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JPRS L/10470

20 April 1982

Japan Report

(FOUO 23/82)

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POLITICAL AND SOCIOLOGICAL

'ASAHI' ON POSSIBLE ABE PRESIDENTIAL CANDIDACY

OW271225 Tokyo ASAHI EVENING NEWS in English 26 Mar 82 p 3

[Column by ASAHI SHIMBUN editorial writer Michisada Hirose under the rubric "Politics and Politicians": "Next LDP Presidential Poll--Should Abe Run or Not?"]

[Text] Last week's articles about an ASAHI SHIMBUN public opinion poll, which found that the popularity of Prime Minister Suzuki had dropped, were presumably read with the keenest interest by the younger leaders of the ruling Liberal-Democratic Party, who aspire after the post of prime minister.

The findings of the survey have given the so-called "new leaders" a new factor to consider in analyzing the situation and deciding whether or not they should run in the LDP presidential election in November.

The things that have to be taken into account are extremely complex. Even if a few of them decide to run, it does not necessarily mean that they are confident of mustering sufficient intraparty support to defeat Suzuki in the election. They may run just to establish a lead over their rivals. Let's look at the calculations being made by Minister of International Trade and Industry Shintaro Abe and his aides in their attempt to chart Abe's future course.

Abe and his aides naturally regard Suzuki's moves as the most important element in their calculations. Suzuki has two alternatives--(1) seeking reelection in November and (2) resigning from office without running for reelection--and he is generally believed certain to choose the former. Nevertheless, Abe and his aides feel that the odds are 50-50.

What are the grounds for expecting that Suzuki may resign? Abe and his aides give two reasons. First, they say, as his political difficulties mount from summer to fall, Suzuki may have to announce his intention of resigning as a last resort so that he can secure intra-LDP cooperation. The difficulties he faces are a revenue shortfall, the worsening trade friction with the United States and Europe, and the Lockheed scandal trial.

Secondly, they suspect that Suzuki may have no intention of running for reelection. "Mr. Suzuki goes golfing every Sunday," an aide to Abe points

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out, "but he always goes to the same course, the Narashino Country Club course in Chiba Prefecture, and he always plays with the same partners." "As for his partying at night, no desire to widen his circle of friends in the business community is in evidence," he adds. "This is completely different from what his predecessors did. They tried to consolidate their position by widening their circle of friends."

The aides to Abe have other things to consider. How will other aspirants, particularly Yasuhiro Nakasone, director-general of the Administrative Management Agency, and Toshio Komoto, director-general of the Economic Planning Agency, act if Suzuki runs in the presidential election? In their view, Komoto will run, but Nakasone is not likely to run.

By helping Suzuki's reelection, they feel, Nakasone will try to assure himself of the support of the factions led by Suzuki and former Prime Minister Kakuei Tanaka in the 1984 LDP presidential contest.

If he is pitted against Komoto and Abe in the coming election, Suzuki would win an overwhelming victory.

But if he runs in the election, Abe would have the advantage of becoming known to the public as a presidential figure ahead of such rivals as: Chief Cabinet Secretary Kiichi Miyazawa; Rokusuke Tanaka, the party's chief policy maker; acting Secretary-General Noboru Takeshita; Masumi Esaki, chairman of the special LDP committee on international economic affairs; and Ichiro Nakagawa, director-general of the Science and Technology Agency.

There would also be a drawback, since running against Suzuki could help Nakasone secure the support of the Suzuki and Tanaka factions, which are numerically of crucial importance. Views are split among Abe's strategists as to whether he has more to gain or more to lose from running in the coming election.

What would happen if Suzuki does not run? In that case, Nakasone, Komoto and Abe would all join in the contest. Abe's aides expected that his toughest opponent would be a candidate from the Tanaka faction, which is by far the largest LDP group.

Whom would that group put up? Abe's strategists feel that since Secretary-General Susumu Nikaido, who would be the natural choice, bears the stigma of a "gray official" in the Lockheed scandal (a politician who allegedly took money of Lockheed origin, but was spared prosecution because of technical difficulties), Esaki would probably be chosen. They suspect that the dispatch of Esaki to the United States and Western Europe as the head of an LDP trade mission to see President Ronald Reagan, Prime Minister Margaret Thatcher and other Western leaders may be a move to groom him as a presidential candidate.

They feel that Abe can afford to wait until after this summer to make the final decision on whether or not to run. At the same time, they feel that

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preparations for his candidacy should be started at an early date. The question for them is the wishes of Abe's boss, former Prime Minister Fukuda.

Fukuda says to Abe: "For the time being, you should not make a move (for the presidential contest). If you don't make a move, others will. You should wait for that."

"For a long time, you have been called the crown prince of the Fukuda faction," he also says, "but you have come to be known as the crown prince of the LDP. Don't let haste bring you down."

Does Fukuda really feel this way? He may be afraid that if Abe runs for the presidency, he will lose control of the Fukuda faction and lose his political power rapidly, just as the faction led by former Prime Minister Takeo Miki came to be known as the Komoto faction after Komoto ran in a presidential race.

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POLITICAL AND SOCIOLOGICAL

SUZUKI, ITO COMMENT ON DEFENSE SPENDING

OW051343 Tokyo JIJI in English 1310 GMT 5 Apr 82

[Text] Tokyo, April 5 (JIJI PRESS)--Prime Minister Zenko Suzuki and Defense Agency Director-General Soichiro Ito Monday kept away from making any specific commitment to hold defense spending down to one pct or less of gross national product (GNP) during the fiscal 1983-87 period for a new defense program.

Questioned at the House of Councillors Budget Committee by socialist Osamu Yatabe, Suzuki said Japan need not change its current policy of limiting defense spending to one pct of GNP. However, he refused to make any specific commitment because he said GNP itself will change.

Ito said the government is making utmost efforts in line with the current policy for the immediate future. But he declined to forecast whether defense expenditure will be kept below one pct of GNP during the five-year period.

Asked by Yatabe to assess nuclear arsenals of the United States and the Soviet Union, Suzuki supported the U.S. view that the Soviets now have a nuclear superiority over the Americans.

But Director-General Akira Shioda of the Defense Agency's Defense Policy Bureau put forward a slightly different view.

He said the two superpowers' nuclear arsenals are believed to be balanced in terms of the number of nuclear warheads and their carriers. Some doubt has been cast on the United States' superiority because Soviet missiles' accuracy has recently been improved, he said.

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POLITICAL AND SOCIOLOGICAL

PREMIER SUZUKI'S MILITARY THINKING ANALYZED

Tokyo ASAHI JANARU in Japanese 5 Feb 82 pp 12-16

[Article by Asahi News Political Reporter Tatsuro Nakajima: "The Military Thinking of Mr Zenko Suzuki"]

[Text] One associates Prime Minister Zenko Suzuki's grappling with the defense question with the kind of toy that stands back up as soon as it is pushed down. While we are wondering if he permitted a "boost" to defense spending, he would suddenly give "dove-like instructions" to the head of the Defense Agency, and [then at another time] strengthen efforts for disarmament. Even at the Japanese-American summit conference last year, this "zig-zag movement" was already revealed. What is the Prime Minister's basic line of thought and policy on military affairs? Pointing to new developments in the defense question, such as Japanese-American Joint Study on Far East emergencies and Japanese-American military technology cooperation, now that parliamentary debate has started, we are trying to elucidate the Prime Minister's military thinking and its context. (The Editors)

Prime Minister Suzuki can be called a dove, a pacifist. He himself wishes to be seen as such. But, to find the right label we ought not forget the fact that his is an "emotional" pacifist. At times the Prime Minister's dove feelings come to the surface. When these feelings have clashed with harsh reality, severe friction has resulted. But, the feeling one now gets, looking at the treatment of defense spending in the 1982 budget, makes all the more obvious the distance between the Prime Minister's feelings and what they actually correspond to.

The Prime Minister's roots as a politician are in post-war democracy. At the height of "war weariness," he ran as a Socialist Party candidate in the general election of April 1947 and won. He was born into the not-too-prosperous family of a fisherman on the Sanriku Coast in Iwate Prefecture. After graduating from the Agriculture and Forestry Ministry's Fisher Institute (currently, the Tokyo College of Fisheries), he joined the fishing cooperative movement. Thus, it is not strange that he ran for election from the Socialist Party.

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Moreover, for 3 months, starting at the end of 1942, he underwent military experience. Once speaking about the difficulties of those times and of his training as a corporal in Akita prefecture: "We were made to run along the Omono River carrying heavy machine guns. It was very hard for an 'old soldier' past 30."

Even though he did not actually have any combat experience, he was one of the war victims. In addition to forming his dove nature, it is an essential part of him that he cannot ignore.

Until becoming Prime Minister, he served ten terms, a total of 6 years and 7 months, as the Chairman of the Executive Board of the LDP. After having been through the management of domestic politics, he had no experience when he was thrust into the rough waters of international politics. One could only count the painful Japanese-Soviet fishing negotiations (in Moscow) which were entangled with the problem of northern territory when he was Minister of Agriculture and Fisheries. All through he preserved his dove nature, never losing it. Of course, he was perhaps also influenced by former Prime Minister Ikeda, of whom it was said that he only had economics on his mind.

In the summer of 1980 Prime Minister Ohira's sudden death brought Suzuki to power. With the Soviet invasion of Afganistan at the end of the previous year and the takeover of the American embassy in Iran, Japan's foreign policy was already showing strong signs of pro-American support, such as it had not shown up until then. For example, at the Japanese-American summit conference in May 1980, President Carter said, "We want early implementation of plans already in the Japanese government," and he demanded the moving up of the 1978 mid-term operation estimate (plans to procure equipment). Prime Minister Ohira also promised "earnest efforts."

Prime Minister Suzuki, who had just assumed political power, said, "I inherit the policies of Ohira." But, actually, it seems there had been much resistance to following the pro-American line that Ohira took. Probably he had a need to assert his independence from Ohira. In compiling the budget for 1981, he confounded the expectations of many cabinet members and LDP defense-related legislators, and cut to 7.6 percent their demand for a 9.7 percent increase in defense spending. He calculated that "this much [of a cut] should not worsen Japanese-American relations." However, voices on the American side said "we have been betrayed"--and there arose discord between Japan and the U.S.

At the May 1981 Japanese-American summit conference, the Prime Minister hit President Reagan with such statements as "the peace constitution that renounced war" "the pledge of the people that they will not become a major military power" "difficult economic conditions." The difference between what he said and the Japanese-American joint statement that promised "greater efforts for defense" became a problem, which in turn caused the resignation of Foreign Minister Ito. Even afterwards, the Prime Minister did not hesitate to say "I have related everything to President Reagan." This can be described as a phenomenon in which the Prime Minister's dove-nature was reflected, though in a twisted way, in politics.

However, as the Prime Minister increased his experience in the international arena with a visit to Europe, followed by one to America, and attending the Ottawa and North-South Summits. The Prime Minister's dove-posture gradually began to retreat into the shadows especially in cases of western international politics--where President Reagan takes the lead raising the idea of a serious threat toward the Soviet Union. At last year's budget planning session, going along with the general trend in the LDP the Prime Minister increased defense spending 7.8 percent, instead of cutting the 7.5 percent budget increase proposed. While the Finance Ministry was frantically trying to preserve a 7.5 percent ceiling, [he] played up to the LDP's request for an increase in defense spending by drumming up the idea of "the usual 7.61 percent increase as was done before" on commercial TV. In contrast with 2 years ago, the U.S. side expressed its "thanks for the effort." In the final analysis, it cannot but be said that the Prime Minister put emphasis on the joint-statement he made rather than on the words that he threw at President Reagan.

The Prime Minister decided that if he drove down defense spending like a year ago, it would be like pouring gas on the fire of anti-Japanese criticism in the U.S.--which is the product of economic discord. As that indicates, it must not be overlooked that the prime minister is bringing his position around from a domestic orientation to a foreign orientation. "Taking the reins of political power for one and a half years, the Prime Minister greatly deepened his consciousness of the international situation," was the praise of someone close to the Prime Minister. Wouldn't this be the same as getting mired in international politics, especially in America's global strategy? In other words, it is tantamount to being swept away by the loud cries of insistence.

However, giving a boost to defense spending as he did this time does not mean that the Prime Minister has the intention of abandoning the economic supremacy of the conservative mainstream which has continued since the days of Yoshida. It is an outlook that calls for a gradual increase in defense spending always within the limits of the Japanese-American Security Treaty. Even if independent defense efforts are sued for, indefinite expansion of defense spending is unthinkable. And, the position of an independent defense theory tied to "bilateralization of the Security Treaty" and a "theory of nuclear arms" is untenable. It is probably all right to distinguish those points from the defense hawks who are firmly rooted in the LDP.

Sympathetic Ears to the Refutation of "Domestic Battlefield Proposal"

What is most on the Prime Minister's mind now is the course of the 1981 mid-term operation Estimate (forecasting the period from 1983 to 1987). The Defense Agency is going ahead with operations based on a fundamental aim of achieving in the 1981 mid-term a level of defense strength envisioned in "the broad outline of defense plans." But, according to preliminary calculations, it will cost a total of nearly 6 trillion yen. Because equipment spending will be about 25 percent of total costs, the total amount of defense spending in the 1981 forecasted mid-term period will expand 20 trillion yen. In that case, defense spending will break through the 1 percent-of-the-GNP framework

and will necessarily become approximately 1.3 percent of the GNP. It is said that the Prime Minister was surprised when the report came out.

After the January 12 cabinet meeting, the Prime Minister called back Defense Minister Ito. Even Chief Secretary of the Cabinet Miyazawa had no previous notice and at the point of meeting with reporters was called back. Facing the two men, the Prime Minister broached the matter, "I will hereby instruct you in the whole picture of my basic thoughts concerning the maintenance of defense power.

At this point he clearly rejected the threat-response theory which believes in increasing defense strength to counterbalance the increased military strength of neighboring countries. Also, he unprecedentedly ventured to go into the particulars of defense theory and made a series of statements such as "a defense system suitable to a maritime nation," "obstruct landing at water's edge" "'hedgehog-ization' relying on air-defense missiles." He also talked about a balance of the three self-defense forces--land, sea, and air. Together with what the Prime Minister has said up to the time, these statements were received by everyone as his instruction to set out in the direction of "emphasizing Air and Maritime defense" during the 1981 mid-term operation estimate period. This is understandable.

Close to half of defense spending (which in 1982 is 2.5861 trillion yen) is personnel costs; moreover, the greater half is taken up by the ground self-defense force. Balancing the land-sea-air forces in this way, if we are to achieve the proposed level of defense strength by 1987 (the end of the 1981 forecasted mid-term period), it will be as large a defense expenditure as the Defense Agency predicts. Therefore, the Prime Minister's real intention must be to cut army expenses more. One can conjecture that with [the strategy of] vanquishing enemies at water's edge and not allowing the mainland to become a battlefield one does not need that many tanks, and thus it is unnecessary to increase the amount of army personnel.

January 7 this year. There was a contribution by a former major of the ground self-defense forces on the editorial page of the ASAHI SHIMBUN. His idea was that the 1981 forecasted mid-term period is based on "the home battleground proposition" and, criticizing the army-emphasis corps organization, proposed that in order to attain defense capability navy and air force personnel be strengthened and army personnel be reduced by a third. The Prime Minister, seemingly impressed by the article, showed a clipping to an associate and was reported to have said "if only the Defense Ministry saw things this way." Perhaps the article's emphasis corresponded exactly to the Prime Minister's ideas. This is a story of a few days before he sent instructions to the Defense Minister.

I am not an expert; thus, an expert thinks...

However, the Prime Minister's instructions met a "counter-attack" from the Defense Agency and defense specialists. A conference with the Defense Ministry bureaucracy January 18th ended with terrible results. [The Prime

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Minister] was told that his outright rejection of the threat-response theory contradicted his answer to Diet interpellation which stated: considering the harsh international situation, the level proposed in the Outline will be achieved as rapidly as possible." Also, [He was obliged] to acknowledge the connection between the strains of the international situation and defense-strength preparations. When the Prime Minister's remark, "a defense organization suitable to a maritime nation," was construed as his intention to strengthen the defenses of the sea lane (the sea transportation route) which he emphasized in America last May, the Prime Minister could not help but to say "that is another story."

Concerning the "hedgehog defense" theory, a counter-argument was made saying that "our country, surrounded by ocean on all sides and having a large shore line, will have to spend more on making a defense plan that will prevent a land invasion." Thereupon, the Prime Minister retreated from the question, saying "I am not an expert. The question of what exactly is to be done is for the experts to think about." Those around the Prime Minister defended the "hedgehog" approach as one used as an analogy of a thorough defense-only position without giving a military threat to its neighbors.

In addition, inviting the backlash of the ground Self-Defense Force which may view the Prime Minister's "emphasis on sea and air" as "neglect of the ground force," the Prime Minister obscured the danger by saying, "I have no recollection of emphasizing maritime and air self-defense forces." There was criticism that the Prime Minister's instructions lacked a viewpoint that tied defense preparations to the Security Treaty. All of these lead to a dubious conclusion that one does not know for what purpose the Prime Minister instructed Defense Minister Ito. It is a very awkward position for the Prime Minister to be in.

Thus, people are saying "The Prime Minister's defense thinking is very rudimentary. If he does not prepare a more theoretical system..." No matter how much he tries to check the Defense Agency's independence, apprehension increases that without a well-constructed defense theory, the pressure to increase defense strength projected for the 1981 forecasted mid-term period cannot be resisted.

The fear that the Prime Minister has begun to cross a dangerous bridge.

Closely tied in with this is the policy of the "Comprehensive Security." After the Prime Minister assumed power, he immediately enunciated the establishment of this policy. It is a line of thought that tries to ensure our country's security not just by defense strength but through the power of diplomatic efforts, economic and technical aid, and so forth--the implementation of policies that emphasize coordination. At the end of last year he started the Comprehensive Security Cabinet Meeting. However, what position does defense strength hold in this policy? Discussions or theoretical arguments in the government, beginning with those around the Prime Minister, are getting almost nowhere.

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The term "Comprehensive Security" comes up first at the special session of the Diet in August 1980. Although the Prime Minister touched on the Comprehensive Security again in a speech on his administration's policy a year later, no significant meaning could be found about the term. One was left with the impression that the term Comprehensive Security was simply dancing around.

Because the position of defense strength remains unclear, boosting defense spending or venturing on the particulars of defense may be possible. The Prime Minister, unlike the late Prime Minister Ohira, does not have his own "brain trust" around him. That may be one reason why the Prime Minister's thinking does not have theoretical systemization.

Comprehensive Security was originally viewed as "a covering cloak that did not allow the burning smell of the expansion of defense strength to be revealed." If so, there is no necessity to rush a conclusion regarding what position defense strength will take. But the way it became bogged down arouses one's suspicion. At any rate, as time goes on the "banner" of Comprehensive Security will fade away, if it stands as it is.

The speech and actions of the Prime Minister with regard to the defense question are difficult to understand and are confused by mixing his official stance with real motives--a pattern is about to be set, in which the dove-like words and actions are withdrawn under pressure. Apprehension is surrounding the government regarding 1982 defense spending projections--the fear that "the Prime Minister has begun to cross a dangerous bridge." In an economic situation where the incurring of additional national debt became unavoidable due to economic doldrums, why did he approve a 7.8 percent increase in defense spending? The 1981 rate of expansion was in line with welfare budget, but this time it greatly exceeds the 2.8 percent increase of the welfare budget. From 1983, which is the first year of the implementation of the 1981 mid-term estimate, will defense spending continue increasing, no matter what economic conditions are? Uncertainty weighs heavily for the future.

The Prime Minister has for some time past given as a yardstick of defense preparation "painful economic conditions" "the peace constitution" "a national consensus." How were these taken in deciding the defense spending of this time? What kind of international conditions will speed up the achieving of the outlined level of defense strength, and will the Prime Minister stick hereafter to the framework of a level of 1 percent of the GNP? In the debates at the reopening of the Diet, a satisfactory explanation for each of the questionable points will probably be called for. If the Prime Minister, fearing the overtaking by the opposition party, confines himself to the safe official answer prepared by bureaucrats for the Diet, what the Prime Minister is thinking and what he aims to do will become more blurred to the eyes of the people.

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MILITARY

MISSILES PROPOSED AS CORE OF SELF DEFENSE FORCES

Tokyo KOKUBO in Japanese Jan 82 pp 68-80

[Article by Katsuichi Tsukamoto: "A Proposal for Defense Power Buildup"]

[Excerpts] Introduction

When I expressed my opinion on the consolidation of defense power in an article entitled "Direction of the Consolidation of Japan's Defense Power--Antiaircraft and Antiwarship Missiles Should Be the Core of the Self Defense Forces" in the October issue of MODERN SECURITY, published by the Comprehensive National Security Research Institute, unexpectedly, it seemed to arouse some interest. I do not know whether it was positive or negative, but evidently the article offered convenient material for argument. However, as I have the disadvantage of lacking technical knowledge of missiles, I am aware that my view is actually just an opinion.

It is undeniable, however, that the way in which the present consolidation of defense power is being carried out tends to be a mannerism, and the situation is such that breaking away from convention by adopting new ideas is difficult. Military men (self defense officials) tend to be conservative. Error is never allowed for those engaged in defense--a grave responsibility concerning the existence of a nation. For this reason, they value the precedents set in the past and extend them to the future as they are. Because they believe this is the most reliable and safe direction, such a trend may be inevitable.

An orthodox consolidation of defense power is, of course, important. At the same time, we must not ignore the cases in which strategy surprised the enemy, or technology superior to the enemy's accomplished its goal. It is especially important that only that side which has developed superior technology can expect success.

My personal proposal for this new "consolidation of defense power" was created by breaking from convention, based on the above viewpoints, and through groping toward a system of consolidation most adequate for Japan's defense.

I have used the word "new," but this does not mean to fundamentally reform the direction of the present consolidation of defense power. Rather, I

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would attempt to make some improvements based on the direction presently being taken. The consolidation promoted by the Self Defense Agency has been regarded as reasonable up to now, while it has been in the basic stage of construction. At the present stage, however, it is for the first time necessary to begin reformation toward a new direction.

Let me first give a summary of my personal proposal which appeared in MODERN SECURITY, and then I would like to explain two or three major points more specifically.

2. Characteristics of Japan's Security

Japan's characteristic of being an island surrounded by the sea has a great impact on its defense. If Japan secures dominance of the air and commands the sea, invasion by a foreign enemy would be almost impossible, and only small-scale invasions from the Korean Peninsula and the Karafuto-Chishima archipelagoes would be considered. On the contrary, however, if invading forces command the sea and air, the invasion would be easily executed. For this reason, the basic principle of Japan's defense lies in the priority given to the reinforcement of the maritime and air forces. (This does not mean to reduce the importance of ground troops, which are the core of the national defense.)

Since an invading force must rely either on air transport (airborne troops) or on sea transport, and the greatest weakness exists during this transportation, Japan's defense must first be directed at attacking this weak point.

Japan's characteristics of having a high population density and scarce resources which depend on supply from overseas show that it is not equipped for a prolonged war and also that combat in Japan is difficult. Protection of the sea lane is crucial.

The policy of the "Japanese Self Defense Forces" designed exclusively for defensive posture has an advantage in simplifying the consolidation of defense power. Japan does not recognize counterattack against an enemy base by ground forces because such an attack is considered outside the framework of the "defense only policy." This will in effect sanctify the enemy's invasion base and is thus unreasonable in terms of a theory of strategy; however, in terms of the consolidation of defense power, it has the advantage of concentrating Japan's efforts on the area of defense alone, since offensive troops are not needed.

3. Direction of the Consolidation of Japan's Defense Power

The requisites in the direction of the consolidation of Japan's defense power are consolidation of the various characteristics of Japan's defense as mentioned above, utilization of its advantages, and supplementation where it has disadvantages.

It is indicated that the "Outline of the Defense Plan" assumes the pattern of invasion against Japan to be based on combat during World War II. Of

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course we cannot say that such combat will not take place in the future. It is possible that a repetition may occur in local combat.

But disputes that have broken out in various areas after World War II show that the pattern of war has undergone radical change. This is because war is greatly restricted by politics. Every war has taken the form of limited warfare, and political forces have greatly controlled combat activities. In the future, war will take place under complex conditions as a political tool and will be settled by means of comprehensive politics, including diplomacy and the like. This is the way of thinking in "Comprehensive Security."

Moreover, progress in scientific technology has changed war strategies and methods so that technological superiority has begun to control leadership on the battlefield.

We must deeply discern the condition of future warfare and consolidate our defense power in compliance with it, or our efforts for consolidation will be meaningless. Here we strongly sense the importance of drastic tactics and their foundation, technological development.

A basic principle of war guidance in order to win a battle (achieve a goal) in the future will be, first of all, to devise the means to achieve a goal before involvement in an actual battle (determent) and, should a fight be unavoidable for the sake of self defense, to make the most of one's advantages; that is, to place the invader under the influence of its own weakness and disadvantages alone.

When Japan's defense is considered from this basic principle, we can see that the following should be considered: defeat invading forces while they are being transported via air or sea when they are vulnerable; try to avoid combat in Japan; and stand in a superior position technologically through the use of scientific technology. Of course, it would be ideal for us to secure a superior air force and command the sea; hope for this, however, is dim for the time being, in Japan's present circumstances.

If we consider all this in a comprehensive manner and seek out the direction of Japan's consolidation of defense power, we will focus on a defense plan with antiwarship and antiaircraft missiles at its core. The objective of this strategy is to destroy an aggressive enemy by antiaircraft and antiwarship missiles before they land in our country. The history of war indicates that progress in science and technology makes such a defense plan feasible. The war in the Middle East is one example. In that war, invasion by aircraft in the areas where antiaircraft missiles were installed was most difficult.

Since the task given to the missile unit can be simplified, this strategy is more advantageous for Japan, which employs the strategy of Self Defense Forces designed exclusively for taking a defensive posture.

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The essence of this proposal is an extensive buildup of antiaircraft and antiwarship missile units. With respect to antiaircraft missiles, the Nike-Hawk unit cited in the "Outline of the Defense Plan" will be remodeled and extensively reinforced at the same time. Antiwarship missiles, on the other hand, must be utilized and made into the core unit (major force) of the Ground Self Defense Force.

Through its buildup, the antiaircraft missile unit will become independent of Ground and Air Self Defense Forces and an "Antiaircraft Self Defense Force"--a fourth self defense force--will be newly created. This measure will be taken in order to facilitate both the development of this unit and emergency expansion.

Up to this point I have summarized by "personal proposal." Now, let me discuss more specifically the major problematic points of this conception.

1. Command of Sea and Air

I have already stated that the general rule in defending Japan, which is an island country, is to maintain a superior position in the air and sea, and to destroy the invading enemy on the sea (during transportation).

At present, the Soviet Union is the only country which is capable of invading Japan, and its invasion routes are via the Sea of Japan and its adjacent sea areas. We must judge that to secure command of the air (dominance of air at the necessary occasion and period) over the Sea of Japan, etc, is difficult for now. This is because the Sea of Japan, etc, are located within a distance which can be backed up by the Soviet Union's Far East ground and air bases. Therefore, the Japanese air forces must confront the Soviet Far East Air Force under nearly equal conditions. As a result, it is necessary to upgrade our standards regarding the performance and number of aircraft and the conditions of the air bases to levels equivalent to those of the Soviet Union's Far East troops.

This, however, would necessitate an extensive buildup of the Air Self Defense Force, and the defense budget would probably be several times greater than the present one. Practically speaking, therefore, Japan cannot do this for the time being. Since an increase in the number of aircraft involves not only maintenance and operation but also consolidation of air bases, it is accompanied by difficulty in terms of expenses and other aspects (public welfare).

It has been proven in the history of war that control of the air can never be attained unless air superiority is anticipated.

It would be difficult for Japan to accomplish destruction of invading troops on the sea by commanding the sea and the air, which is most desirable strategically.

The strategy expressed in this proposal places antiaircraft and antiwarship missiles at its core, and is aimed at destroying an enemy attempting to invade in the sea area in the vicinity of Japan, replacing the above measure as an alternate choice.

2. Missiles Versus Conventional Weapons

Missiles have many advantages compared to conventional weapons. The major points of advantage are as follows:

1) The manufacturing facilities are relatively simple. The production technology of the missile itself is not simple, but the facilities to manufacture it are simpler than those of tanks and aircraft. This is because it does not require large machine tools and facilities.

It is possible for the majority of parts for missiles to be produced in small and medium-size factories if the knowhow is present. Needless to say, sophisticated technology and an efficiently arranged facility are needed in order to combine these parts and complete a missile, but fortunately, Japan has excellent automobile plants, etc, so locating a facility is not a difficult problem to be solved.

The fact that a large facility is not needed and that many small and medium size industries can be mobilized indicates the suitability for mass-production in case of emergency. In the future, when technology progresses further, this characteristic will increasingly be encouraged.

2) The operation is simple and easy. The missile as a weapon is complex and sophisticated, but its operation is simple, and in the future, technology will advance to the extent where a missile will hit a target by a pushbutton operation. For this reason, the operation of missiles can be handled by anyone once he has been trained, and in case of emergency, by reviewing the training for a short period. By taking advantage of this through consolidating self-defense officials, in combination with the mass-production mentioned above, a certain degree of rapid expansion is feasible.

Such hardware as warships, aircraft, tanks, and cannons, which are today's major weapons, require facilities and time for production; therefore, only those we possess in peacetime can meet an emergency. Inevitably, we must be prepared for emergency by possessing and storing a great number of them in peacetime. And, after a certain time has elapsed, all of them will become obsolete and scrap iron. This is why armaments are referred to as a mass consumption item.

Missiles can eliminate this disadvantage.

3) Antiaircraft and antiwarship missiles are purely defensive weapons. Because of this, there will be less fear of criticism from neighboring countries that Japan is planning to become a "great military nation," or is creating the rebirth of militarism, etc. Since Japan must pay maximum attention to these accusations, this characteristic is significant.

4) There is less trouble with residents. This proposal refers to a missile of small scale, so the location of its deployment is less restricted and there will be no fear of noise pollution. As technology advances, the mobility of missiles increases, so it will become possible to keep them at an army post or training location ordinarily. For these reasons there would be far less trouble with residents than there would be in the case of aircraft and tanks.

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5) In addition, another characteristic of the missile is that it can take advantage of the volunteer enlistment system, and an increase in the number of self defense force officials is not so greatly needed.

On the other hand, there are also disadvantages and problematic points.

1) R&D must be thorough and substantial. This could be the largest issue of all. Small-scale missiles have many technological problems yet to be resolved. There are missile parts for which the supply depends on technology imports from foreign countries. Initially, imports of missiles themselves or licensed production may be necessary.

Furthermore, since the technological progress of missiles is rapid, constant R&D will be demanded.

For this reason, R&D expenditure must be increased steeply. At present, the R&D budget of the Defense Agency is 31.7 billion yen for FY 81. This is one-eighth that of West Germany, one-fifteenth that of England and France, and in comparison with that of the United States, it is less than 1/100. Under these circumstances the development of excellent missiles is inconceivable.

It is essential to increase R&D expenditure to a level equivalent to, or greater than, that of the West European countries by increasing the amount to at least 10 times more than the present scale. But a sudden increase in R&D expenditure will cause problems in the payment of researchers' salaries and consolidation of facilities; it should be done step-by-step, but as soon as possible.

The lack of R&D expenditure is causing the defense technology of Japan to fall notably behind that of private concerns. Even among the parts used for missiles, there are some which have similar tendencies. Thus, if we take advantage of private technology by increasing R&D expenditure, the improvement of missile technology is feasible.

2) Information collecting ability must be improved. Another crucial factor is to make C³I, in which an information collecting ability is indispensable. This is even more important since the invading forces would attempt a surprise attack with technology superior to the defense's. Improvements in ECM and ECCM are also important. The repletion of C³I is one of the keys to realizing this proposal.

The control of target quota is another bottleneck in terms of technology. An equal distribution of missiles to the entirety of enemy fighters, which will assault in several tens or several hundreds, requires a high level of fire control technology, and this is an issue to be resolved in the future.

3. Size of a Missile Unit

The size of a missile unit will be calculated by future research. The budget and the number of personnel are restrictive requirements which must be examined carefully.

The Soviet Union is equipped with more than 10,000 launcher units for fixed missiles alone, in addition to a number of mobile antiaircraft missiles. Although it is difficult to compare Japan with the Soviet Union, since the air defense area is far smaller, obtaining a comparable ratio of launcher units would be one of the criteria. In order to meet this, we must expand the scale to a level which would be considerably larger than the present Nike-Hawk unit, but it is not altogether impossible.

Although the mobile antiaircraft missiles are used for self defense combat, along with the technological progress, they can be used for strategic purposes in the future.

The antiwarship missile unit will be organized in accordance with the water's edge defense operation for the predicted landing spot of the invading troops, but along with the improvement in the range of a missile, the area of fire control can be expanded, and thereby the number of troops needed can be proportionately reduced.

4. Changes in the Present Structure

The antiwarship missile unit is the original responsibility of the Ground Self Defense Force for the purpose of mainland defense, and it will be embodied by this division through reorganization.

The antiaircraft missile unit will be organized with the present Nike-Hawk at its core.

The role of the Ground Self Defense Force as a core of national defense will not change even in a defense based primarily on missiles. The foundation of national defense lies in the spirit of the Japanese people, who want to protect their country, and its core consists of the Ground Self Defense Force which will organize resistance together with the people.

In addition, the ground troops are also the final resistance organization in the national defense.

The Maritime and Self Defense Forces do not need a great deal of change in the direction of the present consolidation of defense power. Rather, they will be directed in conformity with the defense of the Japanese land and sea lanes.

1) Security of Personnel Requirement

The security of personnel for antiwarship and antiaircraft missile units is one of the most critical issues.

An antiwarship missile unit is designed to achieve the original tasks of the Ground Self Defense Force. Naturally, it is most desirable to increase the number of personnel by breaking through the regular complement of 180,000 which has been restricting the increase of the Ground Self Defense Force for many years. But since this is difficult in the present circumstances, it must be worked out by reorganizing the troops.

The antiaircraft missile unit will be extensively expanded with the personnel requirement of the present Nike-Hawk unit at its core. The security in having a shortage of personnel of several thousand will be the major problem.

It appears that an increase in the regular complement of Self Defense Forces would resolve the problem easily; this, however, would involve not only an increase in personnel expenses but also a great difficulty in recruiting. Naturally, as a measure of convenience, we can consider taking some personnel from the regular membership of the Ground Self Defense Force. But a further cutback in the Ground Self Defense Force's 180,000 regular complement does not seem appropriate since that is the minimum requirement.

However, at present, due to the fact that there are vacancies of more than 20,000 (limit of sufficiency rate), and personnel and provisions expense rates are nearly 80 percent (this means the condition of a gradual decline in equipment), we must introduce a new idea in regard to the organization of the Ground Self Defense Force. For example, one idea would be the formation of different organizations by dividing the present divisions, which take a uniform organization, into a division for mobile strike and a division mainly for defense, training, and recruiting. In this way, we can create some personnel.

Of course this measure alone cannot meet the requirement of the antiaircraft missile unit. Therefore, a partial increase of the regular complement by recruiting from outside is inevitable.

2) Maritime and Air Self Defense Forces

Although I have stated above that the Maritime and Air Self Defense Forces require little change in the direction of their present consolidation of defense power, in order to unite the defensive strategies of the Ground, Maritime, and Air Self Defense Forces, the direction of consolidation will naturally be concentrated on strategies for the land of Japan and its vicinity.

The Maritime Self Defense Force should concentrate greater effort on the defense of the sea lane; at the same time, it should not neglect a defense power buildup inshore. The major target of the inshore defense is not enemy warships but a convoy transporting landing troops. In this respect, the current condition must be corrected, since there is no base to speak of in front of the Sea of Japan, with the exception of Maizuru.

In order to secure air dominance in strategic places by defeating the superior enemy air forces, we must have a concept guiding an air strategy behind the antiaircraft missile screen. Such an operation is difficult for Japan, in which the vertical depth is poor, but if we fight under equal conditions, we cannot make up for our inferiority in terms of numbers. Therefore, we must adopt the strategy of destroying enemy aircraft after they have broken through the antiaircraft missile screen.

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3) Air Defense Command

It is desirable to unify the air defense command. It may be a general rule to unify air defense combat fighters and antiaircraft missiles also (except surface-to-air missiles for self defense).

This proposal suggests an organization of the "Antiaircraft Self Defense Force" separating the antiaircraft missile units from both Air and Ground Self Defense Forces. Although this deviates from the general rule, in my judgment it is better to do so in order to expand and develop the anti-aircraft missile units. Manned aircraft and missiles are weapons of different qualities, and their control in peacetime requires different systems. The establishment of such units within the same Self Defense Force might cause a hindrance to the development of one by the other.

This can be seen by looking at the status of the present Nike unit within the Air Self Defense Force. The result would be the same if the unit were placed under the Ground Self Defense Force, and since there is a problem of unified command in case of emergency, this measure is unacceptable.

Consequently, it is desirable to organize an independent, fourth self defense force. In this case, however, it must be done on the condition that a clear policy be established on the unification of command organization in the event of an emergency. Otherwise, it cannot function effectively should an emergency arise. Unity in peacetime training is also needed.

4) Points of Change

Expansion of R&D must take place at once. This is an urgent issue. Development of an excellent missile, ECM and ECCM, are all pressing issues.

With respect to reorganization, we will engage in research and examination of effective units during the period of 1981 mid-term operation, and it will be made concrete in the next mid-term operation period (1984 mid-term operation). Research prior to reorganization and the stage of examination of effective units are critical. In line with the progress in the aforementioned development of missiles, cautious programming will be planned.

At present, the Defense Agency has begun modernization of the BADGE system; parallel with this, it may be necessary to plan a radical expansion of C I.

Putting all the above-mentioned accounts together, the conception of this proposal will be realized in the 1990's.

5. Japanese Self Defense Forces Designed Exclusively for Defensive Posture

What we must consider next is whether a defensive operation alone can defend our nation. A defense based on missiles is designed to appropriate most of the major force for defense of the mainland, and because of this, the strength of a counterattack on the enemy's base will be restricted.

But the same weak point is found in the present defense conception; in accordance with the Japan-U.S. Security Treaty, Japan expects an attack on enemy bases from the U.S. military's war potential.

As already mentioned above, there has been a marked trend toward increased restriction of war through politics as a political tool. Unless the United States and the Soviet Union, the two powers, confront one another directly with armed forces, it is most likely that a political resolution will end a war in the future by striking a significant blow to the enemy. The movement of world opinion will greatly influence this. In the case of Japan, we can expect a modern version of the Mongolian invasions.

But of course, once war has broken out, the fundamental tendency of war, that is, an appeal to unnecessary violent action, would be unavoidable, and it is likely that this might diminish the political power to terminate war. Here arises the necessity of a final resistant organization with ground troops in its core, and the people's firm resolution to defend their country can break an enemy invasion and deter a war.

6. Relationship With the United States

The relationship with the United States is the key factor in Japan's defense. Recently, however, the Japan-U.S. relationship has not been altogether smooth. The United States' demand for Japan's defense power buildup is severe, and the situation is such that it can develop into defense frictions.

One area of U.S. discontent with Japan lies in Japan's insufficient efforts to build up its defensive power. This is measured by a low defense expenditure rate compared to GNP. Japan should immediately abolish such an unreasonable restriction on defense expenditure as a maximum of 1 percent of GNP, and should make an effort to contribute its due share with regard to the country Japan is allied with.

Another concern of the United States in regard to the direction of the consolidation of defense power is that when the U.S. Far Eastern war potential swings to another front, especially the Middle East, Japan lacks the ability to compensate for a gap created in the Far East. For this reason, Japan should eliminate anxiety about its security by reinforcing its autonomous defensive power. It is also necessary to provide stability in the surrounding sea areas by reinforcing antiaircraft and antisubmarine capabilities.

Of these, the latter is critical, that is, not to create anxiety about Japan's defense when the U.S. military in the Far East shifts. We must establish a foundation wherein the U.S. military is able to shift; this in itself indicates that Japan's defense must be conducted autonomously by Japan.

It is a general principle that a country must be defended by itself. A collective security supplements an autonomous defense power, and the latter in turn renders service to a collective security.

From this view also, this proposal attempts to achieve the goal of having an autonomous national defense with missiles at its core by means of firmly protecting the country, and will effectively contribute to the U.S.-Japan security relationship.

7. Resolution To Protect Our Country

This proposal emphasizes the aspect of attempting to achieve a goal of national defense by supplementing a personnel shortage with the power of technology and money. This is because the proposal aims not at falling behind the condition of a war which is predicted in the future, but rather at taking the initiative.

I would like to stress that this proposal does not alter the hard fact that the foundation of national defense lies in the resolution of the Japanese people who wish to protect their country. This stems from the realization that this operation will be carried out elsewhere under almost the same conditions as those of a decisive battle taking place in our homeland. Without a defense foundation based on the Japanese people, this kind of operation cannot be realized. The Japanese people's resolution to protect their own nation is the essential requirement.

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ECONOMIC

JAPAN'S AIRCRAFT INDUSTRY TO ENJOY BUOYANCY IN BUSINESS

Tokyo NIHON KOGYO SHIMBUN in Japanese 6, 7, 8 Jan 82

[6 Jan 82 p 5]

[Text] Kawasaki Heavy Industries

The aircraft industry is about to take a very important leap forward. First of all, in terms of private sector, production of the "Boeing 767," headed by Kawasaki Heavy Industries Co, Ltd, Mitsubishi Heavy Industries Co, Ltd, and Fuji Heavy Industries Co, Ltd, is a step in the right direction. And the "BK117" helicopter, jointly developed by Kawasaki and West Germany's MBB Company, is one step from acquiring model certification. Meanwhile there have been orders for 120 of Mitsubishi's business jet, the "MU300," and full-scale mass production has finally started. As for defense orders, production has begun on the "F15 fighter" and the "P3C sub-spotting plane;" further, the design and production of the MTX (second generation mid-sized trainer), produced by Kawasaki, the main contractor, in cooperation with Mitsubishi will follow. Since these various projects will all bloom together and full-scale mass production will continue progressing favorably in FY1982, there are many cases contributing to business results. Japan's aircraft industry sales of 280 billion yen in FY1980 will reach 328 billion yen in FY1981, and sales of nearly 400 billion yen are forecast for FY1982. Each manufacturer is expecting this year to be one of great steps forward.

Total of 52 "767's"

Since 1978 Kawasaki Heavy Industries Co, Ltd has continued with plant and equipment investments amounting to 17 billion yen in order to promote the Boeing 767, P3C sub-spotting plane, F15 fighter and BK117 helicopter, and will finally complete its investments in FY1981. Since a mass production system is in place and a project team for the MTX development has also been set up and has started on the basic design, 1982 is the year in which the entire aircraft department will wrestle with these five major projects.

The allotted production of the 767 of Kawasaki Heavy Industrie is for the nose and mid-sections; 27 plane sections were produced in FY1981 and finally total sales of 4 billion yen in total contributed to business gains. The pace during the first half of 1982 will be a monthly production of 4 aircraft and

in the latter half, the pace will be a monthly production of 8 aircraft; so the schedule shows favorable progress as anticipated at the time of development. A total production of 52 aircraft sections has been scheduled in 1982 and a sales total of nearly 10 billion yen will add greatly to business achievements.

It is reported that Kawasaki's technology team participated with Boeing from the design state of the 767 and studied what could not be studied in Japan. As stated by Masahiko Iwata, director, Kawasaki Heavy Industries Co, Ltd, "what we did was only the designing of one section, the fuselage, but we were exposed to the idea for designing an energy conserving jumbo aircraft which has become a great asset in the design of future aircraft." So much was gained from their study abroad in terms of technology and it seems that confidence was gained in rearing a technology staff for the future.

Model Certification This Summer

Even though the BK117 helicopter, another civilian airplane project, is a joint development, it is a full-fledged twin engine helicopter first developed by Japan. At present, tests are continuing for acquisition of FAA model certification; and acquisition of certification is targeted for the summer of 1982. Together with MBB Company, there are already orders for 130 (Kawasaki has orders for 20). A mass production system has been started with a monthly production of 6 aircraft. There are BK117 bodies lined up in the Gifu plant, and a production of 80 is expected in FY1982; furthermore, the target for FY1983 is 90 aircraft. Due to changes in FAA inspection standards, each manufacturer's model certification acquisition for new models has been delayed. It is forecast that the BK117 certification will be delayed for not more than a year later than anticipated. Although it will be acquired in the summer, nonetheless it is said that deliveries are expected by the end of the year. This is because of the desire to complete supplementary items, such as examination of operation manuals and pilot training; the attitude of wanting to spend sufficient time and deal carefully with the project can be inferred from this.

Corresponding to improvement in nuclear powered submarines, Kawasaki, the main contractor, started production of the P3C sub-spotting plane which is expected to give a high level detection capability to Japan's coastal patrol. The first plane came out of the hanger at the end of 1981. The first flight and tests of this plane will run from February through March; and it will be delivered to the Defense Agency in May.

The first order in FY1981 for 5 aircraft to a total of 20 billion yen are in the midst of production; these will be delivered during FY1982. The first aircraft is KD production, almost completely from American made parts, but domestic parts will gradually be used starting with the second aircraft, and with the fifth aircraft, production will be almost entirely domestic. This is an opportunity to show Japan's aircraft industry's high level technological power. Moreover, the decision has already been made for orders of 10 aircraft in the second phase. Production of a total 42 aircraft (besides these, another 3 from FMS), will proceed in accordance with the defense plan until the mid-80's.

Technology Accumulated with the "F15"

In the area of allotted production, wings and rear sections of the F15 fighter for 12 aircraft were produced and delivered in FY1981, and in FY1982, 15 of the 30 aircraft in the second contract and the 1 remaining aircraft from the first contract, for a total of 16, will be produced and a monthly production rate of 2 aircrafts will progress favorably. In the design which also puts importance on air war capability in addition to the top speed of 2.4 mach, composite materials and titanium alloy were much used; and it is said that this technology has advanced greatly in the production plants. The construction of the main wings is of four rods of titanium alloy and the upper outer surface is made from a thick sheet of aluminum alloy and the underside outer surface is made from a braid of titanium alloy; the major part of the fuselage is one solid machined piece of titanium alloy. So this construction can be called the acme of a modern fighter plane; and perhaps it will greatly influence the design of the MTX, a decision having been made for its development.

Last fall, the development of the MTX was decided with Kawasaki as the main contractor; a project team was set up within the company at the same time the decision was made; and basic planning started with a 94 member project team led by Masahiko Iwata as the project manager, 44 members from Kawasaki and 50 members participating from Mitsubishi and Fuji.

Targeted Sales of 100 Billion Yen

Kawasaki has a past record of producing 210 T33 jet trainers, and inasmuch as Kawasaki was hoping to make the most of this experience someday, the design group, saying "our hope has been fulfilled," is putting its spirit into it all the more trying to show its ability. The trainer is said to have the most difficult fuselage of all aircraft, and even more so because it is the link between the beginner trainer and the newest F15. The shape of the plane is a dihedral angled main wing, tandem two-seater, horizontal tail plane; and it will use the domestic XF3 twin engine (with a 1.6 ton thrust), presently in the midst of development, and a maximum speed of 0.6 mach is anticipated. It is hoped that the weight can be held down to under 5.5 tons, using boron composite materials as the major material. Basic design will end in one year and it is expected that partial production will begin in FY1983. Total orders of 200 are expected. It is a project attracting attention as a development with the dual character of accumulation of technology and stability of operations.

Kawasaki has almost completed its plant and equipment investments, and all is ready in all areas, such as mastery of the design with computers, new technology and the like. FY1982 is the year to finally demonstrate the past accumulation of technology in the aircraft division. A sales target of 100 billion yen has been set for the division.

[7 Jan 82 p 7]

[Text] Mitsubishi Heavy Industries. Beginning with the 767

"It is the first time since the resumption of aircraft production to have such a large project at one time," says Shinichi Aizawa, managing director of Mitsubishi Heavy Industries Co, Ltd, Nagoya plant.

Twenty-five years until the end of the war and 30 years since the end of the war have passed since Mitsubishi's Nagoya plant started as a manufacturer of internal combustion engines; but it seems FY1982 will be the busiest post-war year in this history.

Not to mention production of the 767, projects which Mitsubishi has lined up are as follows: its own development, the MU300 business jet, final assembly of the F15 fighter, allotted production of the P3C, production of the T1 trainer and the F2 fighter, furthermore, remodeling plans for the F4 fighter, participation in the MTX development and, although a small part, production of helicopters.

In terms of civilian requests, the same as other manufacturers, it is handling allotted production of fuselage parts for the 767; it is producing the rear section of the fuselage and doors. In FY1981, it produced 34 longeron for fuselage, and it is expected that with a monthly production rate of 4 or 5, it will produce 54 in FY1982. It is certain that production of the 767 will have a monthly production pace of 8, beginning at the end of FY1982 through FY1983. It seems that the rear fuselage section of one aircraft alone is 200 million yen. So it seems that greater weight is being given by civilian orders to Mitsubishi which has many government contracts.

Monthly Production of 8

However, when all is said and done, it is the Mitsubishi developed MU300 jet in which the company places its greatest hopes from FY1982 and on. It passed the same strict FAA inspection as the jumbo jet on 6 November last year, and this aircraft which successfully acquired model certification has already had orders for 120, mainly from the U.S. The first plane was delivered early this year. Since it will start mass production at a monthly production rate of 8 aircraft in FY1982, fuselages are lined up at the Komaki-minami plant. The FY1982 production target is 90 aircraft; delivery of orders received now is expected in May 1983; so production will not catch up with orders.

The reason orders have increased so much, primarily in the U.S. market, is because this is the only newly developed plane in the field of business jets in the last 10 years, and there has been great improvement in its capability; and because Mitsubishi has a foundation for this because it manufactured 700 or so MU2 turbo prop planes, the predecessor of MU300. However, because of technology with its supercritical wings, improved spoiler and full span flaps, and decrease in fuselage resistance, it achieved a 13 percent increase in fuel efficiency and cruising speed over other manufacturers' planes. The

fact is that it can reach a speed of 803 km per hour. Furthermore, it achieved the widening of interior space and building a more comfortable passenger cabin. One cannot miss the fact that it was highly praised because of the high design technology power which resolved these technologically contradictory conditions, high efficiency and comfort. There will be a profit in terms of business results starting in 1982 at 2.25 million dollars (March quarter 1981 price) per unit. Managing Director Shinichi Aizawa comments, "Money will really come in six years after development." Expectations are great with this aircraft.

The F15, Pillar of Defense Orders

On the other hand, the F15 fighter is the pillar of defense orders. Preparation of this plane is being expedited not just because this company wanted it but because it is the core of the defense of Japan's airspace. The first plane was delivered by Mitsubishi to the Defense Agency on 11 December last year. A contract has been concluded for Mitsubishi Heavy Industries as the main contractor to produce 86 of the planes from now until FY1986 in accordance with the Defense Agency's plan setting up an air defense system. It is anticipated that in FY1981 four planes will be produced and delivered; 11 planes in FY1982. Subsequently with 13 planes in FY1983 and 7 in FY1984, the monthly production rate will be about one plane per month, and like the P3C, use of domestic parts in this plane will increase from the ninth plane. This will be a great asset in absorbing new technology and production know-how.

"We have become used to construction with titanium alloy, a difficult process. In actually making the fuselage there are many instances where we understand the reason for such things as why one wire must be so thin." (Managing Director Shinichi Aizawa) It can be called an important aircraft as a move to the next generation airplane (fighter) to be developed, anticipated in the mid 1980's.

Besides these, Mitsubishi has the allotted production of the front and rear fuselage sections of the P3C, and although few in number, it has the production of the HSS2 helicopter (civilian name is S61); and sales in Mitsubishi's aviation/aerospace division were 120-130 billion yen in FY1981, and are targeted to exceed 200 billion yen in FY1983. It is hoped that 150 billion yen will be achieved in FY1982 as the basis for that target. This year will be the year which gives vitality to all plants.

[8 Jan 82 p 7]

[Text] Fuji Heavy Industries. Advanced FRP Process Technology

In contrast to Kawasaki Heavy Industries Co, Ltd and Mitsubishi Heavy Industries Co, Ltd, the aircraft division of Fuji Heavy Industries Co, Ltd, which descended from the former Nakajima Airplane Company achieved sales and its share of the company's total sales of no more than 4 percent or 20 billion yen out of 520 billion yen. This is because Fuji stopped developing its own planes for a while, and also its allotted production on the Boeing

767 was limited to parts manufactured from fiber reinforced plastics, such as the fairing of the main wing joint and the landing gear cover. Its high level technology maintained a standard second to no other manufacturer, such as in the licensed production of the multi-use UH1H helicopter, its greatest masterpiece, and also assembly of the P3C wing.

Its allotted production on the 767 is for production of about 20 aircraft in FY1981. Total sales of 1.8 billion yen cannot help but be low with only FRP process products. It expects to produce about 3 times that in 1982; it will produce parts for 53 aircraft. Fuji also will have a monthly production of 6, which is in step with the other manufacturers. Its intent is to extend FRP process technology to other products. Fuji's view is that the fairing runs a length of 20 meters in jumbo aircraft and when divided up has 13 parts. In order to manufacture it with minimal distortion and error in the parts, manufacture of a precise master model and inspection with a computerized automated measuring instrument are required. These have great merit in terms of production control and improvement of the technology level. In the future when the time comes to produce FRP automobile parts, this will bring a major innovation." (Yoshio Akiyama, director)

Large-scale Wing Facilities, Fuji's Forte

Fuji, which produces helicopters in a technology tie-up with Bell Company, the largest U.S. manufacturer of helicopters, has produced and delivered 138 UH1 helicopters ordered by the Defense Agency until now; in FY1981 it produced 5 and has decided to produce 5 in FY1982 also. The year before last it considered a licensed production of Bell's large scale 214ST helicopter, but that was shelved because the demand for it in Japan is small and the investment risk would be too great. However, Fuji's great hope for FY1982 is the AH1 anti-tank helicopter; it is supposed to produce and deliver 54 of them by FY1986. And if orders come in smoothly, it is expected that there will be orders for 22 as a first phase over the three year period beginning FY1982.

Because this helicopter is the design development which makes the most of a power system of the UH1 helicopter which Fuji handled, producing this kind of aircraft fits Fuji perfectly. In addition to the high speed and maneuverability, this is seen as a chance to accumulate technology in terms of its own future development, such as with sights and heavy armaments, such as the 7.62 millimeter machine gun, 40 millimeter grenades, rocket bombs and missiles. Fuji is currently continuing its investigation of preparing for licensed production with Bell, and intends to make plant and equipment investments of about 5 billion yen.

Besides these, it will also have allotted production of the P3C and the F15. It will produce 3 of the P3C wings in FY1981 at 500 million yen, and 3 in FY1982; since the parts processed will double, sales will amount to 1 billion yen. F15 production uses titanium alloy sheet process and many hot press parts. Although sales in FY1982 will be low at 300 million yen, the technology they will acquire will be great.

Many of Fuji's projects are other companies' allotments; so FY1982 will be limited to a slight increase over the previous year at about 24 billion yen,

but since Fuji's strength, not found in other companies, is that it has facilities for assembly of large scale wings, it seems Fuji has great hope for the YXX wings for which a tie-up has been nearly concluded.

FY1982, in which numerous projects will become full-scale is the year in which a large step forward is promised not only for the manufacturers in charge of fuselage construction and final assembly, but also for cooperative manufacturers which make working instruments, struts, propellers and the like.

Favorable production has become full-scale in various fields such as Teijin Limited's spoiler power control parts, Sumitomo Seimitsu's struts and prop propellers, Shimadzu Seisakusho, Limited's angle gear box, and Shin Meiwa Industry Co, Ltd and Nippon Hikoki Co, Ltd, which directly cooperate on fuselage production. The Aeronautics/Aerospace Industry Association sees a firm production amount of 350 billion yen. Even in the engine field which is far behind the fuselage field, Rolls Royce Company of the UK, Ishikawajima-Harima Heavy Industries Co, Ltd, Mitsubishi Heavy Industries Co, Ltd, and Kawasaki Heavy Industries Co, Ltd set up a joint venture company, and development of a new model jet engine has started. Planning is advancing favorably and some parts have already been completed; tests will start on the first plane in England in February 1982 and on the second plane in Japan in March.

Likewise, this year is the year when the YXX tie-up will be concluded. The aircraft industry will tie-up with foreign manufacturers as equal partners, unlike the situation with the YX. So this year will be the year in which the aircraft industry's real ability will be questioned on all points of design development, production and sales.

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SCIENCE AND TECHNOLOGY

SEMICONDUCTOR TRADE FRICTION WITH UNITED STATES DISCUSSED, PART I

U.S. Import Regulation Request

Tokyo NIHON KEIZAI SHIMBUN in Japanese 5 Feb 82 p 5

[Article: "SIA's Move"]

[Text] The Japanese-American semiconductor friction situation, which had been in a somewhat tranquil state, has once more become shrouded in dark clouds. This is manifested by the American Semiconductor Industry Association's (SIA) move toward regulation of imports of Japanese made semiconductors which it asked the United States Department of Commerce for "government handling" of the situation. The objective of this regulation is the Japanese 64 kilobit RAM (random access write-in and read-out memory), which has captured about 70 percent of the American market, and it is anticipated that Japanese-American competition in leading products, including VLSI (large type integrated circuits), will become even more fierce.

With regard to this present move on the part of the SIA, the Japan Electronic Equipment Industry Association said: "We do not know why it chose the present time to move to regulate imports" as it probes its competitor's motives. This is because IC (integrated circuit) trade going to the United States during the period January through November 1981 showed a decrease of 5.5 percent over the same period of the previous year, to 63.8 billion yen, while imports for the same period decreased only 1.3 percent, to 63.3 billion yen, and the favorable balance was only 500 million yen (this balance was plus 3.4 billion yen the previous year), so the export-import ratio was roughly equal.

At the same time, the long-standing issue of IC customs duties was alleviated by agreement between the two governments to lower them, and the U.S. duties were lowered to 4.2 percent in January this year (they were previously 5.6 percent) while the Japanese duties were lowered to 4.2 percent in April formerly 10.1 percent), and the duties are now roughly the same. The Japanese seem to be saying: "We are doing our utmost to avoid this trade friction."

On the other hand, the Japanese industrial world is showing signs of enhanced alertness with the statement: "These movements are rather deep-rooted."
"The SIA is not looking for a balance between imports and exports but is

planning to make an issue of leading technology" (executive of Toshiba Corporation) is the Japanese view. Japan has already secured about a 40-percent share of the American market in the matter of the 16 K RAM and it presently accounts for about 70 percent of the 64 K RAM, and SIA believes that if this situation continues, the next generation 256 K RAM will be completely dominated by the Japanese, so this is the situation which is responsible for its attitude.

Furthermore, the American semiconductor industry recently has been severely affected by the current depressed economic situation, and all companies are reflecting poor business conditions. One of the top micon maker members of SIA, Intel, showed a decrease in net profits for 1981 to 70 percent below that of the previous year. National Semiconductor showed a roughly equal balance between income and expenditures, and Mostec reported a net loss.

This is why the American companies are unable to foot the bill for the vast expenditures required for new facilities; they have been forced to suspend their production of the 64 K RAM or pull out of the field altogether. The situation has deteriorated to the point that it has even been said that the only two companies which can compete toe to toe with the Japanese makers are Texas Instruments and Motorola.

Plant construction costs have increased sharply and large research funds have to be expended for a company to get into the 256 K era, and this is creating the fear that the Japanese-American gap will become even wider. It seems to be the belief on the part of the SIA that now is the time to beat down the Japanese influence.

In view of this situation, the Japanese makers are on guard, saying: "We don't know what further unreasonable demands will be forthcoming." At the same time, they are making every effort to avoid frictional confrontations, saying: "We will put more strength into new plant construction in the United States and increase the output of our presently operating facilities there." There are also many who say: "We would like to put more effort into developing leading technology."

"Where the issue of the 64 K RAM is concerned, it is obvious that the American makers should show more resolve" (Vice President Jungi Ouchi, Nippon Electric), and there are some who even seek to send more encouragement to their competitors. In any event, the friction revolving around leading technology alone is expected to involve high-level government decisions and competition is expected to become more fierce, with possible emotional opposition from the American side.

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Standardization of 256 K Issue

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 10 Feb 82 p 13

[Article: "256 K Production"]

[Text] The initiation of production (sample shipment) of the 256 K memory (256 kilobit random access memory) has become a topic of discussion, and at

present the Japanese makers are taking the basic attitude of "looking at patterns." All of the companies have already completed their 256 K development and have the technological capability to come out with samples at any time, but so far there has been no international standardization of the 256 K itself, so these companies are refraining from all production and shipment until the standards are set. To be sure, there is some feeling that the 64 K market has only just developed, and there should be an effort to avoid nipping such a development in the bud by the early introduction of the next-generation product.

The reason the various IC companies are attaching great importance to their sample shipments is their bitter experience with the 64 K. Fujitsu was the first to announce a commercial 64 K in the spring of 1978, but this unit required two power sources, so it received poor acceptance. Since then, TI, IBM, and Motorola successively announced their development of the 64 K, and it was only after five rounds taking over 2 years that standardization was established.

This experience has taught the makers that taking the lead and announcing product development and production may result in the need to redesign a modified product if standardization requires a somewhat different item, and any such redesign will require at least a year to complete, while plans for mass production will be greatly delayed as a result, leaving the company far behind its competitors. This is why the makers are quietly waiting this time; "It may be said that the Japanese industry has become that much tougher" (Nippon Electric top executive).

It is believed that standardization of the 256 K will not see much basic change in pin arrangement and power source because of the need for flexibility to enable interchange with the 64 K. On the other hand, the top people at Hitachi Limited say: "There is the one point that requires study regarding the user's prerogatives." At the same time, the same people said that the standardization "market place" will be the International Solid State Circuit Conference (ISSCC) which will be convened on the 10th (local time) in San Francisco.

The industry considers that the problem points in standardization include: "Inclusion of redundancy (it is difficult to build a unit in which all 500,000 elements are constructed flawlessly, and backup circuits are employed in the event faulty elements are formed); "large users such as IBM and DEC have not decided what their needs are"; and "what about the timing problem." In addition, it is said in some quarters that even though standardization may be decided by the ISSCC, this conference is "purely a conference to present research results and not the organ to establish the standardization. This is a meeting where top technologists of the world's IC industries will gather under one roof, and their lobbying efforts will have a strong influence on the standardization decided upon," seems to be the general attitude. The industry is looking on in the belief that, while not included on the agenda, Hitachi plans to introduce a new development proposal for the 256 K at this conference, and reaction to this announcement will lead to the emergence of a consensus for standardization.

There is concern that Japanese-American semiconductor conflict will begin anew with the 64 K problem, and what American industry is irritated over is that where it concedes "defeat" in the 64 K at the present stage, it finds it almost impossible to reverse the situation for the next-generation 256 K. In other words, it has become evident that rounds 1 and 2 of standardization--which is instrumental in advantageous guiding of the market--were captured by Nippon Electric, and round 3 will again be controlled by Japanese industry, so the future for American industry does not seem too bright.

The two organs which decide on IC specifications and standardization are JEDEC (Joint Electron Device Engineering Council) and IEC (International Electron Committee). JEDEC is composed of more than 30 companies headed by powerful American makers such as Valos, GE, and DEC, and has more than 10 committees such as the package committee, each of which studies and decides on specifications for various themes under its jurisdiction.

There are no legal restrictions attached to the items that are decided upon, but marketing of any product which does not meet specifications is very disadvantageous, and every company makes every effort to come out with products which meet specifications. IEC has a similar function, but it points toward systematizing specifications on a worldwide level. Compared to JEDEC, it is comprised more of academic people, and it lacks clout.

In any event, standardization of the 256 K will be determined by MEDEC, and announcements of sample shipments will not be forthcoming until standardization is accomplished. JEDEC says it is presently receiving proposals from the different companies, and it will be about half a year before any decision is made. As a result, it is said that "sample shipments will have to wait until the latter half of this year at the earliest; any earlier date is out of the question" (Fujitsu executive).

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Effect of U.S. Recession

Tokyo NIHON KEIZAI SHIMBUN in Japanese 13 Feb 82 p 5

[Article: "Increasing U.S. Irritation"]

[Text] There is increasing irritation on the American side in the Japanese-American semiconductor friction. This is indicated by the recent move on the part of the American Semiconductor Industry Association (SIA) to regulate import of Japanese the 64 K RAM (random read-in and read-out memory) through the United States Trade Representative (USTR) followed by the criticism by Commerce Secretary Baldrige of the Japanese semiconductor industry and trade policies at a public hearing.

The Ministry of International Trade and Industry at present is saying outwardly that "there is currently no Japanese-American semiconductor friction" (headquarters of Bureau of Machine Information Industry) and seems to be downplaying any statements on the part of the American side, but it is anticipating

a further increase in friction and is secretly providing administrative guidance to the large semiconductor makers. About the end of last week, the top echelon of the Ministry of International Trade and Industry even passed on the unusual statement: "Be discreet about dumping type exports which can lead to criticism" to the vice president and director level of the six large semiconductor makers, Nippon Electric, Hitachi Limited, Fujitsu, Mitsubishi Electric, Oki Electric, and Toshiba Corporation. At the same time, the ministry is encouraging foreign capital semiconductor makers to set up plants in Japan and promote mutual interchanges between Japan and the United States.

In the background of this present rekindling of the Japanese-American semiconductor friction are: 1) the fear on the American side that there will be a reversal in the Japanese-American relationship in the development of leading technology, and 2) the American semiconductor industry is in deep recession.

The VLSI (very large-scale integrated circuit) is not only the mainstay of the electronics revolution, but in the United States it is a vital technological product in the military and space development areas. The VHSI (very high-speed integrated circuit) development plan initiated in the United States in 1979 was designated a primary goal by the defense department, and the government allotted \$200 million for its development. At the same time, military and space related funds are increasing for the American semiconductor industry in the midst of the entire industry being faced with a recession; it is estimated that the 1981 funds from this source increased 23 percent over the previous year, to \$600 million; the dependence of the industry on military and space funds is increasing with the years.

Despite this situation, the first salvo in the VLSI conflict involving the 64K RAM saw the Japanese forces take over 70 percent of the U.S. market; the irritation of the U.S. Government and industry is very great, and there have been increasing warnings that "if this situation continues, we will also lose out to the Japanese in the matter of the 256 K RAM." At the same time, there are active movements against Japanese regulations. "We have no means to counter trade friction that involves military and national defense" (Ministry of International Trade and Industry official), and the present situation is that this ministry has already begun to worry about the situation.

At the same time, the most recent industrial performance of the American semiconductor industry has been anything but good. The 1981 profit performance of Intel, which is a central member of the SIA, dropped more than 70 percent below the previous year's level; even Texas Instrument (TI), which professes to support a free trade system, has seen a sharp decline in profits, to about half that of the previous year during 1981. There is increasing peril that continuation of the present situation will make it difficult to assure development funds for the next generation VLSI.

The IC (integrated circuit) customs duties, which had been a problem, were lowered as the result of agreement on the part of both governments, and this year's American duties are pegged at 4.24 percent (compared to 5.6 percent the previous year) while the Japanese duties are 4.2 (from 10.1 percent the previous year), so the two countries are about the same where custom duties are concerned.

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At the same time, there was a large decrease in Japanese IC exports to the United States during 1981: the cumulative total for January-November was 500 million yen (3.4 billion yen for the same period the previous year), and the export-import balance is in a state of equilibrium.

In addition, four companies, Nippon Electric, Hitachi, Fujitsu and Toshiba, have been building plants in the United States, while the American companies TI and Motorola have built plants in Japan, and it is to be expected that there will be other foreign capital ventures which will establish plants in Japan. It may be stated that where semiconductors are concerned, there is a Japanese-American mutual exchange environment. The statements from the Ministry of International Trade and Industry and the Japan Electronic Equipment Association to the effect that "Japanese-American friction in the semiconductor area does not seem likely" stem from such a background.

Be that as it may, Japanese-American semiconductor friction is heating up despite what some Japanese quarters say. "We do not know what demands will be coming up next" (a top industrial figure) is typical of the increasing anxiety. Industrial people are saying: "We must put greater effort into onsite plants and increasing onsite production volume" and "If there is any leading technology that needs to be obtained, we will not spare anything to acquire it," thereby displaying their countermeasures, but the actual situation is that neither measure possesses decisive clout.

"The fastest way to avoid friction is, above all, for the American makers to come out with a leading product" (Hitachi executive) is also a typical comment heard. On the other hand, it is expected that semiconductor friction between Japan and the United States will become even more fierce, to the extent that development in leading technology will develop to the stage of assuring national security and even to involvement in high-level administrative problems.

In such a situation, Vice Minister Fujiwara of the Ministry of International Trade and Industry said on the 12th: "This is a problem that will be resolved only with semiconductors," as he put his finger on the real difficulty in resolving this problem.

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Reciprocal Plant Construction

Tokyo NIHON KEIZAI SHIMBUN in Japanese 17 Feb 82 p 8

[Article: "Solution for Trade Friction"]

[Text] Efforts on the part of American semiconductor makers to locate plants in Japan have become more active. Fairchild, which is the seventh ranking semiconductor company in the world, formally announced its plans to construct an IC (integrated circuit) plant in Toso city, Nagasaki Prefecture, and this

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was followed by the announcement on the part of America's number two maker, Motorola, that it too will begin construction of a new plant. In addition, Intel, which is the largest micon maker, heads a list of several companies which are planning to set up plants in Japan and together with the world's leading semiconductor company, Texas Instruments (TI), will make up a list of large semiconductor makers which over the course of the next few years will be putting up production strongholds in Japan. In the other direction, Japan's semiconductor makers have already seen five of their ranks producing IC on American soil, plans for construction of second plants are rapidly developing, and Japanese-American production is accelerating. The Ministry of International Trade and Industry considers that "this mutual advance in plant construction plays an important role in easing semiconductor friction" (Machine Industry Information Bureau) and is welcoming these most recent developments.

The reason American semiconductor makers have become anxiously involved in setting up plants in Japan is to be able to utilize to the fullest the superior business practices of Japan, including productivity and quality control. TI, which initiated semiconductor production in Japan in 1968, has already put up three semiconductor plants in this country. Among these, the Miura plant in Ibaraki Prefecture which was completed near the end of 1980, has been designated the production plant for the 64 K RAM (random access memory), which is the first-round product in the area of VLSI (very large scale integrated circuits), from among the many TI plants distributed around the world, and a considerable volume of this plant's products are being exported back to the United States.

It is said that this decision was based on the high evaluation of the productivity and strict quality control exercised in Japanese plants. Even the American makers that are planning to put up plants in Japan say: "The success TI has enjoyed in Japan has been a major stimulus." Motorola plans to start production of the 64 K RAM at its new plant, and there is very great possibility that the Japanese plants of these various companies will be their VLSI production plants.

At the same time, there is an appealing factor in the Japanese semiconductor market for the American semiconductor makers. The market scale for 1981 was estimated at about \$4.5 billion, which is greater than the \$4 billion for all Europe combined and is right next to the \$7 billion for the United States, making the Japanese market the second largest in the world. Furthermore, the rate of growth of the Japanese market for the first part of the 1980 decade is expected to continue at about a 20-percent pace, contrasting sharply with the American rate of growth, which has leveled out.

These are the reasons why the American semiconductor makers are spotlighting production and sales in the Japanese market, to take the strain off the American market which is still suffering from recession.

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President R. Skako of the 100-percent Fairchild-financed Fairchild Japan (main office in Shibuya in Tokyo, capital more than 450 million yen) stressed the advantages of this company's move by saying: "Not only have production and supply times been reduced, but products to meet the user's requests can be developed and produced," revealing a policy of reinforced sales efforts in Japan.

In the midst of rekindled Japanese-American semiconductor friction, there has been increasing criticism on the part of the SIA (American Semiconductor Industry Association) with regard to the closed nature of the Japanese market. On the other hand, these entries of American makers into Japan have the effect of negating these criticisms, and the Ministry of International Trade and Industry welcomes these moves. At the same time, Japanese makers are more active in putting up plants in the United States, and some easing in the semiconductor friction may be forthcoming.

Mutual Advances in Plant Construction on the Part
of Japanese-American Semiconductor Makers

	American Side		Japanese Side
TI	Tsurugadani, Saitama-ken, Hinode, Oita-ken, Miura, Ibaraki-ken	Rome (formerly Toyo Dengu Seisakusho)	Sunnyvale, California
Motorola	Kaizu, Fukushima-ken (joint with Toko) Plans for new plant	Hitachi Limited	Dallas, Texas
Fairchild	Toso, Nagasaki-ken (expected to start operation Aug 1983)	Nippon Electric	Mountain View California
		Fujitsu	San Diego, California
Intel	Plans to construct mass production plant	Toshiba Corpora- tion	Sunnyvale, California
Advanced Micro Devices (AMD)	Plans to construct mass production plant		

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Comparison of Industries

Tokyo DENSHI GIJUTSU in Japanese Vol 24, No 1, Jan 82 pp 94-96

[Article by Hiroshi Semi. Conclusion of article published in JPRS L/10332, 18 February 1982, of this series]

[Text] Production: The American semiconductor industry was originally nurtured under the mission of responding to the challenges of the military and space related industries. As a result, it may be said that "selective awareness" was the controlling factor during the 1970's before the IC production process was stabilized. In other words, it was only necessary to select those items from the total number of IC produced which met the specifications. Otherwise, there was the situation that no other production process was available.

The interest of technologists working in the semiconductor industry was initially directed at innovations or improvements to the production process. The American, with his pioneer spirit, loves to work at the frontier, which in a spirit shared nationally has his interest naturally drawn in the direction of development of new types of IC, for example, the "design area."

As the commercial market demand for IC's increased with the 1970 decade, the top interest of the American semiconductor industry was divided between two points.

The first point was to come out on the market with an innovative IC design one step ahead of the competitors as early as possible. The second point was to put mass production of this IC on track as early as possible. The establishment of mass-production technology even 1 day ahead of the competitors would enable a cost superiority. The introduction of new products backed up by an innovative feature strengthened the power to control the market.

These two points were the basic strategies of American industry. Any company with these two points which entered the field with reasonable timing could not be driven from the market. Proper timing meant that these two items should not be too early or too late. There are many examples of businesses which failed because of being on the scene too early. The Koger Company, which cornered a number of IBM graduates and made an attempt to start off as a memory speciality maker, is a good example.

Where Japan is concerned, it was the practice in the past that basic technology including knowhow was introduced from American industry. Those products which were manufactured with the use of imported technology were first of all incorporated into the company's own system products to be used within the plant.

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In other words, there was a market for the minimum quantity required for startup. As a result, the completion of the built up technology, that is, the problem of how to achieve a good product rate from a single wafer, became the focus of attention.

It was the high quality of Japanese labor that supported the plan to improve yield at the lowest levels, and the small variation in quality is also a measure of this quality. This superiority in quality over the United States is manifested in the stabilization of a manufacturing process in a comparatively short time. Once a process is stabilized, the introduction of automation is not too difficult.

This historical difference on the part of Japanese industry is manifested in the form of a memory which may be considered in the light of a built-in technology crystal. The production of MOS memory by American industry during the June-August quarter of last year was an average of 4 million units per month, or roughly 2.3 times the Japanese production.

On the other hand, if we look at the most advanced 64 K DRAM, three companies--Hitachi, Fujitsu and Nippon Electric--can stand up with the best five in the world. Fujitsu and Nippon Electric also occupy the top ranks in the area of the 16 K DRAM, which again is booming (according to information from the Dataquest Company).

Quality: It may be said that the superiority of this built-in technology that is distinctive of Japan is founded on this difference in the basic concept of quality.

The Japanese consumer is known the world over for subjecting not only semiconductor products but all purchase items to a rigorous examination.

Semiconductor products are required to go through not only mechanical strength tests but various deterioration tests under varying temperature conditions, and the electrical properties tests are rigorous. An American industry representative has dubbed these "tests to declare goods unacceptable."

The basic concept of a producer in Japan is the perfection principle, in which he makes every effort to come out with a product more perfect than his competitors. There are many instances in which products with specifications that are better than those indicated by the customer are produced due to competition with other makers.

The United States is in a different world. The United States is a country of contract companies, and seller and buyer are in a sort of antagonistic relationship. Where the seller is at the borderline of the customer's specifications, he pushes the contract to the limit as long as the specifications are met. To be sure, importance is placed on how low costs can be lowered. Greater weight is placed on price competition than on quality

competition. This was one of the points of dissatisfaction a certain top executive of one of Silicon Valley's top semiconductor makers displayed when he saw the severity of the inspection on receipt of goods by Japanese industries.

The product his company produced deviated slightly below the specifications. As a result, the customer, which was a Japanese company, rejected the entire lot. Another supplier will only ship products all of which meet specifications, so why should only this American industry member ask for "special treatment." This is how the Japanese industry countered.

When seen from the eyes of American industry, such an emphasis is beyond comprehension. This practice is the product of a function principle which is the relationship between the acceptance principle and the frontside-backside unity principle. The American view is that as long as the IC product fulfills its role as an IC, then it is a beautiful product and even though it deviates slightly below specifications, that really should not matter.

Competition: This difference in attitude toward quality on the part of Japanese industry is the result of the early perfection of a production system which came out with products of high reliability. American industry, which until about the middle of the seventies regarded Japanese production strength lightly, finally came to realize the high reliability of Japanese IC products and began to draw a protective wall about itself.

President Spock of National Semiconductors heads those who believe that "the battle involving technology, productivity and quality with the Japanese forces" has started, and he is spurring his fellow workers on.

Japan's monthly IC production volume last year was about 220 million units per month, compared to the 500 million per month of the United States. There was a rapid increase in Japan's linear IC production this past year. The average monthly production from January through August was about 450 million units for the United States, while Japan showed a rapid increase to 260 million.

It is clear that Japan is fast catching up on the numbers. Looking at the price factor, the per-unit price of the Japanese product dropped almost 10 percent over the previous year, while the cost of the American product is holding steady. That is why the specter of Japanese industry catching up in the matter of numbers can be somewhat discounted. The source of this numbers boom in Japan is the so-called private use items in the home entertainment area. When seen from the standpoint of expansion rate, VTR type products are the mainstay along with facsimiles reflecting the OA age and office equipment including cameras, voice and audio equipment.

In the area of MOS memory which American industry is pushing, the overall picture is one in which Japanese industry is not falling behind. While these

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data are limited to June-August of last year, American companies shipped 40 million units per month. The competing Japanese industry was able to come up to slightly less than 20 million units per month. If we look into the individual memory production as well, it seems that Japanese industry holds a greater share in the leading product area.

The trends of Japanese industry include moving from memory to logic in the area of single IC, and from hardware to software in the systems area. American industry is also rolling back to meet this challenge.

Products: The pattern of this rollback on the part of American industry seems to be to avoid memory in which the built-in technology is the basic item and to go into micon-related and custom-related IC where software service and design capability are required. The very high speed IC is associated with advances in the VHSIC (very high speed integrated circuit) plan under the direction of the Pentagon, and this may turn out to be an area where Japanese industry will not be able to contend.

Great effort is being put into the large bit micon series, which involves development of products close to systematization.

Micon products bedecked with software represent an area where American industry has taken over the world market. The American forces are moving toward establishing an even more secure foothold on the world market taking advantage of this controlling power. Intel and AMD recently entered into a 10-year technological cooperative program. Intel will provide the technology.

There are grounds to think that there will be even more moves toward joint efforts between industries in the valley. This is because the top people of the various companies in the valley have the common background of being "Fairchild graduates."

Industry Strategy: Semiconductor products are superior worldwide products. They possess wide applicability to all types of items in all countries of the world. At the same time, these are superminiaturized items making it feasible to transport them to any part of the world in short order.

On the other hand, if the share of any country's market is to be increased and service commensurate with the purchase price is to be provided, the production base alone cannot keep up. This is the role of multinational corporations. This will involve Japanese companies setting up bases in the United States and in European countries not only as semiconductor device makers but also as peripheral equipment industries.

Where multinationalization is concerned, the Americans have already taken some steps in that direction. For example, the representative semiconductor industry of the United States, Texas Instruments (TI), already has production

plants in more than 10 countries throughout the world and has long had multinational status. It has four production plants in Japan. The competing Japanese industries are only now beginning to go international. Among the Japanese companies, multinationalization on the part of Nippon Electric seems to be the most advanced.

Role of the country: Up till now the Japanese Government has ranked semi-conductors and computer industries as strategic industries in view of their importance and large impact, and has protected and nurtured these industries.

On the other hand, there will be a wide reduction in IC import duties starting in the spring of 1982 as the result of pressure from the United States to even precede the lowering by the American side, and the present situation is that outside elements will be allowed to participate even in the area of national projects. The United States is reexamining its leading industries from the viewpoint of national defense. It is very possible that this will be followed by efforts to prop up some industries.

There are many situations in which high-level technology and leading industries are closely interwoven with a nation's security. Private industries in the United States have raced into technological cooperation with other industries in the interest of preservation, and they are screaming for the removal of Japan's so-called noncustoms barrier. Should the governments get involved, Japanese-American relations will probably become more complex. The protective trade mood which prevails in the United States will probably strengthen this trend considerably.

The electronics industry centered on the semiconductor industries of the United States and Japan will become the power to "control the world" (President Sanders of AMD Company).

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SCIENCE AND TECHNOLOGY

SEMICONDUCTOR TRADE FRICTION WITH UNITED STATES DISCUSSED, PART II

Japanese IC Industry's View

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 24 Feb 82 p 14

[Text] There are signs that semiconductor trade friction between Japan and the United States will be rekindled in a connection with 64 K memories, but at a press conference in the Keidanren Building (Otemachi, Tokyo) on the 23d, Managing Director Toshio Takai of the Electronic Industries Association of Japan countered U.S. criticism of Japan by saying: "IC [integrated circuit] trade between Japan and the United States is in balance at present, and the two countries are in a complementary relationship with an active exchange of technology and capital investment; there are no real problems." He stressed mutual prosperity in a statement on the argument over the 70 percent share of the 64 K RAM market held by Japanese companies: "Demand has only begun; this is no time to discuss market shares. U.S. companies with their own production facilities, such as IBM and Western Electric (WE), are already fully involved in quantity production, and other major semiconductor companies are improving their production facilities; it will not be possible for Japanese companies to take over the entire market. We hope, in fact, that quantity production in the United States will be established quickly."

The association press conference on IC trade with the United States featured Takai and, as a company representative, Nippon Electric Corp Vice President Tadayoshi Ouchi. Saying that it is first necessary to know the facts regarding the balance of IC trade between Japan and the United States, Takai explained that the balance of IC trade differs from trade in television sets and automobiles in that Japanese imports exceeded exports throughout the 1970's, and although this changed to an export surplus in 1980, even that surplus was a mere 700 million yen; trade is quite evenly balanced.

With regard to capital investment and exchange of technology, Takai stressed that U.S. IC manufacturers like Texas Instruments, Motorola, Fairchild, Intel and Analog Devices are locating production facilities in Japan, and Japanese companies like NEC, Hitachi Ltd, Toshiba Corp, Fujitsu Ltd and ROOMA have moved into the United States; production is being extended actively in both directions, and the semiconductor industries of the two countries are in a complementary relationship. He went on to say that last September the

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governments of Japan and the United States agreed to accelerate implementation of the tariff cut to 4.2 percent, the rate that is the final goal of the Multilateral Trade Negotiations. At that time both countries came to share the perception that free trade in semiconductors should be maintained and supported, and the basic judgment was made that semiconductor trade between Japan and the United States is not a problem.

With regard to imports of Japanese 64 K dynamic RAM's, the object of increasing criticism in the U.S., it was said that: "If we compare demand to a marathon race, the runners have started but they have only gone 200 or 300 meters; this is not the time to argue about the size of market shares. The world market will grow 2.90 fold, from \$63 million in 1981 to \$181 million in 1982, then up 4.8-fold to \$880 million by 1985. This is a sector of rapid growth." He explained that this market cannot be monopolized by Japanese companies; the United States has great latent dynamism in the sector of advanced technology and can catch up in a single spurt of enthusiasm, so Japan is hoping for a relationship of coexistence.

NEC Vice President Ouchi said: "Trade in IC's is completely free, but trade friction cannot be eliminated as long as overall trade is out of balance. The need for 64 K RAM's is quite strong in the United States, and we have sold them at a fair price. It is the U.S. user who would suffer if Japan stopped exporting now. We can only await the beginning of quantity production in the United States. Our position was explained by the Esaki mission." He thus indicated that the industry does not want voluntary restraints on exports.

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NEC President's View

Tokyo DENPA SHIMBUN in Japanese 6 Mar 82 p 1

[Text] Nippon Electric Corp Vice President Tadayoshi Ouchi recently said, in regard to semiconductor trade friction between Japan and the United States: "The criticism from the United States is abstract. Even the SIA (America's Semiconductor Industry Association) has found recent moves by the administration and Congress to be harsh and hard to understand."

Ouchi also stated his views as a representative of the industry at a press conference on "the Japanese understanding of semiconductor trade friction" held at the end of February by the Electronic Industries Association of Japan. Since then he repeated criticism of the United States while telling a reporter of this newspaper of recent trends in the semiconductor industry and the trade issue.

According to Ouchi, Japanese semiconductor sales grew 10 percent in 1981, but U.S. sales fell 4 percent. Japan experienced this strong growth because of increased domestic demand for such things as home VTR's [videotape recorders]; global exports remained level, and exports to the United States were down from the previous year. The poor state of the U.S. semiconductor industry was due to the general slowdown in business; even if exports from

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Japan had increased they would not have exceeded a 4 or 5 percent share of the U.S. market, so they would not have hurt the business of U.S. manufacturers.

Ouchi said that the sudden outpouring of criticism from the United States since the beginning of 1982 was nothing but the use of Japan as a scapegoat. He stressed that the problem is a drop in overall demand within the United States, and unless demand improves, criticizing Japan will not really change anything.

The 64 K RAM's, however, are another matter. The reason Japanese companies have such a high share of that U.S. market is that Japan took the lead in production technology and improved yield. But the 64 K RAM is a product for which there is a growing market, and U.S. criticism of the size of the Japanese share of the market is wide of the mark in that this is only the beginning. According to Ouchi: "If we compare it to a marathon race of over 40 km, the runners have only gone a few hundred meters and are still in their starting dash."

Ouchi said there will be a large market for 64 K RAM's from 1983 through 1985; the 256 K RAM, about which Japanese newspaper accounts have excited the United States, is expected to become dominant in 1986.

Reportedly there are those who consider the size of the Japanese share of the U.S. market for 64 K RAM's to be a problem in terms of U.S. defense and who want to invoke national security (to have the President prohibit imports which threaten security). Ouchi said: "They talk about the defense problem, but at the same time they want Japan to buy their advanced technology. When 64 K RAM's are sold to the United States, it is impossible to know what equipment they will be used in until the user installs them. There have been cases in which 64 K RAM's sold for civilian use in telecommunications equipment have been used in military applications, but the particular details cannot be learned." He complained that the market for 64 K RAM's is just getting started, and "this is not the time to take up national security provisions" in connection with defense.

A report of the Joint Economic Committee of the U.S. Congress entitled "International Competition in Advanced Technology and Development of Trade in the Semiconductor Industry," pointing to the issue of 64 K RAM prices, said that with the support of the controlled domestic market, Japan was quickly able to move into quantity production and export 64 K RAM's to the United States. Although many experts did not expect the price to fall below \$10 until 1982, Japanese manufacturers cut the price to \$5 even though demand remained high. Ouchi denied this, saying: "I don't know about other (Japanese) manufacturers, but dumping just isn't possible for us." He said the price leaders in the U.S. market are the U.S. manufacturers, and Japanese products cost 17-18 percent more in the United States than in Japan because of tariffs and merchandising costs.

Thus Ouchi said the criticism from the United States is abstract and not in accordance with the facts. Criticism previously came primarily from the

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SIA, but recently it has come, for unknown reasons, primarily from the administration and Congress.

Ouchi repeatedly stressed the status of the semiconductor industry: (1) the equilibrium in semiconductor trade between Japan and the United States; (2) Japan's accelerated reduction of its higher IC tariffs to the same level as those of the United States; and (3) the absence of nontariff barriers and the resultant development of positive investment and sales activity in Japan by U.S. manufacturers. He said that in order to avoid friction, Japanese companies are moving in the direction of: (1) avoiding price competition so there would be no suspicion at all of dumping, (2) increasing the use of production facilities within the United States, and (3) persuading the government that semiconductor trade friction is not a matter limited to semiconductors, but part of a trend of criticism of Japan in connection with the deficit in the U.S. trade balance.

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MITI's View

Tokyo DENPA SHIMBUN in Japanese 10 Mar 82 p 1

[Text] The Japanese Government's policies to aid high-technology industries such as semiconductors and computers have been labelled by the United States as unfair, a nontariff barrier, and an element in the economic friction between Japan and the United States. But according to information revealed by an informed source on the 9th, government aid to the computer and IC industries is much higher in the United States. The view of MITI [Ministry of International Trade and Industry] is that, "the scope of assistance is larger in the United States; this runs counter to American criticism." The U.S. misunderstanding of the facts in the trade problem is obvious, but apparently government assistance will continue to be subjected to unreasonable criticism.

The Japanese-U.S. Trade Subcommittee met at the Foreign Ministry in Tokyo's Kasumigaseki on the 9th and 10th. There were to be consultations on the promotion of joint development projects and trade in high technology products, but for some time the United States has criticized national assistance to the computer and IC industries, and has pressed to have them participate in these projects. At the hearings on trade held by the Joint Economic Committee of the U.S. Congress on 10 February, Commerce Secretary Baldrige complained that exports to the United States had increased rapidly because of a nontariff barrier in the form of government research and development aid to the Japanese semiconductor industry. On the 12th, Minister of International Trade and Industry Abe countered that such criticism is contradictory.

The central question is whether the U.S. complaints that government assistance is higher on the Japanese side are indeed correct. Information from an informed source on the 9th confirmed that government assistance to the computer and IC industries in 1981 and 1982 is much higher on the U.S. side.

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This information shows that the United States provides abundant assistance through government organs like the NSF (the National Science Foundation), NASA (the National Aeronautics and Space Administration) and the Defense Department; in both years the total assistance was larger than Japan's by a factor of 10.

In the 4 fiscal years beginning in 1976, Japan completed a VLSI [very large scale integrated circuit] development program (total research cost about 70 billion yen) which has been criticized by some quarters in the U.S. semiconductor industry, but the United States is carrying out a VHSIC [very high speed integrated circuit] program (1980 to 1986; \$225 million committed). Even if Japan's VLSI development had been continued through 1980 and 1981, the various U.S. efforts would still have a higher total.

MITI has recognized that the U.S. Government's research and development budget for high technology industries is much higher than Japan's, and it intends to refute the one-sided criticism from the United States. Government assistance in this field is not limited just to the United States and Japan; there are also strong assistance programs in European countries--over 10 million yen per year in Britain, some 12 billion yen in France, and over 30 billion yen in West Germany.

Japanese assistance policies focus on establishing basic technology which can be expected to become important in the future and which must be handled over a longer period than 1 year. Government assistance is considered indispensable in all cases covered.

The dominant view in Japan is that the balance of government assistance to high technology industries is tipped very much toward the United States, which has developed its defense and aerospace industries. This is clear from recent government budgets; U.S. criticism on the point is simply inaccurate.

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Table accompanying article 3:
Government Assistance for Computer and IC Technological Development

<u>Category</u>	<u>Japan</u>		<u>United States</u>	
	<u>1981</u>	<u>1982</u>	<u>1981</u>	<u>1982</u>
Promotion of basic technological development for next generation of computers	6,200	5,616	193	226
Basic computer technology development (5th generation computer R&D)	15	426	249	308
R&D for high-speed computer system for science and technology (large-scale project)	30	813		
R&D on new function elements within next-generation basic industrial R&D	673	1,128		
Total	6,918	7,983	442	534

Japanese amounts in millions of yen
U.S. amounts in millions of dollars

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SCIENCE AND TECHNOLOGY

TRADE ACTIVITIES WITH BULGARIA, EAST GERMANY REPORTED

Bulgarian Magnetic Grinding Technology

Tokyo NIHON KOGYO SHIMBUN in Japanese 2 Dec 81 p 1

[Text] Toyo Kenmasai Kogyo To Engage in a Joint Venture With Bulgaria Concerning Magnetic Grinding Technology Imports

On the 1st, Toyo Kenmasai Kogyo (president, Chikara Takahata; headquartered at 1-2 Mita, Minato-ku, Tokyo; telephone, 03-453-2351) announced the establishment of a joint concern, "To-Bu MX," which will import magnetic grinding technology (MX) jointly developed by the Bulgarian Government and its Industrial Laboratory. It has already completed the procedures for obtaining a license to establish a company in Japan; the company will be officially established after a license is obtained from the Bulgarian Government, which is expected to be granted in the middle of this month. This is the first time industrial technology will be imported from Bulgaria.

Toyo Kenmasai Kogyo, a comprehensive grinding machines trading firm, has imported grinding technology from the United States and has engaged in sales of grinding machines. It considers the MX manufacturing technology developed by the Bulgarian Industrial Laboratory a remarkable one, and since last year it has been negotiating with the Bulgarian public corporation. The capital of the joint concern is 20 million yen; the proportion of investment is 51 percent by Toyo Kenmasai Kogyo and 49 percent by Bulgaria; the president will be Mr Takahata.

The MX technology uses a magnetic field between electromagnetic poles to create a powerful grinding brush condition between the magnetic grinding material, a mixture of ceramics and iron powder, and the grinding objects; the grinding takes place either by vibrating or rotating the two. Conventional grinding technology uses only nonmagnetic grinding material, not magnetic material. The secret of this method lies in the magnetic grinding, by which the surface of odd shapes can be ground freely. It will be used for grinding auto parts, parts for home electric appliances, and precision parts such as those used for sewing machines and watches.

As of March next year, the joint concern will begin sales of magnetic grinding machines and magnetic grinding materials; the sales target for the first year is 200 billion yen. Sales territories will include Japan, Taiwan, Korea, Southeast Asia, the United States, Canada, and Australia.

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East German Machine Tools

Tokyo NIHON KOGYO SHIMBUN in Japanese 7 Dec 81 p 1

[Text] Toyo Kogyo and Sumitomo Corporation To Import Machine Tools From East Germany; Reciprocal Import for "Familia"

Reportedly, Sumitomo Corporation (president, Mitsuo Uemura) and Toyo Kogyo Co Ltd (president, Yoshiki Yamazaki) have decided to import machine tools for engines from East Germany aiming at next fall. This is the first concrete measure of the barter trade on the basis of which Sumitomo Corporation will import goods from East Germany as a reciprocal measure for Toyo Kogyo's 10,000 compact "Familia" automobiles, for which an export contract with East Germany was concluded by Sumitomo in May of this year.

In addition to Toyo Kogyo, Sumitomo Corporation plans to export annually an average of some \$5 million worth of East German-made machine tools to Third World countries.

The machine tools which will be imported from East Germany jointly by Sumitomo Corporation and Toyo Kogyo are a portal plane grinding machine by Uscher Sreiben [phonetic] Corporation and a horizontal boring grinding machine by Union Corporation; a total of two units worth approximately 200 million yen. Toyo Kogyo will install these grinding machines in its main plant in Hiroshima and use them for cylinder type engines.

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Robot Exhibit at Leipzig Fair

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 23 Jan 82 p 4

[Text] The First Japanese Robot Exhibition in Eastern Europe; Five Japanese Companies Including Fujitsu To Exhibit at East German Trade Fair in March

At the spring trade fair in Leipzig, East Germany, which will last a week beginning 14 March, for the first time five Japanese companies will exhibit industrial robots and robot technology. The Leipzig Fair will be the first in the East European bloc to include a Japanese robot exhibition, and since East Germany and other countries are eager to import robots, this fair may be a turning point for creating a Japanese-made robot boom.

There are five participating robot-related companies, including Fujitsu and Kawasaki Heavy Industries, which are participating for the first time, and Toshiba, Dainichi Kiko, and Oa Tsuki. Fujitsu and Toshiba intend to exhibit robots and demonstrate operations. Kawasaki Heavy Industries plans to exhibit video, and Dainichi Kiko and Oa Tsuki plan to introduce robot technology for a plasma cutting machine which was jointly developed by the two.

In spite of high standards at research institutes, the actual condition of robot technology in East European countries is such that their robots have only single

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operational capability at actual production sites, and their production volume is also very small. But each country is anxious to import; particularly East Germany, where the trade fair will take place. East Germany has announced a policy to resolve its labor shortage by introducing 45,000 robots by 1985 in line with its 5-year plan. However, it is obvious that East Germany's robot plan cannot be achieved through domestic production capacity alone; therefore, it is strongly predicted that the majority of robots will be imported from Japan and the advanced Western countries. Aside from East Germany, an interest in robots is growing in Czechoslovakia and Romania, and their own developments are underway; however, it is an undeniable fact that they lag behind in technology.

With this background, Japan has become the center of attention for the world's highest robot technology, production capacity, and the number of robots at work. Many East European countries in addition to East Germany will visit the Leipzig trade fair, and it is most likely that this first exhibition by Japanese companies will encourage exports to the countries of Eastern Europe.

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Bid on East German Plant

Tokyo NIHON KEIZAI SHIMBUN in Japanese 26 Jan 82 p 8

[Text] Nisshin Steel To Engage in Technological Cooperation With East Germany by Offering Bid on Polished Band Steel Plant

On the 25th, Nisshin Steel Co Ltd disclosed that it plans to make a bid on the polished band steel cool rolling plant plan by East Germany's Oranienburg [phonetic] public corporation including both software and hardware. In May of last year when Chairman Honecker of East Germany's Council of State visited Japan, he asked Nippon Steel Corporation to cooperate in this plan. However, since the plan concerns the area which is Nisshin Steel's specialty, the latter took over and has since been negotiating. Nisshin Steel will submit an estimate to the East German industrial plant import public corporation by mid-February. It is likely that West European steel manufacturers will also bid, but Nisshin Steel seems to offer the greatest advantage in terms of its accumulation of software, etc. Nisshin intends to make its effort in the present negotiations with a view to making this the first step toward cultivating the East German market.

The Oranienburg [phonetic] public corporation is a polished band steel plant located northwest of Berlin which presently owns a French-made cold rolling facility (annual production capacity, 60,000 tons). It imports hot rolling coils from the Soviet Union and manufactures polished band steel by the cool rolling method. Its actual production appears to be about 20,000 tons per annum. The demand for polished band steel, which is used for a wide range of industrial products such as precision machines, is growing in East Germany; therefore, it is planning to install a set of rolling mills with an annual production of 36,000 tons, a cutting machine, a packaging line, etc.

In cooperation with Ishikawajima-Harima Heavy Industries (rolling mill) and Toshiba Corporation (electric and instrumentation-related), Nisshin Steel is aiming at a

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blanket contract for designing, machinery, and operational guidance. The total estimated sum is approximately 4 billion yen. The plant manager and others from the Oranienburg [phonetic] public corporation came to Japan last week and are presently visiting Nisshin Steel, taking a tour of its Hanshin plant.

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SCIENCE AND TECHNOLOGY

MILITARY TECHNOLOGY COOPERATION WITH UNITED STATES DISCUSSED

Tokyo NIKKEI BUSINESS in Japanese 8 Feb 82 pp 66-71

[Article by Shogo Imoto]

[Text] The United States Has Its Eyes on Japan : 'We Want Japanese Technology'; Idea of Creating Subcontractor Bases for Conversion to Military Applications

--The United States is asking Japan to provide military technology.

--The major objective is U.S.-Japanese joint development of military products such as electronic products, rather than acquiring existing technology. There is a pattern of attempting to make Japan a "subcontractor base" for military technology. There is even an idea of creating subcontractors for actual weapons.

--The reason for this is the lack of enough technicians in the United States to keep up with military expansion and the improvement in technical ability of Japanese industry.

Bulging Defense Budget; the United States Is Still Dissatisfied

"When it comes to military technology, Japan makes no attempt to supply any to America. This is strange. We want to see the restrictions removed."

In the middle of December last year, Undersecretary of the U.S. Department of Defense (in charge of technology) made this statement, strongly requesting that the Defense Agency clear the way for provision of Japanese military technology to the United States and make structural improvements. This occurred in the third round of the regular U.S.-Japan armament technology conferences.

It began with talks in June of last year between Director General Omura of the Defense Agency (his position at that time) and U.S. Secretary of Defense Weinberger. The argument at the armament conference was an extension of this.

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The United States is pursuing a change in Japan's three principles against arms export which maintain the position: "We will not export arms (technology) to any country." The Americans are saying: "It is natural not to export to the communist bloc or to warring nations, but why can you not give military cooperation to an ally like the United States?"

In response to this, the government, principally the Ministry of Foreign Affairs, the Defense Agency, and MITI are working out a unified government position. The Ministry of Foreign Affairs and the Defense Agency are consolidating their views along the line that "on the basis of the U.S.-Japan Mutual Security Treaty, export of arms (technology) to the United States can be handled separately from the three principles." However, MITI sees difficulty in this and the discussions are not progressing toward a conclusion.

The government has been strengthening defense, for instance by adopting a budget with a bulging defense allotment in 1982. However, there is no end to charges by the United States that Japan is getting a "free ride in security." The Defense Agency and the Ministry of Foreign Affairs are both ready to go along, saying: "If we do not approve even of weapons technology exports, we cannot avoid U.S. criticism."

So, what sort of Japanese military technology is the United States seeking? This is a question that arises because the Defense Agency's actual research and development expenditures in 1981 were only 31.7 billion yen. Nippon Electric President Tadahiro Sekimoto says: "That is not even as much as our company alone spends on research and development." In comparison, the U.S. expenditures for military research and development in 1980, converted to yen, were 3.3 trillion yen (at a rate of 230 yen to the dollar). That is more than 100 times the amount of Japanese spending, a great difference.

"They are far ahead of Japan in basic technology, advanced technology, and systems technology for aircraft, space exploration, and nuclear power." The people involved in defense at companies like Mitsubishi Heavy Industries, Mitsubishi Electric, and Nippon Electric all say the same thing in different ways. There does not seem to be any reason for America to go out of its way to ask Japan for technology.

However, the focus of concern is not this very military type of technology. It is consumer technology. A great deal of technology has been developed in Japan which can very readily be converted to military applications. This is what America has its eyes on.

So what sort of technology is this? Two or three specific examples are given below.

U.S. Interest in TDK, Hitachi, NEC

--Ferrite, a Material That Absorbs Electric Waves

"We would like to sample of the paint containing ferrite developed by your company."

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In December last year, this desire was expressed to TDK Electronics by the U.S. Embassy in Japan. Ferrite is an oxide of alloys including iron, and it is superior to other materials as a radio-wave-absorbing material. TDK is preeminent in the world in ferrite development. It almost monopolizes the field. It already sells electric-wave-leakage-prevention material for electronic ranges, material for preventing television wave harm, and material to prevent unnecessary electric wave radiation for use in ships' radar.

However, the technology for absorbing electric waves has great significance for military purposes. If it were painted on missiles, they could hit their targets without being discovered by enemy radar. If it were used on self-defense ships and fighter planes, there would be no worry about being discovered by the enemy. For this reason, TDK has been carrying out joint development of paint containing ferrite with Mitsubishi Heavy Industries missile development division.

It is not surprising that the United States is interested. The development of the "invisible bomber Stealth" was announced in the plan for strengthening nuclear capability presented by U.S. President Reagan last fall. "If we apply TDK's ferrite, we can succeed in development." We get the impression that this is what the Americans are thinking.

TDK has little to say. "The patent related to joint development with the Defense Agency is held by the Defense Agency, and we are not in a position to decide on supplying a sample." The Defense Agency also appears embarrassed. The Equipment Bureau says: "What we are doing now is painting the self-defense ships with paint containing ferrite. This is still at the basic research stage. It is not a substitute material that can be applied immediately. The United States is probably thinking of studying it literally as a sample."

However, informed sources in the industry point out: "Right now, there is no material superior to ferrite as an electric-wave-absorbing material. It is certain that the United States is highly interested." Of course, this is a matter related to military technology export, and there is no conclusion yet on a supply of samples.

Planar-Polarization-Maintaining Optical Fibers

This optical fiber with the difficult name was developed by the Hitachi Ltd Central Research Laboratory. Optical fibers provide a path for optical communication using a glass thread the size of a human hair. Compared to conventional copper lines, they can handle a great deal more transmitted information. The planar-polarization-maintaining optical fiber maintains a set direction of the plane of light oscillation. Not only does it have a greater volume of transmission capacity than existing optical fiber, it can be used in the gyroscope, which measures the position of airplanes and missiles, and reportedly quadruples the precision of conventional gyros.

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This optical fiber was developed in the fall of 1980 by the Hitachi Central Research Laboratory as a world first. Naturally, it attracted the attention of many countries and there was a rush of inquiries, including one from the U.S. Naval Laboratory. Sanehiro Kudo, second department manager at the Hitachi laboratory, says with pride: "Our major objective is applications for optical communication and optical IC's. Our technical standards are second to none."

Infrared Charge-Coupled Device (IR-CCD)

IR-CCD's combine the charge-coupled devices (CCD's) used as the "eyes" in video cameras with infrared detection devices (IR's). Expected applications for consumer use include medical diagnosis of the human body and detection of defects in ovens or kilns. If they are applied to military equipment, they would exert power as the "eyes" of missiles. The IR-CCD installed in a missile would discriminate the infrared rays emitted from aircraft, ships or tanks as an image and accurately determine the target so that it would be difficult for the enemy to escape from the missile.

The Defense Agency started development of this IR-CCD in 1981, commissioning three companies, Toshiba Corp, Mitsubishi Electric, and Fujitsu, to do the research. CCD's have already been introduced in video cameras. The Japanese technical level in this field is high and has attracted the notice of the United States and Europe.

These are just a few examples. There are many other examples, although scattered, of advanced Japanese technology which is at the highest world level. These include VLSI's (very large-scale integrated circuits), computers, optical communications equipment, industrial robots, ceramics, carbon fibers, and sensors.

For example, in optical communications, there was an "incident" sensationalized in the newspapers in mid-January: "Optical communications equipment made by Nippon Electric was used by U.S. Army for military purposes." This demonstrated the excellence of this technology in an extreme fashion.

This was a case in which the optical communications equipment delivered to a subsidiary of AT&T (American Telephone and Telegraph) by NEC in the fall of 1980 was used for the purely military communications network of the U.S. Army.

NEC's senior executive managing director, Kiyoshi Kakita, says: "That optical communications equipment was not "milspec" (military specifications). It was made according to specifications for ordinary public lines. We had no idea it would be used for military purposes." Some sources in the industry say: "It is not possible that NEC did not know something like that." However, the problem is that even equipment made for ordinary public lines could be used for military purposes.

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Ordinarily, it is necessary to meet military specifications for resistance to strong shocks and sharp fluctuations in humidity and temperature when making military equipment. The reason that NEC's optical communications equipment, made according to specifications for private lines, could be used for military purposes is that it had sufficiently high reliability.

In addition, it is reported that the U.S. large military equipment company, Rockwell International, is carrying out joint development on rocket engines and electronic data analysis technology with Mitsubishi Heavy Industries and Hitachi.

Three Principles of Arms Export: Shackles on Joint Development

In the past, it was a common pattern for advanced technology to flow from military to civilian applications. However, recently, examples of a reverse flow, from civilian to military, are growing. The dividing line between civilian and military has become very vague. Some reasons for this are the expansion of the consumer market and the demand of users for high quality and improved performance. Progress in consumer technology is fastest in Japan.

As shown in the accompanying table, there are many instances of Japan taking the lead in recent exchanges of advanced technology. In terms of payments and receipts of compensation for technology in technology exchanges, receipts in 1980 were 26.3, with payments set at 100, so the amount of payments was much greater. However, the amount of receipts is growing year by year. (See graph) Therefore, it is natural for the U.S. Defense Department to take an interest in Japanese consumer technology.

Another reason the United States is asking Japan to provide military technology is a shortage of technicians. With the end of the Vietnam war and the Carter administration's cutbacks in the defense budget, the number of engineers and technicians in the U.S. military supply industry has fallen dramatically in the last 10 years. Subcontractors have especially decreased in number. The 6,000 companies which subcontracted with the aerospace industry have shrunk to 3,500. Those related to the navy have decreased by 25 percent.

Therefore, it is hard to cope with President Reagan's great military expansion policy. The production of one extra F-15 or F-16 fighter would require a year and a half. No matter how many technicians were hired, it would not be enough.

Amid this noisy debate over military technology exports, MITI is behaving cautiously. MITI has previously maintained that "exports of multipurpose technology which can be used for either civilian or military purposes is approved even under the present three principles for arms." It seems to think that if that is the case, there is no need to handle it separately from the three principles or for America to push for revision of the three principles.

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Indeed, there are already several examples, such as Mitsubishi Heavy Industries, Hitachi and Rockwell International carrying out "actual" military technological collaboration under the rubric of multipurpose technology. Therefore, the MITI position is somewhat understandable.

However, although the United States well understands MITI's intentions, it has not withdrawn its demands for provision of weapons and technology. And the Ministry of Foreign Affairs and the Defense Agency are attempting in some way to answer the demand. Why has this situation occurred?

Military analyst Masateru Tachibana explains this difference as follows: "It is difficult to use consumer technology for military purposes as is. Performance must be greatly improved so that it will withstand operation under difficult conditions and not break down. If we go that far, it becomes purely military technology and this violates the three principles." In other words, America is after more than existing technology. It wants joint development or shared development of improved and new technology based on existing technology.

Japan is weak in systems technology such as that required for rockets and the BADGE system (automatic ari defense warning control system). Therefore, even in joint development or shared development, Japan would mainly handle subsystems such as electronic parts and electronic control devices or peripheral devices for rockets. In any case, there would be no expectation of great advantages for America with only existing technology under the limitations of the three principles.

This fact coincides with the tremendous drop in U.S. military subcontractors. "Creation of a subcontractor base for military technology"--America wants to use Japanese manufactureres as subcontractors through joint development and shared development projects.

However, will the problem end with technology exports? Voices in the Japanese defense industry are asking: "Isn't America asking for actual product (arms) exports?"

Concept of Using Subcontractors: The Japanese Are Watching Developments

"It is essential to avoid dirt in the manufacture of IC's, so employees have to change into sanitary clothing before they enter the work area. However, in America there is a strong feeling that women never take off their shoes except in bed, so it took a year just to get the female employees to remove their shoes." This complaint was voiced by NEC President Sekimoto concerning the IC plant purchased in the United States.

The reduction in American productivity and the decline of modified technology and production technology is spreading into all fields. The American military journal NATIONAL DEFENSE discusses this subject in almost every issue. However, in Japan there are many examples of improving the performance of original American products, such as aircraft manufactured under license from the United States, by replacing most of the old parts. Also, it is reported that American IC's have missing wires or defects in wiring more

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often than in Japanese products. A reason for the desire to use Japanese manufacturers as subcontractors is a scheme to obtain not just advanced technology but production technology and production control technology.

Hajime Karatsu, executive managing director of Matsushita Communications Industry Co Ltd and an expert on production technology, says: "What is truly lacking in the United States, rather than advanced technology, is production technology, modified technology, and production control. Japan's factories have plenty of this." This area seems to be what the United States has its eye on.

However, this technology is inseparably linked with the training and experience of workers in the factory. It is not easy to export technology alone. In that case, we come to the conclusion that the simplest method is to export products (arms) directly.

If this happens, there is a clearer conflict with the three principles. As the United States presses for the provision of military technology, it may be planning a future scenario in which Japan is a subcontracting base for both software (technology) and hardware (arms).

How is Japan going to deal with this? First, let us look at private corporations. They are very calm on the surface. They seem to be watching developments. Mankichi Tateno, chairman of the Japan Arms Industry Association and president of Nippon Steel Works Ltd, comments as follows:

"I do not know what the United States is seeking. I cannot reply while the government is undecided about the three principles on arms. It goes without saying that our duty is to follow government policy. Therefore, if arms (technology) exports to America are allowed, we intend to cooperate appropriately with the United States. Of course, we are business corporations, so we cannot do anything that is not profitable."

The problem is the later stage of "business." Joint development of advanced technology is attractive. From the companies' point of view, whether they are subcontractors or something else, there is no point in not going along as long as the American arms industry is providing the development expenses. Also, when it comes to export of products (arms), much greater profits can be expected than for technology exports.

MITI vs Foreign Ministry and Defense Agency: What Will the Nation Decide?

On the other hand, there are also disadvantages. There is a danger that the United States might grab Japan's specialty technologies, such as computers, optical communications, and robots, in the name of military cooperations and use them for consumer products, thus reducing Japanese competitiveness.

In addition, export of weapons (technology) (even for parts) would bring with it clearer distinctions between friendly countries and enemy countries. If countries opposing the United States decided that "the friends (Japan) of our enemies (the United States) are our enemies," and boycotted the consumer goods that make up the majority of Japanese exports, there would be serious problems.

Because complicated factors of advantage and disadvantage are intertwined, business says: "Nothing is decided, so let us watch quietly."

So what is the government going to do?

The position of the Japanese Government is not simple. When it comes to arms (technology) exports to the United States, MITI, unlike the Foreign Ministry or the Defense Agency, reportedly dislikes taking criticism in the Diet and is unwilling to put exports to America in a separate category. However, the situation is not that simple. MITI is the overseer of industrial policy. It is more aware even than industry itself of the disadvantages feared by industry which might accompany the export of weapons (technology) such as "a boycott of Japanese products by enemies of the United States."

In addition, there is the problem of the position of the "nation." While researching this article, I ran into this view from a military-related source:

"The United States is afraid of Japan becoming a major military power in Asia. If it can create a subcontracting base here for technology and arms, it will know the level reached by Japanese military technology and can easily control it. That is its ultimate aim."

From the American point of view, it would be easier to control Japan if it makes it into a subcontractor.

However, Japan is also a "nation", so while it continues to give importance to its alliance with the United States, it also has a desire to retain a relative degree of independence as an independent country. "That is why MITI is dragging its feet. Even if the Defense Agency is willing to allow exports, it would check each item of technology and arms for appropriateness so that Japan is not placed totally under U.S. control."

The same military source summed it up this way: The industrial freedom of Japan as a nation should be carefully preserved. It seems that MITI, the Ministry of Foreign Affairs, and the Defense Agency all concur on this point. If this is true, even if the three principles were revised, it is difficult to imagine that arms (technology) exports would expand very rapidly. In any case, the issue of the export of arms (technology) presents a difficult choice to the nation.

There Are Many Instances of Japanese Leadership in Recent Exchanges of Advanced Technology with Europe and the United States

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Examples of major technology exchanges (including items under negotiation)

--VTR joint venture between Japan Victor, Thorn EML of Great Britain, and Telefunken of West Germany

--VTR joint venture between Matsushita Electric and Bosch of West Germany

--Request to Mitsubishi Electric from Westinghouse for technological assistance in robots for use in the semiconductor industry

--Joint development of new boiling water nuclear reactor between Toshiba, Hitachi, Tokyo Electric, and GE

--Joint development of pressurized water nuclear reactor between Mitsubishi Heavy Industries and Westinghouse

--Jet engine development (XJB Project) between Ishikawajima-Harima Heavy Industries and Rolls Royce of Great Britain

--Jet passenger aircraft development (YXX Project) between major American aircraft manufacturers and Mitsubishi Heavy Industries and other companies

--Joint development of charcoal-fired boilers between Kawasaki Heavy Industries and Babcock of West Germany

--Cooperation and commercialization of hot water turbine between Mitsui Shipbuilding and Bifuse [phonetic] of the United States

--Information exchange on a small VTR with built-in camera between Sony, Hitachi, Matsushita, etc, and Kodak

--Minifax joint venture between Matsushita Electrical Transmission Equipment and the British Government

--Information exchange on computer and electron exchange technology between NTT and IBM

--Joint development of turbo-charger for use in ships between Ishikawajima-Harima and BBC of Switzerland

--Industrial robot technological assistance from Fujitsu France to Six Hundred of Great Britain

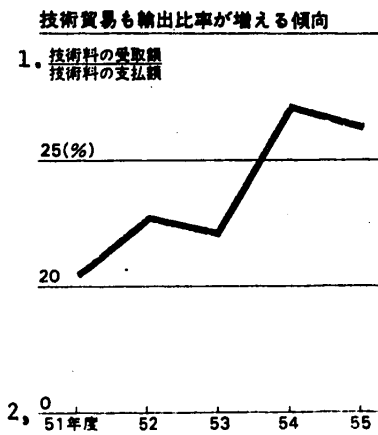
--Technological assistance for industrial robots and semiconductor technology from Hitachi to GE

--Lithium battery technological assistance from Matsushita to Rayovac

--OCR (optical character reader) technological assistance from Nippon electric to Barrows of the United States

--Large computer and semiconductor technological assistance from Fujitsu to ICL of Great Britain

--Technological assistance for ship turbo-charger from Mitsubishi Heavy Industries to GEC of Great Britain



Expanding Trend of Export Rate for Technology Trade

1. receipts of technology fees
payments of technology fees

2. 1976, 1977, 1978, 1979, 1980

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SCIENCE AND TECHNOLOGY

'NIHON KEIZAI' HAILS TOYOTA-GENERAL MOTORS TIE-UP

OW121423 Tokyo NIHON KEIZAI SHIMBUN in Japanese 10 Mar 82 morning edition p 2

[Editorial: "The Strategic Significance of Toyota-GM Tie-Up"]

[Text] The trump card Toyota Motor Company has been holding, just in case it decided to move into the United States, was a business tie-up with General Motors, the world's largest automaker and its foremost rival in the global small-car war. The top leaders of Toyota and GM, namely Presidents Toyota and Smith, have agreed to enter into negotiations on the possibility of jointly manufacturing small cars. Details of the joint venture will be worked out in the future. But, according to the general idea, the two automakers will set up a joint company to produce as many as 500,000 small cars by using small car technology developed by Toyota.

GM and Toyota rank first and second, respectively, in the world's auto industry. Judging from their size, naturally the U.S. antitrust laws will be the greatest hurdle the two auto giants have to surmount in effecting the proposed tie-up. Nevertheless, Toyota's decision is most opportune in view of the present acute economic friction between Japan and the United States. Since the decision will go a long way towards defusing tension, we support it and hope that coming negotiations will proceed smoothly.

When realized, the tie-up will be unprecedented in industrial history in its scale and impact. It will pose a threat to all automakers at home and abroad. It will also have a crucial impact on the reorganization of the world's automobile industry currently under way in the middle of the small car war and on the new auto industry map which will emerge in the wake of that reorganization.

More importantly, the tie-up has great strategic significance in coping with the Japan-U.S. automobile issue in the future. In retrospect, before Japan-U.S. friction increased over the automobile issue, the United States had strongly urged Toyota to build a factory on her soil. Thus how fast Toyota would respond to this call was regarded as the key to settling the complicated auto issue. Once there was an idea of jointly producing cars with Ford. But Toyota maintained a cautious approach to the question of building a plant in the United States. But now it has opted to tie-up with GM. This decision has been partly promoted by the fact that auto exports to the United States have dropped since the imposition of self-restraints, making it clear that there is a limit to car

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exports. Aside from this background, Toyota's decision to respond to the request for building a plant in the United States is in itself of great significance.

It is also important that the tie-up will practically take the form of technical assistance provided by Toyota, thus being in the nature of industrial cooperation in reviving the U.S. auto industry. At present, negotiations are under way to limit auto exports to the United States to approximately 1.68 million in the second year of self-imposed restraint beginning in April, or the same level as this year. Despite this and other measures, the U.S. auto industry has not yet recovered from its slump.

GM is no exception in this regard, despite being the first among the big three to embark on small car development. J-car sales are not so good either--the J-car made its debut last year as a full rival of Japanese small cars. This indicates that it is not so easy, even for such a giant as GM, to complete a production system in the small car field in which it has little experience. In joint production with Toyota, GM aims at that particular class of small car which it has never undertaken to produce. Thus the projected joint production, as a typical mode of industrial cooperation, will be helpful in hastening GM's recovery.

Some time ago, GM made capital-participation in Suzuki Motor Company in reversal of its small car strategy and adopted a plan to receive small car supplies from Suzuki. Joint auto production with Toyota is in addition to this. Emerging from all this is a new division of labor, centering around GM, with Japanese firms charged with the production of the class of cars smaller than the J-car. Establishment of this kind of division points to the direction in which Japan-U.S. auto trade will be stabilized in the future. Toyota's strategy to move into the United States following that direction may well be said to be another judicious decision.

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SCIENCE AND TECHNOLOGY

JAPAN TO PROPOSE JOINT RESEARCH PROJECTS

OW011206 Tokyo MAINICHI DAILY NEWS in English 31 Mar 82 p 5

[Text] Minister of International Trade and Industry Shintaro Abe Tuesday reported to Prime Minister Zenko Zuzuki Miti's draft plan for the Japanese delegation's proposal at the Versailles summit in early June.

Miti's tentative plan, though broad, places the emphasis on a proposal for nine joint research and development projects with other summit countries in such high-technology areas as robotics, communications satellite launching, and integrated digital and fiber-optic communications networks.

By taking the initiative in such joint R&D projects at the Versailles summit, Miti hopes that Japan will be able to make a positive contribution to the alleviation of the persisting friction with other industrialized countries and fend off harsh criticism from summitteers, as well as demonstrate that Japan is playing the role of a powerhouse of the world economy.

Miti is working on the plan so as to spare Japan from total isolation at the Versailles meeting, since Japan alone has been running a lopsided surplus in trade with most other summit member countries.

Minister Abe advanced a joint R&D proposal at the trilateral trade forum in Key Biscayne, Florida, in January. The European economic community has been asking Japan to take such initiatives for the past year or so.

Under the draft plan, participating countries are to pool a fund for 8-to-10 year-long joint projects. Japan will, Miti envisions, make a contribution of 50-100 billion yen to each of the agreed-upon projects.

In the communications satellite area, a Japan-U.S.-Europe group or a Japan-Europe group will launch satellites primarily for broadcasting educational programming to developing countries: The launching itself will be undertaken by the U.S. or Europe while Japan is to provide the needed communications systems, especially receivers and programming.

In the communications network area, Miti plans joint development of integrated digital/fiber-optic networks which are similar to the information network system (INS) being developed by the Japan Telegraph and Telephone Public Corp (NTT).

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SCIENCE AND TECHNOLOGY

JAPAN EYES SATELLITE BROADCASTING IN 1990'S

OW221305 Tokyo ASAHI EVENING NEWS in English 22 Mar 82 p 3

[Text] In the report the study and research council on the diversification of broadcasting submitted on Friday to Posts and Telecommunications Minister Noboru Minowa, it says that people will be able to enjoy television broadcasts using broadcasting satellites in the 1990's.

Broadcasting satellites will make it possible for people to enjoy TV programs that are as clear as movies, the high-fidelity reproduction of music, and to receive, by means of a facsimile machine, hundreds of thousands of pages in just 30 seconds, as well as still images with sound.

The report called for studies on technical developments, the establishment of technical standards, the benefits to listeners and the economic feasibility of such broadcasts.

The council was established within the Posts and Telecommunications Ministry in July 1980 and consists of 15 professors, journalists, researchers and critics. They studied demand trends, technical developments and problems connected with future broadcasting policy.

The report submitted Friday to Minowa consisted of three parts: (1) trends toward diversification in the broadcasting field; (2) outlook for and problems of broadcasting policy; and (3) proposals.

Symbolic of the whole is satellite broadcasting, which will begin with the practical broadcasting satellite (BS-2) to be launched in March 1984. There will be color broadcasts on two channels; both channels will be used for NHK broadcasts to remote islands and mountainous areas, where the reception of ordinary broadcasts is poor, and during disasters.

Later two satellites, BS-3 and BS-4, will be launched to make available eight channels under an international agreement. Users can receive broadcasts anywhere in Japan if they turn a bowl antenna one meter in diameter toward the point where longitude 110 degrees east crosses the equator.

The problem is economic feasibility. If the advertising charge system is adopted, the NHK channels will compete with commercial broadcasting stations. The report proposes that the broadcasting waves be encoded and that listeners buy magnetic cards each month or insert into decoders. The proposals are, in effect, for pay television. The report says that such broadcasts will be economically feasible if 10 million people buy the pay TV receiving cards.

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SCIENCE AND TECHNOLOGY

ELECTRONICS FIRMS TO BOOST PLANT EXPENDITURES

OW271407 Tokyo the DAILY YOMIURI in English 26 Mar 82 p 4

[Text] According to latest investment forecasts made available to Kyodo news service, six major semiconductor firms expected to spend at least record 160 billion yen (\$653 million) in the new fiscal year starting 1 April.

That figure will bring to at least 430 billion yen (\$1.7 billion) industry expenditure on plant and equipment between fiscal 1980 and 1982.

"We will lose out to our rivals if we fail to make proper plant and equipment investment," one senior company official said.

Nippon Electric Company, the industry leaders, will increase its investment to 40 billion yen in the forthcoming fiscal year against 38 billion yen in the current fiscal year 1981.

Hitachi, Ltd plans to raise investment by 7 billion yen to 35 billion yen while Toshiba Corporation will increase investment by 50 percent to 30 billion yen.

Fujitsu, Ltd and Mitsubishi Electric Corporation have refused to disclose the amount of investment this year, although it appears certain to be more than current spending of 34 billion yen and 14.8 billion yen, respectively.

New investment by OKI Electric Industry Company in the new fiscal year will be limited following the completion of a huge investment program in Miyazaki, Kyushu.

The ensuing battle over plant and investment in the Japanese semiconductor industry is partly reflective of the country's dominance in the market of 64 kilobit ram (random access memory) components.

Current plans call for the six leading semiconductor makers to achieve a monthly production of one million 64k rams to meet strong U.S. demand.

Nippon Electric and Toshiba however, are starting construction of plants capable of producing a 256k ram which can store 4 times more information.

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Hitachi and Fujitsu are considering acquiring land for similar plants.

A major feature of their new investment programs is a shift of production sites from Kyushu to Honshu and Hokkaido.

Nippon Electric is now building a 27 billion yen plant in Kanagawa and plans to build a 5 billion yen plant in Akita-ken starting this summer.

Toshiba also has plans to start work on a 10 billion yen plant in Kanagawa-ken.

Fujitsu has secured a plant site in Miyagi-ken, while Hitachi is discussing construction plans with the city of Chitose in Hokkaido.

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SCIENCE AND TECHNOLOGY

DIVISION OF SUPER COMPUTER R&D EFFORT DECIDED

Tokyo NIHON KOGYO SHIMBUN in Japanese 9 Feb 82 p 9

[Text] JJ by Fujitsu, Hitachi, and Nippon Electric

Parallel Processing System--To Be Decided in FY-83

The technical research association of high-speed computation systems for science and technology (director: T. Yamamoto, president of Fujitsu) recently set the FY-81 assignments for supercomputer technical research among the six member corporations and began research. Each corporation is focusing on research in its respective specialized field, but the parallel processing system was assigned as collaborative research for the six firms. According to the Agency of Industrial Science and Technology, the policy, as a rule, is to release the research results to foreign firms as well.

Supercomputer research is the assignment for the Electrotechnical Laboratory and for the association. The FY-81 research project for the Electrotechnical Laboratory includes the niobium Josephson junction (JJ) device, the gallium arsenide field effect transistor (GaAsFET), and the parallel processing system; whereas the private sector association was assigned the lead JJ device, the high-speed electron movement transistor device (HEMT), GaAsFET integration, and the parallel processing system.

The assignments for the six firms are: the JJ device for Fujitsu, Hitachi, and Nippon Electric; HEMT for Fujitsu and Oki Electric; GaAs for Toshiba, Nippon Electric, Mitsubishi Electric, and Hitachi respectively; and the six firms will work collaboratively on research on the parallel processing system in which multiple basic processors are simultaneously operated. These research projects are expected to continue through FY-82 (in the government's budget proposal, 117 million yen for the Electrotechnical Laboratory, and 696 million yen for the private sector, totalling 813 million yen) with the same assignments. However, regarding GaAs, the Agency of Industrial Science and Technology states that due to the high research level of the private sector, the weight of the future research assignment may shift more heavily onto the private sector.

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In supercomputer development, the decision for a parallel processing system is very important, along with research on a high-speed logic device and a high-speed memory device. However, the Agency of Industrial Science and Technology expects that a decision on the processing system will not be made until FY-83. At that stage, the six firms will be assigned architecture and software development.

The research results obtained in this project up to 1989 will all revert to the government. However, the government believes it is important that these industrial properties and knowhow be transferred to the private sector as much as possible and plans to popularize them through the Association for the Promotion of Industrial Technology. The Agency of Industrial Science and Technology states that as a rule, foreign firms are not discriminated against; however, in that case, whether or not to treat them on the same level as Japanese firms is an industrial policy issue.

A supercomputer is a system for large-scale, high-speed computation such as high-speed processing of satellite images, simulation of a nuclear fusion reactor, meteorological analyses, etc. The goal is to develop a system with the capacity of above 10 BFLOPS (10 billion floating point arithmetic per second). The duration of the research and development is 9 years, from FY-81 (3 months) until 1989, and an R&D fund of 31 billion yen is scheduled.

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SCIENCE AND TECHNOLOGY

RESEARCHERS DEVELOP ANTINEUTRON FIBER

OW051445 Tokyo ASAHI EVENING NEWS in English 3 Apr 82 p 3

[Text] An epoch-making synthetic fiber which can effectively stop neutron rays has been developed in joint research by Kyoto University's Nuclear Reactor Experimental Laboratory and Toray's Fiber Research Institute.

This fiber is made by enclosing a special powder that absorbs neutrons inside the small fibers. Cloth made from this synthetic fiber can be used to protect unaffected parts when a patient is undergoing neutron ray treatment.

Also, depending on the way it is used, it can be effective to some extent as protective clothing against neutron rays from nuclear bombs.

There is the possibility of large orders for this new synthetic fiber from countries which are worried about nuclear attacks.

This fiber was developed by Keiji Kanda, assistant professor at Kyoto University, Shigehiro Ouchi, chief Toray researcher, and others in three years of research and experiments. A patent has been applied for in connection with its use in cancer therapy.

A report on the new fiber was made by Toru Furubayashi of Kyoto University's Nuclear Reactor Experimental Laboratory Friday at the annual meeting of the Japan Nuclear Energy Society in the Engineering Department of Osaka University.

The cloths experimentally made by Toray are a woven white cloth and a knitted black cloth which contain lithium fluoride in powder form and boron carbide in powder form, respectively. The fact that both lithium and boron absorb neutrons was utilized.

The lithium has been enriched so that the proportion of lithium 6, which is the isotope with the highest neutron absorption rate, contained in it has been raised from the 7.5 percent in natural lithium to 95 or 96 percent.

The yarn used to make the cloth is 0.03 millimeter in diameter, but 40 percent of the weight of the yarn consists of neutron-absorbing powder. The main material used in making the fiber is polyethylene, but other details have not been revealed because they are trade secrets.

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Kanda would like to use the cloth made from fiber containing lithium to protect surrounding areas when conducting the neutron treatment of brain tumors.

Because it can be easily woven into cloth, there is the possibility that it can be used for protective clothing against neutron rays from nuclear bombs. Kanda believes that such protective clothing may not be too effective against neutron rays from neutron bombs, but may be effective to some extent against neutron rays from atomic bombs.

But such protective clothing would be powerless against gamma rays, so it would have to be worn inside buildings and shelters.

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SCIENCE AND TECHNOLOGY

NEW DEVELOPMENTS IN VARIOUS KINDS OF SENSORS DESCRIBED

Intelligent Sensor

Tokyo NIHON KEIZAI SHIMBUN in Japanese 18 Feb 82 p 8

[Text] Sharp has incorporated a signal treatment circuit in one section of the presently available optical sensor (sensor) to develop an intelligent sensor, and this product has been designated "OPIC" and will be produced by the company starting this spring. The optical sensor is a vital unit widely used with industrial robots and various NC (numerical control) machinery, but the company, riding on the wave of the popularity of mechatronics (electronization of machines), is sensing a sharp rise in demand for intelligent sensors to replace the former sensors used in this area. It is said that in the United States, GE (General Electric) and TI (Texas Instruments) are pushing plans to develop and market intelligent sensors as part of their coming strategic products, and Sharp's entry into this field has spurred the development race among domestic and foreign companies.

The acronym OPIC coined by Sharp is a synthesis of optics (science of light) and IC (integrated circuits). This is an instrument in which amplification circuits and constant voltage circuits have been incorporated into the former optical sensor to give it a signal treatment capability, and the various functions have been integrated into a single product.

An "OPIC converted photcamera," which is a pairing of an already developed light emitting section and a light receptor section and detects the presence and transit of items, and an "OPIC converted photointerrupter" containing logic circuits were developed, and sample shipments to users have been initiated. The production line at the Tenri plant (Nara Prefecture) is being expanded, and the company plans to initiate monthly production of 50,000 units by the middle of March. The company further plans to double production by next year to a pace of 100,000 units per month.

The company also plans to convert multifunctional-type solid state relays, sensors for optical fiber use, and color sensors to OPIC form, and it plans to introduce these products to the market successively during the next half year.

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Expansions are also being made into areas other than optical sensors including temperature sensors "EMIC" (provisional name) and gas sensors "GASIC" (provisional name) in a policy intended to apply intelligent capability to all types of sensors presently sold under the name "...IC."

The intelligent sensor is a strategic product on which the large semiconductor makers both domestic and foreign have just started research and development. It is considered that for an industrial robot to acquire the degree of intelligence it needs, it must be provided with sensors which have the capability of duplicating the role of human nerves in sensing external stimuli and transmitting the information to the brain. Where the present sensors can only sense light or sound, the newer sensors will incorporate the capabilities of a microcomputer and consolidate all of its functions on a single base plate, according to present plans. In this sense, the Sharp OPIC is the first step toward the intelligent sensor.

In Japan, Yamatake-Honeywell announced plans to engage in active development of "intelligent sensors" together with the Honeywell company of the United States, and there is good possibility that the frontline battles between the various companies will quickly intensify.

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Thermal Sensor

Tokyo NIKKEI SANGYO SHIMBUN in Japanese 6 Mar 82 p 1

[Text] Urawa--Shibaura Denshi Seisakusho (main plant, Urawa-shi, Saitama-ken; president, Kenzo Kitamura; capitalization, 150 million yen) in cooperation with Kyoto Ceramics has succeeded in the development of a temperature sensor (sensor) which combines a fine (high densification) ceramic with a semiconductor element. Mass production will be started soon. Great thermal shock strength and a rapid thermosensitive response rate are some of its features, and this company will continue joint research with Kyoto Ceramics to couple this sensor with micons and engage in other application technology. It plans to expand application to a wide market area, including industrial-use air-conditioners, office equipment, and then response sensors for industrial-use robots.

Development of Intelligent Robot Market

This new type sensor is called a "neothermy" sensor, which is a combination of the thermister (variable thermal resistance semiconductor) element which is Shibaura Denshi's forte and fine ceramics, and the highlight of this development is the technology to match the thermal expansion coefficients of the constituent materials of the thermosensitive section. Since the sensitive sections is sheathed in ceramic, there is great strength with regard to both thermal and mechanical shocks. Its response speed as a sensor is 0.2-1 second, and its thermosensitive range is from -5 to 450°--far beyond the capabilities of previous sensors. The company has applied for patents in Japan, the United States, the United Kingdom, France, Italy and Switzerland.

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At the same time, a process has been developed to produce this sensor whereby intrafurnace operations result in a quasifinished product. Where former sensor production was plagued with lengthy finishing and assembly operations, mass production advantages can be realized by this process for neothermy, and it is said that Shibaura Denship plans to market the product at the low price of 300-350 yen. Test production of the product is under way at the company's main plant in Machitani, Urawa-shi; production line expansion is under way at its daughter company, Tohoku Shibaura Denshi (main office, Tazawako-machi, Akita-ken; president, Kenzo Kitamura; capitalization, 20 million yen); and production at the plant is expected to begin in earnest in April-May.

The policy will be for Shibaura Denshi to be in charge of running the business and sales; sales of 200 million yen are anticipated for the next several years. The patent rights with Kyoto Ceramics will be decided by coordination between the two companies, and they plan to reinforce exchange in technological areas from here on to develop applied technology and cater to customer's needs. Kyoto Ceramics is a ceramic company and as such has been test producing ceramic production engines, and Shibaura Denshi has been complementing this by conducting research on sensors to be used with these engines.

First Salvo in the Cooperative Battle

Shibaura Denshi is a master specialty maker which does a business of 3 billion yen per year centered on temperature sensors. There is the uneasy situation that the temperature sensor market is expected to grow at the rate of 30-40 percent each year, and this is prompting large makers such as Hitachi Limited, Matsushita Electronic Parts, and TDK Electronics to move into this field. In order to cope with the entry of these large adversaries into this area, Shibaura Denshi plans to "strengthen cooperative efforts with leading industries in dissimilar areas" (President Kitamura), and the cooperative effort with Kyoto Ceramics is the first salvo in this battle.

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Visual Sensor

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 9 Mar 82 p 9

[Text] Fujitsu Fanuc (Seizaemon Inaba, president) has developed a "position adjustment sensor" with visual capabilities and will soon offer this sensor as an option with its industrial-use robots. This unit is intended to serve the role of "eyes" and accurately determine various work positions whose aim is installation on machine parts assembly robots such as the "A series," or the "S series" spray robot to prevent erratic operation of these robots. The company is expected to use this unit for the assembly robot at the unmanned motor plant which is expected to be completed this spring at its Yamanashiken site and claims this will aid in completely unmanned operation at night.

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Since November last year, the company has been selling the "S series" spray robot, which can be used to remove the turnings and other waste formed during machine finishing, apply paint, and apply sealing (joint painting). This unit is a combination of a joint type and a cylindrical coordinate type, and the positioning precision is a high ± 0.5 millimeter. Because of the need to spray paint or oil on the intended surface or machinery with greater precision, the company had been looking toward a robot endowed with visual capability.

In another direction, the company started sales last September of its "A series" robot to be used for assembly purposes. This robot uses cylindrical coordinates, and it can be combined with the "M series" robot already in use to form an "assembly cell" which is well suited for tightening screws and fitting parts together. Fitting operations which are difficult to perform manually or tightening of bolts can be performed at the very high precision of ± 0.05 mm, indicating the great emphasis placed on precision positioning. However, on rare occasions when the work position may be very slightly offline or the angle may be slightly off, a bolt cannot be started and this causes the work to stop. During the day, working personnel can rectify the situation, but at night it is necessary to provide the robot with "eyes" if the work is to proceed in an unmanned operation, and the "position adjustment sensor" was developed to fill this need. In other words, this is the same as a so-called monitoring system for night-time use.

This sensor is made up of an ITV (industrial television camera) video sensor installed on a robot; it accurately reads the work position as it detects any deviation and corrects the position. The hardware for the sensor is mostly supplied from other companies, but the software for the system was developed independently by this company. The company plans to exhibit a robot equipped with a "position adjustment sensor" at the international machine tool exhibition to be held in Osaka about the end of October.

The company further plans to use sensor equipped assembly robots at the motor plant presently under construction next to the Fuji plant in Yamanashi-ken. This plant will "produce motors with robots from fabrication to assembly" and will be solely for the production of controller motors. The assembly will be handled by 47 robots, and an assembly cell will consist of one "M series" finishing robot and three "A series" assembly robots to which one sensor will be provided. A "position adjustment sensor" will be provided for each of the roughly 20 robots which will be used to perform the most difficult task of passing through long bolts. It appears that the production site will come one step closer to unmanned status with this sensor development.

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SCIENCE AND TECHNOLOGY

RECENT ACTIVITIES OF KOMATSU FORKLIFT, KOMATSU LTD REPORTED

Development of New Forklift

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 6 Feb 82 p 7

[Text] Transport Machinery and Transportation: Uncover Forklift Demand; Komatsu Forklift To Mobilize the Entire Group

In order to uncover the overall demand for forklifts, Komatsu Forklift Co Ltd (president, Takesaku Wada) has consolidated a structure to positively engage in new operations while emphasizing the development of new types of forklifts and attachments. This measure is intended to stop the trend of decline in domestic demand for forklifts since the latter half of last year. As "the diversification of forklifts is still lagging," (President Wada) the company will consolidate the "mechatro-forklift" and attachment, which is a blind spot. In order to do this, the entire group, including its dealers and subcontractors, has been developing a "roller" strategy to uncover new ideas. In addition, it has newly established a Survey and Development Division which will be in charge of launching into promising operations.

Development of New Products and Attachments: A Survey and Development Division Established to Invite New Ideas

Last year, the domestic demand for forklifts was about 46,000 units, a decline of about 18 percent from the previous year. This reflected an inactive domestic market; however, Komatsu thinks there is no use sighing over this sluggish demand.

According to Komatsu Forklift, forklifts still fall behind in terms of taking carefully thought out measures to meet the market demand. In other words, "since the area of application of forklifts is broadening, we must supply products and attachments which are easily used in the respective areas" (President Wada).

For this reason, during the month of February, Komatsu is conducting a campaign to invite ideas involving not only its headquarters and branches but also its dealers and subcontractors. This is a campaign in which each division will submit opinions reflecting the normal standpoint of the division. The principle of this is to intensively incorporate all requests from the users into a roller strategy.

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The ideas span a wide range including improvement of forklifts, shovels, and attachments and incorporation of new technologies and materials into the current line of products. For example, a forklift will be equipped with a micro-computer and sensor mechanism, thereby realizing a "mechatro-forklift" which is capable of stacking high loads, which was formerly accomplished uncertainly by the naked eye of an operator.

In addition, the company welcomes ideas unrelated to the concept of the forklifts and shovels which the company handles. In connection with the move into this promising area, the Survey and Development Division headed by Director Yutaka Koizumi was newly created. The company is currently constructing a clear system in terms of organization.

This is the first attempt by the company to involve the entire Komatsu Forklift in a project. The company says: "There is a great deal of potential demand, such as the replacement of manual operation by forklifts. We can still increase the number of users by uncovering areas which were formerly overlooked." (President Wada)

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Strong Business Performance

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 8 Feb 82 p 12

[Text] Indifferent to the "Construction Machinery Recession," Komatsu Demonstrated Strong Business Performance, Again Recorded Increased Earnings and Profits During the Previous Period, Outrivaling Pinched Fellow Companies.

There is a theory that "during recession, the top manufacturer of an industry becomes strong." It seems that this has again been proven in the construction machinery industry. Needless to say, this refers to Komatsu Ltd (president, Ryoichi Kawai).

The company's settlement month is December. Definite figures have not been computed for the time being, but it appears that last year's (the 112th term) figures are nearly firm at 567.4 billion yen for sales, 58.5 billion yen for ordinary profits, and 27.2 billion yen for profits after tax. These figures, of course, indicate an increase in earnings and profits by a great margin compared with the business performance of FY-80, again demonstrating the strength of the company.

Even among the listed companies, those whose ordinary profit in proportion to sales exceeds 10 percent are quite rare. Approximately 90 percent of Komatsu's total sales belong to construction machinery, for which the demand has been sluggish since the latter half of last year. The business is in such bad shape that the oil pressure shovel, a representative piece of equipment, demonstrated a double-digit decline in shipments last year.

Naturally, many construction machinery manufacturers have been driven to a decrease in profits even though they have managed to secure sales to some extent.

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Usually, with a slowdown in demand comes a fierce beating down of prices on the sales front. In the case of oil pressure shovels, some sigh, "the price per weight is lower than that of baked potatoes!"

With such a situation, the reason behind Komatsu's outstanding achievement is found solely in the activities of its export department.

The details of sales are: domestic sales recorded about 261.5 billion yen, or a decline of 14.4 billion yen from the previous year; exports, on the other hand, increased by as much as some 76.9 billion yen, recording 305.9 billion yen. It appears that the proportion of exports reached as high as 54 percent. This has become the basis for realizing an increase in both earnings and profits which is greatly envied by other companies of the industry.

It is true that exports and domestic demand are both wheels of the same vehicle. Even if domestic demand has declined, such products as bulldozers, oil pressure shovels, and motor graders are still strong, and even with respect to oil pressure shovels, which have thus far been regarded as relatively weak, "we established a lead of 2,000 units more than the second ranking manufacturer in Japan last year." Concerning dump trucks, it can be said that they are a monopoly of Komatsu.

Accordingly, although a bad business environment exists, Komatsu has secured a certain quantitative market share and increased production volume through an export drive. Thus, it has realized a cost reduction; this, however, was possible due to the enormous strength of its sales force. In fact, Komatsu has long engaged in building up an overseas sales network in order to export bulldozers. It is unique in this respect because much of the construction machinery industry has seriously begun to engage in exports only since sometime last year. Of course in terms of a domestic network, too, Komatsu is far ahead of other companies.

On the other hand, in terms of production, Komatsu boasts that "if we manufacture the same product, our company is capable of manufacturing it cheaper than others." This is the primary factor in producing profits. Indeed, the company's passion for total quality control (TQC) is tremendous; and this may be the foundation of its confidence.

Komatsu has been running smoothly, but it is taking aim at the Caterpillar Company of the United States. Recently, everywhere in the company opinions reflecting consciousness of Caterpillar have been expressed. It is also true that the Caterpillar Company is aware of Komatsu.

It is recently acknowledged that Caterpillar is the king of world construction machinery, and the fact that the latter regards Komatsu as its rival in itself speaks of the growth of Komatsu. Komatsu has shown no sign of letting out the reins; it is concentrating on challenge alone.

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Expansion of Machinery Production

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 16 Feb 82 p 12

[Text] Machinery and Tools: Komatsu Ltd To Expand Industrial Machinery Division Extensively; Aiming at 100 Billion Yen or a 2.5-fold Increase in 3 Years

Komatsu Ltd (president, Ryoichi Kawai) intends to aim at an increase in the sales of the Industrial Machinery Division from the present approximately 40 billion yen to the 100-billion-yen mark in 3 years and, further, to 130 billion yen in 5 years. This plan is part of the company's new policy to expand its Nonconstruction Machinery Division in order to break away from the one-sided emphasis on its Construction Machinery Division, which is responsible for approximately 90 percent of the total sales of 567.7 billion yen. The company's operation planning room, which takes the initiative in launching into new operations, will make a maximum effort for smooth operations in industrial robots, collection of sea sand, and an engine-driven air conditioning system, which have been put on the market since last year. As a project of the entire Komatsu group, it plans to expand those operations with high potential for use of amorphous technology, too.

Industrial Robots and Semiconductors To Be Nurtured in Order To Correct Distorted Structure Stressing Construction Machinery

Last year, business was good for Komatsu Ltd, which reached the 560-billion-yen mark in sales, a 12-percent increase, and which secured 58.5 billion yen in ordinary profits. Of these sales, about 90 percent pertained to construction machinery such as bulldozers, oil pressure shovels, motor graders and dump trucks.

In addition, the company has an Industrial Machinery Division which had sales of approximately 40 billion yen last year. It also had annual sales of approximately 10 billion yen in shells and self-propelled artillery consigned to the Defense Agency, and about a 10-billion-yen business performance in outside sales of single-engine units. All these combined, however, amount to only about 60 billion yen, or a little over 10 percent of the total sales.

The expansion of the Industrial Machinery Division is intended to correct such distorted stress on construction machinery. "We will of course aim at balanced expansion while developing the Construction Machinery Division. For this reason, the composition ratio of the Industrial Machinery Division, which accounts for total sales, may not change drastically; we would like to actively engage in this project as our policy to expand nonconstruction machinery." (Managing Director Munemitsu Yamada)

More specifically, it plans to increase the sales of the Industrial Machinery Division from the present approximately 40 billion yen to 100 billion yen in FY-84, 3 years from now. In order to do so, along with realizing the current major items such as the large automobile press, the medium and small-size general press, and machine tools, it intends to achieve a smooth operation in industrial robots (arc welding), a sea sand collecting system, and a diesel engine-driven air conditioning system, which were all put on the market since the end of last year.

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Furthermore, in 5 years the company plans to more than triple the present scale by achieving 130 billion yen in sales. "In order to do this, however, the entire company will be involved in the new operation."

This Nonconstruction Machinery Division is being expanded by the entire force of the Komatsu group. It also intends to positively nurture amorphous technology and metallic silicon, the development of which is underway by its affiliates.

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