# Prospect and Dilemma of the Defense Industry in Japan in the Post Cold-War Era Accommodation to Globalization of Economy

KIMURA Soji
MATSUOKA Hisao

## Introduction

The politics and economy of the world have changed drastically since the end of the Cold War. It should be noted that the largest change of which is the movement toward market economy in the socialist and communist countries. As a result the market economy has expanded throughout the world thus making the economic activities being a truly global scale. We might call this phenomenon as the globalization of economy. On the other hand, there is a strong tendency toward forming a regional blocks. The North American Free Trade Agreement (NAFTA) has created the largest economy block in the world. It puts a high ratio of regional parts procurement and has strongly exclusive characteristics. The European Union (EU) has concluded the Maastricht Treaty that declares common currency and political unity. Introduction of common currency in 1999 is a symbol of their policy to stabilize and prosper the economy by creating an economic block. There is no doubt that quest for economic growth in many nations has strengthened more than ever before since the end of the Cold War. Under these circumstances, the United States has been exercising influence over each nation in various ways in order to maintain the good economic conditions that started in 1991 as well as to defend the national interest with the overwhelming military supremacy and economic power.

In the mean time, Japan has been concerned with the issue of restructuring and deregulations. It lacked a realistic economic visions or clear national strategy. Although Japan has the economic power second only to the United States, the economy has been in a bad condition due to the prolonged aftermaths of the burst of bubble economy. Japan also struggled for survival against the Big Bang financial sector reforms. Enterprises are involved in restructuring, mergers and cooperation in the scale that has never been heard of with their survivals at stake. The defense industry is no exception to this and is also facing severe conditions.

The role of the defense industry in Japan, however, has not changed since the international environment around Japan continues to be nebulous. The world with no wars or conflicts is still a utopia, so that every nation build military power with the objectives of its continuation of prosperity, or for the stability in the surrounding areas.

The objective of this paper is to summarize the current problems facing the defense

*NIDS Security Reports,* No.2 (march 2001), pp. 1-34.

industry in Japan. And this paper will also make a comparative studies on the situations of the defense industry in the major nations in the post Cold-War era.

## 1 Environment surrounding the defense industry

Since the end of the Cold War, the defense spending of each country has shown the tendency for reduction. The total defense expenditure of the world in 1997 was around 70% of that in 1989. The major factor in this reduction is the significant decrease in the national defense budget of Russia since the collapse of the Soviet Union in 1991. The European nations and the United States have also cut the defense spending. The nations that increased the defense spending after the Cold War are those in the East Asia who showed considerable economic growth and the Middle East nations that were affected by the Gulf War in 1991. But the increase in the defense spending in the Middle East nations was temporary, and it has lowered to the level in the Cold War era.

Reduction of the defense spending and decrease of the weapons procurement volume in Europe and the US have promoted streamlining and better efficiency of the defense industries. The defense industry of those countries showd mergers and acquisition of companies, trimming of the personnel in the defense division, curtailment of the production scale, withdrawal from the defense industry and other means of restructuring of the defense industry, and created a trend to increase dependency on the weapons exports against depreciation of the production and development costs and to concentrate on acquisition of the markets.

The national defense spending and the amount of equipment procurement in the United States have both been cut down to around 70% of the level in 1990. This reduction exerted strong impact on the defense industry that employs a large number of workers.[1] Unemployment caused by restructuring of the companies has become a serious problem for the states that possessed many defense industries. The issue was especially severe in the Unied States around the time of the end of the Cold War when the economy was in a bad condition.[2]

Restructuring of the defense industry in the United States started earlier than in the European nations. Large-scale enterprises have conducted mergers and acquisitions among themselves as a means to control the market by enlarged scale. The aircraft industry, in particular, has decreased its members to only three companies. As a result, specialization in

---

[1] Office of Technology Assessment, *After the Cold War: Living With Lower Defense Spending* (Washington D.C.: U.S. Government Printing Office, 1992). (OTA) (Translated by Japan Federation of Economic Organizations, *Boei Seisan iinkai tokuho (Special Report of Defense Production Committee) No.246*, August 25, 1993, p.3) According to this report, the employment in the national defense industry and the Department of Defense (civil service) was 6 million in 1991.

[2] Junko Nishikawa, *Reisengo no amerika gunjusangyo (Munitions Industry in the US after the Cold War),* (Nihon Keizai Hyoron-sha, 1997), and OTA, ibid.

the defense field and allotment of equipment production have progressed, and some corporations are separating their defense division to convert the mainline into civilian business. Although the European nations had had the basic policy to depend on the domestic defense industries for procurement of the defense equipment, the reduction of the defense spending after the Cold War has steered them into changing the focus to exports of weapons. They have been restructuring the defense industries and considering joint development and production as well as mergers with foreign enterprises for further development, better production efficiency and compatible operability with due consideration to the competition with the United States. These indicate the changes in the recognition of the conventional defense industry base.

The defense industry in Europe occupies the position of a key industry for the nation. The national governments cannot possibly expect the corporations alone to endeavor to cope with the effects of reduction of the national defense budget. They are in pursuit of the definition of the defense industry in the post Cold War era by taking measures to ensure superiority in the research, development and production capabilities in the world as the national security issue with due consideration to the future battle conditions.

Under those global circumstances, the defense spending in Japan has not experienced considerable changes seen in Europe and the United States where strategic environment has been affected by the collapse of the Soviet Union, the situations specific to the Cold War era remain in the Korean Peninsula and Taiwan. The procurement of the equipment, however, has certainly decreased. The defense budget seems to have topped out as seen in the middle-term defense preparation plan due to the slowdown of the economic growth and the economic and financial problems where the cumulative deficit is higher than the GDP in the national budget.[3] Furthermore, there occurred social problems concerning the procurement of the defense equipment, including the bill-padding by certain corporations, misappropriation by officers in the Central Procurement Office and disclosure of bribery by a certain corporation to the politicians, which have given rise to suspicion among the people on the defense procurement. The Defense Agency is now spurred to promote the "acquisition reform" to cut

[3] The effects on the defense budget appeared in the "Promotion of Financial Structure Reform" adopted in the cabinet meeting on June 3, 1997, including; (1) as for the medium-term defense preparation plan (total of 25.15 trillion yen), the defense related cost level shall be restrained for the next 3 years, and the total amount of non-personnel cost for the remaining period (9.2 trillion yen) will be reduced by 10%, (2) the defense related cost during the concentrated reform period shall be restrained to be under the amount for the previous year.

down the procurement cost which has been under review for some time.[4] Thus the defense industries in Japan are in an extremely severe business environment. Although the ratio of the defense related sales in the total sales (dependency on defense) is significantly lower than those in the European or American corporations, they must take measures against the decrease in the amount of the equipment procurement and reduction of the procurement cost while fighting against the decline in the civilian demands and coping with globalization.

The defense industries in Europe are apprehensive about their survival as they fear that gigantic enterprises formed as a result of restructuring in the American defense industries. They fear it would enlarge the gaps in technologies and prices. Therefore, they are eager to promote restructuring. The Japanese defense industry, on the other hand, is not yet following the suit. It is uncertain, however, whether the Japanese defense industry will continue the production of defense equipment at the time when the civilian industries are desperately struggling with restructuring due to severe economic environment. Their direction may create serious problems in the national security of Japan that depends on the civilian enterprises for the defense related production. There is apprehension that the civilian enterprises might abandon the idea that it is only natural to take a part in national defense if there is no business merit in the defense related business division.

In November 1995, the Security Council of Japan and the Cabinet Council reviewed the "National Defense Program Outline" adopted in October 1976, and decided the "National Defense Program Outline for 1996 and Subsequent Years" as a measure to cope with the changes in the international environment in the post Cold War era. Prior to this review, the "Defense Affairs Board" was established as a private advisory group for Prime Minister Hosokawa in February 1994 with the objective to propose the framework concept for the defense policy to replace the conventional national defense program. This Board submitted a report titled "Security and Defense Capabilities of Japan: Prospect for the 21st Century" to Prime Minister Murayama in August 1994.

The essence of this report is to describe what improvement measures are required in the defense capabilities to meet the new international situations and the national security environment, and it positioned defense in the comprehensive national security policy system. It also reviewed the defense industry, technological bases, etc. as the themes to be considered by the entire government or the entire Japanese society among the issues that are closely related to the required reorganization of the defense forces. Concerning the defense industry, in particular, it stated that, "it is not a major industry in the Japanese economy. It should be,

---

[4] The "Promotion of Financial Structure Reform" decided on June 3, 1997 stipulated to streamline and make better efficiency of the equipment procurement and replenishment system, constrain the procurement prices and make other acquisition reform efforts. On June 1998, the Defense Agency announced to request the manufacturers to reduce the equipment procurement prices by 10% in 5 years by 2003 (*Nihon Keizai Shimbun,* June 23, 1998), but in December, shortened the period by 2 years and decided to cut down the price by 10% by 2001 (*Nihon Keizai Shimbun,* December 16, 1998.)

however, emphasized that it is extremely important to maintain the defense industry in Japan that can develop and produce the equipment with high technologies and high quality in view of the national security," and the report gave good evaluation to the civilian enterprises that had developed the defense equipments and maintained the production bases in the post-war period, and emphasized their importance.

Since the end of WWII, Japan has structured a national security system that relies on the civilian enterprises for production of defense equipment without possessing the government-run war equipment factories as practiced in the pre-war period. Therefore it was natural to positively evaluate the civilian enterprises in charge of defense equipment production and award an extremely high social status, instead of criticizing them as the "merchants of death".[5] It has become a serious problem whether the defense industry that has directly contributed to the national security of Japan through development and production of the defense equipment can maintain the incentive to continue the defense businesses. Defense production requires high technological development capabilities and high capital investment. The issue was especially problematic under the circumstances where the amount of procurement is decreasing due to the end of the Cold War and the profits of the entire enterprises are shrinking due to the economic difficulties, and facing the problem of reduction of the procurement prices at the same time.

## 2. Transitions of Defense Spending

### (1) Transitions of defense spending in major European nations and the United States

As noted earlier, the national defense spending has been reduced worldwide since the end of the Cold War. The total defense spending in the world in 1997 was 700 billion dollars, which is around 70% of the spending of 1,050 billion dollars in 1989 when the Cold War ended as shown in Table 1. The Western nations increased the defense spending for strategic reasons against the Soviet Union in the 1980s as shown in Table 2-1, but the substantial enemies of NATO ceased to exist at the end of the Cold War. It has created a situation where peoples of the Western nations demand so-called "peace dividend", which want to cut down the national defense spending and dwert it to a civilian secter. The defense spending in the West has significantly decreased as shown in Table 2-2, -31% (annual average at -4.4%) in the US, -10 % (ditto, -1.2%) in France, -27% (ditto, -3.8%) in Germany, and -23% (ditto, -3.2%) in the UK, from 1989 to 1997 calculated in the US dollars exchange rate of 1995 for comparison. These reductions were mostly achieved through less spending on the procurement of the equipment. The ratios of decrease in the equipment procurement spending in France, Germany and Italy exceed those in the total national defense spending at 27%, 55% and 34%

---

[5] Kazuo Toyama, *Nihon no boei sangyo (Defense Industry in Japan),* (Toyo Keizai Shimpo-sha, 1979), p.171

respectively, while those in the US and UK were 31% and 8% respectively as shown in Table 3.

In recent years, however, the reduction of the defense spending has slowed down and seemed to have bottomed out. The United States, in particular, plans to increase the national defense spending from 2001.[6]

Table 1 Transitions of national defense spending in the world (1988 to 1997)
(US 1 billion dollars in the exchange rate of 1995)

| | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|---|---|---|---|---|
| WOD | 1066 | 1047 | 1003 | - | 810 | 779 | 756 | 716 | 708 | 704 |
| NATO | 604 | 601 | 661 | 613 | 622 | 597 | 575 | 548 | 535 | 528 |
| USA | 378 | 374 | 357 | 314 | 331 | 314 | 296 | 279 | 264 | 259 |
| USSA | 259 | 240 | 203 | - | 47.5 | 41.9 | 40.0 | 24.6 | 23.3 | 24.1 |
| Europe | 500 | 483 | 447 | - | 279 | 265 | 259 | 235 | 235 | 234 |
| Africa | 12.6 | 13.3 | 12.3 | 11.2 | 10.6 | 10.7 | 9.7 | 9.2 | 9.4 | 8.8 |
| US | 410 | 405 | 386 | 338 | 358 | 342 | 325 | 309 | 295 | 290 |
| Asia | 95.0 | 99.5 | 102 | 105 | 108 | 110 | 112 | 115 | 119 | 120 |
| Middle East | 39.6 | 36.9 | 47.0 | 64.2 | 45.0 | 42.1 | 41.2 | 38.5 | 42.1 | 43.3 |
| Oceania | 8.9 | 8.8 | 8.8 | 8.3 | 9.1 | 8.9 | 9.2 | 8.9 | 8.7 | 8.8 |

Source: SP, *SIPRI YEARBOOK 1998* (New York): Oxford University Press), Table 6A.1 and Table 6A.3

Table 2-1 Defense spending in the West (1980 to 1989)
(in US 1 million dollars in 1988 exchange rate)

| Year | US | | France | | Germany | | UK | | Italy | | Japan | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Amount | growth rate | Amount | growth rate | Amount | growth rate | Amount | growth rate | Amount | growth rate | Amount | growth rate |
| 1980 | 206.6 | | 32.2 | | 33.8 | | 31.1 | | 14.2 | | 20.1 | |
| 1981 | 221.0 | 7.0 | 33.0 | 2.3 | 34.2 | 1.2 | 30.5 | △1.8 | 14.3 | 0.9 | 20.6 | 2.6 |
| 1982 | 240.6 | 8.9 | 33.7 | 2.0 | 33.8 | △1.3 | 33.3 | 8.9 | 15.3 | 7.0 | 21.3 | 3.2 |
| 1983 | 258.8 | 7.6 | 34.3 | 1.7 | 34.1 | 0.8 | 35.0 | 5.1 | 15.6 | 2.1 | 22.4 | 5.2 |
| 1984 | 270.9 | 4.7 | 34.1 | △0.4 | 33.7 | △1.0 | 36.5 | 4.4 | 16.1 | 3.0 | 23.5 | 4.9 |
| 1985 | 290.0 | 7.1 | 34.1 | 0.0 | 33.8 | 0.2 | 36.5 | 1.0 | 16.6 | 3.6 | 24.7 | 5.0 |
| 1986 | 305.1 | 5.2 | 35.1 | 3.0 | 34.7 | 2.7 | 36.2 | △1.0 | 17.0 | 2.0 | 25.9 | 5.1 |
| 1987 | 300.9 | △1.4 | 36.1 | 2.9 | 35.2 | 1.7 | 35.7 | △1.3 | 19.21 | 3.2 | 27.3 | 5.3 |
| 1988 | 294.9 | △2.0 | 36.1 | △0.1 | 35.1 | △0.6 | 34.6 | △3.0 | 20.4 | 6.4 | 28.5 | 4.5 |
| 1989 | 289.1 | △2.0 | 36.4 | 0.8 | 35.0 | △0.4 | 34.5 | △4.7 | 20.8 | 1.9 | 24.4 | 2.9 |
| 1980-average | | 4.2 | | 1.4 | | 0.4 | | 0.8 | | 4.5 | | 4.3 |
| 1989 against 1980 | | 39.9 | | 13.0 | | 3.6 | | 10.9 | | 46.5 | | 21.4 |

Source: *SIPRI YEARBOOK 1990,* Table 5A.2

[6] President Clinton's State of the Union message that demanded increase to modernize the military for the next 6 years. *Nihon Keizai Shimbun,* January 20, 1999 evening issue.

Table 2-2 Defense spending in the West (1988 to 1997)
(in US 1 million dollars in 1995 exchange rate)

| Year | US | | France | | Germany | | UK | | Italy | | Japan | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Amount | growth rate | Amount | growth rate | Amount | growth rate | Amount | growth rate | Amount | growth rate | Amount | growth rate |
| 1988 | 377.6 | | 51.4 | | 54.0 | | 42.6 | | 22.7 | | 45.4 | |
| 1989 | 373.6 | △1.1 | 52.1 | 1.3 | 53.8 | △0.3 | 42.7 | 0.4 | 22.8 | 0.8 | 47.4 | 4.3 |
| 1990 | 357.0 | △4.5 | 51.9 | △0.5 | 56.8 | 5.4 | 41.6 | △2.5 | 22.0 | △3.8 | 47.7 | 4.6 |
| 1991 | 313.6 | △12.1 | 52.2 | 0.7 | 52.5 | △7.5 | 43.0 | △3.3 | 22.3 | 1.4 | 47.7 | △4.6 |
| 1992 | 331.3 | 5.6 | 50.5 | △3.2 | 50.0 | △4.9 | 38.9 | △9.6 | 21.6 | △2.9 | 48.8 | 2.4 |
| 1993 | 313.8 | △5.3 | 50.0 | △1.1 | 44.9 | △10.1 | 38.0 | △2.2 | 21.8 | 0.5 | 49.4 | 1.1 |
| 1994 | 296.2 | △5.6 | 50.2 | 0.6 | 41.9 | △6.7 | 36.8 | △3.3 | 21.2 | △2.5 | 49.6 | 0.5 |
| 1995 | 278.9 | △5.9 | 47.8 | △4.9 | 41.2 | △1.8 | 33.9 | △7.8 | 19.4 | △8.7 | 50.1 | 1.0 |
| 1996 | 263.7 | △5.4 | 46.6 | △2.5 | 40.3 | △2.0 | 34.1 | 0.6 | 21.4 | 10.3 | 51.1 | 2.0 |
| 1997 | 259.0 | △1.8 | 47.1 | 1.0 | 39.1 | △3.1 | 32.8 | △3.7 | 21.6 | 1.0 | 51.4 | 0.5 |
| 1980-average | | △4.4 | | △1.2 | | △3.8 | | △3.2 | | △0.6 | | 1.1 |
| 1989 against 1980 | | △30.7 | | △9.6 | | △27.3 | | △23.2 | | △5.3 | | 8.4 |

Source: *SIPRI YEARBOOK 1998,* Table 6A3

Table 3 Defense spending in the West (1988 to 1997)
(in US 1 million dollars in 1995 exchange rate)

| Year | US | | France | | Germany | | UK | | Italy | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Amount | growth rate | Amount | growth rate | Amount | growth rate | Amount | growth rate | Amount | growth rate |
| 1988 | 93650 | △8.5 | 21784 | 3.3 | 10426 | △4.7 | 10810 | △1.8 | 4647 | 5.7 |
| 1989 | 94525 | 0.9 | 22242 | 2.1 | 10230 | △1.9 | 9397 | △13.1 | 4683 | 0.8 |
| 1990 | 88535 | △6.3 | 22273 | 0.1 | 10047 | △1.8 | 7455 | △20.7 | 3845 | △17.9 |
| 1991 | 85626 | △3.3 | 22110 | △0.7 | 8195 | △18.4 | 8346 | 12.0 | 3632 | △5.5 |
| 1992 | 75863 | △11.4 | 20673 | △6.5 | 6643 | △18.9 | 7039 | △15.7 | 3246 | △10.6 |
| 1993 | 69032 | △9.0 | 19859 | △3.9 | 4987 | △24.9 | 98864 | 0.4 | 3742 | 15.3 |
| 1994 | 86487 | 25.3 | 19397 | △2.3 | 4568 | △8.4 | 9156 | △7.4 | 3289 | △12.1 |
| 1995 | 77243 | △10.7 | 16657 | △14.1 | 4692 | 2.7 | 7457 | △18.6 | 2906 | △11.6 |
| 1996 | 7943 | △8.2 | 16469 | △1.1 | 4478 | △4.6 | 8149 | 9.3 | 3056 | 5.1 |
| 1997 | 65259 | △8.0 | 16255 | △1.3 | 4575 | 2.2 | 8603 | 5.6 | 3108 | 1.7 |
| Annual average | | △4.0 | | △3.7 | | △9.0 | | 0.6 | | △4.5 |
| 1997 against 1989 | | △31.0 | | △26.9 | | △55.3 | | △8.4 | | △33.6 |

Source: *SIPRI YEARBOOK 1998,* Table 6.1

(2) Transition of defense spending in Japan

(A) General

There were criticism among public in both sides of pacific that the defense spending in Japan had been too restricted so taking an advantage of the Security Treaty with the US. They called Japan is not bearing his appropriate military burden. After the National Defense Program Outline was issued, however, the defense spending had steadily increased. The growth rate (growth rate in the national budget at 4%) at an annual average of 6% (4.3% in US $ conversion) had been maintained from 1980 to 1989 until the Cold War ended. The defense

spending in 1989 increased by 21% compared to 1980.

This figure reflected the effect of the strong yen, but still ranked at the third, behind 47% of Italy and 40% in the US in the comparison of reinforcement of the defense capabilities. This increase was motivated by severest factors including the creation of the National Defense Program Outline, reinforcement in the Soviet Far East regiment in the Pacific Region, and enforcement of active defense capability preparation policy of the Nakasone administration helped by stable majority control of the Liberal Democratic Party in the Diet.[7] Even after the end of the Cold War, the budget for 1997 showed an increase by 8% compared to 1990 although annual spending at the defense was still under 1% of the GNP, which, along with Italy (5% increase), took a different look from those in other Western nations (France, UK and Germany) (see Table 2-2). It was only in the 1998 budget that showed a decrease from the previous year.

Thus, while the total defense spending converted in the US$ has increased, the equipment procurement spending in the Japanese yen peaked out in 1990 and has been decreasing as in the other Western nations. The defense industry in Japan is certain to face the same problems as in other Western nations.

(B) Equipment procurement spending

The ratio of the equipment procurement spending or the non-personnel expenses in the total defense spending has increased in the 1980s as shown in Table 4. It was around 52% in 1981 but increased by 8 points to 60% at the end of the Cold War (1990 and 1991). The ratio of the major equipments in the non-personnel expenses increased by 7 points from 37% in 1981 to 44% in 1988, which indicates that the major share of the increase in the defense spending in the 1980s was allotted to them. Since 1992, however, it shifted to reduction. The share in the non-personnel expenses in 1998 was around 56%, and the share of the major equipments in the non-personnel expenses was down to under 30%, with a significant reduction rate of 14%. The actual amount decreased to 78% from 1.58 trillion yen at the peak time in 1991 to 820 billion yen in 1998. It would be at the level of early 1980s when the changes in the consumer prices are taken into consideration. The decreases in the share of the non-personnel expenses and in the major equipments within indicate the increase of maintenance or necessary expenses in the logistic (equipment repair cost, research and development cost, base maintenance cost, maintenance cost for the American Forces bases, etc.), personnel and ration expenses. The procurement spending for the major equipments shows clear inclination toward further reduction.[8]

---

[7] Arthur Alexander, "Defense Industry in Japan (1)," *JADI*, October 1993, p.9.

[8] Among the non-personnel expenses, the frontal expense was significantly cut down, but the rear expenses increased. The overall increase was 580 billion yen (43%) compared to 1998, and the equipment repair cost at 267 billion yen (68%), facility maintenance cost at 76.7 billion yen (68%) and the US Forces bases maintenance cost at 111.5 billion yen (78%) significantly increased.

(C) Transition of procurement of major equipments from industries

Upon analysis on the transition of the amounts of contracts for each of the Class A, Class B, guided missiles, ammunition, warships and other vessels, and aircraft to study the details of the major equipments, decrease was discovered except in the Class B as shown in Table 5.[9] While the share of the aircraft at the high level of 40% in 1980 decreased by 10 points to 30%, the share for the sea vessels increased to the same level as the aircraft's. The share of the Class B increased by 2 points to 7% since 1990, to the level of the Class A's. The share of the guided missiles that had increased from 1985 to 1990 started to decrease from 1991. It decreased by 10 points in 1998 from the peak time in 1989.

Table 4 Transition of the defense budgets, non-personnel expenses, and frontal and rear non-personnel expenses (expenditure base) (In 100 million yen)

| | Total budget | | Personnel | Non-personnel | | Frontal | | | Rear |
|---|---|---|---|---|---|---|---|---|---|
| Year | A | Growth rate | | B | BA% | C | CB% | Growth rate | |
| 1981 | 24000 | 7.6 | 11444 | 12556 | 52.3 | 4586 | 36.5 | - | 7970 |
| 1982 | 25861 | 7.8 | 12053 | 13808 | 5304 | 5097 | 36.9 | 11.1 | 8711 |
| 1983 | 27542 | 6.5 | 12258 | 15284 | 55.5 | 6176 | 40.4 | 21.2 | 9108 |
| 1984 | 29346 | 6.55 | 13094 | 16252 | 55.4 | 6767 | 41.6 | 9.6 | 9485 |
| 1985 | 33435 | 5.2 | 15439 | 17232 | 54.9 | 7224 | 41.9 | 6.8 | 10008 |
| 1986 | 33435 | 6.6 | 15086 | 18350 | 54.9 | 7733 | 42.1 | 7.0 | 10617 |
| 1987 | 35174 | 5.2 | 15439 | 19736 | 56.1 | 8556 | 43.4 | 10.6 | 11180 |
| 1988 | 37003 | 5.2 | 15789 | 21215 | 57.3 | 9292 | 43.8 | 8.6 | 11923 |
| 1989 | 39198 | 5.9 | 16136 | 23063 | 58.8 | 9510 | 41.2 | 2.3 | 13553 |
| 1990 | 41539 | 6.1 | 16680 | 42913 | 59.9 | 9576 | 38.4 | 0.7 | 15337 |
| 1991 | 43860 | 55 | 17568 | 26293 | 59.9 | 10579 | 40.2 | 10.5 | 15718 |
| 1992 | 45518 | 3.8 | 18808 | 26711 | 58.7 | 9938 | 37.2 | △6.1 | 16773 |
| 1993 | 46406 | 1.95 | 19396 | 27011 | 58.2 | 9179 | 34.0 | △7.6 | 17832 |
| 1994 | 46835 | 0.9 | 19975 | 26860 | 57.4 | 8944 | 33.3 | △2.6 | 17917 |
| 1995 | 47236 | 0.86 | 20714 | 26522 | 56.1 | 7576 | 28.6 | △15.3 | 18946 |
| 1996 | 48455 | 2.58 | 20760 | 27694 | 57.2 | 8054 | 29.1 | 6.3 | 19641 |
| 1997 | 49414 | 1.98 | 21260 | 28154 | 57.0 | 8056 | 28.6 | 0.0 | 20099 |
| 1998 | 49290 | △0.25 | 21739 | 27551 | 55.9 | 8199 | 29.8 | 1.8 | 19351 |

Source: *Boei hando bukku 1998 (Defense Handbook 1998)* and *JADI* October issue, 1998

[9] *Jieitai sobi nenkan 1998 (1998 Self Defense Forces Equipment Annual),* (Asagumo Shimbun-sha , July 1998), pp.555 - 556. Class B includes vehicles, communications equipments and facility equipments for the Ground Self Defense Force, and Class A includes tanks, guns, mortars and rifles of the Ground Self Defense Force.

Table 5 Transition of the new contract money and shares of major frontal equipments (contract base) ( in 100 million yen)

| Year | New Contract | Class B | Share | Class A | Share | Guided missile | Share | Ammunition | Share | Vessels | Share | Aircraft | Share |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1981 | 4960 | 231 | 4.7 | 431 | 8.7 | 480 | 9.7 | 787 | 15.9 | 1959 | 39.4 | 1071 | 21.6 |
| 1982 | 8461 | 226 | 3.1 | 747 | 5.6 | 541 | 6.4 | 1063 | 12.6 | 1884 | 22.3 | 4232 | 50.0 |
| 1983 | 6799 | 276 | 4.1 | 511 | 7.5 | 453 | 6.7 | 1009 | 14.8 | 1744 | 25.6 | 2806 | 41.3 |
| 1984 | 8217 | 285 | 3.5 | 528 | 6.4 | 619 | 7.5 | 1134 | 13.8 | 1945 | 23.7 | 3707 | 45.1 |
| 1985 | 8797 | 310 | 3.5 | 518 | 5.9 | 1032 | 11.7 | 1452 | 16.5 | 1865 | 21.2 | 3619 | 41.2 |
| 1986 | 9256 | 419 | 4.5 | 489 | 5.3 | 1428 | 15.4 | 1327 | 14.3 | 1604 | 17.3 | 3977 | 43.1 |
| 1987 | 9483 | 477 | 5.0 | 591 | 6.2 | 1622 | 17.1 | 1495 | 15.8 | 1415 | 14.9 | 3876 | 40.9 |
| 1988 | 9805 | 471 | 4.8 | 641 | 6.5 | 1625 | 16.6 | 1491 | 15.2 | 1745 | 17.8 | 3819 | 39.0 |
| 1989 | 10207 | 53 | 4.9 | 718 | 7.0 | 1826 | 17.9 | 1702 | 16.7 | 1370 | 13.4 | 4075 | 40.0 |
| 1990 | 10727 | 541 | 5.0 | 862 | 8.0 | 1691 | 15.8 | 745 | 16.3 | 2279 | 21.2 | 3596 | 33.6 |
| 1991 | 8986 | 491 | 5.5 | 679 | 7.6 | 1219 | 13.6 | 1545 | 17.2 | 2310 | 25.7 | 2706 | 30.0 |
| 1992 | 8685 | 490 | 5.7 | 720 | 8.3 | 1093 | 12.6 | 1580 | 18.3 | 2037 | 23.5 | 2716 | 31.4 |
| 1993 | 8800 | 464 | 5.3 | 702 | 8.0 | 77 | 78.8 | 1563 | 17.8 | 2218 | 25.2 | 3068 | 34.8 |
| 1994 | 8820 | 490 | 5.6 | 663 | 7.5 | 82 | 19.3 | 1570 | 17.8 | 2294 | 26.0 | 2968 | 33.7 |
| 1995 | 8250 | 489 | 5.9 | 699 | 8.5 | 897 | 10.9 | 1526 | 18.5 | 2435 | 29.5 | 293 | 26.2 |
| 1996 | 8352 | 507 | 6.1 | 572 | 6.9 | 72 | 98.7 | 1302 | 15.6 | 2030 | 24.3 | 3198 | 38.3 |
| 1997 | 8410 | 638 | 7.6 | 600 | 7.1 | 77 | 49.2 | 1355 | 16.1 | 2377 | 28.3 | 2631 | 31.3 |
| 1998 | 7980 | 545 | 6.8 | 532 | 6.7 | 61 | 57.7 | 1404 | 17.6 | 2350 | 29.4 | 2494 | 31.3 |

Source: JADI October issue, 1998

Comparison of the contract money against the peak time showed the decrease of 33 billion yen for Class A (-38% from 1990), 120 billion yen for guided missiles (-66% from 1989), 34 billion yen for ammunition (-19% from 1990) and 158 billion yen for aircraft (-39% from 1989). The decrease is largest in the guided missiles in the ratio, and the aircraft in the terms of spending. The defense industries that manufacture them must have suffered significant impact in their management.

Table 6 Comparison of budget against the peak time

| | Peak time and amount | | 1998 budget | Decrease amount | Decrease rate |
|---|---|---|---|---|---|
| Class A | 1990 | 86.2 billion | 53.2 billion amount | 33 billion | △38.3% |
| Guided missiles | 1989 | 182.6 billion | 61.5 billion | 121.1 billion | △66.3% |
| Ammunition | 1990 | 174.5 billion | 140.4 billion | 34.1 billion | △19.5% |
| Aircraft | 1989 | 407.5 billion | 249.4 billion | 158.1 billion | △38.8% |

Source: JADI October issue, 1998

## 3 Current situations of the defense industries in Europe and US

### (1) Changes in the corporate scale

According to the data for the top 100 enterprises in the defense related sales listed in the

*SIPRI YEARBOOK,* the total sales decreased in 1994 to around 80% of the sales in 1990, but recovered to the level of 86% in 1996. While the sales share in the US decreased by 8 points from 63% to 55% between 1989 and 1996, the shares in Western OECD nations and non-western OECD nations increased by 4 points and 3 points in the same period respectively. The number of enterprises decreased by 9 (around 20%) from 47 to 38 in the US and by 2 in the UK, while it increased by a few in France, Germany and Japan as shown in Table 8. In other areas, the number increased in Israel and Korea, and enterprises in Canada, Australia and Turkey started to participate in this field in the last 9 years.

In terms of the volume of sales, the number of American enterprises in the top 20 decreased from 15 in 1988 to 11 in 1996, and the number in the top 10 decreased by 3, replaced by the enterprises of the UK and France. Among the top 100, medium-size enterprises decreased and large- and small-size ones increased in the UK, large- and medium-size ones increased and small-size ones decreased in France, and medium-size ones increased in Germany. As for the sales shares per size, while the sales of the top 20 increased by 6.5 points from 56.6% in 1988 to 63.1% in 1996, the sales of the enterprises in the 21st to 60th ranks decreased by 6.4 points from 32.5% to 26.1%. Since the sales share for those under the 61st rank has not changed, the top 20 enterprises have overtaken the lost shares. The sales of the top 10 enterprises, in particular, increased by 8.6 points from 36.0% to 44.6%, which indicates that the sales have concentrated in the top 10 enterprises. Furthermore, the difference of the average sales per enterprise between the top 10 and those under the 80th enlarged from 16.3-folds in 1989 to 20.5-folds. It indicates that the restructuring of the corporations has caused effect of the concentration of defense related sales to large-scale enterprises. As a result, it promoted a creation of huge-size enterprises. It is especially evident in the US and UK. They have apparently selected the scale merit by enlarging the size of enterprises as a countermeasure against decline of the defense demand.

Table 7 Transition of the sales and shares in the top 100 enterprises per area (in US billion$)

| Year | Total | US | | W-OECD | | OT-OECD | | NON-OECD | |
|---|---|---|---|---|---|---|---|---|---|
| | | Amount | Share | Amount | Share | Amount | Share | Amount | Share |
| 1989 | 168.6 | 106.2 | 63.0 | 52.5 | 31.1 | 6.2 | 3.7 | 3.7 | 2.2 |
| 1990 | 181.8 | 109.9 | 60.5 | 60.5 | 33.3 | 6.1 | 3.3 | 5.3 | 2.9 |
| 1991 | 177.8 | 108.9 | 60.9 | 58.6 | 32.8 | 6.7 | 3.1 | 4.6 | 2.5 |
| 1992 | 167.7 | 99.9 | 59.6 | 56.6 | 33.7 | 7.1 | 3.8 | 4.1 | 2.4 |
| 1993 | 156.1 | 97.4 | 62.4 | 47.8 | 30.6 | 6.9 | 4.4 | 4.0 | 2.6 |
| 1994 | 148.1 | 89.3 | 60.2 | 46.6 | 31.5 | 8.2 | 5.5 | 4.1 | 2.8 |
| 1995 | 154.0 | 87.7 | 57.0 | 53.0 | 34.4 | 9.1 | 5.9 | 4.2 | 2.7 |
| 1996 | 156.4 | 85.3 | 55.2 | 556 | 35.2 | 10.5 | 6.7 | 4.0 | 2.5 |

Source: *SIPRI YEARBOOK 1991; 1992; 1993; 1994; 1995; 1996; 1997; 1998*

W-OECD :France, UK, Germany, Italy, Sweden, Switzerland, Spain and the Netherlands

Other OECD :Japan, South Korea, Australia, Turkey, Canada

Non-OECD :Israel, India, South Africa

Table 8 Number of enterprises and sales share in the top 100 in the West (US billion $)

| Year | Total | US | | France | | Germany | | UK | | Italy | | Japan | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No. | Share | No. | Share | No. | Share | No. | Share | No. | Share | No. | Share |
| 1989 | 168.6 | 47 | 63.0 | 9 | 9.7 | 7 | 4.5 | 14 | 10.2 | 3 | 2.9 | 6 | 3.7 |
| 1990 | 181.8 | 47 | 60.5 | 10 | 11.7 | 8 | 5.0 | 14 | 10.6 | 3 | 4.1 | 6 | 3.3 |
| 1991 | 177.8 | 47 | 60.9 | 11 | 11.9 | 8 | 4.9 | 13 | 10.3 | 3 | 3.1 | 5 | 3.1 |
| 1992 | 167.7 | 46 | 59.6 | 14 | 13.1 | 7 | 5.0 | 11 | 9.8 | 3 | 3.2 | 6 | 3.8 |
| 1993 | 156.1 | 46 | 62.4 | 12 | 12.0 | 8 | 5.2 | 11 | 10.5 | 2 | 1.8 | 9 | 5.1 |
| 1994 | 148.1 | 43 | 60.2 | 11 | 11.3 | 8 | 5.0 | 11 | 10.5 | 2 | 1.8 | 9 | 5.1 |
| 1995 | 154.0 | 40 | 57.0 | 12 | 13.2 | 8 | 5.1 | 12 | 11.5 | 2 | 2.1 | 10 | 5.5 |
| 1996 | 156.4 | 38 | 55.2 | 11 | 12.7 | 9 | 5.4 | 12 | 12.6 | 2 | 2.4 | 7 | 4.6 |

Source: *SIPRI YEARBOOK 1991; 1992; 1993; 1994; 1995; 1996; 1997; 1998*

Table 9 Conditions of defense industries outside the US and Western Europe ranked in the top 100 in SIPRI

| | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|---|
| Korea | 2 | 1 | - | - | - | - | - | - | 3 |
| Australia | - | - | - | - | - | - | - | - | 2 |
| Turkey | - | - | - | - | - | - | - | - | 1 |
| Canada | - | - | - | 2 | 2 | 1 | 2 | 1 | 1 |
| Israel | 2 | 1 | 3 | 3 | 3 | 4 | 5 | 5 | 5 |
| India | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| South Africa | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Source: *SIPRI YEARBOOK 1991; 1992; 1993; 1994; 1995; 1996; 1997; 1998*

Table 10 Changes in the number of enterprises in the top 100 per rank

| | 1st to 10th | | | | | | | | | 1st to 20th | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 |
| US | 9 | 9 | 8 | 8 | 8 | 8 | 8 | 7 | 6 | 15 | 14 | 14 | 13 | 13 | 14 | 13 | 12 | 11 |
| France | - | - | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 |
| Germany | - | - | - | - | - | - | - | - | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| UK | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Italy | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - | 1 | 1 |
| Japan | - | - | - | - | - | - | - | - | - | 1 | 1 | 1 | - | 1 | - | 1 | 1 | 1 |

Source: *SIPRI YEARBOOK 1991; 1992; 1993; 1994; 1995; 1996; 1997; 1998*

Table 11 Secular changes of sales per rank

| Year | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|---|
| Total amount | 172.4 | 168.6 | 181.8 | 178.8 | 167.7 | 156.1 | 148.1 | 154.0 | 156.4 |
| 1-10 th | 62120 | 61630 | 66720 | 65990 | 57600 | 56690 | 62630 | 65480 | 59750 |
| | 36.0 | 36.6 | 36.7 | 36.9 | 34.3 | 38.2 | 42.3 | 42.5 | 44.6 |
| 1-20 th | 97480 | 96610 | 103590 | 102640 | 92420 | 91180 | 90430 | 94720 | 98730 |
| | 21.3 | 20.4 | 20.6 | 21.2 | 22.5 | 20.6 | 18.7 | 18.9 | 17.0 |
| 21-40 th | 36680 | 34470 | 37480 | 37850 | 37740 | 32200 | 27670 | 29150 | 26540 |
| | 21.3 | 20.4 | 20.6 | 21.2 | 22.5 | 20.6 | 18.7 | 18.9 | 17.0 |
| 41-60 th | 19240 | 18870 | 20260 | 19620 | 18530 | 16210 | 14180 | 14490 | 14250 |
| | 11.2 | 11.2 | 11.1 | 11.0 | 11.0 | 10.4 | 9.6 | 9.4 | 9.1 |
| 61-80 th | 11350 | 10900 | 12170 | 12340 | 11310 | 9650 | 9220 | 9480 | 9830 |
| | 6.6 | 6.5 | 6.7 | 6.9 | 6.7 | 6.2 | 6.2 | 6.2 | 6.3 |
| 81-100 th | 7620 | 7760 | 8510 | 8280 | 7720 | 6880 | 6650 | 6110 | 6790 |
| | 4.4 | 4.6 | 4.7 | 4.6 | 4.6 | 4.4 | 4.5 | 4.0 | 4.3 |

Total amount in US $, Upper line for each rank: Sales in US 1 million $, lower line: share
Source: *SIPRI YEARBOOK 1991; 1992; 1993; 1994; 1995; 1996; 1997; 1998*

The numbers of employees in the defense industries in both US and Europe significantly decreased by 47 points in the US, 29 points in France, 44 points in the UK and 30 points in Germany between 1987 and 1995.

Table 12 Changes in the numbers of employees in the defense industries in the US and Europe (in 1,000)

| Year | US | UK | France | Germany | Western Europe | Russia |
|---|---|---|---|---|---|---|
| 1987 | 4400 | 625 | 615 | 300 | 2000 | 7000 |
| 1988 | 3986 | 595 | 585 | 290 | 1900 | 6500 |
| 1989 | 3543 | 575 | 570 | 275 | 1800 | 6300 |
| 1990 | 3100 | 550 | 540 | 290 | 1700 | 5800 |
| 1991 | 2945 | 515 | 525 | 250 | 1600 | 5300 |
| 1992 | 2790 | 415 | 509 | 240 | 1500 | 4900 |
| 1993 | 2635 | 395 | 482 | 230 | 1400 | 4200 |
| 1994 | 2480 | 375 | 458 | 220 | 1300 | 3600 |
| 1995 | 2350 | 350 | 435 | 210 | 1200 | 300 |
| Decrease rate | 47 | 44 | 29 | 30 | 40 | 57 |

(Note) The decrease rate is against the figures in 1987
Source: IISS, *The Military Balance 1996/1997* (London: Oxford University Press, 1996), p.283

(2) Weapons export

As shown in Table 13 the overall volume of the weapons export decreased worldwide. The volume in 1997 was around 55% of 1987. The US and the Soviet Union had equally divided the volume and occupied 70% share of the world market during the Cold War. But the share of Russia plunged down to around 15% after the dissolution of the Soviet Union and now the US occupies nearly 50% of the world share in weapons export. In Western Europe, the weapons export of France and the UK decreased (the share of France, in particular, decreased by 50% in 1991 from the previous year), while export from Germany increased. However, both France and the UK have started to increase the absolute volumes and shares in recent years. In comparison between the domestic procurement and export volumes, the ratio of the export by the US exceeded 20% at one time, but dropped in 1996 to the same level as in 1987 at 15%. The average ratio of export in France, Germany, UK and Italy was 24%, a significant increase from 15% in 1987 average. These numbers indicate the inclination toward dependence on export to offset the decline in the domestic procurement orders by thse countries. This trend is particularly strong in the UK and France.

Table 13 Weapon export shares of major nations (1990 US m$)

| Year | World | US | | France | | Germany | | UK | | Italy | | Russia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total Amount | % | Total Amount | % | Total Amount | % | Total Amount | % | Total Amount | % | |
| 1987 | 45870 | 13691 | 29.8 | 3232 | 7.0 | 784 | 1.7 | 2171 | 4.7 | 599 | 1.3 | 38.7 |
| 1988 | 40034 | 12204 | 30.5 | 2403 | 6.0 | 1241 | 3.1 | 1704 | 4.3 | 693 | 1.7 | 36.6 |
| 1989 | 37616 | 11366 | 30.2 | 2788 | 7.4 | 953 | 2.5 | 2541 | 6.8 | 208 | 0.6 | 38.6 |
| 1990 | 30891 | 10648 | 34.5 | 2220 | 7.2 | 1656 | 5.4 | 1509 | 4.9 | 287 | 0.9 | 33.9 |
| 1991 | 25819 | 12568 | 48.7 | 1071 | 4.1 | 2520 | 9.8 | 1143 | 4.4 | 346 | 1.3 | 18.0 |
| 1992 | 24532 | 13794 | 56.2 | 1300 | 5.3 | 1503 | 6.2 | 1099 | 4.5 | 464 | 1.9 | 11.6 |
| 1993 | 23999 | 12504 | 52.1 | 898 | 3.7 | 1562 | 6.5 | 1585 | 6.6 | 353 | 1.5 | 14.4 |
| 1994 | 20231 | 10434 | 51.6 | 704 | 3.5 | 2392 | 11.8 | 1506 | 7.4 | 289 | 1.4 | 5.5 |
| 1995 | 21271 | 9823 | 46.2 | 811 | 3.8 | 1255 | 5.4 | 1726 | 8.1 | 338 | 1.6 | 15.1 |
| 1996 | 22542 | 9528 | 42.3 | 2004 | 8.9 | 1399 | 6.2 | 1975 | 8.7 | 393 | 1.7 | 17.3 |
| 1997 | 25156 | 10840 | 43.1 | 3348 | 13.3 | 569 | 2.3 | 2631 | 10.0 | 408 | 1.6 | 13.8 |

Source: *SIPRI YEARBOOK 1998,* Table 8.1 (1993 - 1997),*1994;*Table13.8 (1989)
Ditto *1996;* Table 11.1 (1991, 1992), *1993;* Table 10.10 (1988)
Ditto *1995;* Table 14.1 (1990), *1992;* Table 8.1 (1987)

Table 14 Ratios (%) of domestic procurement and weapons (general purpose weapons) export per nation

| Year | US | France | Germany | UK | Italy |
|---|---|---|---|---|---|
| 1987 | 15.6 | 18.7 | 9.6 | 20.7 | 12.8 |
| 1988 | 15.2 | 13.4 | 16.0 | 16.5 | 14.0 |
| 1989 | 14.0 | 15.3 | 12.5 | 28.3 | 4.2 |
| 1990 | 14.0 | 12.1 | 22.1 | 21.2 | 7.0 |
| 1991 | 17.1 | 5.9 | 41.2 | 14.3 | 9.0 |
| 1992 | 21.2 | 7.7 | 30.0 | 16.3 | 13.4 |
| 1993 | 21.1 | 5.5 | 41.1 | 16.8 | 8.9 |
| 1994 | 14.1 | 4.4 | 69.4 | 17.2 | 8.3 |
| 1995 | 14.8 | 5.9 | 35.0 | 24.5 | 10.9 |
| 1996 | 16.3 | 15.1 | 38.2 | 27.4 | 12.8 |

(Export volume / domestic procurement)
Source: Domestic procurement volume; *SIPRI YEARBOOK 1997,* Table 8.1
Export volume; same as Table 13

(3) Defense industry in the US

The defense industry in the US is experiencing drastic changes of restructuring of the entire industry due to the national defense budget that had peaked out in 1985 and shrank to 70% of the peak volume. At the some time, due to the redution of the defense spending in many countries, the US has decreased the weapons export.

Restructuring of the defense industry in the US started early as an immediate response to the reduction of the national defense spending after the end of the Cold War. The major contracting enterprises repeated mergers and acquisitions among themselves as indicated in the decrease of the number of American enterprises in the top 100 in the *SIPRI YEARBOOK* (see

Table 8). As a result, two to five enterprises monopolize at each division of the defense industry, therefore they enhanced the competitiveness. In comparison of the difference between the top and the 10th rank enterprises as shown in Table 15. While the sales share of the 10th rank enterprise against the top was 45% in 1990, it was mere 8% in 1997, and the sales share of the top 5 enterprises among the 100 major enterprises contracting with the Department of Defense increased to 44% in 1996 from 33% in 1990.[10]

Table 15 Changes of sales of top 10 enterprises in the US (US$m)

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|---|---|---|---|
| 1 | MD 9020 | MD10200 | MD 9290 | LO 10070 | LM 14400 | LM 13800 | LM 18010 | LM 18500 |
| 2 | GD 8300 | GD 7620 | LO 7600 | MD 9050 | MD 9230 | MD 9620 | MD 9510 | BO 13775 |
| 3 | LO 7500 | GM 7500 | GM 5400 | GM 6900 | GM 5900 | LL 6500 | NG 6700 | NG 8200 |
| 4 | GM 7380 | LO 6900 | GE 5300 | MM 6500 | NG 5600 | GM 6250 | GM 6660 | RN 6270 |
| 5 | GE 6450 | GE 6120 | NP 4960 | RN 4500 | LL 5100 | NG 5700 | RN 4030 | TR 3800 |
| 6 | RN 5500 | NP 5100 | RN 4800 | NP 4480 | BO 3800 | BO 4200 | BO 4000 | GD 3650 |
| 7 | BO 5100 | RN 5100 | BO 4700 | UT 4200 | UT 3800 | RN 3960 | UT 3380 | UT 3311 |
| 8 | NP 4700 | BO 5100 | MM 4400 | BO 3800 | RN 3500 | UT 3650 | TR 3360 | LI 2923 |
| 9 | MM 4600 | MM 4560 | UT 4300 | LL 3750 | LI 3160 | LI 3030 | GD 3310 | NN 1600 |
| 10 | UT 4100 | RI 4000 | RI 3570 | RI 3350 | GD 2860 | GD 2930 | LI 3220 | GE 1500 |
| ● | 45.5 | 39.2 | 38.4 | 33.3 | 19.9 | 21.2 | 17.9 | 8.1 |

Source: *SIPRI YEARBOOK 1992, 1993, 1994, 1995, 1996, 1997, 1998* (1990 to 1996 data), *Defense News,* JU 20-26 1998 (1997 data)

●symbol indicates the ratio of sales (%) of the 10th rank enterprise against the top.

*Names of enterprises

| | | |
|---|---|---|
| MD: McDonnell Douglas | BO: Boeing | NG: Northrop Grumman |
| GD: General Dynamics | NP: Northrop | LI: Litton Industries |
| LO: Lockheed | MM: Martin Marietta | TR: TRW |
| GM: General Motors | UT: United Technologies | NN: Newport News Ship-building |
| GE: General Electric | RI: Rochwell International | LM: Lockheed Martin |
| RN: Raytheon | LL: Loral | |

The United States bans mergers of American defense related enterprises with foreign enterprises as a general rule to prevent drain of technologies.[11] The restructuring of the American defense industry after the end of the Cold War faced several options to choose: becoming an enterprise that specializes in defense business through mergers and acquisition; reinforces civilian businesses while continuing acquisition of defense businesses; converts to

[10] SIPRI, *SIPRI YEARBOOK 1998*, p.204.

[11] According to *Nihon Keizai Shimbun,* September 1, 1999, the Department of Defense started to prepare the environment for strategic cooperation, mergers and acquisition with major overseas enterprises in view of reinforcement of the foundation of the American defense industry and improvement of inter-operability with the allies, and converted the policy to ban mergers, etc. with foreign enterprises. *Nihon Keizai Shimbun,* October 4, 1999 reported that the DOD plans to promote M&A with Japanese enterprises to expand the defense technology exchange and announced to officially tap at periodical meeting for the equipment and technology between Japan and the US in January 2000.

dedication to civilian businesses by selling, shrinking or withdrawing of the defense division.[12] Lockheed Martin and Northrop Grumman took the first option with high dependence on defense related businesses. Boeing and United Technologies took the second with secured worldwide shares in the civilian businesses. Unlike the post WWII period, the characteristics of the post Cold War era defense industries are separation of the defense division and other means to shrink the defense related businesses at enterprises instead of creating new civilian demands because most of the enterprises are competitive in the civilian businesses as well.[13]

The US Department of Defense has proactively promoted amendment of the procurement outline of the equipment, introduction of the market principle in the defense industry, and utilization and expansion of the military-civilian compatible technologies as the environment has thus changed. The National Defense Report in March 1996 recognized that the Department of Defense had become a small customer and a recipient of the latest technologies required for the victories in the future battlefields (electronics, computer, data processing and communication) from the civilian industries, and it could no longer depend on the exclusively military technologies and must depend on the products and manufacturing of the civilian or dual purpose technologies. It also recognized that the reduction of the procurement volume due to the cutback in the budget was preferable because the reduction of the sales at the defense industry promoted restructuring and reduction of the excessive capabilities. It added that on the other hand it would take required measures to maintain the special equipments, facilities, skills and know-how that are unique to national defense that could not be depended on the civilian industries.[14] The Report also quoted the report submitted to the Congress in September 1994, "Industrial Capabilities for Defense", and listed the focuses of the Department of Defense on the defense industry issue, (1) achievement of acquisition reformation, (2) utilization of the dual and civilian technologies, (3) encouragement of the restructuring of the defense industry, (4) export control with the balance between the national security and economic security, and (5) communication with the industries.[15]

The United States has thus identified the national policy on the new relations with the defense industry and promoted further reviews and businesses. In other words, the Department of Defense has not only executed reviews on advising the anti-trust control

---

[12] Saburo Takai, "Shogaikoku ni okeru boei sangyo no jittai (Conditions of Defense Industries Abroad)," *JADI,* May 1998 p.22. Rockwell, Ford, GE, GM, Unisys, Westinghouse and IBM have withdrawn. *SIPRI YEARBOOK 1997,* p.248 carries the data for the enterprises that fell from the top 100 from 1990 to 1995.

[13] Yuzo Murayama, "Beikoku boei sangyo no gunmintenkan to reisengo no bukiyushutsu shijo (Conversion to Civilian Business of Defense Industry in the US and Weapons Exports Markets after the Cold War)," *Kokusai-Seiji (International Politics)",* No. 108, March 1995, pp. 31-35.

[14] William J. Perry, *Annual Report to the President and the Congress,* March 1996, p.71

[15] Ibid., p.73

agencies concerning the loss of competitiveness and other adverse effects,[16] but conducted payment of retirement compensation, relocation support, re-education and medical cares to subsidize the expenses required in removal of excessive capabilities as well.[17]

The defense industry policy of the US seems to ensure military superiority of the US and requirements in acquisition of technological superiority that support it. The US is coping with the changes in the environment under the national policy to secure national interest rather than leaving it to free competition by the American defense industry itself.

The number of employees in the defense industry is reported to have decreased by 1 million, from 3.7 million in 1987 to 2.7 million in 1993 through restructuring.[18]

According to the national defense report in 1998, as the cutback in the national budget would exert heavy impact on the small to medium enterprises, the Department of Defense entered into major contracts with small to medium enterprises for 25.4 billion dollars, or 23.2% of the total contract money with American enterprises at 109 billion dollars in 1996. It was the highest in the past 30 years. The report also instructed the major contracting enterprises to enter 41.8% of subcontracting to small and medium enterprises.[19]

It is inevitable that the defense industry will require huge amount of money for the fixed cost including research and development for higher technologies and establishment of production facilities to accommodate them in the future. If small-size enterprises pay for them individually, it would be advantageous in view of business competition but it would certainly push up the procurement cost as the procurement and export volume decreases. For the US government, it is the enlargement of the scale merit through mergers and acquisitions in the defense industry that would enable enhancement of the research and development capabilities and reduce the cost. It would lead to acquisition of the economical and superior American products, and enable solid ground for military superiority of the US in the world. It would also help create the favorable environment for the national security of the US through assurance of leadership in the joint development and production with allies by enhanced compatibility in operations, increase of the export volume of equipments, and accompanying reinforcement of the alliance, maintenance and enhancement of the friendly relations with the nations in Asia, Middle East and Eastern Europe by increased transfers of weapons and other diplomatic advantages. Furthermore, the enterprises would be able to acquire global sales shares, and obtain considerable profits from the required education, training, maintenance and other life cycle costs.

---

[16] Studied 35 cases since March 1995, completed 11 cases in 1997. William S. Cohen, *Annual Report to the President and the Congress,* 1998, p.179

[17] The enterprises must prove that the saving is more than double the cost. The DOD bore 765 million dollars for 7 cases since July 1993. The estimated saving amount is over 4 billion dollars in 5 years. Ibid., p.180

[18] Statement by William J. Perry, Secretary of Defense on May 4, 1995. *Janes Defense Weekly,* 20 May 1995.

[19] William S. Cohen, *Annual Report to the President and the Congress,* 1998, p.180

(4) Defense industries in Western Europe

The national defense budgets of the NATO member nations have increased the share in the entire NATO defense budget since 1990, but it is in the same level as in the national defense budget of the US. The budgets of the major members, France, Germany and the UK in comparison with the US are 17.1%, 15.3%, 12.9% and 12.9% (in the 96 and 97 US$ exchange rates) respectively.[20] According to *SIPRI YEARBOOK,* the sales of the top 100 enterprises in the Western OECD member countries are around 65% of the sales of the American enterprises (1996), and the number of the enterprises in the top 10 is mere three (UK: Ae and GC and France: Thomson).[21]

The total weapons exports volume of France, Germany, UK and Italy is also around 60% of the US (1996) level. The differences in the scales from those of the American enterprises are large in both national defense budget and weapons export volume.

While the Western European nations are conducting international joint research and development in the consortium or JV[22] styles in pursuit of better economic efficiency, restructuring of the defense industry is in progress in each nation spurred by the reduction of defense procurement.[23] It is, however, not in conformity and slower compared to the progress in the US. Restructuring in Western Europe has progressed mainly in the aircraft, military electronics divisions and other high-tech and system integration in the form of international JVs, but development and production of the tanks, guns, armored vehicles and other army weapons are still conducted at each nation.[24]

---

[20] SIPRI, *SIPRI YEARBOOK* 1998, Table 6A.1 and Table 6A.3

[21] SIPRI, *SIPRI YEARBOOK* 1998, Table 6.4 and Table 6.

[22] Consortium is a temporary agreement for joint project management, and limited to the range of joint development and joint production of one type of weapons and does not require complicated relations between enterprises or governments. Many of its management functions negotiate and manage the work share among the participants. Most of the joint production was conducted by the single supply source for the components and subsystem manufacturing, and the manufacturing of the complete system was conducted in all participating countries. A Joint Venture is an inter-governmental cooperation for joint possession and joint management by more than two enterprises. DP, Globalization of weapons production: Reformation of national defense market, translated by Japan Federation of Economic Organizations, Boei Seisan iinkai tokuho *(Special Report by Defense Production Committee), No. 250*, October 20, 1994, pp. 53-59.

[23] Saburo Takai, Syogaikoku ni okeru boei sangyo no Jittai *(Conditions of Defense Industries Abroad),* p.24. According to *Yomiuri Shimbun,* January 19, 1999, there was an acquisition of Marconi Electronics by British BAe.

[24] There are 37 enterprises in Europe. The reasons for the non-progress for the ground weapons industry are; "The national operation needs are still priority and recognized as more valuable than international competition, and there is no market pressure from the US, but the major enterprises that manufacture the main tanks also possess the production capabilities for light armored vehicles. The production scale and technological capabilities of the ground weapons manufacturers suit the national requirement as the structuring of the fighting forces has shifted from heavy equipment to those for immediate actions after the end of the Cold War, and there is another issue of employment of some 30,000 people, which all fanned the policy to strengthen the domestic capability rather than international mergers." *Defense News*, August 31 - September 6, 1998

Restructuring at each nation and international JVs, however, remain at the level of dispersion of risks and standardization of the equipments, and have not achieved streamlining of the industries in the entire Europe that holds excessive production capabilities. The defense procurement budgets and sales including exports are not comparable to those of the US. The gap between the US in the research and development as well as the product cost is increasingly deepening, and they might lose the future potential in the performance and unit prices of the equipments, procurement processes, military power build-up and exports. There is apprehension that the US might take the leadership in promotion of international cooperation propelled by the compatible operability which the US is advocating, and Europe might fall under the control of the US in the strategies, tactics and the overall systems. Such a situation might affect the defense policies of each Western European nation and the alliance with the US, not to mention the issue of survival for the defense industries in the entire Western Europe.[25] Furthermore, the Western Europe has to deal with the problem of continuation of weapons exports when the weapon system has to change as the former Eastern European countries join NATO.

The Western European nations had basically depended on domestic defense industry for procurement of the equipments while maintaining NATO and resisted to mergers of defense industries across the borders, but they have begun to recognize the necessity for restructuring to go beyond the borders within Europe and across the Atlantic Ocean. Such movements have become increasingly brisk.[26] The major powers of Europe, namely France, UK and Germany, seem to be obligated to take leadership in this restructuring. It is the UK and Germany that are proactively in pursuit of mergers across the borders. In the UK, which has little resistance to acquisition of enterprises across the borders in the civilian fields,[27] restructuring of the defense industry has progressed to specialize in the defense business, and now it occupies a large share in the weapons market in the world along with France next to the US. Germany, where most of the military related industries are affiliates of the giant domestic enterprises, had traditionally imposed strict regulations on weapon export, but now is an active pursuer of international mergers.[28] It has been said that their efforts had been obstructed by France, where most of the defense industries are government undertaking and it is essential to solve the domestic problems of employment assurance and covering of a deficit by subsidies and to

---

[25] William S. Cohen, *Annual Report to the President and the Congress, 1998*, p.182.

[26] In July 1998, the Ministers of Defense of the UK, France, Germany, Italy, Spain and Sweden agreed to standardize the equipments and to avoid double investment on the research and development, and announced the demand for integration to civilian enterprises. *Yomiuri Shimbun,* August 2, 1998.

[27] The acquisition across the borders in 1998 was at 127.7 billion dollars, an increase by 4-fold from the previous year. Eighty percent of the enterprises which the British enterprises bought were American. The British enterprises have converted the position of the recipient of acquisition to the performer of acquisition. *Nihon Keizai Shimbun,* January 25, 1999.

[28] *Defense News,* November 23-29, 1998.

promote privatization. France, however, is shifting towards privatization along with mergers of major factories with the pressure from other EU member nations recently. The French government announced partial privatization of Aerospatiale in July 1998.[29] It is planned that Airbus Industrie, a joint venture of France, Germany, UK and Spain will become an independent enterprise in the aircraft production field in 1999. It would spur the union concept to integrate the aircraft, space and defense related enterprises under the ADC (Air Defense Council of Europe) concept.[30]

Few manufacturers in Europe have international competitiveness, and the unemployment rates are still high in each countries.[31] It seems that conversion of military industry to civilian industry and privatization of the government run enterprises are facing difficult situations for those reasons. Due to little expectation for the military procurement demand and expansion of weapons export in the future, expansion of the civilian divisions is crucial, thus the enterprises such as aerospace, automobile and other civilian industries must take leadership and maintain its competitiveness. If the defense industries are left to the market economy, there is apprehension that they might be absorbed by the scale economy of the US. Therefore, they are forced to pursue mergers across the borders with due consideration to the government-led international joint development and production as well as the transfer of the focus to businesses in the civilian markets, except for those that are able to specialize in the defense business. Integration of the defense industries in the entire Europe or across the Atlantic Ocean and globalization of the defense equipment production tend to proceed around Europe. The future, however, seems to be fraught with difficulties when the varying concepts on a State and national security, leadership in equipment research, production bases and employment issues are taken into consideration.

## 4 Defense industry in Japan

In the defense industry in Japan, the major military equipments procurement was reduced in 1998 to 77.5% of the volume in 1998 by reduction of the budget, and the overall sales in the defense division have declined. Under these circumstances, the defense industry in Japan should have seeked for mergers and business alliances among the sea vessel manufacturing

---

[29] They plan to merge Aerospatiale and Matra, a defense division of French Lagardere, and make it partially privatized and list it in the stock market. *Yomiuri Shimbun,* August 2, 1998; *Defense News,* November 23-29, 1998.

[30] German DASA and French Aerospatiale Matra announced merger in the first half of 2000 and establishment of a new company ADS, which will have the 3rd largest sales volume in the world. DASA announced a merger with Spanish CASA (June, 1999), and it will de facto control the civilian aircraft manufacturer Airbus Industrie. The action of the British Ae that planned a merger with DASA is drawing attention. *Yomiuri Shimbun,* August 2, 1998; *Nihon Keizai Shimbun,* October 15, 1999.

[31] The unemployment rates of ⅢQ in 1998 were, US: 4.6%, France: 11.8%, Germany: 10.9% (quick announcement), and Japan: 4.3%. Bank of Japan, *Bank of Japan Investigation Monthly,* January, 1999.

enterprises as those industnes in Europe and the US.[32] There has been, however, no movement toward mergers and acquisitions among different businesses, withdrawals and other restructuring as seen in Europe and the US. There has been no significant lay-off as practiced in the US.[33] Most enterprises are conducting restructuring within the limits listed below, and their efforts remain at the level of streamlining to cut down the expenses with similar policies practiced in the civilian industries.

*Review on the organization: Reduction, transfer, integration, abolition of the defense related divisions and sections, and mergers of affiliates
*Reduction of employees: Relocation of development and design engineers and manufacturing engineers to civilian divisions, holdback of new employment, suspension of re-employment of managers, limited re-employment of retired employees, lay-off, reduction of temporary staff
*Working hour management: Better efficiency of work, reduction of overtime
*Review on subcontractors and work allotment: Reduction of subcontractors' work volume, and in-company accommodation
*Constraint on facility investment and new research and development cost
*Integration of the production lines
*Development of civilian businesses

The defense industry is struggling to reinforce the business characteristics through in-company restructuring to maintain the defense division.[34] The reasons behind the fact that the ratio of the defense related production in the general industrial production volume is small

[32] Ishikawajima-Harima Heavy Industry and Sumitomo Heavy Machinery Industry established Marine United in October 1995 with the targets to enhance technologies and cut down the unit price as the countermeasures against decrease in shipbuilding orders stipulated in the amended first medium-term Defense Plan and the economic slump in the civilian divisions, and control designing and process management, but the manufacturing was to be conducted by IHI and SHM for the time being. Hitachi Zosen and Mitsui Engineering and Shipbuilding agreed on business cooperation to achieve the same targets by encouraging mutual exchange of design charts and shipbuilding know-how in June 1995.

[33] According to *Asahi Shimbun,* August 24, 1998, the employees at defense industry in Japan is 60,000 in the research by the Defense Production Committee, and according to Tetsu Kuwahara, "Boeisangyo no genjo to kadai (Current Conditions and Issues of Defense Industry)," *JADI*, April 1998, p.9, the number of employees of defense production related industries in the qualified enterprises for main contract (some 1,300) is 60,000. According to Toshifumi Hirai, "Boeisangyo no genjo to kadai (Current Conditions and Issues of Defense Industry)," *JADI*, May 1995, p.2, the number of employees including those in the subcontractors is 150,000 to 200,000.

[34] According to an interview with a gun powder company in Japan (February 4, 1998), even the companies mainly engaged in subcontracting plan to maintain the company system that suits the budget size, without considering mergers or cooperation.

at 0.6, is because the primary defense related production is conducted by general electric appliances manufacturers and heavy industries at one of their divisions, and their dependence on defense production is lower than in Europe or in the US with comparatively high international competitiveness in the civilian businesses. It indicates that it is unlikely that reduction of the defense related procurement would exert decisive effects in the management of the entire enterprises.[35]

Such situations were created because the defense budget of Japan has been small compared to its economy and the defense industry has been placed in the environment where business strategy to increase dependence on the defense related production had been constrained due to the de facto export ban policy with in the framework of the three principles on weapons exports. Another reason was the creation of the task allotment structure and the characteristics of business risk dispersion since the Weapons Manufacturing Law, Aircraft Manufacturing Law and other laws have restricted new participation of weapons manufacturing and the small research and development cost and unique procurement system have acted to eliminate competition among enterprises.[36]

Furthermore, the unemployment problems caused by privatization of the defense businesses as seen in Europe and the US and the excessive personnel problem has been solved within the enterprises.

In recent years there has been emergence of enterprises that try to reinforce the business characteristics with the means other than in-company restructuring. For instance, there are enterprises that plan to expand the technological superiority to others by increasing the number of engineers for the aerospace system Mitsubishi Electric and others that have reached basic agreements on the joint development in the defense field with Lockheed Martin of the US to cooperate in the joint development of the next generation missiles and radars, as well as the order acquisition activities to the Defense Agency. They are pursuing strategies to reinforce the defense technologies through joint effort with foreign enterprises.[37]

Some enterprises that possess an aerospace division are trying to enlarge the businesses in

---

[35] According to *SIPRI YEARBOOK 1998,* there are 7 Japanese enterprises in the top 100, but the average dependence ratio on defense products was 4.5 (the 7 are Mitsubishi Heavy Industry with 10% at the 16th, Mitsubishi Electric with 4% at the 31st, Kawasaki Heavy Industry with 8% at the 44th, Ishikawajima-Harima Heavy Industry with 7% at the 50th, NEC with 1% at the 68th, Toshiba with 1% at the 69th and Hitachi with 0.4% at the 92nd). The average of the top 10 American enterprises in the same source is 50.3%, average of the top 10 British enterprises is 38.8%, average of the top 10 French enterprises is 39.0%, and the average of the top 9 enterprises of Germany is 20.3%. According to Richard J. Samuels, *Fukoku kyohei no isan:gijutsu senryaku ni miru nihon no sogo anzenhosho (Heritage of the Measure to Enrich and Strengthen a Country: Comprehensive National Security of Japan seen in the Technological Strategies),* (Mita Shuppan-kai, 1997), pp. 464-465, "The Japanese industry has integrated the defense production in the larger-size civilian industries."

[36] *Yomiuri Shimbun,* December 2, 1998.

[37] According to an interview with an aerospace related enterprise in Japan (February 5, 1999), although they have cut back the personnel in the skilled divisions and indirect divisions, they increased the personnel in the design and research division by 200 from 1990. The data on Mitsubishi Electric is from *Nihon Keizai Shimbun,* August 25, 1998.

the civilian division by proactively promoting joint efforts, including participation in the large size aircraft development project with the European and American enterprises that have an aerospace division, investment for expansion of engine production, and joint development of spacecraft.[38]

According to the Japan Aerospace Industry Association, the production volume of aircraft in Japan in 1998 was 928.3 billion yen, the highest ever, and the export volume was 322 billion yen, 23% increase from the previous year, which has offset the decline in the defense related demand through expansion of businesses in the civilian industries. Expansion of businesses in the civilian industry, however, has not led to sales increase for some enterprises.[39] The expansion of businesses in the civilian industries is under a difficult situation especially with the severe economic conditions at the moment.

The Japanese government is concerned with the severe conditions of the defense industry. The Ministry of Labor designated the "gunnery manufacturing" as a "business that requires special employment coordination," a victim of the economic slump in October 1996, and took measures to provide a tax relief (defense industry related tax system) in the corporate tax for the facility investment required for more efficient, high quality business to the manufacturers (including subcontractors) of aircraft or weapons from 1997.[40]

## 5 Problems for defense industry in Japan

The end of the Cold War means victory of the Western liberalism and democracy in political and military views, and victory of the market economy in the economic viewpoint. It brought a reduction of national defense spending worldwide as the "peace dividend" and enabled the shift of the resources to the primary production activities. Reduction of the national defense spending, however, made the defense industries in Europe and the US burdened with excessive production capabilities. Promotion of weapons exports and restructuring of the defense industries are spurring optimization of the enterprises, and the market economy is promoting pursuit for scale merit and globalization. The waves of restructuring have reached to the point of international correlative restructuring. The United

---

[38] According to *Nihon Keizai Shimbun,* September 13, 1998, Kawasaki Heavy Industry, Mitsubishi Heavy Industry and Fuji Heavy Industry participated in the large-size passenger aircraft development project of Boeing of the US. According to *Nihon Keizei Shimbun,* February 25, 1999, Mitsubishi Heavy Industry decided to participate in the development of the next super-jumbo passenger aircraft "A3 (capacity for 555)". According to *Nihon Keizai Shimbun,* September 9, 1998, Kawasaki Heavy Industry announced an international joint development of the engine for a new aircraft model of Rolls Royce of the UK. According to *Nihon Keizai Shimbun,* January 7, 1999, Mitsubishi Heavy Industry reached a basic agreement with Boeing in the US on a joint development of the engine for Delta 4.

[39] According to an interview with a gun powder company in Japan (February 4, 1999), they are seeking to advance into the medical equipments by a spin-off, but they have difficulties in increasing sales against competition with better known existing suppliers.

[40] *JADI,* February 1997.

States has gained confidence in its economic system from the victory of market economy, and raised its position in the international economy thanks to the lower unemployment rate and better economic conditions after the finance has turned into black although trade deficits still remain. The US is pushing global standardization in the American standard and has a stronger voice over opening of markets.

Japan is suffering from economic slump and high unemployment rate, and facing the problems of the pressure for public investment regardless of shortage of revenue from taxes and increase of debts incurred by the remedies against the financial crises. The worldwide tidal wave for global economy has brought increased in-flows of cheaper imports from all over the world, and activated restructuring of the enterprises to shift the production bases to overseas and cut off the unprofitable businesses. The entire Japanese industry is in a most severe environment. This might shake up the foundation of the manufacturing, the major industry of Japan, which might affect the defense industry that depends on it.

In view of procurement of equipments, purchasing of cheaper imports or adoption of licensed production would contribute to reduction of the procurement cost more than with the original development of equipments that requires high research and development cost, and it would enable mitigation of the financial burden of the State and ensure the procurement quantity. It would, however, cause the Japanese defense industry to lose the incentive for new and highly technological development, disable the performance of the clause in the National Defense Program Outline, "to consider maintenance and enhancement of defense production and technological level through appropriate domestic production and other similar measures," and cause further weakening of the foundation of defense production.

(1) Self development capability

The domestic procurement ratio accoreing to the Defense White Paper indicates that domestic production of the defense equipments in Japan achieved 90% at the phase of the Third Defense Power Consolidation Plan in the late 1960s and early 1970s as shown in Table 16. This achievement in less than 20 years since resumption of the defense production after WWII is an evidence of the high technological level of Japan. It was, however, mentioned that "among the domestic procurement, many of the aircraft, guided missiles, etc. were procured by licensed production, and a considerable part depended on introduction of technologies learned from foreign countries, notably the United States in actuality".[41] The ratio of the domestic production would be much lower when the licensed production is taken into consideration, but no data on this matter has been announced.

In study of the acquisition methods of major equipments per field, the ratios of domestic development are low and licensed production or exports are high in aircraft, missiles and other

[41] *Boei nenkan 1998 (Defense Annual 1998),* (Defense Annual Publishing House, 1998), p. 488.

major equipments, and the domestic development ratio is high in armored vehicles and other ground defense equipments as shown in Table 17. The domestic original development is little especially in the highly systemized equipments. According to Arthur Alexander of the Rand Institute of the US, the defense industry of Japan has poor achievement rate in the research and development of the weapon systems with complex structures, and procures licensed production equipments or directly purchases imported equipment with less endeavor on self development or production, and the focus is on the simpler hulls, fuselages and chassis.[42] He also compared the degrees of domestic production of the subsystems for fighter jets and warships and concluded that the domestic development technologies of Japan are particularly poor in the system field.[43]

Table 16 Transition of equipment procurement volumes per procurement method (in 100 million yen)

| Year | Domestic Procurement A | Procurement Import B | Onerous aid C | Gratis aid D | Total ACD | Domestic procurement | Remarks |
|---|---|---|---|---|---|---|---|
| 1950-57 | 2415 | 95 | 25 | 3569 | 6104 | 39.6 | |
| 1958-60 | 2789 | 109 | 168 | 1405 | 4471 | 62.6 | 1st DPCP |
| 1961 | 702 | 63 | 60 | 261 | 1086 | 64.6 | |
| 1962-66 | 5781 | 242 | 382 | 497 | 7084 | 81.6 | 2nd DPCP |
| 1967-71 | 12829 | 662 | 478 | 33 | 14002 | 91.6 | 3rd DPCP |
| 1972-76 | 21588 | 1001 | 617 | 0 | 23206 | 93.0 | 4th DPCP |
| 1977-80 | 30869 | 1392 | 2894 | 0 | 35137 | 88.1 | |
| 1981-85 | 59466 | 3243 | 4339 | 0 | 67046 | 88.2 | |
| 1986-90 | 80672 | 3799 | 4686 | 0 | 89158 | 90.5 | |
| 1991-95 | 86574 | 5345 | 4725 | 0 | 96645 | 89.6 | |
| 1996 | 18725 | 938 | 541 | 0 | 20204 | 92.7 | |

[42] Arthur Alexander, "Nihon no boei sangyo ni tsuite (3) (Defense Industry in Japan (3))," *JADI*, December 1993, p.17. He quoted the weapons system production classification of Janes Weapon System, and compared Israel and Italy. According to this comparison, while Israel produces 21 items out of the listed 25 and Italy produces 23 items, Japan produces only 12 items.

[43] Arthur Alexander, ibid., December 1993, pp. 19 and 24.

Table 17 Acquisition methods of major equipments in Japan (%)

| | 1970 | | | 1980 | | | 1990 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Import | LD | Domestic | Import | LD | Domestic | Import | LD | Domestic |
| Combat aircraft | 0 | 100 | 0 | 4 | 80 | 16 | 3 | 76 | 21 |
| Transport aircraft | 53 | 29 | 17 | 0 | 43 | 57 | 13 | 53 | 33 |
| Training planes | 0 | 81 | 19 | 0 | 62 | 38 | 3 | 48 | 49 |
| SAM | 55 | 45 | 0 | 27 | 73 | 0 | 11 | 63 | 25 |
| Armored vehicles | 78 | 0 | 22 | 5 | 0 | 95 | 0 | 0 | 100 |

* LD: Licensed domestic production; Domestic: self development

Source: Arthur Alexander "Nihon no boei sangyo ni tsuite (Defense Industry in Japan)" *JADI* October issue, 1993

As Arthur Alexander pointed out, there seems to be a limit in the self development capabilities for national defense equipments in Japan. The reasons seem to be the high dependence on the licensed production with the objective to acquire technologies and failure to endeavor for self development. This situation must be the result of the significant influence of demilitarization policy to destroy the military economic foundation and disapproval of restoration, which was one of the major policies of the occupation forces after WWII. The occupation force lead by the US banned research, development and production of weapons for 7 years. It resulted in destruction and deterioration of the production facilities, scattering of the engineers and lag in technologies. Even after resumption of production of weapons, the Defense Agency had difficulty in making investment to technological development with poor allowance from the national budget. But it was necessary to meet the demands for acquisition of equipments with high reliability and operability. The national government expected technological propagation and growth into the entire Japanese industry through early creation of the domestic production foundation of the defense equipments as the national industry policy. It was, on the other hand, only natural for the enterprises to select acquisition of know-how from licensed production that seemed more economical and easier to learn with expectation to transfer the technologies to the civilian industry, instead of endeavoring for self development that would incur huge expenses out of the poor profits to fill the technological gap that had formed in the vacuum period after the War.[44] The licensed production, however,

[44] Samuels said, "Although Japan could not develop its own weapons due to political and financial restrictions, it conducted licensed production at every opportunity and learned the technologies...The Japanese government intervened to securely spread the technological know-how throughout Japan and often transferred technologies...They also understood that licensed production is cheaper, has less risk and procides a shortcut to master the technologies." Samuels, *Fukoku kyohei no isan (Heritage of the Measure to Enrich and Strengthen a Country),* p.272.

left the problem of disability to master to understand the concept of key technologies.[45]

Although the research and development expenses in the defense budget have been on the increase in recent years, mere 3.2% of the entire defense budget, which is extremely low compared to 14% of the US (22-fold in the amount), 12% of France (2.7-fold in the amount) and 6% of Germany (1.2-fold in the amount).[46] Partially due to this small allowance of the research and development expense, the defense industry is making the research and development with full employment of the civilian technologies and considerably depending on the technologies accumulated in the civilian industry divisions or each enterprise. This is why the ratio of the self development is high in the simpler systems commonly employed in the civilian industry divisions and low in the complex and high-tech exclusively military systems.[47]

The Defense White Paper states; "we shall promote research and development of equipment with sufficient consideration to constrain the lifecycle cost in view of the severe economic, financial situation, and execute various studies including technological verification study in order to contribute to establishment of effective and state-of-art technologies for equipments."[48] The purview, however, is limited to the development of equipments including electronic equipments for the supporting FX, new observation and patrol helicopters, intermediate range air-to-air guided missiles, intermediate range surface-to-air guided missiles, light anti-tank guided missiles, new self-propelled howitzer, carrier-based fire direction system and sonars.[49] The objectives of the scientific and technological plan of the Department of Defense of the US, by the way, are to develop the technologies indispensable for maintaining the world's strongest military capabilities, to create the foundation for the next generation technologies by reinforcing the basic sciences, and to maintain the balanced plans in the wide ranges from the basic sciences to development and verification of the latest technologies to this end.[50] The plan also states that the importance of technological superiority has become greater since the scale of military has shrunk after the end of the Cold War and highly technological weapons are easier to acquire in the world market due to globalization of the weapon manufacturing.[51]

It is necessary for Japan to reinforce the creation of the technological development foundation with reference to the concept of technological development of the US. There is a huge gap between the conditions in the US where the research institutes in the academia,

---

[45] Samuels, ibid., p. 275

[46] Tetsu Kuwahara, "kokubo sangyo no genjo to kadai (Current Conditions and Issues of Defense Industry)," p.10.

[47] *Boei hakusyo 1998* (Defense White Paper, 1998), p.166. Tetsu Kuwahara, ibid., p.2. Alexander, "Nihon no boei sangyo (3), (Defense Industry in Japan (3))," December 1993, p.26.

[48] *Boei hakusho 1998 (Defense White Paper, 1998),* pp. 166 - 167.

[49] *Boei hakusho 1998 (Defense White Paper, 1998),* p.381, data 32.

[50] William J. Perry, *Annual Report to the President and the Congress,* March 1996, p.135.

[51] Ibid., p. 135.

industries and the Department of Defense are conducting investigative development and latest technology development as well as basic studies and other long-term investment.

The technological issue, however, might cause dispute between Japan and the US. The US has opposed to development of FSX in Japan with apprehension that domestic production of FSX in Japan might shake up the weapons export ban policy and lose compatible operability with the American aircraft. There has been an argument that Japan might transfer the technology learned in the joint development of FSX into civilian aircraft.[52] This situation indicates that the US entertains the apprehension that improvement of the civilian technologies after transfer of the military technologies to civilian application would weaken the American industries and it would also enable transfer of the civilian technologies to military application to strengthen the military capabilities in Japan. Thus, technological transfer from the US is becoming increasingly difficult.[53]

Although endeavor to improve the domestic development would invite pressure from the US as described above, the authors believe that sufficient consideration will be required for enhancement of technologies especially in development of the systems and software when creating the technological foundation for the national defense industry in view that it will become a deterrent to assure the national security of Japan.[54]

(2) Defense related production and technological foundation

Maintaining the defense related production and technological foundation in Japan is important because it would create a deterrent to assure the national security of Japan and enable accommodation for high-tech application to equipments, acquisition of appropriate equipments that suit the geographical and cultural features of Japan, stable maintenance and replenishment of the equipments and prompt acquisition at emergencies.[55] Reduction of the defense procurement has caused the cutback of the personnel through relocation of the development and design engineers and manufacturing engineers in the defense divisions to civilian divisions and constraint of new employment, integration of the production lines, constraint on the facility investment and other measures to slim down the excessive production capabilities. The major problem in those efforts is the reduction of the development, design and manufacturing engineers. Development of special technologies such as defense equipments requires accumulation of technologies in the apprentice system where the engineers with experiences in development take leadership in the next development as

---

[52] Yuzo Murayama, Amerika no keizai anzenhosho senryaku *(Economic Security Strategy of the US),* (PHP Institute, 1996), pp. 165 - 167.

[53] Yuzo Murayama, ibid., p. 162. Yuzo Murayama, "Nozomareru boei sangyo gijutsu kiban rongi (Desirable Defense Industry Technology Foundation Argument)," *DISA*, September 1994, p.4.

[54] *Boei hakusyo 1998 (Defense White Paper, 1998),* p.166.

[55] Ibid., p.163.

managers or key personnel and educate the new and inexperienced engineers, and it is said to take 5 to 10 years of experience to become able to educate manufacturing engineers.[56]

Constraint on employment or relocation of engineers would be likely to deteriorate the technological development capabilities and adversely affect the next development. Reduction of the volume of procurement would prolong the usage of the existing equipment and postpone the start of development of new equipments, which might cut off the continuation of skills and make it difficult to maintain the technological foundation. An extreme example is the current situation of Japan, where many engineers had dispersed due to the ban on manufacturing of weapons and aircraft imposed by the US after the defeat in WWII causing inferiority in defense related production, aircraft development capability in particular, is still unable to catch up with the capabilities of Europe and the US.

Under the current economic difficulties in the manufacturing industry, relocation of engineers in the civilian division would also be difficult. It is a serious problem in the guided missiles and gunnery industry that was designated as the industry that requires special employment subsidy.[57]

(3) Incentive for defense related production

Equipment manufactured in Japan is said to be extremely expensive compared to foreign products. It is said that tanks are two to three times more expensive than those in the same class manufactured in Europe and the US, fighter planes are twice as expensive due to licensed production, and rifles are four to five times more expensive than the American made products.[58] For instance, the comparison on the unit price and the production volume of tanks in Japan and the US indicated that the unit price of a model 74 tank is around 300 million yen and the production volume is about 900 in Japan, while the unit price of an M60 tank of the US was around 1/2 with the production volume of 15,000, and the unit price of a model 90 tank is about 1 billion yen with the production volume unknown but 300 at most,

---

[56] An interview with an aerospace related company in Japan (February 5, 1998).

[57] The conditions of the shipbuilding industry in the economic slump are as follows. Among 6 major shipbuilding and heavy industry companies, 4 reported worsened ordinary loss at the interim settlement of account in September 1998 (Mitsubishi Heavy Industry, Ishikawajima-Harima Heavy Industry, Hitachi Zosen and Sumitomo Heavy Industries). The ordinary profit and loss of Mitsubishi Heavy Industry in the second half is expected to be in the red of around 10 billion yen. The ordinary profit for the entire term will fall by 70% of the previous term. The ordinary profit for Ishikawajima Harima Heavy Industry in the second half is expected to be half of the profit in the previous term. No escort ship will be built in the second half, and the shipbuilding division will suffer decrease of profit by 30%. *Nihon Keizai Shimbun,* October 30, 1998, *Nihon Keizai Shimbun,* February 18, 1999, *Nihon Keizai Shimbun,* February 25, 1999. According to an interview to a ground equipment company in Japan that was designated as a company that requires special employment subsidies (February 4, 1998), around 800 persons were cut off in the entire company in 6 years.

[58] *Nihon Keizai Shimbun,* June 24, 1998 (evening issue). According to Alexander, "Nihon no kokubo sangyo ni tsuite (3) (Defense Industry in Japan (3))," the price of a domestically developed system is 3 times higher than foreign products', and 50- to 200-fold for the licensed products.

while the unit price of an M1 tank of the US is 1/3 with the production volume of 8,500.

The major reason for the high price is small volume production. The production is limited for domestic procurement only because weapons exports are banned by the Three Principles on Weapons Exports, which causes all the huge research and development cost and investment for the production facilities to be reflected on the domestic procurement prices. This is considerably different from the conditions of the European and American enterprises, which can lower the prices by large production volume through exports and which are exposed to the market principles and forced to make the prices competitive. The reasons for higher prices in Japan also include the requirement for higher technologies, many special orders in the Defense Agency specifications, tendency to pursue multiple functions and pricing in the cost accounting system. There is another opinion on the reasons for higher costs that the Japanese enterprises must maintain a required number of engineers and production lines to enable prompt acquisition of the equipments at emergencies, which is deterring adoption of the production system employed in the civilian divisions with superior production efficiency.[59]

Reduction of the equipment procurement volume could further solidify such disadvantageous characteristics of the defense industry. It is inappropriate to discuss the high prices of the Japanese defense-related products in the same standard of the civilian products and to make comparison between Japan, which bans weapons exports, and foreign nations where weapons exports are legitimate actions of the nation. It is also natural that the defense equipment does not suit the market economy because they are public asset and their market is limited to only in Japan.

The acquisition reform currently under way, however, is important. The decision to reduce the equipment procurement price by 10% within 3 years is particularly important in removing the structural problems of the defense procurement in Japan by making the defense industry and the State pursue cost reduction, although some may ague that it would damage the incentive for the defense related production and force the defense industry to reconsider or withdraw from defense related business.[60] It is also necessary for the State to create an environment where it is easier to draw production plans and R&D plans for the enterprises with the focus on what kind of capabilities are required in the defense industry for the purpose of the national security of Japan.

(4) Restructuring of defense industry and international joint development

According to the data on top 100 enterprises listed in SIPRI YEARBOOK, the dependence of the defense industry on the defense demand in Japan is considerably lower than European or American enterprises', with the average of the top 7 at 4.5% (see footnote 33).

---

[59] Alexander, "Nihon no boei sangyo ni tsuite (2) (Defense Industry in Japan (2))," *JADI*, November 1993, p.28.
[60] *Nihon Keizai Shimbun*, December 16, 1998.

The Japanese enterprises, however, (although they are at the prime positions in the defense industry) have secured the position in the civilian divisions with international competitiveness, and it is highly unlikely that they will start thorough restructuring, such as mergers, for the defense business that makes up mere 4.5% of the total sales. Reinforcement of the characteristics tends to be focused on cutback of the personnel. No data is available for confirmation of the restructuring trend at the subcontractors' level, but it seems to be insignificant because judging from the relations with subcontractors in the civilian production, it must be retaining vertical relations in dispatching of the personnel and cooperation in skills and funds.[61]

In the event, however, that mergers and other means of restructuring within Europe or across the Atlantic Ocean are to progress in the near future as mentioned earlier, if the scale of the defense related business remains smaller than in Europe or the US, even the enterprises with international competitiveness in the civilian divisions would continue to have the problems of technological inferiority and high cost that are similar to the apprehension held in Western European nations today. Even if they were to depend on the domestic development or technology transfer from the US, the economic cost and political risk would be large. Selection of cooperation such as joint development or joint production will become necessary since generous technology transfer from the US can no longer be expected because the US is apprehensive that the technologies transferred from the US might improve the technological capabilities in the civilian divisions.[62] Although some enterprises have reached basic agreements on joint development with American enterprises, the defense industry has started to demand reconsideration on the ban on weapons exports because the weapons exports issue would obstruct and limit the range and functions of joint development with European or American enterprises that deem weapons exports as legitimate activities.[63]

Another serious problem is the existing practice of research and development in Japan that strongly depend on technology transfers from the US and the technological capabilities of the civilians. The State is in the situation where the defense budget must be reduced and the procurement prices must be lowered even though the prices for the equipments soar to accommodate the latest high-tech and ever-rising research and development cost, while the industry is in the situation where the cut-throat price competition is unavoidable due to globalization, and it cannot possibly afford the development of the highly advanced technologies for the defense business. These situations make it difficult for the enterprises to expect spin-offs or dual use effect, which will lead to loss of incentive for maintenance and enhancement of the defense technology foundation. It would make the defense business

---

[61] Samuels, *Fukoku Kyohei no isan (Heritage of the Measure to Enrich and Strengthen a Country)*, p. 270.

[62] Yuzo Murayama, "Nozomareru boei sangyo gijutsu kiban rongi (Desirable Defense Industry Technology Foundation Argument)," pp. 4 and 5.

[63] The "Japan-US Security Industry Forum", proposed at the 17th Japan-US Periodic Meeting for Equipment and Technology (ST) in 1995 and executed from 1997 by the defense industries in Japan and the US, proposed to both government to approve export of the equipment that was jointly developed by Japan and the US to the US at the end of 1997. *Asahi Shimbun,* August 24, 1998.

recognized as a low profitability field, and if the principle of the market economy functions to withdraw from an unprofitable field, it would be impossible to expect them to "contribute to the national interest"[64], and the incentive to cut off the defense division would function for the survival of the enterprises in general. As a result, the foundations for production and technologies would weaken, the development capabilities in the defense related production would lower and structuring of deterrence and coping capabilities of Japan on its own will become even more difficult.

## Conclusion

The enterprises, the manufacturers in particular, in Japan are in a severe environment for survival due to the progress of globalization and the current economic difficulties. The enterprises with a defense division are forced to take measures against reduction of the defense procurement volume and cutback of the procurement cost.

In view of the defense procurement, it is natural that employment of imports with lower cost and production under licenses could achieve de facto reduction of the procurement cost and provide better economy than the self development that would incur huge research and development expenses and facility investment as the defense product market is small in Japan for political reasons. It is also natural that the enterprises will withdraw from and lose the incentive for the defense business that requires huge amount of research and development expenses and facility investment according to the market economy principle if the defense business is recognized as a field of low profit and few future potentials by the enterprises even though they are expected to conduct the defense business for the national interest.

Under these circumstances, Japan has maintained and improved the domestic production foundation and technological foundation despite the adversity created by conditions required for resumption of defense production after WWII, small budgets, limitation in the market and other political deterrents. It largely owes to the licensed production from the United States, efforts for domestic production and the national policies. It is important to maintain the concept that possessing the production foundation and technological foundation can be the deterrents to ensure national security as maintained in Europe and the United States despite the globalization of economy and restriction in the budget in Japan. The defense industry in Japan has nurtured the corporate characteristics to suit the special environment of Japan after WWII. The industry has developed the defense business with the efforts of the enterprises concerned and the protective development policy of the government in spite of the suspension of defense production enforced for some time after WWII, and has contributed to the national security of Japan. This must be highly emphasized in the Japanese society.

Severity of competition among enterprises or among nations with the survival at stake is

---

[64] Alexander, "Nihon no boei sangyo ni tsuite (2) (Defense Industry in Japan (2))", November 1993, p.5.

sharpening in the globalization. Under these circumstances, it is apparent that the defense industry in Japan cannot possibly rival with the gigantic defense industries in Europe and the United States whose market spread throughout the world if the current Three Principles on Weapons Exports continue to apply. It will not be surprising that enterprises start to cut off their defense division for survival if the defense business offers no future potentials and no profitability. Furthermore, the attitude of the media on reporting the recent scandals concerning procurement of equipment might make the enterprises feel involvement with the defense business would damage the corporate image.

As discussed above, the economic and business environment both in and out of Japan around the defense industry is severe with thinning nationalism in the enterprises, and there are increasing number of factors that make continuation of the defense business a demerit. Under these circumstances, it is important to identify the basic attitude of how to prepare the self defense capabilities in the long run, and how much domestic production will be assigned to which equipments in view of national defense and national interest, and present it to the enterprises promptly. Otherwise the defense industry in Japan is in danger of gradual deterioration to bring destruction upon itself.