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Report Memorandum #05-06

This report briefly summarizes METI's Interim Report on Robot Policy compiled by the Robot Policy Study Committee in May 2005. The summary translation was made by Ms. Kazuko Shinohara (kshinoha@nsf.gov). (Note: METI: Ministry of Economy, Trade and Industry)

METI's Robot-related Projects
As of October 20, 2005

1. Robot-related Projects

(1-1) Commercialization of Next-generation Robots
Total budgets: Yen 4.13 billion (ca. $36 million) for JFY2004-2005

1. Purpose: To commercialize robots to be used for welfare

To obtain people's awareness of prototype robots

2. Outline: Nine robots to be commercialized and 65 prototype robots were demonstrated at Aichi Expo during March-September 2005

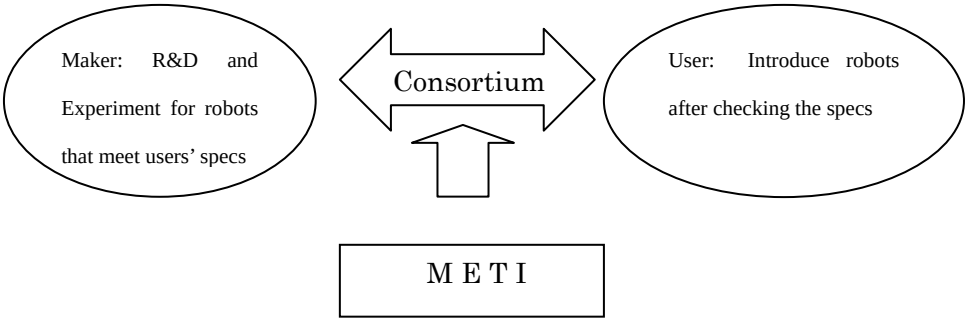
3. Robots to be commercialized:

Cleaning: Matsushia Electric: Sweepy
Fuji Heavy Ind.: Subaru Robo Heighter
Guard: ALSOK: Guard Robo
Temzak: Mujiro
Customer Service: Mitsubishi Heady Ind: Wakamaru
Advanced Media: Heart Actoroid
Intelligent Wheelchair: Aisin/Fujitsu: TAO Aicle
Child Care: NEC: PaPeRo

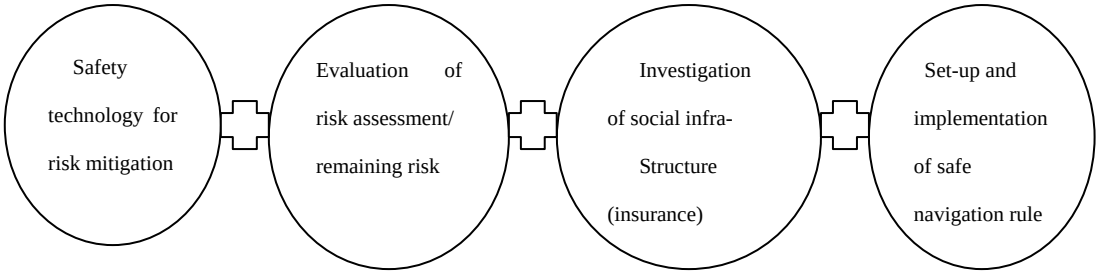
(1-2) Support for Creating Service Robot Market
JFY2006 budget: Yen 420 million (ca. $3.6 million)
Project duration: 2006-2007

1. Purpose:
To support R&D on safety of robots and implementation of model cases
To support the first step for creating service robot market

2. Outline:
(1) Consortium consisting of makers and users: R&D and experiments based on discussions on specifications and evaluation of costs



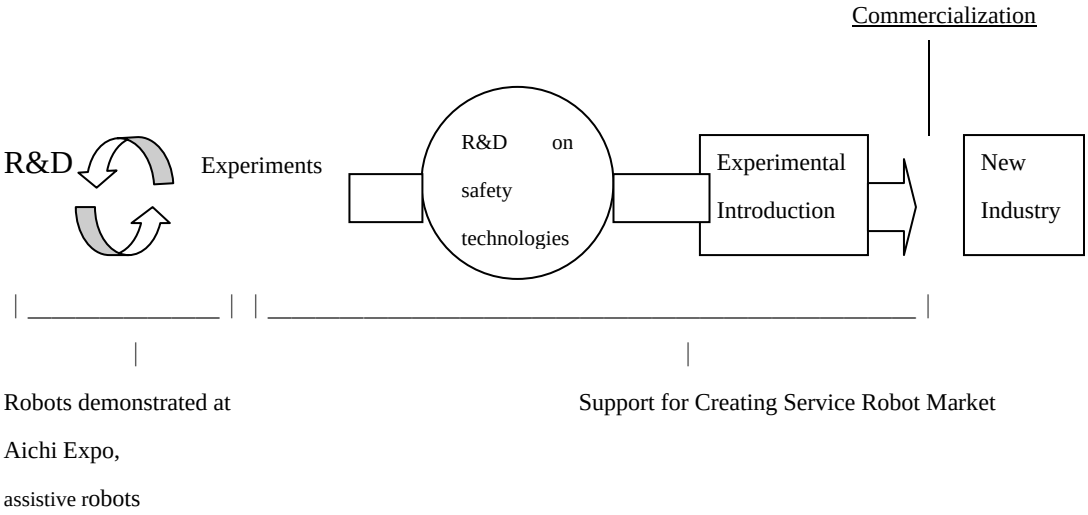
(2) R&D on consistent safety from manufacturing through operation



(3) R&D on durability, reliability, stability control, and navigation technology

(4) Improvement of environment for robot market

3. Flow for Creating New Industry for Service Robots:



Issues:

(1) Guard always need to be attended for security purpose: not practical

(2) R&D is needed on durability, reliability, and safety

(3) Demonstrations are held without users, which makes the specs that meet the users unclear.
(4) Users request more than enough specifications, which causes too much burden to users.

Approaches:

- To establish methods to verify the safety of robots
- Joint work by users and makers to analyze the specifications required for commercialization of robots and the environments surrounding robots

4. Proved (or Experimented) Robots and Users

Cleaning Robots Office Bldg.,Park	Transportation Robots Intra-bldg. Mail delivery	Guard/Guide Robots Shopping Ctr. Hospitals

Maintenance Robots Plant factory maintenance	Rescue/Disaster Prevention Robots Search of life at disaster	Under house floor Inspection Water/sewage maintenance	Other Robots

(1-3) Strategic R&D for Frontier Robots with Missions
JFY2006 budget: Yen 1.54 billion (ca. $13 million)
(New, Contract research)
Project: JFY2006-2010

1. Purpose:
To establish missions to be performed by robots in BtoB and BtoC fields
To apply Robot Technologies to other fields (Automobile, E-life)
(B: Business; C: Customer)

2. Outline: (1) To establish missions that are challenge for robots
(2) To come up with specifications to attain the missions
(3) Solicitation and selection of R&D performers

(4) Specifications to be checked after completion of projects

3. Missions and required R&D

Field	Mission (example)	Major Field	Required R&D
Service Robot	House keeping	Sensing	-3-D distance sensor -Sense of touch sensor -Human behavior data mining technology -Advanced recognition technology
		Communication	-Facial expressions-Voice composition technology -User behavior recognition in specified environment
Next-generation Industrial Robot	Robots that work together with human beings in assembly lines (e.g., automobile assembly line)	Safe driving	-Self analyses/self repair -safety soft actuator
		High-speed media processing	-Algorithm for high-speed three-dimensional view and sound source orientation
Robot in special environment	Speedy support robot in dangerous areas	High-speed driving High-speed moving	-Speedy actuator -High-speed high efficiency CVT -Artificial muscle -Dynamic obstacle avoidance structure
		To meet the environment	-Dust-free/anti-radiation structure for robot parts junctions

R&D on parts that are required for and common to next-generation robots

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Application of the technologies to other products (automobile, e-life) than robots

(1-4) Commercialization of Assistive Robots

JFY2006 budget: Yen 900 million (ca. $7.8 million)

Project duration: JFY2005-2007

1. Purpose:
Welfare robots that require advanced safety and flexibility in the movement

2. Outline: (1) Rehabilitation-assist robot
(2) Standing-up and walking-assist robot
(3) Bathroom and getting-up-from-bed assist robot

Users are required to be involved from the early stage of R&D.

(1-5) Basic Technologies Common to Next Generation Robots
JFY2006 budget: Yen 400 million (ca. $3.5 million)
Project duration: JFY2005-2007

1. Purpose: Basic technologies required for modulation of basic parts that are prerequisite for developing robots and for common interface that connects parts and systems

2. Outline:
(1) To disassemble the basic unit into three parts (eyes, ears, and arms & legs) and let each part have autonomy; R&D on both hardware and software, taking standardization into consideration

(2) To process the information obtained from each part and develop robot device and software that become interface to expedite the transmission of the information, which will promote modulation of parts into robot industry

2. Robot-related Tax and Financial Investments

(2-1) Loan from the Development Bank of Japan (DBJ)

DBJ offers low interest rates for loans by the user companies of service robots (cleaning, guard, welfare) when they purchase robots as follows:

Business	Interest rate	Loan interest rate
1., 2., and 3. that fulfills A and B 1. Business that produces new products or offers new service 2. Business that improves the method of production or sales by its own unique technologies or know-how 3. R&D after commercialization to implement 1. and 2. above A: High Level: Equivalent to patent B: Uniqueness: To be recognized as unique in the market	Policy Interest Rate II or III (*1)	40% or 50% (*2)

*1: If the business is in one of the following fields (seven priority fields for creating new industry: METI's strategy) and new and expected to have employment opportunities, Policy Interest Rate III and Loan Interest Rate of 50% are applied.
(1) fuel cell, (2) e-life, (3) robot, (4) contents, (5) welfare/service, (6) environment/energy/service, (7) business support service

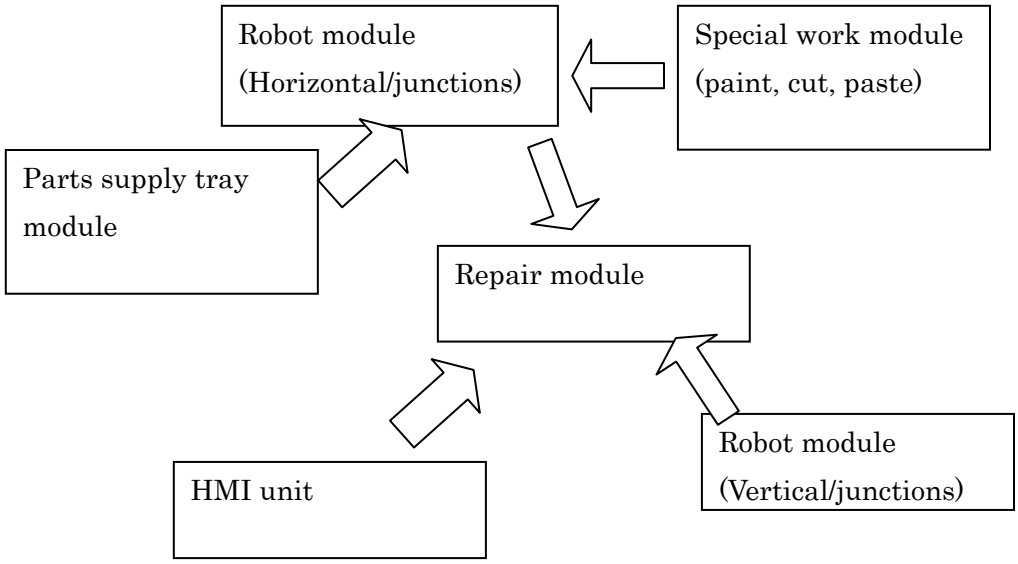
*2: If the business fulfills the condition that it is new, the loan rate is 50%.
- Business that drastically decrease the production cost or advance the function
- Business that drastically decrease the service cost or drastically advance the quality
- Business that has new method for providing products or service

2-2. Request for Improvement of Tax System

Under request for application of "Energy Reform Tax System*" for the facilities that enable automatic production by cell production method in assembling machines and parts

An example is module structure of production system using robot cell.

* - Energy Reform Tax System: If facilities for reforming the energy supply mechanism are established, 30 percent of the cost required to establish the facilities are repaid.



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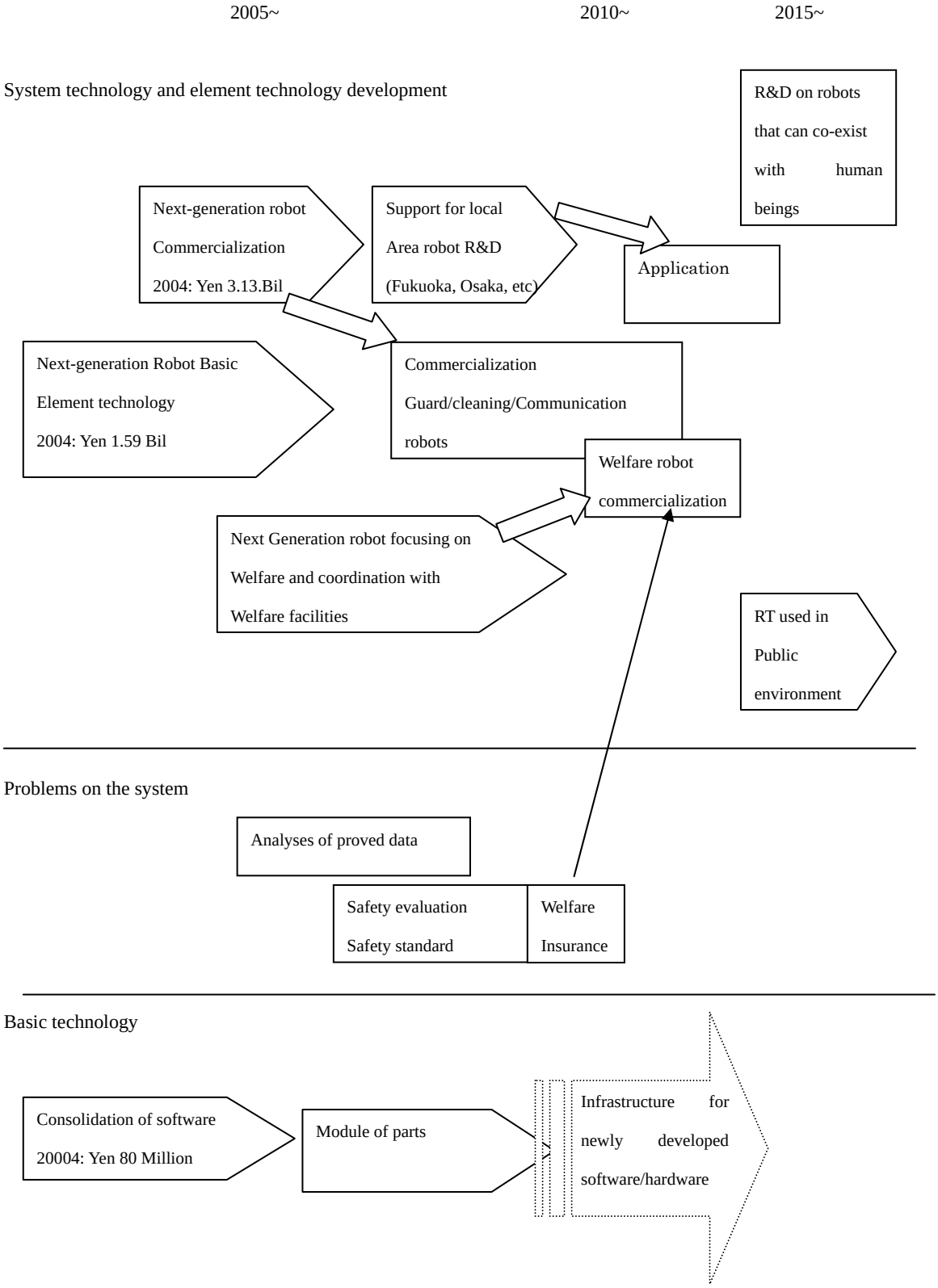
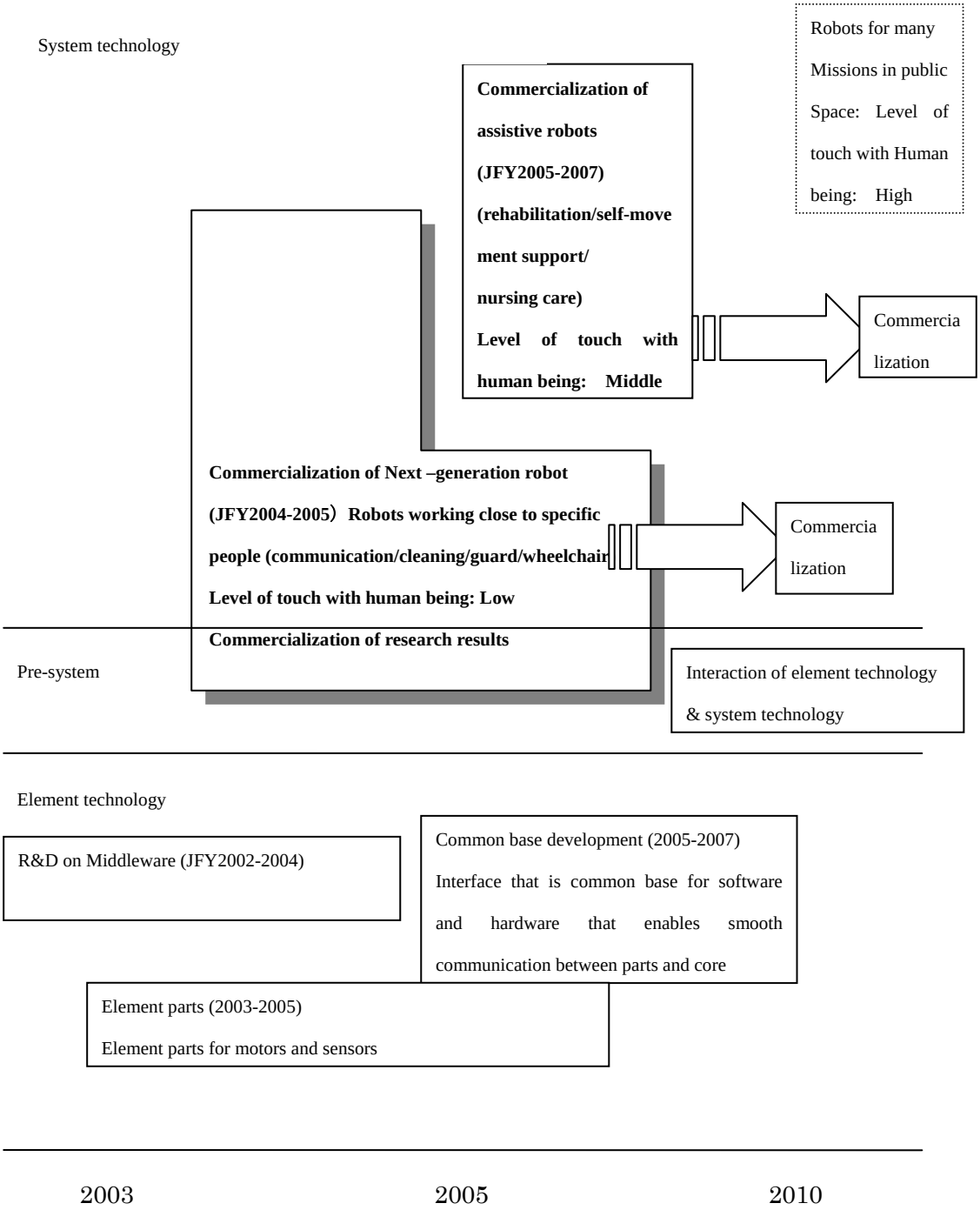
REFERENCE: Action Plan for Strategies for Creating New Industries



REFERENCE: Robot-related Technology Development at METI



REFERENCE: Government-supported Robot-related Projects

	Program/R&D	Outline	JFY2005 budget Yen Billion
METI	Next-generation robots -Parts for robots -Common base -Commercialization -Commercialization of man-support robots	Core robot technologies	3.73 (ca. $32 mil)
MIC	Network robot	Combination of ubiquitous network technology and robot technology	Some out of 0.48 (ca. $4 mil)
Fire Agency	Fire-fighting/disaster prevention robot	Automatic running-type analyzer at the time of NBC	0.11 (ca. $1 mil)
MEXT	-Brain-type computer -Rescue robot	-Sensor technology, control technology, materials technology, and technology transfer -Search for victims in fallen buildings and underground	Some of 1.41 (ca. $12 mil)
MHLW	Operation robot under guidance by image	Remote operation system	Some out of 1.11 (ca. $9.6 mil)
MAFF	Next-generation agricultural machines	Automatic agricultural machine that process the work that requires big burden to men	Some out of 1.88 (ca. $16 mil)
MLIT	-Remote operation robot -Underwater robot	Automatic construction machine, underwater measurement system, underwater self-movement technology, remote operation technology	Some out of 1.60 (ca. $14 mil)

END of THIS REPORT