL YEAR                    | 1974        | 1975        | 1976        | 1977        | 1978        | 1979        |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| PERSONNEL & PROVISIONS         | 94,699,262  | 122,846,066 | 149,937,055 | 163,262,653 | 179,762,677 | 185,334,281 |
| CURRENT-TEAR OBLIGATORY OUTLAY | 88,474,142  | 78,643,333  | 93,336,011  | 117,989,670 | 156,902,314 | 166,073,958 |
| CURRENT-YEAR MATERIAL          | 55,819,163  | 66,558,122  | 70,777,934  | 75,903,867  | 84,443,867  | 102,595,608 |
| TOTAL                          | 238,992,567 | 268,047,521 | 314,051,000 | 357,156,190 | 421,108,858 | 454,003,847 |

(Unit : 1000Yen, Expressed in minimal term)

| FISCAL YEAR                    | 1980        | 1981        | 1982        | 1983        | 1984        | 1985        |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| PERSONNEL & PROVISIONS         | 191,297,957 | 203,530,509 | 219,986,573 | 221,455,053 | 241,612,693 | 258,862,267 |
| CURRENT-TEAR OBLIGATORY OUTLAY | 208,331,903 | 235,123,960 | 256,648,036 | 307,216,830 | 351,878,604 | 358,749,604 |
| CURRENT-YEAR MATERIAL          | 110,027,250 | 114,508,443 | 126,267,650 | 125,365,234 | 112,492,277 | 115,654,204 |
| TOTAL                          | 509,657,110 | 553,162,912 | 602,902,259 | 654,037,117 | 705,983,574 | 733,266,075 |

| FISCAL YEAR                    | 1986        | 1987        | 1988        | 1989        | 1990        | 1991          |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|---------------|
| PERSONNEL & PROVISIONS         | 282,669,925 | 301,194,097 | 310,677,258 | 311,969,791 | 317,413,953 | 331,312,132   |
| CURRENT-TEAR OBLIGATORY OUTLAY | 392,317,167 | 437,329,163 | 489,198,578 | 504,890,583 | 487,397,898 | 581,473,610   |
| CURRENT-YEAR MATERIAL          | 118,299,332 | 123,024,944 | 140,872,987 | 154,699,462 | 171,210,732 | 172,297,462   |
| TOTAL                          | 793,286,424 | 861,548,204 | 940,748,823 | 971,559,836 | 976,022,583 | 1,085,083,204 |

| FISCAL YEAR                    | 1992          | 1993          | 1994          |
|--------------------------------|---------------|---------------|---------------|
| PERSONNEL & PROVISIONS         | 352,100,000   | 365,255,946   | 382,792,413   |
| CURRENT-TEAR OBLIGATORY OUTLAY | 583,400,000   | 559,103,981   | 572,199,103   |
| CURRENT-YEAR MATERIAL          | 168,500,000   | 160,545,838   | 155,523,691   |
| TOTAL                          | 1,104,000,000 | 1,084,905,765 | 1,110,515,207 |

Source : Kaijouietai Yoson Jimuteiyou (Kaijoubakuryoukanbu)

# APPENDIX Z. TREND IN JMSDF BUDGET (BY 3 COMPONENTS)

|   |                        | (Unit : 1000Yen, Expressed in nominal term) |            |            |            |            |            |            |            |            |            |  |  |
|---|------------------------|---------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--|--|
|   |                        | 1955                                        | 1956       | 1957       | 1958       | 1959       | 1960       | 1961       | 1962       | 1963       | 1964       |  |  |
| 1 | Personnel & Provisions | 3,751,705                                   | 5,551,961  | 6,888,630  | 7,106,355  | 8,121,650  | 9,586,280  | 11,382,979 | 13,734,107 | 16,024,315 | 18,964,681 |  |  |
|   | Personnel              | ..                                          | ..         | ..         | ..         | ..         | ..         | ..         | ..         | ..         | ..         |  |  |
|   | Provisions             | ..                                          | ..         | ..         | ..         | ..         | ..         | ..         | ..         | ..         | ..         |  |  |
| 2 | Flot-Line              | 5,544,680                                   | 8,165,571  | 5,200,543  | 7,133,104  | 11,267,817 | 13,480,314 | 15,014,571 | 14,436,714 | 13,305,675 | 16,520,257 |  |  |
|   | Ship                   | 5,544,680                                   | 7,804,378  | 5,200,543  | 6,711,416  | 8,195,834  | 9,460,712  | 8,005,970  | 6,987,894  | 9,526,228  | 10,717,186 |  |  |
|   | Aircraft               | 0                                           | 361,193    | 0          | 421,688    | 3,073,243  | 3,984,413  | 6,011,726  | 6,016,785  | 2,270,371  | 3,960,605  |  |  |
|   | Amunition              | 0                                           | 0          | 0          | 0          | 1,740      | 35,189     | 996,875    | 1,452,235  | 1,509,076  | 1,842,466  |  |  |
| 3 | Others                 | 9,715,952                                   | 9,137,007  | 10,035,936 | 11,430,341 | 12,813,561 | 13,525,306 | 16,025,416 | 19,295,435 | 22,504,971 | 22,556,593 |  |  |
| 4 | TOTAL                  | 19,012,337                                  | 22,854,539 | 21,925,109 | 25,669,800 | 32,203,028 | 36,591,900 | 42,423,026 | 47,466,256 | 51,834,961 | 58,041,531 |  |  |

|   |                        | 1965       | 1966       | 1967       | 1968       | 1969        | 1970        | 1971        | 1972        | 1973        | 1974        |  |  |
|---|------------------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|--|--|
| 1 | Personnel & Provisions | 22,702,398 | 25,731,298 | 28,931,137 | 33,429,846 | 38,523,576  | 45,595,607  | 54,233,668  | 64,296,981  | 76,186,068  | 94,699,262  |  |  |
|   | Personnel              | ..         | ..         | ..         | ..         | ..          | ..          | ..          | ..          | ..          | ..          |  |  |
|   | Provisions             | ..         | ..         | ..         | ..         | ..          | ..          | ..          | ..          | ..          | ..          |  |  |
| 2 | Flot-Line              | 19,933,305 | 20,398,770 | 23,371,295 | 27,669,137 | 36,850,351  | 51,087,600  | 64,076,737  | 74,074,522  | 76,220,965  | 76,302,541  |  |  |
|   | Ship                   | 13,657,606 | 14,836,034 | 17,220,429 | 18,751,384 | 21,071,000  | 22,815,329  | 30,463,008  | 35,369,449  | 36,573,559  | 43,439,980  |  |  |
|   | Aircraft               | 4,059,427  | 3,348,111  | 3,497,407  | 6,314,583  | 13,030,092  | 25,329,438  | 30,001,167  | 34,986,618  | 35,519,312  | 28,196,529  |  |  |
|   | Amunition              | 2,216,272  | 2,214,625  | 2,653,459  | 2,603,170  | 2,749,259   | 29,527,732  | 3,612,622   | 3,718,455   | 4,128,094   | 4,666,032   |  |  |
| 3 | Others                 | 25,425,287 | 28,914,099 | 32,693,402 | 36,170,624 | 39,033,417  | 42,587,984  | 43,909,630  | 49,491,948  | 62,043,884  | 67,990,764  |  |  |
| 4 | TOTAL                  | 68,061,990 | 75,044,167 | 84,995,834 | 97,269,607 | 114,407,344 | 139,281,191 | 162,220,095 | 187,863,451 | 214,452,927 | 238,992,567 |  |  |

|   |                        | 1975        | 1976        | 1977        | 1978        | 1979        | 1980        | 1981        | 1982        | 1983        | 1984        |  |  |
|---|------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--|--|
| 1 | Personnel & Provisions | 122,846,066 | 149,937,055 | 163,262,653 | 179,762,677 | 185,334,281 | 191,297,957 | 203,530,509 | 219,986,573 | 221,455,053 | 241,612,693 |  |  |
|   | Personnel              | 117,101,727 | 143,507,653 | 156,835,786 | 172,738,026 | 178,487,242 | 183,657,108 | 195,220,126 | 211,933,374 | 213,610,019 | 233,337,365 |  |  |
|   | Provisions             | 5,744,339   | 6,429,402   | 6,426,867   | 7,024,651   | 6,847,039   | 7,640,849   | 8,310,383   | 8,053,199   | 7,845,034   | 8,275,328   |  |  |
| 2 | Flot-Line              | 67,798,003  | 79,282,791  | 94,825,664  | 122,036,601 | 129,885,952 | 159,706,698 | 184,520,099 | 205,031,650 | 224,606,414 | 280,595,496 |  |  |
|   | Ship                   | 30,505,971  | 45,435,678  | 54,778,854  | 80,355,593  | 90,752,394  | 116,159,631 | 129,848,344 | 129,010,634 | 145,533,804 | 167,256,728 |  |  |
|   | Aircraft               | 32,013,465  | 27,302,695  | 32,247,862  | 34,760,293  | 29,969,429  | 33,770,764  | 44,384,208  | 61,917,254  | 63,562,177  | 94,498,117  |  |  |
|   | Amunition              | 5,278,567   | 6,544,418   | 7,798,948   | 6,920,715   | 9,164,129   | 9,776,303   | 10,287,547  | 14,103,762  | 15,510,433  | 18,840,651  |  |  |
| 3 | Others                 | 77,403,452  | 84,831,154  | 99,067,873  | 119,309,580 | 138,783,614 | 158,652,455 | 165,112,304 | 177,884,036 | 207,975,650 | 183,775,385 |  |  |
| 4 | TOTAL                  | 268,047,521 | 314,051,000 | 357,156,190 | 421,108,858 | 454,003,847 | 509,657,110 | 553,162,912 | 602,902,259 | 654,037,117 | 705,983,574 |  |  |

|   |                        | 1985        | 1986        | 1987        | 1988        | 1989        | 1990        | 1991          | 1992          | 1993          |  |  |
|---|------------------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|---------------|---------------|--|--|
| 1 | Personnel & Provisions | 258,862,767 | 282,669,925 | 301,194,097 | 310,677,258 | 311,969,791 | 317,413,953 | 331,612,132   | 352,070,892   | 365,255,946   |  |  |
|   | Personnel              | 250,243,013 | 273,905,603 | 292,209,236 | 301,411,255 | 302,651,459 | 307,889,707 | 323,319,513   | 344,950,847   | 357,982,462   |  |  |
|   | Provisions             | 8,619,754   | 8,764,322   | 8,984,861   | 9,266,003   | 9,316,332   | 9,524,246   | 8,292,619     | 7,120,045     | 7,273,484     |  |  |
| 2 | Flot-Line              | 278,395,331 | 313,741,813 | 338,066,676 | 383,589,887 | 365,232,202 | 317,391,989 | 424,201,821   | 367,768,428   | 351,512,700   |  |  |
|   | Ship                   | 167,226,780 | 173,761,134 | 171,185,059 | 197,900,806 | 186,803,025 | 140,526,832 | 190,880,170   | 166,575,259   | 176,908,926   |  |  |
|   | Aircraft               | 89,744,488  | 113,136,954 | 136,201,730 | 154,620,946 | 142,162,227 | 133,067,936 | 181,779,536   | 155,759,020   | 128,925,907   |  |  |
|   | Amunition              | 21,424,063  | 26,843,725  | 30,679,897  | 31,068,135  | 36,266,950  | 43,797,221  | 53,342,123    | 45,434,149    | 45,678,265    |  |  |
| 3 | Others                 | 196,008,477 | 196,874,686 | 222,287,431 | 246,481,678 | 294,357,843 | 341,216,641 | 329,569,251   | 380,315,090   | 369,137,119   |  |  |
| 4 | TOTAL                  | 733,266,575 | 793,286,424 | 861,548,204 | 940,748,823 | 971,559,836 | 976,022,583 | 1,085,393,204 | 1,100,154,410 | 1,084,905,765 |  |  |

Source : Kaijijoujietai Yosan Jimuteiyoi (Kaijibakuryoukanbu)

# APPENDIX AA. JMSDF SHIPBUILDING COST (BY TYPE)

|    | TYPE   | SHIP NAME  | REAL COST<br>(FY1985)<br>(1000 Yen) | Cost/Ton<br>(FY1985)<br>(1000 Yen) | Cost/Ton/GNP |
|----|--------|------------|-------------------------------------|------------------------------------|--------------|
| FY |        |            |                                     |                                    |              |
|    | DE     |            |                                     |                                    |              |
|    | FY1961 | KITAKAMI   | 7,420,057                           | 4,980                              | 6.88E-08     |
|    | 1967   | CHIKUGO    | 7,955,372                           | 5,412                              | 4.72E-08     |
|    | 1977   | ISHIKARI   | 14,068,471                          | 10,906                             | 4.99E-08     |
|    | 1979   | YUUBARI    | 16,396,047                          | 11,154                             | 4.59E-08     |
|    | 1986   | ABUKUMA    | 23,609,808                          | 11,805                             | 3.58E-08     |
|    | DD     |            |                                     |                                    |              |
|    | FY1962 | YAMAGUMO   | 10,110,612                          | 4,932                              | 6.87E-08     |
|    | 1963   | TAKATSUKI  | 14,242,918                          | 4,594                              | 5.82E-08     |
|    | 1977   | HATSUYUKI  | 32,894,496                          | 11,151                             | 5.23E-08     |
|    | 1983   | ASAGIRI    | 40,359,168                          | 11,531                             | 4.08E-08     |
|    | 1991   | HARUSAME   | 54,485,316                          | 12,383                             | 2.69E-08     |
|    | DDG    |            |                                     |                                    |              |
|    | FY1960 | AMATSUKAZE | 14,215,567                          | 4,661                              | 7.90E-08     |
|    | 1971   | TACHIKAZE  | 31,198,660                          | 8,104                              | 5.80E-08     |
|    | 1981   | HATAKAZE   | 62,670,571                          | 13,624                             | 5.11E-08     |
|    | 1988   | KONGOU     | 113,380,204                         | 15,747                             | 4.48E-08     |
|    | SS     |            |                                     |                                    |              |
|    | FY1960 | HAYASHIO   | 6,674,718                           | 8,449                              | 1.37E-07     |
|    | 1963   | OOSHIO     | 12,367,682                          | 7,496                              | 9.40E-08     |
|    | 1967   | UZUSHIO    | 15,479,852                          | 8,367                              | 7.23E-08     |
|    | 1975   | YUUSHIO    | 28,987,971                          | 13,176                             | 7.08E-08     |
|    | 1986   | HAMASHIO   | 31,724,905                          | 14,100                             | 5.25E-08     |

Source : Kaijouseitai Yosan Jimuteiyou (Kaijoubakuryoukanbu)

# APPENDIX AB. JMSDF AIRCRAFT INVENTORIES

| Fixed Wing |    | FY 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 |
|------------|----|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| P2V-7      |    |         | 6    | 6    | 10   | 16   | 19   | 29   | 42   | 56   | 56   | 59   | 60   | 59   | 59   | 58   | 55   | 50   | 43   | 37   | 30   |
| P-2J       |    |         |      |      |      |      |      |      |      |      |      |      |      | 1    | 1    | 1    | 3    | 14   | 25   | 36   | 47   |
| S2F-1      |    |         |      |      | 16   | 48   | 60   | 60   | 60   | 59   | 58   | 58   | 58   | 56   | 56   | 56   | 51   | 37   | 23   | 25   | 24   |
| PV-2       | 16 | 16      | 16   | 14   | 11   | 8    | 5    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| PBY-6A     | 2  | 2       | 2    | 2    | 2    | 1    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| TBM        | 10 | 14      | 20   | 16   | 15   | 7    | 7    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| PS-1       |    |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| OTHERS     | 13 | 17      | 29   | 81   | 93   | 91   | 90   | 88   | 100  | 89   | 85   | 85   | 68   | 62   | 60   | 60   | 75   | 82   | 84   | 84   | 90   |
| TOTAL      | 39 | 55      | 73   | 139  | 185  | 186  | 191  | 190  | 215  | 203  | 202  | 202  | 186  | 178  | 176  | 177  | 186  | 185  | 179  | 191  | 205  |

|        |    | FY 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 |
|--------|----|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| P2V-7  |    | 20      | 15   | 12   | 9    | 4    | 2    | 1    |      |      |      |      |      |      |      |      |      |      |      |      |
| P-2J   |    | 62      | 70   | 76   | 80   | 80   | 80   | 79   | 78   | 78   | 76   | 61   | 48   | 39   | 28   | 18   | 10   | 6    | 6    | 6    |
| P-3C   |    |         |      |      |      |      |      | 3    | 8    | 13   | 18   | 25   | 32   | 40   | 50   | 59   | 67   | 77   | 87   | 94   |
| S2F-1  |    | 24      | 24   | 24   | 25   | 22   | 17   | 13   | 10   |      |      |      |      |      |      |      |      |      |      |      |
| OTHERS | 15 | 17      | 17   | 18   | 19   | 19   | 19   | 17   | 15   | 13   | 9    | 5    | 3    |      |      |      |      |      |      |      |
| TOTAL  |    | 93      | 90   | 86   | 85   | 83   | 87   | 85   | 91   | 87   | 87   | 81   | 79   | 79   | 80   | 82   | 85   | 85   | 88   | 93   |
|        |    | 216     | 216  | 216  | 218  | 208  | 205  | 198  | 202  | 191  | 190  | 172  | 162  | 158  | 158  | 159  | 162  | 168  | 181  | 193  |

| helicopter |   | FY 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 |
|------------|---|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| HSS-2(A)   |   |         |      |      |      |      |      |      |      |      | 1    | 4    | 11   | 14   | 17   | 19   | 25   | 31   | 38   | 43   | 49   |
| HSS-1      |   |         |      |      | 1    | 4    | 7    | 7    | 7    | 5    | 5    | 5    | 5    | 5    | 5    | 4    | 3    | 3    | 1    |      |      |
| HSS-1N     |   |         |      |      |      |      |      | 5    | 5    | 9    | 9    | 9    | 9    | 9    | 9    | 9    | 8    | 8    | 8    | 5    | 2    |
| S-51       | 3 | 3       | 3    | 3    | 3    | 3    | 3    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| OTHERS     | 6 | 8       | 10   | 10   | 10   | 10   | 18   | 17   | 18   | 19   | 20   | 20   | 23   | 22   | 20   | 22   | 27   | 23   | 23   | 27   | 27   |
| TOTAL      |   | 9       | 11   | 13   | 13   | 14   | 17   | 28   | 29   | 32   | 34   | 38   | 48   | 50   | 51   | 54   | 63   | 65   | 70   | 75   | 78   |

| FY       | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| HSS-2(A) | 58   | 61   | 59   | 57   | 58   | 56   | 55   | 50   | 46   | 38   | 28   | 22   | 14   | 9    | 5    | 2    |      |      |      |
| HSS-2B   |      |      |      |      | 4    | 8    | 16   | 17   | 23   | 30   | 34   | 42   | 51   | 62   | 79   | 75   | 74   | 72   | 66   |
| SH-60J   |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 2    | 2    | 14   | 26   | 36   |
| OTHERS   | 30   | 30   | 32   | 31   | 33   | 33   | 34   | 32   | 32   | 32   | 29   | 29   | 27   | 28   | 28   | 31   | 32   | 37   | 39   |
| TOTAL    | 88   | 91   | 91   | 88   | 95   | 97   | 105  | 99   | 101  | 100  | 91   | 93   | 92   | 99   | 114  | 110  | 120  | 135  | 141  |

Source : Kantel to Koukuukisyuu (Kaijyoujieshinbunsha)

# APPENDIX AC. JMSDF AIRCRAFT PROCURING COST (BY TYPE)

(1000 Yen)

| FY         | AIRCRAFT | NOMINAL COST | REAL COST<br>-1985 |
|------------|----------|--------------|--------------------|
| Helicopter |          |              |                    |
| 1962       | HSS-2    | 345,899      | 1,114,834          |
| 1979       | HSS-2B   | 2,549,259    | 2,747,406          |
| 1988       | SH-60J   | 4,700,461    | 4,343,711          |
| Fixed Wing |          |              |                    |
| 1962       | P2V-7    | 679,153      | 2,190,154          |
| 1967       | P-2J     | 1,444,425    | 3,489,953          |
| 1978       | P-3C     | 7,486,908    | 8,166,289          |

Source : Kaijouisieitai Yosan Jimuteiyou (Kaijoubakuryoukanbu)

# APPENDIX AD. JMSDF SHIP INVENTORIES COMPARED WITH OTHER COUNTRIES

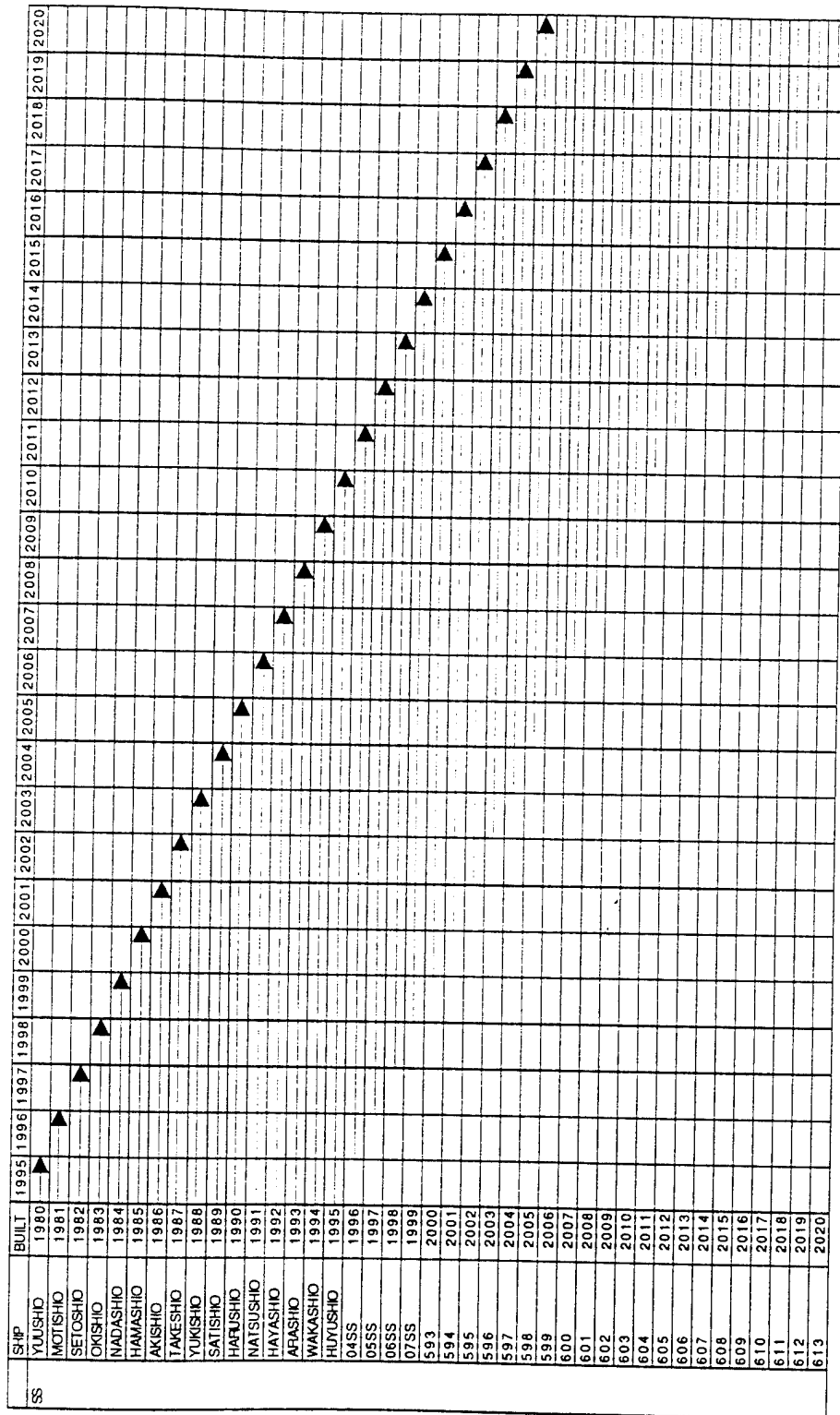
|                     | RUSSIA |                            | U.S. |                            | US(PACIFIC) |                            | FRANCE |                            | U.K. |                            |
|---------------------|--------|----------------------------|------|----------------------------|-------------|----------------------------|--------|----------------------------|------|----------------------------|
|                     | QTY    | DISPLACEMENT<br>(FULL TON) | QTY  | DISPLACEMENT<br>(FULL TON) | QTY         | DISPLACEMENT<br>(FULL TON) | QTY    | DISPLACEMENT<br>(FULL TON) | QTY  | DISPLACEMENT<br>(FULL TON) |
| SSBN                | 48     | 624,200                    | 17   | 287,250                    | 8           | 150,000                    | 5      | 44,600                     | 4    | 48,800                     |
| SSGN                | 22     | 215,000                    |      |                            |             |                            | 6      | 16,020                     |      |                            |
| SSG                 | 5      | 19,250                     |      |                            |             |                            |        |                            |      |                            |
| SSN                 | 53     | 374,500                    | 85   | 534,398                    | 30          | 183,562                    |        |                            | 12   | 65,800                     |
| SS                  | 65     | 198,548                    |      |                            |             |                            |        |                            | 2    | 4,910                      |
| CARRIER             | 2      | 112,000                    | 11   | 978,493                    | 6           | 533,412                    | 2      | 65,560                     | 2    | 41,200                     |
| CRUISER             | 14     | 186,750                    | 37   | 351,375                    | 17          | 162,335                    | 1      | 13,270                     |      |                            |
| DESTROYER           | 33     | 243,774                    | 40   | 329,646                    | 20          | 165,014                    | 15     | 75,006                     | 12   | 51,500                     |
| FRIGATE             | 139    | 263,900                    | 35   | 139,342                    | 13          | 52,376                     | 24     | 41,200                     | 24   | 107,600                    |
| MINE WAREFARE FORCE | 222    | 92,879                     | 15   | 18,725                     |             |                            | 21     | 11,385                     | 23   | 16,620                     |
| AMPHIBIOUS FORCE    | 72     | 233,234                    | 42   | 828,585                    | 25          | 474,235                    | 9      | 40,650                     | 1    | 16,950                     |
| TOTAL               | 675    | 2,564,035                  | 282  | 3,467,814                  | 119         | 1,720,934                  | 90     | 317,845                    | 80   | 353,380                    |

|                     | JAPAN |                            | U.S. Ships<br>Home ported in Japan |                            | CHINA |                            | NORTH KOREA |                            | SOUTH KOREA |                            |
|---------------------|-------|----------------------------|------------------------------------|----------------------------|-------|----------------------------|-------------|----------------------------|-------------|----------------------------|
|                     | QTY   | DISPLACEMENT<br>(FULL TON) | QTY                                | DISPLACEMENT<br>(FULL TON) | QTY   | DISPLACEMENT<br>(FULL TON) | QTY         | DISPLACEMENT<br>(FULL TON) | QTY         | DISPLACEMENT<br>(FULL TON) |
| SSBN                |       |                            |                                    |                            | 1     | 8,000                      |             |                            |             |                            |
| SSGN                |       |                            |                                    |                            |       |                            |             |                            |             |                            |
| SSG                 |       |                            |                                    |                            | 1     | 2,100                      |             |                            |             |                            |
| SSN                 |       |                            |                                    |                            | 5     | 25,000                     |             |                            |             |                            |
| SS                  | 17    | 43,210                     |                                    |                            | 38    | 71,804                     | 21          | 38,430                     | 2           | 2,570                      |
| CARRIER             |       |                            | 1                                  | 80,643                     |       |                            |             |                            |             |                            |
| CRUISER             |       |                            | 2                                  | 18,932                     |       |                            |             |                            |             |                            |
| DESTROYER           | 41    | 160,635                    | 3                                  | 24,120                     | 18    | 66,590                     |             |                            | 7           | 24,290                     |
| FRIGATE             | 20    | 36,630                     | 4                                  | 15,938                     | 38    | 68,426                     | 3           | 4,845                      | 9           | 20,100                     |
| MINE WAREFARE FORCE | 35    | 24,485                     | 4                                  | 83,289                     | 68    | 30,353                     | 29          | 1,740                      | 14          | 6,130                      |
| AMPHIBIOUS FORCE    | 8     | 11,830                     |                                    |                            | 62    | 135,080                    | 31          | 4,495                      | 16          | 41,520                     |
| TOTAL               | 121   | 276,790                    | 14                                 | 222,922                    | 231   | 407,353                    | 84          | 49,510                     | 48          | 94,610                     |
| (MIDGEE SS)         |       |                            |                                    |                            |       |                            | 60          | 5,400                      | 11          | 1,189                      |
| (CORVETTES)         |       |                            |                                    |                            |       |                            | 5           | 3,110                      | 27          | 32,364                     |
| (TOTAL)             |       |                            |                                    |                            |       |                            | 149         | 58,020                     | 86          | 128,163                    |

Source : JANE'S FIGHTING SHIP 1994-95



# APPENDIX AE. ESTIMATE OF SHIPBUILDING FLOW (1995-2020) (1/5)



|    |           |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----|-----------|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DD | TAKATSUKI | 1967 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | KIKUZUKI  | 1968 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | MINEGUMO  | 1968 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | MOTIZUKI  | 1969 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

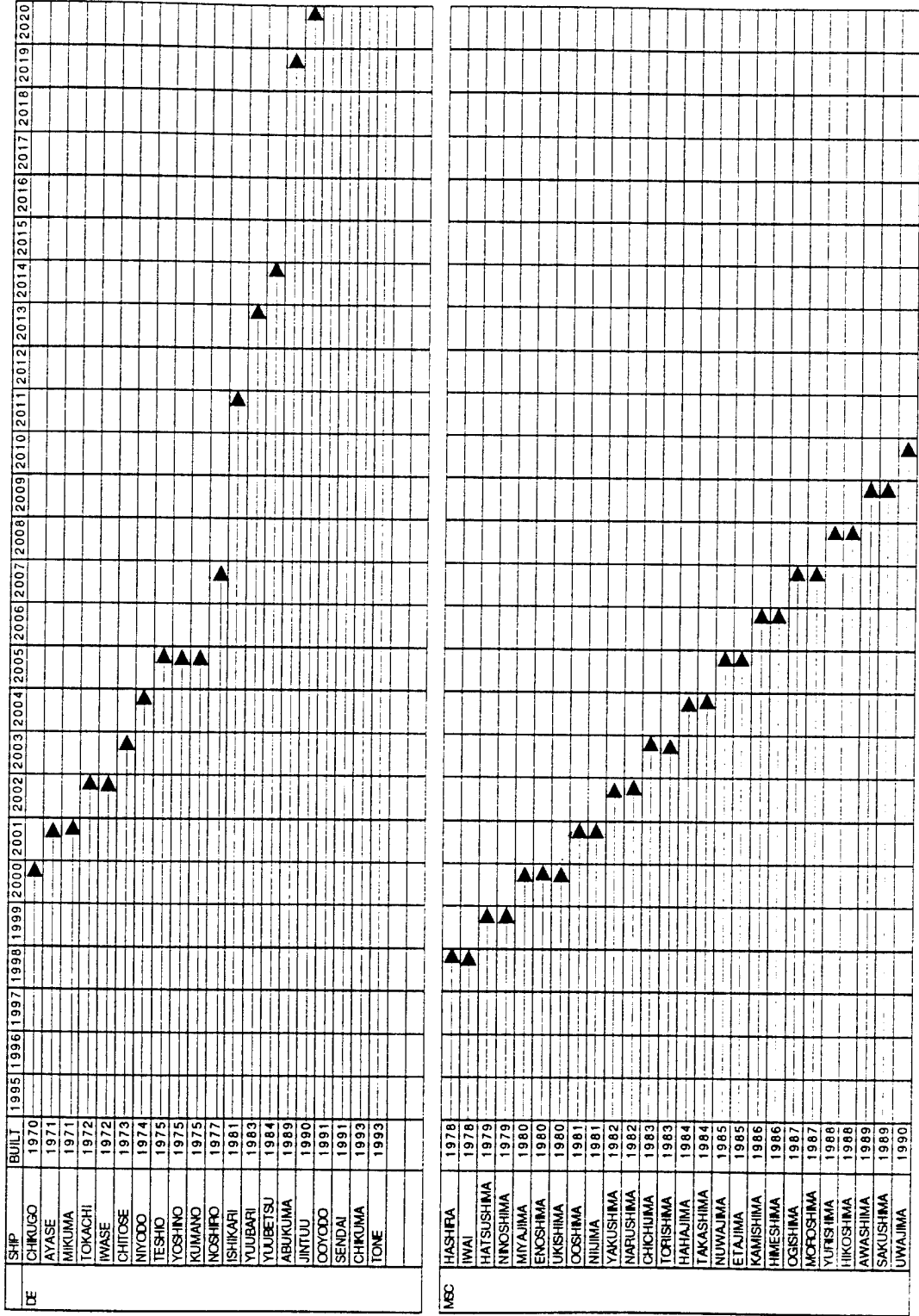
# APPENDIX AE. ESTIMATE OF SHIPBUILDING FLOW (1995~2020) (2/5)

| SHIP | BUILT     | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 100  | NATSUGUMO | 1969 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | NAGATSUKI | 1970 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | MURAGUMO  | 1970 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | AKOJIMO   | 1972 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | AKOJIMO   | 1974 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | YUJUSIMO  | 1978 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | HATSUYUKI | 1982 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | SHIRAYUKI | 1983 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | MINETUKI  | 1984 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | SAWAYUKI  | 1984 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | HAMAYUKI  | 1983 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | ISOYUKI   | 1985 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | HARUYUKI  | 1985 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | YAMAYUKI  | 1985 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | MATSUYUKI | 1986 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | SETOYUKI  | 1986 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | ASAYUKI   | 1987 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | SHIMAYUKI | 1987 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | ASAGIRI   | 1988 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | YAMAGIRI  | 1989 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | YUKIRI    | 1989 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | AMAGIRI   | 1989 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | HAMAGIRI  | 1990 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | SAWAGIRI  | 1990 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | UMIGIRI   | 1990 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | HARUSAME  | 1996 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | 04DD      | 1997 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | 06DD      | 1999 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | 06DD      | 1999 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | 07DD      | 2000 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      | 07DD      | 2000 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

|     |            |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-----|------------|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DDG | AMATSUKAZE | 1965 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | TATIKAZE   | 1976 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | ASAKAZE    | 1979 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | SAWAKAZE   | 1983 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | HATAKAZE   | 1986 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | SHIMAKAZE  | 1988 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | KONGOU     | 1993 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | KIRISHIMA  | 1995 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | 03DDG      | 1996 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | 05DDG      | 1998 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     |            |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     |            |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|     |         |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-----|---------|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DDH | HARUNA  | 1973 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | HEI     | 1974 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | SHIRANE | 1980 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     | KURAMA  | 1981 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

# APPENDIX AE. ESTIMATE OF SHIPBUILDING FLOW (1995-2020) (3/5)



# APPENDIX AE. ESTIMATE OF SHIPBUILDING FLOW (1995~2020) (4/5)

|     | SHIP            | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|-----|-----------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| MSC | IESHMA 1990     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | TSUKISHIMA 1993 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | MAEJIMA 1993    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | 03MSC 1994      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | 04MSC 1995      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | 04MSC 1995      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | 04MSC 1995      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | 06MSC 1997      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | 06MSC 1997      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | 07MSC 1999      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| MEO | YAEYAMA 1993    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | TSUSHIMA 1993   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | HACHIOU 1994    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| MSB | 11-GOU 1975     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | 12-GOU 1975     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| MST | HAYASE 1971     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | HUKUE 1976      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | 06MST 1997      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | 07MST 1998      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     |                 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| MMC | SOUYA 1971      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     |                 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| LST | ATSUMI 1972     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | MOTOBU 1973     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | NEIRO 1977      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | MIJRA 1975      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | OUKA 1976       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | SATSUMA 1977    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | 05 LST 1998     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| LSU | YURA 1981       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | NOTO 1981       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| ATS | AZUMA 1969      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | KUFOE 1999      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| AGS | AKASHI 1969     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | HUTAMI 1978     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | SUMA 1981       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|     | WAKASA 1986     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

APPENDIX AE. ESTIMATE OF SHIPBUILDING  
FLOW (1995~2020) (5/5)

| AOS   | SHIP     | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|-------|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|       |          | 1991 | 1992 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| AGB   | HEIKI    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|       | HARIMA   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|       |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| APC   | SHIFUSE  | 1982 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|       |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|       | MUROTO   | 1980 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| AS(R) | HUSHIMI  | 1970 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|       | CHYODA   | 1985 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|       |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| ASE   | KURIHAMA | 1980 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|       |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|       |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| AOE   | SAGAMI   | 1979 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|       | TOWADA   | 1987 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|       | TOKIWA   | 1990 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|       | HAMANA   | 1990 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

Note : This flow is made by following asamplon of life of ship.  
Submarine : 15 Years  
Iron ship :30 Years  
Wooden Ship : 20 Years

Source : KANTEI TO KOUKUUKI SYUU (HEISEI 6 NENDO BAN) (Asagumo Shinbunsya)

# APPENDIX AF. TREND AND ESTIMATE OF SHIPBUILDING COST (1/7)

SS

(Real Value : 1000 Yen)

| Fiscal Year | NAME      | REAL VALUE | UP RATE | AVE. UP RATE |
|-------------|-----------|------------|---------|--------------|
| 1959        | HAYASHIO  | 6,606,476  |         |              |
| 1959        | WAKASHIO  | 6,606,476  | 0.000   |              |
| 1960        | NATSUSHIO | 6,674,718  | 0.010   | 0.003        |
| 1960        | FUYUSHIO  | 6,674,718  | 0.000   |              |
| 1961        | OOSHIO    | 12,058,401 | 0.807   | 0.825        |
| 1963        | ASASHIO   | 12,367,682 | 0.026   |              |
| 1964        | HARUSHIO  | 11,620,773 | -0.060  | -0.021       |
| 1965        | MICHISHIO | 11,003,653 | -0.053  |              |
| 1966        | ARASHIO   | 11,038,516 | 0.003   |              |
| 1967        | UZUSHIO   | 15,479,852 | 0.402   | 0.284        |
| 1968        | MAKISHIO  | 14,194,970 | -0.083  |              |
| 1969        | ISOSHIO   | 14,740,710 | 0.038   | 0.064        |
| 1970        | NARUSHIO  | 14,571,088 | -0.012  |              |
| 1971        | KUROSHIO  | 13,774,589 | -0.055  |              |
| 1972        | TAKASHIO  | 13,949,194 | 0.013   |              |
| 1973        | YAESHIO   | 20,705,002 | 0.484   |              |
| 1975        | YUUSHIO   | 28,987,971 | 0.400   | 0.873        |
| 1977        | MOCHISHIO | 29,315,454 | 0.011   |              |
| 1978        | SETOSHIO  | 29,175,424 | -0.005  |              |
| 1979        | OKISHIO   | 27,925,058 | -0.043  | 0.008        |
| 1980        | NADASHIO  | 31,173,098 | 0.116   |              |
| 1981        | HAMASHIO  | 31,724,905 | 0.018   |              |
| 1982        | AKISHIO   | 32,545,862 | 0.026   |              |
| 1983        | TAKESHIO  | 29,200,966 | -0.103  |              |
| 1984        | YUKISHIO  | 29,739,792 | 0.018   |              |
| 1985        | SACHISHIO | 30,696,036 | 0.032   |              |
| 1986        | HARUSHIO  | 37,402,606 | 0.218   | 1.290        |
| 1987        | NATSUSHIO | 35,477,370 | -0.051  |              |
| 1988        | HAYASHIO  | 35,339,722 | -0.004  |              |
| 1989        | ARASHIO   | 35,819,834 | 0.014   | 0.036        |
| 1990        | WAKASHIO  | 35,975,840 | 0.004   |              |
| 1991        | HUYUSHIO  | 35,479,683 | -0.014  |              |
| 1992        | O4SS      | 39,879,149 | 0.124   |              |
| 1993        | O5SS      | 47,013,403 | 0.179   |              |
| AVERAGE     |           |            | 0.075   | 0.818        |
|             |           |            |         | 0.018        |

# APPENDIX AF. TREND AND ESTIMATE OF SHIPBUILDING COST (2/7)

## DD

| Fiscal Year | NAME            | REAL VALUE | UP RATE | AVE. UP RATE |
|-------------|-----------------|------------|---------|--------------|
| 1962        | YAMAGUMO        | 10,110,612 |         |              |
| 1963        | MAKIGUMO        | 10,953,853 | 0.083   |              |
| 1964        | ASAGUMO         | 10,154,748 | -0.073  |              |
| 1965        | MINEGUMO        | 11,023,913 | 0.086   |              |
| 1966        | NATSUGUMO       | 10,955,084 | -0.006  |              |
| 1967        | MURAKUMO        | 11,051,293 | 0.009   |              |
| 1969        | AOKUMO          | 11,206,156 | 0.014   |              |
| 1971        | ASAGUMO         | 11,025,293 | -0.016  |              |
| 1974        | YUUGUMO         | 17,157,833 | 0.556   |              |
| 1963        | TAKATSUKI       | 14,242,918 |         | 0.409        |
| 1964        | KIKUZUKI        | 17,934,419 | 0.259   |              |
| 1965        | MOCHIZUKI       | 18,380,248 | 0.025   |              |
| 1965        | NAGATSUKI       | 19,283,320 | 0.049   |              |
| 1977        | HATSUYUKI       | 32,894,496 |         | 1.310        |
| 1978        | SHIRAYUKI       | 30,735,065 | -0.066  |              |
| 1979        | MINEYUKI etc(3) | 32,921,674 | 0.071   |              |
| 1980        | ISOYUKI etc(2)  | 33,277,788 | 0.011   |              |
| 1981        | YAMAYUKI etc(2) | 34,437,168 | 0.035   |              |
| 1982        | SETOYUKI etc(3) | 38,022,103 | 0.104   |              |
| 1983        | ASGIRI          | 40,359,168 |         | 0.227        |
| 1984        | YAMAGIRI etc(3) | 37,258,776 | -0.077  |              |
| 1985        | HAMAGIRI etc(3) | 38,995,939 | 0.047   |              |
| 1986        | UMIGIRI         | 38,674,024 | -0.008  |              |
| 1991        | HARUSAME        | 54,485,316 |         | 0.350        |
| 1992        | 04DD            | 58,593,396 | 0.075   |              |
| AVERAGE     |                 |            | 0.059   | 0.574        |

## DDG

| Fiscal Year | NAME       | REAL VALUE  | UP RATE | AVE. UP RATE |
|-------------|------------|-------------|---------|--------------|
| 1960        | AMATSUKAZE | 14,215,567  |         |              |
| 1971        | TACHIKAZE  | 31,198,660  |         | 1.195        |
| 1973        | ASAKAZE    | 40,308,987  | 0.292   |              |
| 1978        | SAWAKAZE   | 46,479,217  | 0.153   |              |
| 1981        | HATAKAZE   | 62,670,571  |         | 0.348        |
| 1983        | SHIMAKAZE  | 64,964,160  | 0.037   |              |
| 1988        | KONGOU     | 113,380,204 |         | 0.745        |
| 1990        | KIRISHIMA  | 116,951,534 | 0.031   |              |
| 1991        | 03DDG      | 109,987,409 | -0.060  |              |
| 1993        | 05DDG      | 106,492,577 | -0.032  |              |
| AVERAGE     |            |             | 0.070   | 0.763        |

# APPENDIX AF. TREND AND ESTIMATE OF SHIPBUILDING COST (3/7)

## DDH

| Fiscal Year | NAME    | REAL VALUE | UP RATE |       | AVE. UP RATE |
|-------------|---------|------------|---------|-------|--------------|
| 1968        | HARUNA  | 20,532,027 |         |       |              |
| 1970        | HIEI    | 20,746,106 | 0.010   |       | 0.010        |
| 1975        | SHIRANE | 47,666,371 |         | 1.322 |              |
| 1976        | KURAMA  | 48,869,649 | 0.025   |       | 0.025        |
| AVERAGE     |         |            | 0.018   | 1.322 | 0.018        |

## MSC

| Fiscal Year | NAME       | REAL VALUE | UP RATE |       | AVE. UP RATE |
|-------------|------------|------------|---------|-------|--------------|
| 1976        | HATSUSHIMA | 5,378,024  |         |       |              |
| 1977        | NINOSHIMA  | 5,234,636  | -0.027  |       |              |
| 1978        | ENOSHIMA   | 4,627,083  | -0.116  |       |              |
| 1979        | OOSHIMA    | 4,583,425  | -0.009  |       |              |
| 1980        | YAKUSHIMA  | 4,586,628  | 0.001   |       |              |
| 1982        | HAHAJIMA   | 4,723,656  | 0.030   |       |              |
| 1983        | NUWAJIMA   | 4,610,432  | -0.024  |       |              |
| 1984        | KAMISHIMA  | 4,441,814  | -0.037  |       |              |
| 1985        | OGISHIMA   | 4,755,414  | 0.071   |       |              |
| 1986        | YURISHIMA  | 4,739,064  | -0.003  |       |              |
| 1987        | AWASHIMA   | 5,070,284  | 0.070   |       |              |
| 1988        | UWAJIMA    | 6,338,990  |         | 0.179 |              |
| 1990        | TSUKISHIMA | 6,484,507  | 0.023   |       |              |
| 1991        | MAEJIMA    | 7,046,032  | 0.087   |       | 0.055        |
| AVERAGE     |            |            | 0.005   | 0.179 | 0.025        |

## MSO

| Fiscal Year | NAME     | REAL VALUE | UP RATE |       | AVE. UP RATE |
|-------------|----------|------------|---------|-------|--------------|
| 1989        | YAEYAMA  | 15,168,060 |         |       |              |
| 1990        | HACHIYOU | 15,996,747 | 0.055   | 0.055 | 0.055        |

## LST

| Fiscal Year | NAME    | REAL VALUE | UP RATE |       | AVE. UP RATE |
|-------------|---------|------------|---------|-------|--------------|
| 1970        | ATSUMI  | 4,228,878  |         |       |              |
| 1972        | MOTOBU  | 3,809,858  | -0.099  |       |              |
| 1975        | NEMURO  | 4,360,682  | 0.145   |       | 0.023        |
| 1972        | MIURA   | 6,164,231  |         | 0.458 |              |
| 1973        | OJIKA   | 4,991,647  | -0.190  |       |              |
| 1974        | SATSUMA | 5,349,459  | 0.072   |       | -0.059       |
| AVERAGE     |         |            | -0.018  | 0.458 | -0.018       |
| 1993        | 05LST   | 45,328,886 |         | 6.354 | 6.354        |



# APPENDIX AF. TREND AND ESTIMATE OF SHIPBUILDING COST (4/7)

## AOE

| Fiscal Year | NAME       | REAL VALUE | UP RATE |       | AVE. UP RATE |
|-------------|------------|------------|---------|-------|--------------|
| 1976        | SAGAMI     | 15,316,700 |         |       |              |
| 1984        | TOWADA     | 18,901,620 |         | 0.234 |              |
| 1987        | TOKIWA (2) | 19,575,901 | 0.036   |       | 0.036        |
| AVERAGE     |            |            | 0.036   | 0.234 | 0.036        |

## ASR

| Fiscal Year | NAME    | REAL VALUE | UP RATE |  | AVE. UP RATE |
|-------------|---------|------------|---------|--|--------------|
| 1981        | CHIYODA | 18,792,756 |         |  |              |

## ATS

| Fiscal Year | NAME   | REAL VALUE | UP RATE |  | AVE. UP RATE |
|-------------|--------|------------|---------|--|--------------|
| 1967        | AZUMA  | 4,617,798  |         |  |              |
| 1986        | KUROBE | 14,300,585 | 2.097   |  | 2.097        |

## AOS

| Fiscal Year | NAME   | REAL VALUE | UP RATE |  | AVE. UP RATE |
|-------------|--------|------------|---------|--|--------------|
| 1989        | HIBIKI | 13,590,775 |         |  |              |
| 1990        | HARIMA | 13,451,779 | -0.010  |  | -0.010       |

## AGS

| Fiscal Year | NAME   | REAL VALUE | UP RATE |       | AVE. UP RATE |
|-------------|--------|------------|---------|-------|--------------|
| 1967        | AKASHI | 2,848,478  |         |       |              |
| 1979        | SUMA   | 5,523,701  |         | 0.939 |              |
| 1976        | HUTAMI | 9,401,465  |         | 0.702 |              |
| 1983        | WAKASA | 9,044,673  | -0.038  |       | -0.038       |
| AVERAGE     |        |            | -0.038  | 0.821 | -0.038       |

## ARC

| Fiscal Year | NAME   | REAL VALUE | UP RATE |  | AVE. UP RATE |
|-------------|--------|------------|---------|--|--------------|
| 1977        | MUROTO | 16,949,896 |         |  |              |

## ASE

| Fiscal Year | NAME  | REAL VALUE | UP RATE |  | AVE. UP RATE |
|-------------|-------|------------|---------|--|--------------|
| 1992        | ASUKA | 25,079,872 |         |  |              |

## TY

| Fiscal Year | NAME | REAL VALUE | UP RATE |  | AVE. UP RATE |
|-------------|------|------------|---------|--|--------------|
| 1992        |      | 30,873,422 |         |  |              |

# APPENDIX AF. TREND.AND ESTIMATE OF SHIPBUILDING COST (5/7)

## PRICE ESTIMATION

### SS

|       |             |
|-------|-------------|
| 1     | 67,997,938  |
| 2     | 69,221,901  |
| 3     | 70,467,895  |
| 4     | 71,736,317  |
| 5     | 73,027,571  |
| 6     | 74,342,067  |
| 7     | 75,680,224  |
| 8     | 77,042,468  |
| 9     | 78,429,233  |
| 10    | 79,840,959  |
| TOTAL | 737,786,571 |
| AVE.  | 73,778,657  |

Note: No1=HARUSHIO\*1.818  
Others: No.1\*1.018<sup>(n-1)</sup>

### DDH

|       |             |
|-------|-------------|
| 1     | 110,681,313 |
| 2     | 112,673,577 |
| TOTAL | 223,354,891 |
| AVE.  | 111,677,445 |

Note: No1=SHIRANE\*2.322  
No.2 : No.1\*1.018

### DDG

|       |               |
|-------|---------------|
| 1     | 199,889,300   |
| 2     | 215,880,444   |
| 3     | 233,150,879   |
| 4     | 251,802,949   |
| 5     | 271,947,185   |
| TOTAL | 1,172,670,757 |
| AVE.  | 234,534,151   |

Note: No1=KONGOU\*1.763  
Others : No.1\*1.080<sup>(n-1)</sup>

### SSBN

|       |               |
|-------|---------------|
| 1     | 376,831,180   |
| 2     | 392,281,259   |
| 3     | 408,364,790   |
| 4     | 425,107,747   |
| TOTAL | 1,602,584,976 |
| AVE.  | 400,646,244   |

Note: No1='93SSN(USA)\*1.041<sup>17</sup>  
Others: No.1\*1.041<sup>(n-1)</sup>  
93 SSN=1,903.2(\$M)

1.041 is average of AVE. UP RATE  
of SS, DD, DDG, DDH, MSC, MSO, AOE

### DDV

|       |             |
|-------|-------------|
| 1     | 237,598,474 |
| 2     | 247,340,012 |
| TOTAL | 484,938,486 |
| AVE.  | 242,469,243 |

Note: No1='93LHD(USA)\*1.041<sup>17</sup>  
No.2: No.1\*1.041  
'93LHD=1,200(\$M)

### DD(5,000TON)

|       |             |
|-------|-------------|
| 1     | 85,759,887  |
| 2     | 90,648,201  |
| 3     | 95,815,148  |
| 4     | 101,276,612 |
| 5     | 107,049,379 |
| 6     | 113,151,193 |
| 7     | 119,600,811 |
| 8     | 126,418,058 |
| 9     | 133,623,887 |
| TOTAL | 973,343,177 |
| AVE.  | 108,149,242 |

Note: No1=HARUSAME\*1.574  
Others : No.1\*1.057<sup>(n-1)</sup>

# APPENDIX AF. TREND AND ESTIMATE OF SHIPBUILDING COST (6/7)

## DD(3,000TON)

|       |               |
|-------|---------------|
| 1     | 51,775,937    |
| 2     | 54,727,165    |
| 3     | 57,846,614    |
| 4     | 61,143,870    |
| 5     | 64,629,071    |
| 6     | 68,312,928    |
| 7     | 72,206,765    |
| 8     | 76,322,551    |
| 9     | 80,672,936    |
| 10    | 85,271,293    |
| 11    | 90,131,757    |
| 12    | 95,269,267    |
| 13    | 100,699,616   |
| 14    | 106,439,494   |
| 15    | 112,506,545   |
| 16    | 118,919,418   |
| TOTAL | 1,296,875,226 |
| AVE.  | 81,054,702    |

Note: No1=HATSUYUKI\*1.574  
Others : No.1\*1.057^(n-1)

## MSO

|       |             |
|-------|-------------|
| 1     | 44,256,721  |
| 2     | 46,690,840  |
| 3     | 49,258,837  |
| TOTAL | 140,206,398 |
| AVE.  | 46,735,466  |

Note: No1=YAHEYAMA\*1.055^20  
Others : No.1\*1.055^(n-1)

## LST(4,000TON)

|       |             |
|-------|-------------|
| 1     | 17,974,898  |
| 2     | 18,388,320  |
| 3     | 18,811,252  |
| 4     | 19,243,910  |
| 5     | 19,686,520  |
| 6     | 20,139,310  |
| TOTAL | 114,244,210 |
| AVE.  | 19,040,702  |

Note: No1=MIURA\*2\*1.458

Others : No.1\*1.023^(n-1)

## MSC

|       |             |
|-------|-------------|
| 1     | 7,473,669   |
| 2     | 7,660,511   |
| 3     | 7,852,024   |
| 4     | 8,048,324   |
| 5     | 8,249,532   |
| 6     | 8,455,771   |
| 7     | 8,667,165   |
| 8     | 8,883,844   |
| 9     | 9,105,940   |
| 10    | 9,333,589   |
| 11    | 9,566,928   |
| 12    | 9,806,102   |
| 13    | 10,051,254  |
| 14    | 10,302,536  |
| 15    | 10,560,099  |
| 16    | 10,824,101  |
| 17    | 11,094,704  |
| 18    | 11,372,072  |
| 19    | 11,656,373  |
| 20    | 11,947,783  |
| 21    | 12,246,477  |
| 22    | 12,552,639  |
| TOTAL | 215,711,437 |
| AVE.  | 9,805,065   |

Note: No1=UWAJIMA\*1.179  
Others : No.1\*1.025^(n-1)

## AOE

|       |            |
|-------|------------|
| 1     | 29,155,749 |
| 2     | 30,205,356 |
| 3     | 31,292,749 |
| TOTAL | 90,653,853 |
| AVE.  | 30,217,951 |

Note: No1=TOWADA\*1.25\*1.234  
Others : No.1\*1.036^(n-1)

## ATF

|       |             |
|-------|-------------|
| 1     | 89,750,618  |
| 2     | 93,430,393  |
| TOTAL | 183,181,011 |
| AVE.  | 91,590,506  |

Note: No1=05LST\*1.041^17  
Others: No.1\* 1.041^(n-1)

# APPENDIX AF. TREND AND ESTIMATE OF SHIPBUILDING COST (7/7)

## ASR

|   |            |
|---|------------|
| 1 | 62,735.355 |
|---|------------|

Note: No1=CHIYODA\*1.041^30

## ATS

|   |            |
|---|------------|
| 1 | 37,512.094 |
|---|------------|

Note: No1=KUROBE\*1.041^24

## ATSS

|       |            |
|-------|------------|
| 1     | 33,998,969 |
| 2     | 34,610,950 |
| TOTAL | 68,609,919 |
| AVE.  | 34,304,960 |

Note: No1=HARUSHIO\*1.818/2  
No.2: No.1\*1.018

## AOS

|       |            |
|-------|------------|
| 1     | 30,356,997 |
| 2     | 31,601,634 |
| TOTAL | 61,958,632 |
| AVE.  | 30,979,316 |

Note: No1=HIBIKI\*1.041^20  
No.2: No.1\*1.041

## AGS

|       |            |
|-------|------------|
| 1     | 17,110,666 |
| 2     | 17,812,204 |
| TOTAL | 34,922,870 |
| AVE.  | 17,461,435 |

Note: No1=HUTAMI\*1.82  
No.2: No.1\*1.041

## ARC

|       |            |
|-------|------------|
| 1     | 42,710,417 |
| 2     | 44,461,545 |
| TOTAL | 87,171,962 |
| AVE.  | 43,585,981 |

Note: No1=MUROTO\*1.041^23  
No.2: No.1\*1.041

## ASE

|   |            |
|---|------------|
| 1 | 51,693.799 |
|---|------------|

Note: No1=ASUKA\*1.041^18

## TV

|   |            |
|---|------------|
| 1 | 63,635.271 |
|---|------------|

Note: No1=1992 TV\*1.041^18

Source : Kaijoeitai Yosan Jimuteiyo (Kaijobakuryokanbu)

# APPENDIX AG. ESTIMATE OF AIRCRAFT PROCURING FLOW (1995~2020) (1/3)

| A/C | NUMBER | ACQU | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |  |
|-----|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| VP  | 3      | 1981 |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|     | 5      | 1982 |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|     | 5      | 1983 |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|     | 5      | 1984 |      |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|     | 7      | 1985 |      |      |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|     | 6      | 1986 |      |      |      |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|     | 8      | 1987 |      |      |      |      |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|     | 10     | 1988 |      |      |      |      |      |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |      |      |      |      |      |      |      |  |
|     | 10     | 1989 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |      |      |      |      |      |  |
|     | 9      | 1990 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |      |      |      |      |  |
|     | 9      | 1991 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |      |      |      |  |
|     | 10     | 1992 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |      |      |  |
|     | 8      | 1993 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |      |  |
|     | 2      | 1994 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |  |
| 1   | 1995   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |      |  |
| 1   | 1996   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | ▲    |      |      |      |      |  |
| 1   | 1997   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | ▲    |      |      |      |  |

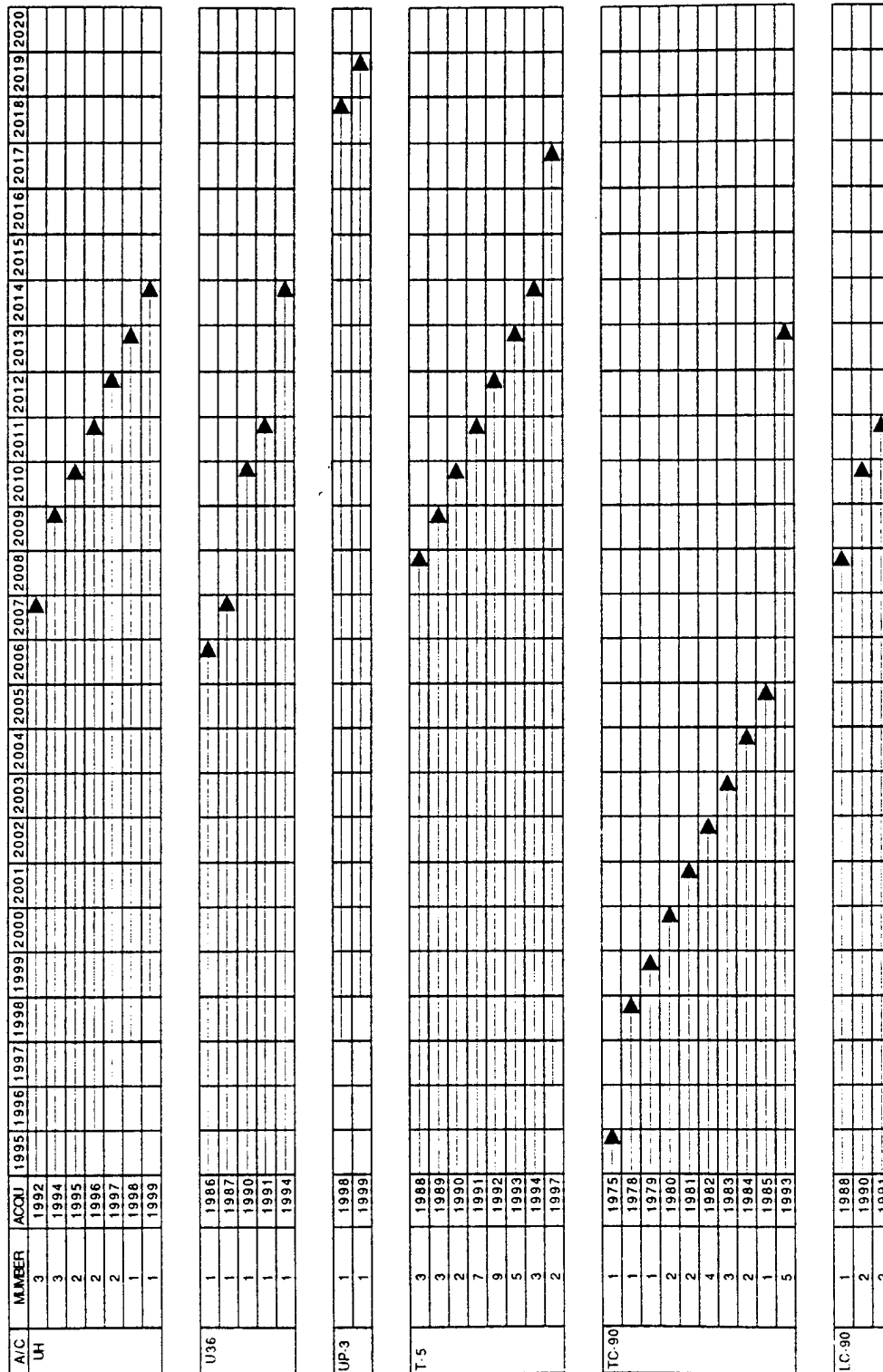
|   |   |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| B | 1 | 1990 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   | 1 | 1991 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   | 1 | 1996 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   | 1 | 1997 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   | 1 | 1999 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|    |    |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----|----|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| SH | 2  | 1989 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 12 | 1991 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 12 | 1992 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 11 | 1993 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 5  | 1994 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 7  | 1995 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 4  | 1996 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 5  | 1997 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 6  | 1998 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|    |   |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----|---|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| MH | 4 | 1989 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 2 | 1990 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 4 | 1992 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 1 | 1994 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|    |   |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----|---|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| US | 1 | 1982 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 1 | 1986 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 1 | 1988 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 1 | 1990 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 1 | 1993 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|    | 1 | 1994 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

APPENDIX AG. ESTIMATE OF AIRCRAFT PROCURING FLOW  
(1995~2020) (2/3)



APPENDIX AG. ESTIMATE OF AIRCRAFT PROCUREMENT FLOW  
(1995~2020) (3/3)

| A/C  | MJMBER | ACQU | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |  |
|------|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| OH6D | 2      | 1983 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|      | 1      | 1984 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|      | 2      | 1985 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|      | 2      | 1988 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|      | 2      | 1990 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|      | 1      | 1992 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|      | 3      | 1996 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| NP-3 | 1      | 1994 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |

Note : This flow is made by following asumption of life of aircraft.  
Fixed Wing : 20 Years  
Helicopter : 15 Years

Source : KANTEI TO KOKUKI SYU (HEISEI 6 NENDO BAN) (Asagumo Shinbunsya)  
KAIOJIEITAI YOSAN JIMTEIYO (Kaiyobakuryokanbu)

**APPENDIX AH. TREND AND ESTIMATE OF AIRCRAFT  
PROCURING COST (1/4)**

**VP (P-3C)** (Real Value : 1000 Yen)

| Fiscal Year | REAL VALUE | UP RATE |
|-------------|------------|---------|
| 1978        | 8,166,289  | -       |
| 1980        | 9,963,535  | 0.220   |
| 1982        | 11,597,113 | 0.164   |
| 1983        | 11,165,871 | -0.037  |
| 1984        | 11,076,263 | -0.008  |
| 1985        | 11,256,776 | 0.016   |
| 1986        | 10,386,263 | -0.077  |
| 1987        | 9,372,614  | -0.098  |
| 1988        | 9,082,350  | -0.031  |
| 1989        | 8,841,221  | -0.027  |
| 1990        | 9,603,396  | 0.086   |
| 1991        | 9,148,061  | -0.047  |
| 1992        | 10,562,543 | 0.155   |
| 1993        | 12,288,140 | 0.163   |
| AVE.        |            | 0.037   |

**EP(EP-3)**

| Fiscal Year | REAL VALUE | UP RATE |
|-------------|------------|---------|
| 1987        | 11,727,578 | -       |
| 1988        | 10,550,401 | -0.100  |
| 1992        | 12,667,516 | 0.201   |
| 1993        | 12,698,413 | 0.002   |
| AVE.        |            | 0.034   |

**SH (SH-60J)**

| Fiscal Year | REAL VALUE | UP RATE |
|-------------|------------|---------|
| 1988        | 4,343,712  | -       |
| 1989        | 4,370,252  | 0.006   |
| 1990        | 4,541,140  | 0.039   |
| 1991        | 4,611,005  | 0.015   |
| 1992        | 4,635,162  | 0.005   |
| 1993        | 5,159,092  | 0.113   |
| AVE.        |            | 0.036   |

**MH(MH-53E)**

| Fiscal Year | REAL VALUE | UP RATE |
|-------------|------------|---------|
| 1986        | 4,871,008  | -       |
| 1987        | 4,354,679  | -0.106  |
| 1989        | 4,056,597  | -0.068  |
| 1991        | 5,214,284  | 0.285   |
| AVE.        |            | 0.037   |

**US(US-1A)**

| Fiscal Year | REAL VALUE | UP RATE |
|-------------|------------|---------|
| 1977        | 6,305,290  | -       |
| 1978        | 6,028,043  | -0.044  |
| 1979        | 6,137,966  | 0.018   |
| 1980        | 6,211,311  | 0.012   |
| 1983        | 5,104,405  | -0.178  |
| 1984        | 5,199,249  | 0.019   |
| 1986        | 5,523,479  | 0.062   |
| 1991        | 6,350,332  | 0.150   |
| 1992        | 6,072,523  | -0.044  |
| 1993        | 6,559,652  | 0.080   |
| AVE.        |            | 0.008   |

**UH(UH-60J)**

| Fiscal Year | REAL VALUE | UP RATE |
|-------------|------------|---------|
| 1989        | 2,891,633  | -       |
| 1991        | 3,702,335  | 0.280   |
| 1992        | 3,969,774  | 0.072   |
| 1993        | 3,931,563  | -0.010  |
| AVE.        |            | 0.114   |

**U-36A**

| Fiscal Year | REAL VALUE | UP RATE |
|-------------|------------|---------|
| 1984        | 3,735,075  | -       |
| 1985        | 3,918,357  | 0.049   |
| 1987        | 2,720,724  | -0.306  |
| 1988        | 2,627,122  | -0.034  |
| 1989        | 2,361,682  | -0.101  |
| 1992        | 1,708,609  | -0.277  |
| AVE.        |            | -0.134  |



# APPENDIX AH. TREND AND ESTIMATE OF AIRCRAFT PROCURING COST (2/4)

## **UP(UP-3)**

| Fiscal Year | NOMINAL VALUE | UP RATE |
|-------------|---------------|---------|
| 1994        | 14,808,000    | -       |
| 1995        | 13,611,000    | -0.081  |
| AVE.        | 14,209,500    | -0.081  |

## **OH-6D**

| Fiscal Year | REAL VALUE | UP RATE |
|-------------|------------|---------|
| 1982        | 212,639    | -       |
| 1983        | 260,801    | 0.226   |
| 1984        | 230,866    | -0.115  |
| 1987        | 227,771    | -0.013  |
| 1989        | 194,379    | -0.147  |
| 1992        | 228,344    | 0.175   |
| AVE.        |            | 0.025   |

## **T-5**

| Fiscal Year | REAL VALUE | UP RATE |
|-------------|------------|---------|
| 1990        | 380,652    | -       |
| 1991        | 397,688    | 0.045   |
| 1992        | 392,486    | -0.013  |
| 1993        | 412,189    | 0.050   |
| AVE.        |            | 0.027   |

## **NP-3**

| Fiscal Year | REAL VALUE | UP RATE |
|-------------|------------|---------|
| 1991        | 7,631,391  | -       |

## **TC-90**

| Fiscal Year | REAL VALUE | UP RATE |
|-------------|------------|---------|
| 1973        | 413,526    | -       |
| 1974        | 409,057    | -0.011  |
| 1977        | 478,080    | 0.169   |
| 1978        | 469,515    | -0.018  |
| 1979        | 387,242    | -0.175  |
| 1980        | 420,635    | 0.086   |
| 1981        | 457,303    | 0.087   |
| 1982        | 531,867    | 0.163   |
| 1983        | 593,269    | 0.115   |
| 1984        | 602,406    | 0.015   |
| 1986        | 585,912    | -0.027  |
| 1992        | 513,558    | -0.123  |
| AVE.        |            | 0.026   |

## **AVERAGE UP RATE**

|             |              |
|-------------|--------------|
| P-3C        | 0.037        |
| EP-3        | 0.034        |
| SH-60J      | 0.036        |
| MH-53E      | 0.037        |
| US-1A       | 0.008        |
| UH-60J      | 0.114        |
| T-5         | 0.027        |
| TC-90       | 0.026        |
| OH-6D       | 0.025        |
| <b>AVE.</b> | <b>0.038</b> |

Note: Negative up rates are ignored

## **LC-90**

| Fiscal Year | REAL VALUE | UP RATE |
|-------------|------------|---------|
| 1987        | 523,946    | -       |
| 1989        | 449,431    | -0.142  |
| 1990        | 495,558    | 0.103   |
| AVE.        |            | -0.020  |

# APPENDIX AH. TREND AND ESTIMATE OF AIRCRAFT PROCURING COST (3/4)

## PRICE ESTIMATION

### VP

|       |               |
|-------|---------------|
| 1~ 9  | 23,165,472    |
| 10~18 | 24,045,760    |
| 19~28 | 24,959,499    |
| 29~36 | 25,907,960    |
| 37~38 | 26,892,463    |
| 39    | 27,914,376    |
| 40    | 28,975,123    |
| 41    | 30,076,177    |
| TOTAL | 1,022,510,369 |
| AVE.  | 24,939,277    |

Note: No.1~9=P-3C(1993)\*1.038<sup>17</sup>  
Others=No.1\*1.038<sup>(n-1)</sup>

### SH(SH-60J)

|       |             |
|-------|-------------|
| 1~ 7  | 9,725,866   |
| 8~11  | 10,095,449  |
| 12~16 | 10,479,076  |
| 17~22 | 10,877,281  |
| 23~24 | 11,290,618  |
| TOTAL | 248,703,158 |
| AVE.  | 10,362,632  |

Note: No.1~7=SH-60J(1993)\*1.038<sup>17</sup>  
Others=No.1\*1.038<sup>(n-1)</sup>

### US(US-1A)

|       |            |
|-------|------------|
| 1     | 14,901,246 |
| 2     | 15,467,493 |
| 3     | 16,055,258 |
| TOTAL | 46,423,997 |
| AVE.  | 15,474,666 |

Note: No.1=US-1A(1993)\*1.038<sup>22</sup>  
Others=No.1\*1.038<sup>(n-1)</sup>

### EP (EP-3)

|       |             |
|-------|-------------|
| 1     | 23,938,915  |
| 2     | 24,848,593  |
| 3     | 25,792,840  |
| 4     | 26,772,968  |
| 5     | 27,790,341  |
| TOTAL | 129,143,657 |
| AVE.  | 25,828,731  |

Note: No.1=EP-3(1993)\*1.038<sup>17</sup>  
Others=No.1\*1.038<sup>(n-1)</sup>

### MH(MH-53E)

|       |            |
|-------|------------|
| 1~ 4  | 13,247,335 |
| 5~ 6  | 13,750,734 |
| TOTAL | 80,490,808 |
| AVE.  | 13,415,135 |

Note: No.1=MH-53E(1991)\*1.038<sup>25</sup>  
Others=No.1\*1.038<sup>(n-1)</sup>

### UH(UH-60J)

|       |            |
|-------|------------|
| 1~ 2  | 7,411,741  |
| 3~ 4  | 7,693,387  |
| 5~ 6  | 7,985,736  |
| 7     | 8,289,194  |
| 8     | 8,604,183  |
| TOTAL | 63,075,107 |
| AVE.  | 7,884,388  |

Note: No.1~2=UH-60J(1993)\*1.038<sup>17</sup>  
Others=No.1\*1.038<sup>(n-1)</sup>

# APPENDIX AH. TREND.AND ESTIMATE OF AIRCRAFT PROCURING COST (4/4)

## **U-36A**

|       |            |
|-------|------------|
| 1     | 3,221,052  |
| 2     | 3,343,452  |
| 3     | 3,470,503  |
| TOTAL | 10,035,006 |
| AVE.  | 3,345,002  |

Note: No.1=U-36A(1992)\*1.038^17

## **UP(UP-3)**

|       |            |
|-------|------------|
| 1     | 29,958,900 |
| 2     | 31,097,338 |
| TOTAL | 61,056,239 |
| AVE.  | 30,528,119 |

Note: No.1=UP-3(1994)\*1.038^20  
Others=No.1\*1.038^(n-1)

## **T-5**

|       |            |
|-------|------------|
| 1~ 2  | 777,054    |
| 3~ 9  | 806,582    |
| 10~18 | 837,233    |
| 19~23 | 869,047    |
| 24~26 | 902,071    |
| 27~28 | 936,350    |
| TOTAL | 23,659,429 |
| AVE.  | 844,980    |

Note: No.1~2=T-5(1993)\*1.038^17  
Others=No.1\*1.038^(n-1)

## **TC-90**

|       |            |
|-------|------------|
| 1~ 5  | 1,004,944  |
| 6     | 1,043,132  |
| 7     | 1,082,771  |
| 8     | 1,123,916  |
| 9~10  | 1,166,625  |
| TOTAL | 10,607,789 |
| AVE.  | 1,060,779  |

Note: No.1=TC-90(1992)\*1.038^18  
Others=No.1\*1.038^(n-1)

## **LC-90**

|       |           |
|-------|-----------|
| 1~ 2  | 1,044,820 |
| 3~ 4  | 1,084,523 |
| TOTAL | 4,258,687 |
| AVE.  | 1,064,672 |

Note: No.1~2=LC-90(1990)\*1.038^20  
Others=No.1\*1.038^(n-1)

## **OH-6D**

|       |           |
|-------|-----------|
| 1~ 2  | 446,830   |
| 3     | 463,809   |
| 4~ 5  | 481,434   |
| 6~ 7  | 499,728   |
| 8~ 9  | 518,718   |
| TOTAL | 4,357,229 |
| AVE.  | 484,137   |

Note: No.1=OH-6D(1992)\*1.038^18  
Others=No.1\*1.038^(n-1)

## **NP-3**

|   |            |
|---|------------|
| 1 | 15,500,775 |
|---|------------|

Note: No.1=NP-3(1991)\*1.038^19

## **VFA**

|       |             |
|-------|-------------|
| 1~ 5  | 8,805,720   |
| 6~10  | 9,140,337   |
| 11~15 | 9,487,670   |
| 16~20 | 9,848,202   |
| 21~25 | 10,222,433  |
| 26~30 | 10,610,886  |
| 31~35 | 11,014,100  |
| 36~40 | 11,432,635  |
| TOTAL | 402,809,919 |
| AVE.  | 10,070,248  |

## **VC**

|       |            |
|-------|------------|
| 1     | 8,744,017  |
| 2     | 9,076,290  |
| 3     | 9,421,189  |
| 4     | 9,779,194  |
| TOTAL | 37,020,691 |
| AVE.  | 9,255,173  |

Note: No.1='92 C-130\*1.038^18  
Others=No.1\*1.038^(n-1)  
'92 C-130=4,468(Yen M)

Note: No.1~5='92 AV-8B(USA)\*1.038^18  
Others=No.1\*1.038^(n-1)  
'92 AV-6B=45(\$M)

Source : Kaijoiteitai Yosan Jimuteiyo (Kaijobakuryokanbu)

## APPENDIX AI. ESTIMATE OF ESCALATION RATE

### Personnel & Provisions

| Year | Real Budget | UP RATE      |
|------|-------------|--------------|
| 1985 | 258,862,767 | -            |
| 1986 | 277,127,377 | 0.071        |
| 1987 | 295,288,330 | 0.066        |
| 1988 | 304,585,547 | 0.031        |
| 1989 | 297,114,087 | -0.025       |
| 1990 | 296,648,554 | -0.002       |
| 1991 | 304,231,314 | 0.026        |
| 1992 | 317,180,984 | 0.043        |
| 1993 | 329,059,411 | 0.037        |
| AVE. |             | <b>0.031</b> |

### Amunition

| Year | Real Budget | UP RATE      |
|------|-------------|--------------|
| 1985 | 21,424,063  |              |
| 1986 | 26,317,377  | 0.228        |
| 1987 | 30,078,419  | 0.143        |
| 1988 | 30,458,956  | 0.013        |
| 1989 | 34,539,952  | 0.134        |
| 1990 | 40,931,982  | 0.185        |
| 1991 | 48,020,298  | 0.173        |
| 1992 | 40,931,666  | -0.148       |
| 1993 | 41,097,536  | 0.004        |
| AVE. |             | <b>0.092</b> |

### Others

| Year | Real Budget | UP RATE      |
|------|-------------|--------------|
| 1985 | 196,008,477 |              |
| 1986 | 193,014,398 | -0.015       |
| 1987 | 217,928,854 | 0.129        |
| 1988 | 241,648,704 | 0.109        |
| 1989 | 280,340,803 | 0.160        |
| 1990 | 318,894,057 | 0.138        |
| 1991 | 302,357,111 | -0.052       |
| 1992 | 342,626,207 | 0.133        |
| 1993 | 331,655,062 | -0.032       |
| AVE. |             | <b>0.071</b> |

Source : Kaijoeitai Yosan Jimteiyō (Kaijobakuryokanbu)

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