

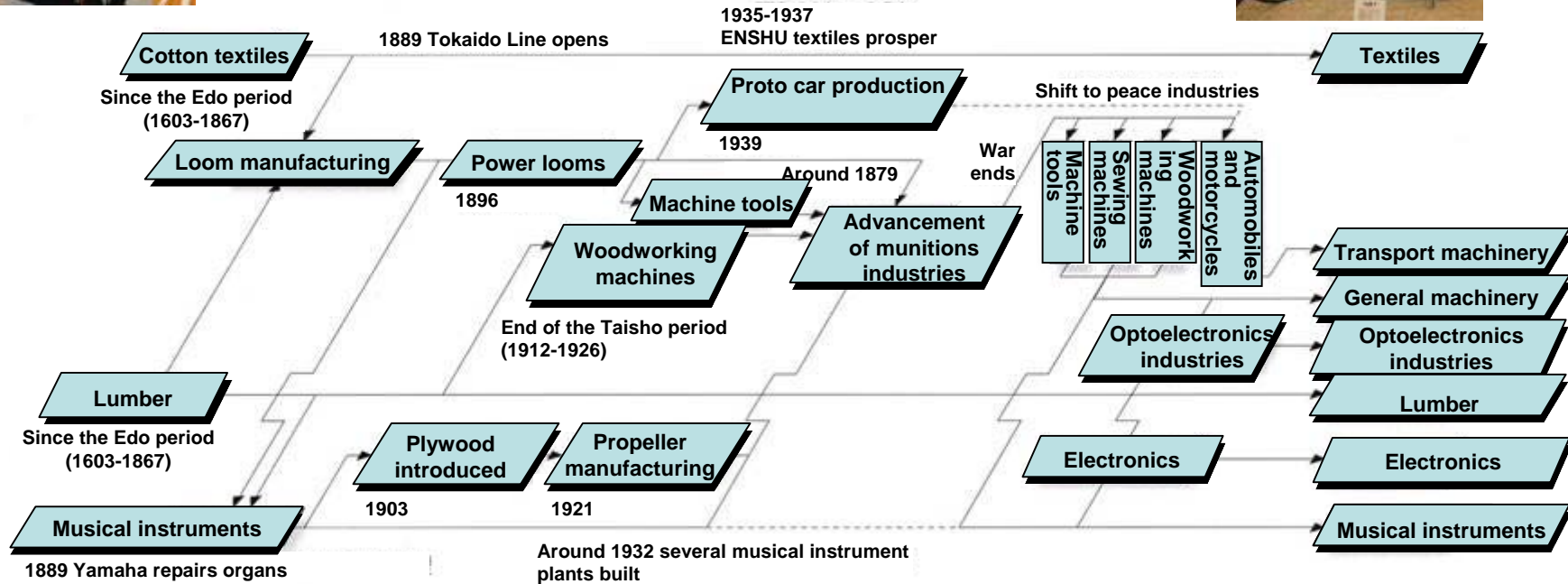
# Promotion of Regional Clusters and Regional Industries in Hamamatsu

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Hamamatsu Cluster Central Project Organization

# Outline of Hamamatsu's Industrial Development



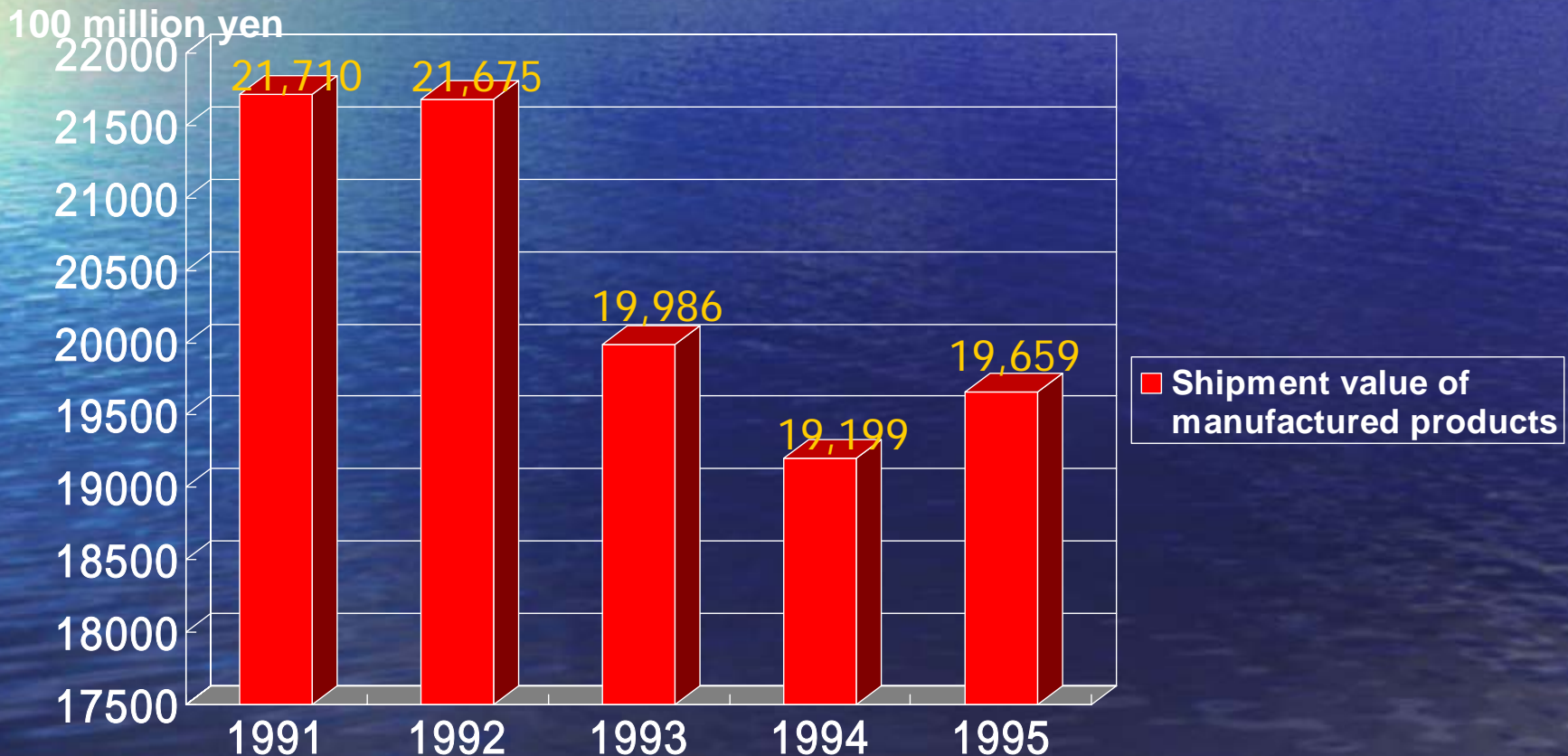
Hamamatsu developed as an advanced industrial city specializing in manufacturing  
Shipment value of manufactured products in Hamamatsu City in 1993

**1.9986 trillion yen**

**(down 7.8% from the previous year)**

**Crisis for Hamamatsu,  
the manufacturing town**

Changes in shipment value of manufactured products in  
Hamamatsu City (1991-1995)



# Hamamatsu cluster operations

Photonics technology is used as a core technology

I. Creation of new photonics technologies

II. Creation of new technologies that utilize photonics

III. Creation of new businesses that utilize photonics

## Intellectual Cluster

Hamamatsu Optronics Cluster

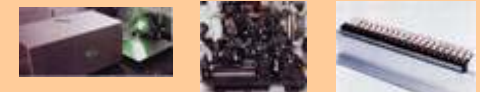
Development and industrialization of high-performance visual imaging technology and imaging systems used in advanced industries and medicine



## Collaboration of Regional Entities for the Advancement of Technological Excellence

### Industrial Tera-Watt Photonics

Creation of new industries through the development of high-powered laser systems for use in high density photon industries and the establishment of creative basic technology through their application



Shizuoka Prefectural Hamamatsu Industrial Engineering Center

Innovative Joint Research Center, Shizuoka University

Hamamatsu University School of Medicine  
(School of Medicine and Photon Medical Research Center)

## Organization for Hamamatsu Technopolis (Intellectual Cluster)

Shizuoka University (Faculty of Engineering, Faculty of Information, Research Institute of Electronics)

Shizuoka Technology Licensing Organization

Hamamatsu Chamber of Commerce & Industry (Industrial Cluster)

Research Foundation for Opto-Science and Technology

## Industrial Cluster

San-en-nanshin vitalization

With the focus of technology on photonics, (i) promotion of upgrading and adding value to existing technologies and (ii) chain-reactive creation new businesses that utilize photonics



# Intellectual Cluster

(Cooperative Link of Unique Science and Technology  
for Economy Revitalization :CLUSTER)

# CLUSTER in Hamamatsu

-Hamamatsu Optronics Cluster-

Concept name :

The Hamamatsu optronics cluster concept

Designated field:

「"Super-visual imaging technology" to support  
next-generation industries and medical treatment」

Target :

Our organization works to further integrate corporation, research institutions and researchers in photonics industrial technology in the Hamamatsu region and form a linked cluster of new businesses and related venture companies.

# Industry-university-government cooperative research themes & Industrialization example

Development of wide dynamic range CMOS image sensor



Security camera, FA camera ...

Development of onboard high-functional image sensor for a car



High-functional camera for car, Surround vision system for car ...

Development of image sensor for the capsular endoscope



Small camera of endoscope ...

Development of a new scanning microscope system using the confocus method



Advanced microscope for cell imaging ...

Development of the high-functional endoscope and operation navigation system



Advanced endoscope, New surgical navigation system ...

Development of the telemedicine and the imaging system with high fidelity color reproduction



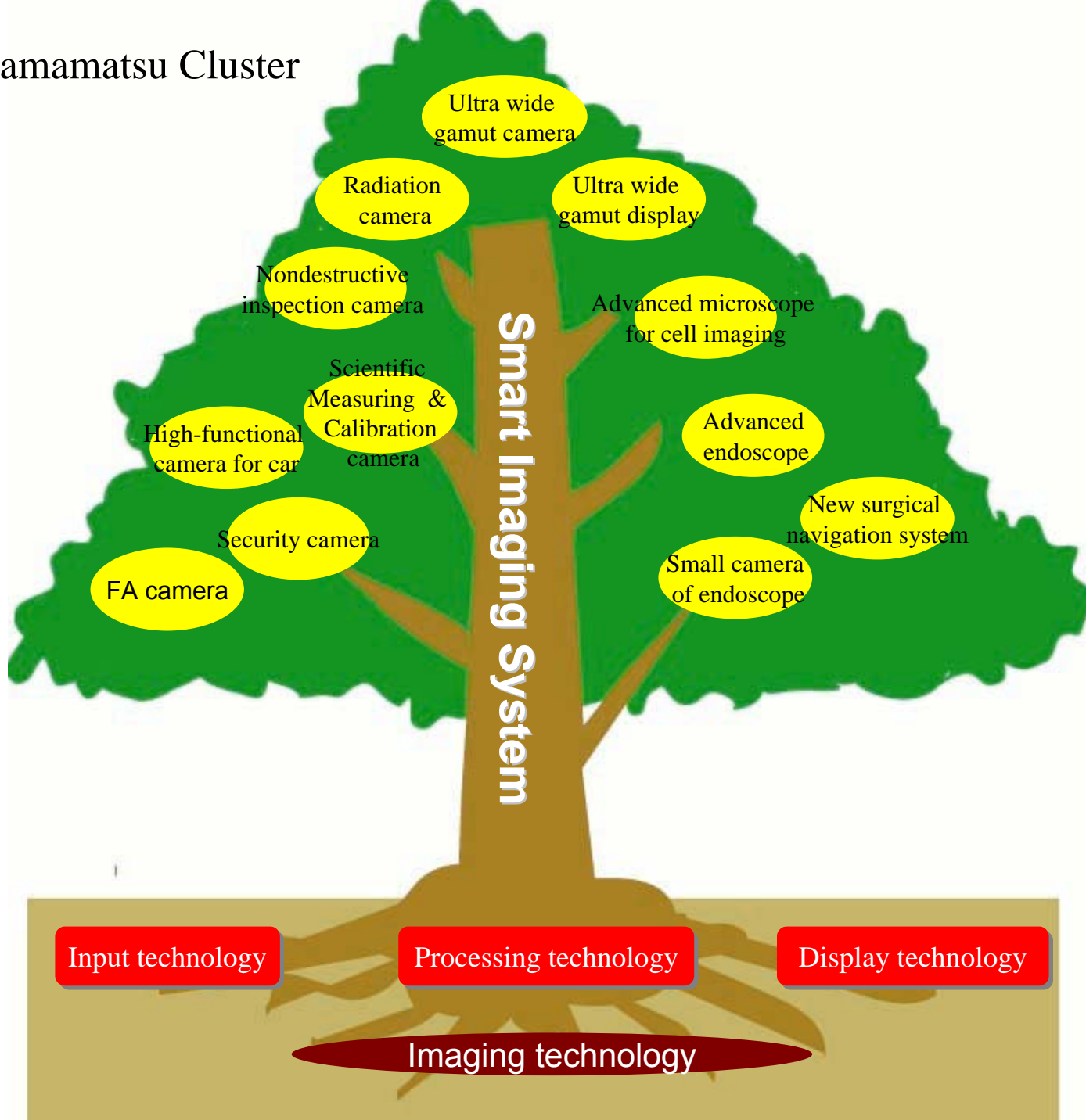
New telemedicine system, Ultra wide gamut camera, Ultra wide gamut display ...

Development of solid State Imaging Device for X-ray and Gamma-ray



Nondestructive inspection camera, Radiation camera ...

# Image of Hamamatsu Cluster



# In-house programs ( 1 )

## *Expertise workshop*

1) Imaging technology workshop

2) Medical Information Engineering Workshop (MIE Workshop)

## *Enlightenment of imaging technology*

Imaging Seminars

# In-house programs (2)

## *Presentation of research results*

Optronics Hamamatsu forum

## *Information*

Optronics Cluster Home page

## *Connection with other project*

Other Project: Industrial Cluster([San-en-nanshin Vitalization](#)) ,  
Collaboration of Regional Entities for the Advancement of  
Technological Excellence([Industrial Tera-Watt Photonics](#)),  
TLO([Shizuoka TLO](#)),  
Regional Science Promotion Program ...

# In-house programs (3)

## *-Association for Industrialization of Imaging Technology-*

### Purpose

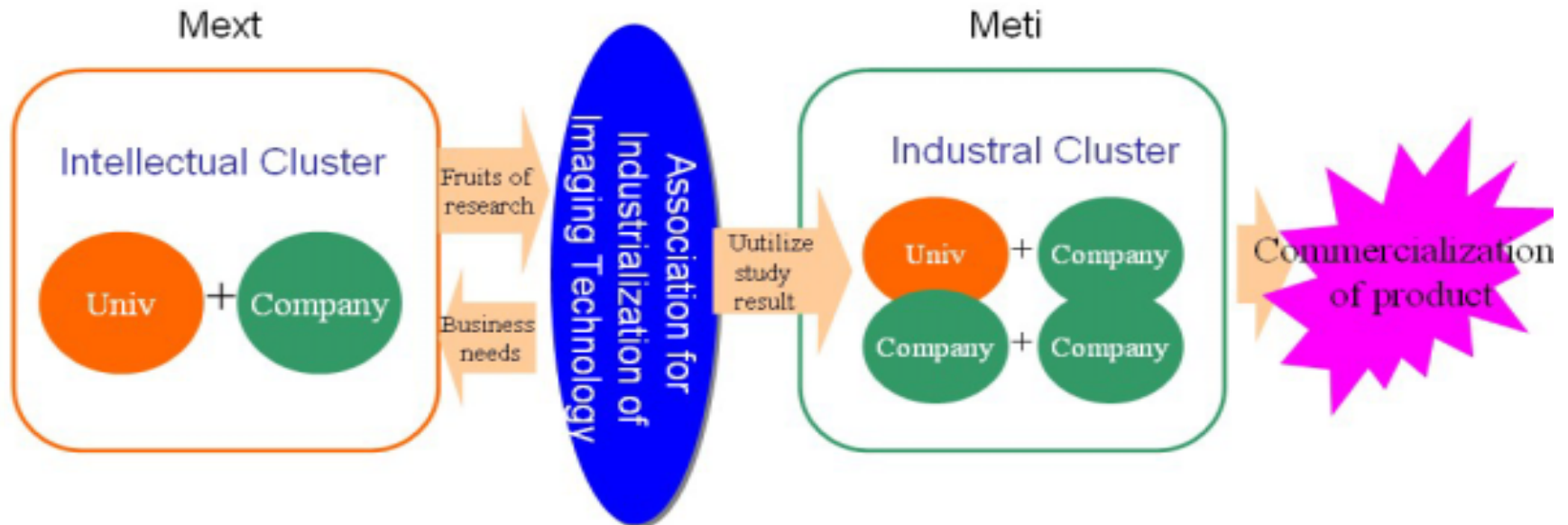
This study association supports the enterprises which attempt development of new products and creation of new business utilizing imaging technique. Further it also aims at creation of venture companies and forming the industrial integration based on optical technique including imaging technique in this area.

### Company targeted

Company in Shizuoka prefecture, mainly in Hamamatsu area which correspond the followings;

1. The company which deal with the business concerning imaging technique
2. The company with interest in business development which utilizes the imaging technique

### Evaluate of Association



# Industrial Cluster

# San-en-nanshin Vitalization

**The Ministry of Economy, Trade and Industry (METI)** enacted the New Industry Creation Promotion Law in 1998 based on its policy that **the creation of new industries is the most important policy** for overcoming the economic recession and securing employment opportunities. METI also intensively and actively introduced measures related to new industries centered on new technology and new product development in regions and companies committed to research and development. San-en-nanshin Vitalization Hamamatsu Branch has been designated a Regional Industry Revitalization Project of the METI's Industrial because of its particularly high level of regional potential.

## History

- July 1999 San-en-nanshin establishes the New Industry Creation Promotion Committee
- November 2000 New Industry Creation Promotion Committee decides to create a structure consisting of three branches, the Iida Branch, the Toyohashi Branch and the Hamamatsu Branch, and to develop business centered on these branches
- June 2001 **Hamamatsu Branch established (research groups: eight organizations and 468 companies)**
- Affiliated organizations: Electron Optics Group Member  
Software Industry Promotion Research Group  
Precision Technology Research Group,  
Semiconductor Laser Application Research Group,  
Hamanako Club, Frontier Hamamatsu,  
Hamamatsu Technology Interchange Plaza,  
monodukuri-net
- June 2002 Iida Branch established
- September 2002 Higashi-mikawa Branch established



## Major operations

- Support for the development of new products and new technologies... financial aid meetings, financial aid application support
- Promotion of industry-academia-government collaboration... matching technological seeds with industry's needs (Industry, Academia and the Government Exchange Meeting), coordination activities
- Promotion of research and development... technology salon
- Marketing support such as market cultivation... monodukuri-net, market cultivation support, business meetings on receiving and placing orders



# San-en-nanshin Vitalization Hamamatsu Branch

## FY2003 Business Plan

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- (1) Industry-academia-government collaboration  
(matching technological seeds with companies' needs)
- (2) Promotion of research and development
- (3) Supporting applications for financial aid for the development of new products and new technologies
- (4) Support for market cultivation
- (5) Support for improvement of quality and development of technology
- (6) Construction and operation of information networks
- (7) Strategies for shifting towards IT
- (8) Others

# (1) Industry-Academia-Government Collaboration

(matching technology with companies' needs)

## · Industry, Academia and the Government Exchange Meeting (held in July)

The goal of the meeting is to further promote technology transfers through active exchanges with professors and assistant professors from local universities specializing in science and technology

Theme: "Research and Development from Hamamatsu in Line with the Industrial Technology Strategy"  
Matching technological seeds with companies' needs to support Hamamatsu's advanced industries



## · Exchange with primary industries (agricultural fields)

A forum for mutual exchange between relevant parties has been created with the aim of agriculture-industry collaboration in technological development and product development, and business issues regarding the agricultural industry are addressed.

\* Medicine-industry collaboration has been developed since 2001.

## (2) Promotion of Research and Development

- **Coordination operations**

Issues regarding companies are addressed and external management resources are introduced.

Management, technology and market cultivation support through technology coordinators

- **Technology Salon (held six times per fiscal year)**

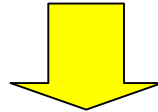
Researchers from local universities specializing in science and technology give presentations regarding the content of their research, thus deepening participants' awareness on various subjects and aiding the transfer of technology. The Salon is also a place to promote exchange between researchers and participants and among participants, so that participants may solve technical problems that they may have had or initiate joint research.



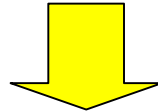
### (3) Supporting Applications for Financial Aid for the Development of New Products and New Technologies

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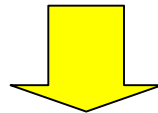
Finding themes for technology development (collection of themes)



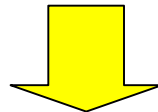
Brushing up of proposals (Committee for Innovation Technology Creation)



Orientations concerning the public application for financial aid and trust funds



Guidance for completing the application form and checking the completed form



Submission of application

## (4) Support for Market Cultivation

- **Individual business meetings on receiving and placing orders (June and February)**

With the aim of supporting revenue increases through the cultivation of new business partners and new sources for orders of member companies, ordering companies are recruited around Japan, and local member branches are recruited and provided explanations in business meetings.



- **Announcement of results of the San-en-nanshin Vitalization Hamamatsu Branch (June)**

A corner is established to introduce the results of local branches at the “Exhibition of Hamamatsu Technology Products,” organized by the Hamamatsu Chamber of Commerce and Industry.

Through financial aid and trust fund activities, such as the consortium for regional revitalization R&D, product development is carried out, and support is provided for the exhibition and demonstration of the commercialized products.

**In addition, through national “projects for SME market cultivation” support is provided to introduce trading companies to the products developed by SMEs, and for their sales and market evolution.**

## (5) Support for Improvement of Quality and Development of Technology

- **Digital Innovation Seminar for Production (Oct. to Nov. – six-part series)**

Aimed mainly at the representatives of SME manufacturers, this management and technology seminar is held to raise awareness on the implicit knowledge prevalent in production technology, highlighting the enhancement of management techniques as one means of improving business.

- **Advanced Technology Research Group (from October, two-part series in each sector)**

Research group into applications for light technologies (laser, optical information processing technologies, etc.)

- **Secondary Innovation Incubators (July to August – five-part series)**

In order to support efforts by SMEs to compete in new business sectors, using existing technologies, this is a series of seminars to identify and evaluate technology seeds, and basic knowledge on intellectual property rights.





## (6) Construction and Operation of Information Networks

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Including information concerning new technologies and new products of affiliate members, and providing through homepages and mail magazines information on such issues as all kinds of financial aid and trust finds and the newest research information from local universities specializing in science and technology, support is provided to branch members for technology development and sales promotion.

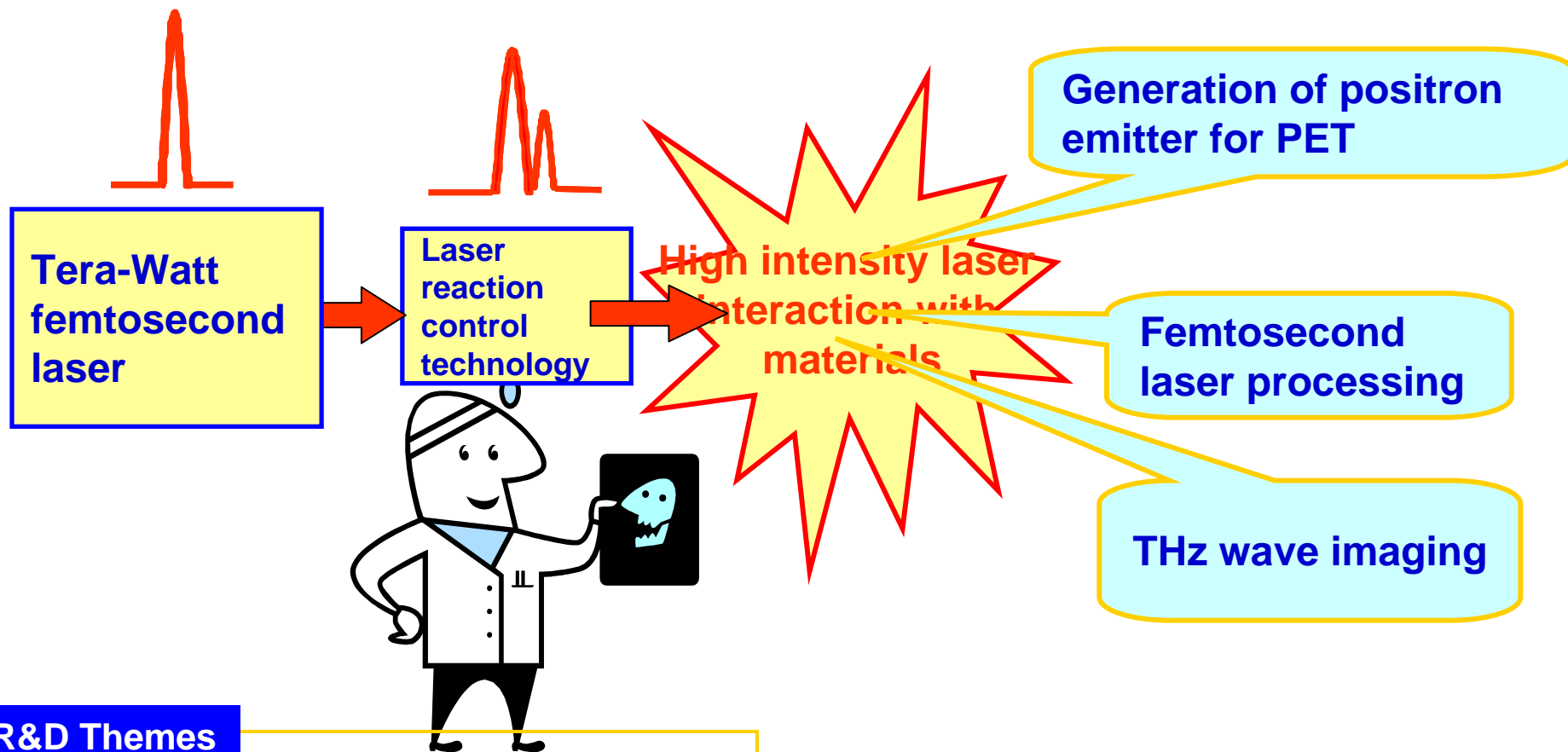
Home page address: <http://www.hit-vit.net>

## (7) Strategies for shifting towards IT

Through such publicly supported projects as the IT Solution Square Project (ITSSP), a project for revitalization of strategic investment into informatization with the objective of recovering industrial competitiveness, which is supported by METI, in order to provide support for management enhancement through promotion of informatization of SMEs, seminars and other events are held to provide a more advanced knowledge base, to motivate companies that are aiming towards management reforms.

# Collaboration of Regional Entities for the Advancement of Technological Excellence

# Industrial Tera-Watt Photonics



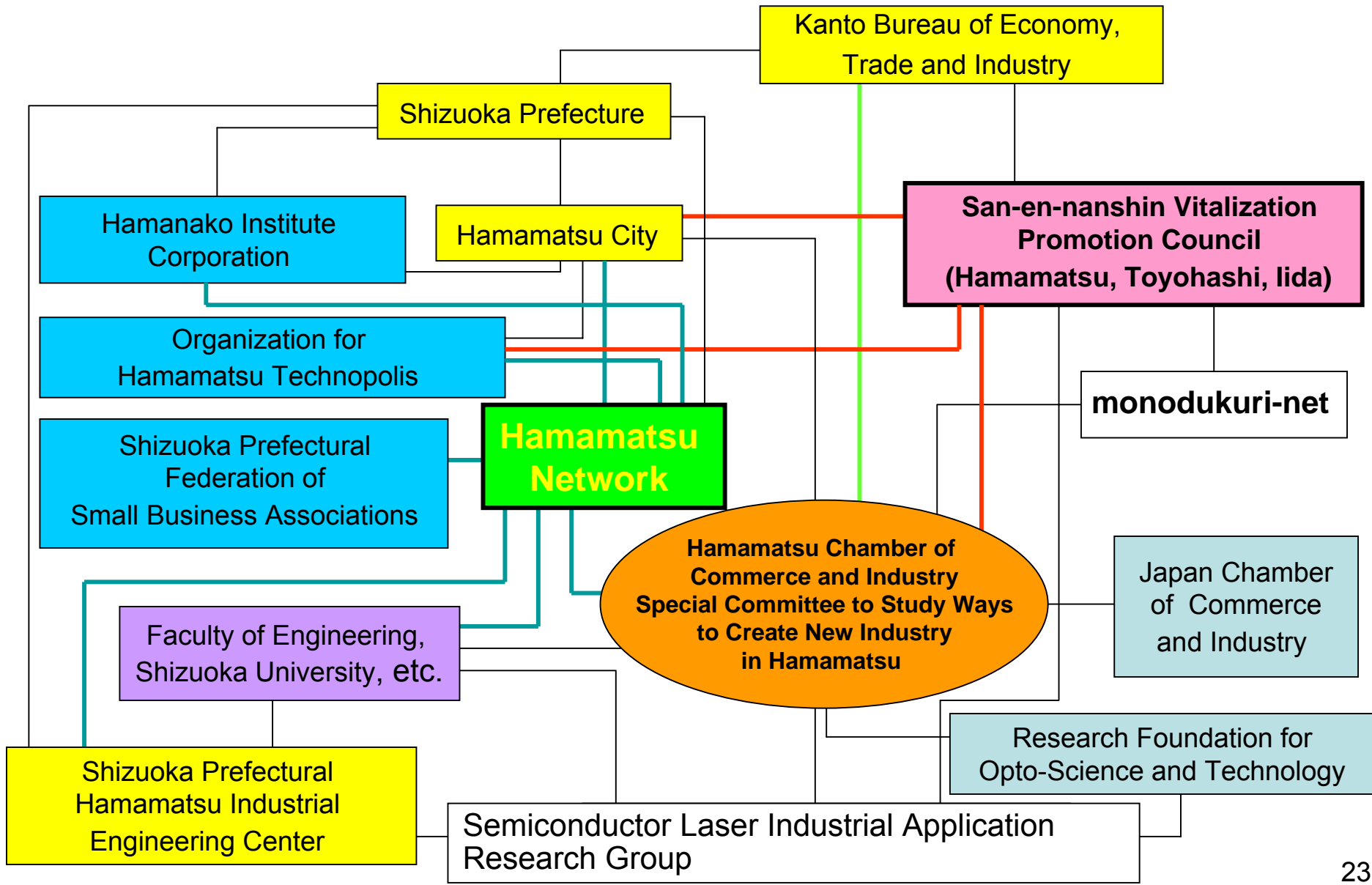
## R&D Themes

- ✧ All solid-state TW femtosecond laser
- ✧ Ultra-high intensity laser reaction control technology
- ✧ Industrial applications of compact, ultra-high intensity laser diode pumped solid-state laser (DPSSL) systems

This project is aimed at developing fundamental technology for new industry based on the ultra-high intensity DPSSL.

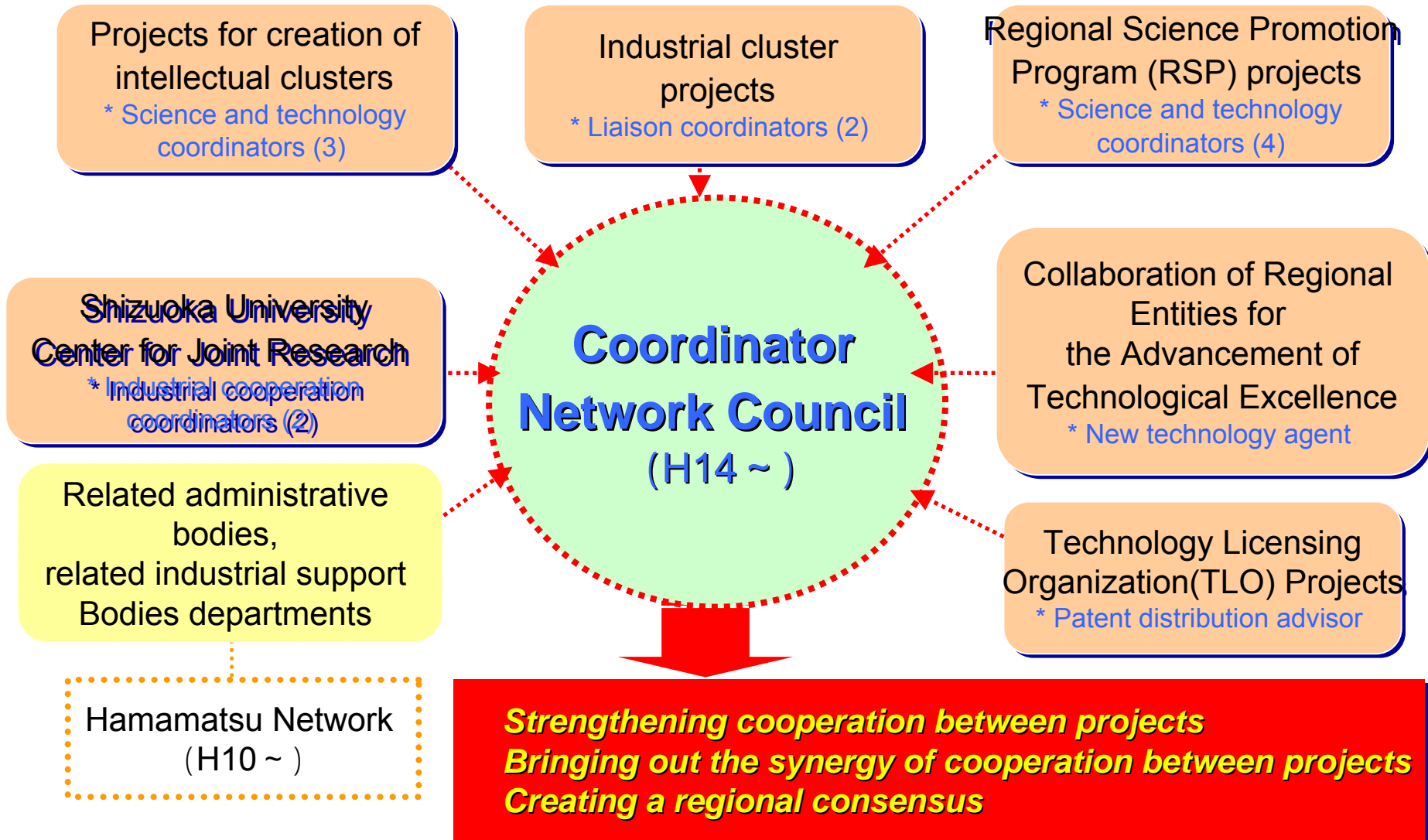
# Network of Industry-university-government cooperative

## Chart Showing Industry Creation Projects in the Hamamatsu Region



# Project Cooperation (human networks)

- Creation of new technology and industry through organic cooperation between projects

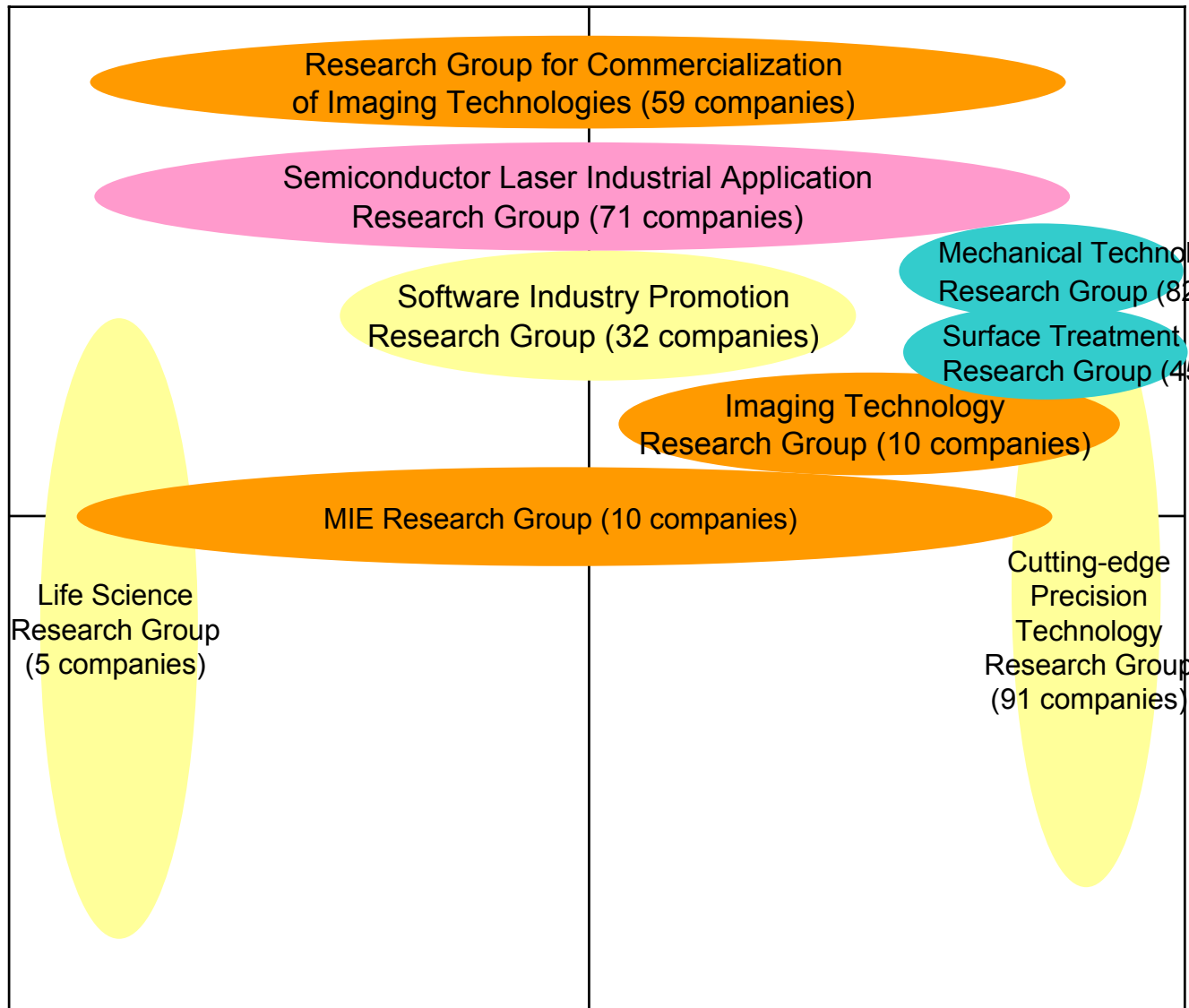


# Creating networks between industry and academia, and among industries (Specialized Technology Research Societies etc.)

As of May 2003

Commercialization and application

Basic research



**Promotion of joint research between Industry and academia and among industries**

**Creation of new technologies and new businesses**

Medicine

Information Technology

Engineering

# Result of Industry-university-government cooperative research themes

# Major Recent Examples of Commercial Ventures Resulting from Industry-Academia Joint Research

Already commercialized

Ventures originating from universities

Commercialization planned

Commercialization using technology of universities outside the local area

## Professor Shoji Kaneko, Faculty of Engineering, Shizuoka University

Function thin-film technology using the spray pyrolysis method → Make Co., Ltd. utilized a part of this technology and commercialized it as **“small experimental-use SPD thin-film formation equipment”**

## Professor Seichi Okamura, Faculty of Engineering, Shizuoka University

Technology that measures water content using microwaves → K Co. utilized a part of this technology to commercialize **microwave water content sensors** used to automate tea manufacturing machines

## Professor Shigenobu Shinohara, Faculty of Engineering, Shizuoka University

Speed measuring technology that utilizes the self-mixing effect of semiconductor lasers

Space Creation Co., Ltd. utilized a part of this technology and commercialized it as **a vibration measuring device**. (Improved model under development)

## Professor Takeshi Sako, Faculty of Engineering, Shizuoka University

Precision cleaning system technology with low impact on the environment → **A university-launched venture was established** with the involvement of Professor Sako

## Professor Shigeo Uchida, Faculty of Engineering, Shizuoka University

Water purification technology based on ultrasonic waves and ultra-violet rays → Suzuki Pump Co., Ltd. is planning to **commercialize a part of this technology during this fiscal year**

## Professor Naoyuki Takahashi and associates, Faculty of Engineering, Shizuoka University

Crystal thin-film production technology → Humo Laboratory, Ltd. will **commercialize this technology in three years**

# Major Recent Examples of Commercial Ventures Resulting from Industry-Academia Joint Research

Professor Masahiro Takigawa, School of Medicine, Hamamatsu University School of Medicine

Skin cancer therapy techniques → A university-launched venture was established with the involvement of Prof. Takigawa

Professor Jiro Otsuka, Faculty of Science and Engineering, Shizuoka Institute of Science and Technology

High-resolution displacement sensor, high-resolution/high-precision locating technology  
→ Company S utilized part of the technology and commercialized the “0.1nm-level locator device”

Professor Tadashi Masuda, Faculty of Science and Engineering, Shizuoka Institute of Science and Technology

Rotary encoder high-precision correction technology → Utilizing part of the technology, Company C developed a correcting device for R&D purposes  
With technological guidance to Company T, the device was commercialized

Professor Seiji Katayama, Joining and Welding Research Institute, Osaka University

Professor Katsuhiko Sakai, Faculty of Engineering, Shizuoka University

Laser welding technology → Utilizing part of the technology, ENSHU Limited commercializes the “semiconductor laser welding system”

Assistant Professor Junichiro Makino, Department of Astronomy, Graduate School of Science University of Tokyo

VLSI design technology → Utilizing part of the technology, Hamamatsu Metrix commercializes the “multi-particle high-speed super parallel calculating device”

# Examples of Commercial Ventures Resulting from Industry-Academia Joint Research - Case (1)

## **FY2001 corrective quick-response consortium for regional revitalization R&D**

Theme: Development of highly efficient welding system utilizing high-power laser diodes

Outline of research: To develop a cutting-edge world-leading laser welding system featuring the high-output semiconductor laser device, systemically eliminating welding defects in the welding process, a bottleneck for laser welding in the past, improving energy efficiency, reducing costs, saving space and cutting maintenance to zero.

R&D Members: [University] Joining and Welding Research Institute, Osaka University (Professor Seiji Katayama),  
Faculty of Engineering, Shizuoka University (Professor Katsuhiko Sakai)  
[Public testing] Shizuoka Prefecture Hamamatsu Industrial Technology Center  
[Companies] ENSHU Limited, Yamato Industrial

Achievements: Development of a cutting-edge world-leading laser welding system

Product name: High-output Semiconductor Laser Welding System



# Examples of Commercial Ventures Resulting from Industry-Academia Joint Research (2)

## **The FY2001 Instant-Release Regional Consortium for Revitalization R&D Project**

Theme: “Research and Development of Compact Semiconductor Laser Vibration Measuring Systems Using Self-Mixing Effect.”

Outline of research: Developing non-contact small-sized vibration measuring systems composed of small-sized sensor heads using the semiconductor laser self-mixing effect for miniaturization and improved precision and complexity and to reduce measurement costs, and high-speed signal management circuits to detect and control beat waves.

R&D members:        [University] Shizuoka University, Faculty of Engineering  
                              (Professor Shigenobu Shinohara)  
                              [Businesses] Space Creation Co., Ltd.  
                              and ART Electronics Co., Ltd.

Achievements:        Development of a small-sized, low-cost,  
                              non-contact vibration measuring system using  
                              semiconductor lasers

Product name:        Laser Vibration Measuring System LZB-02



# Products that have been developed through industry-academia cooperation in the Hamamatsu area



Senjo Seiki Co., Ltd. developed a manually operated high precision stabilizing unit



Make Co., Ltd. developed a small laboratory-use SPD thin-film Production device



ENSHU Limited developed a high-output semiconductor laser welding system, the L1



Flying Mole Co., Ltd. developed a 1-Bit D-class digital amplifier, the DAD-M



Modeling R Co., Ltd. developed a cell production compatible separable substrate robot, the RPS-300



Hamamatsu Metrix Co., Ltd. developed a multi-particle high-speed super parallel calculating device, the GRAPE6B



ART Electronics Co., Ltd. developed a paste print 3D screening device, the ASP-300



Space Creation Co., Ltd. developed a laser vibration measuring system, the LZB-02

# San-en-nanshin Vitalization Hamamatsu Branch Office, Secretariat

(Within the Hamamatsu Chamber of Commerce and Industry Industrial Section)

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