Development of System and Technology for Advanced Measurement and Analysis

September 15nd, 2009

Department of Advanced Measuring Technology
Innovation Headquarters
Japan Science and Technology Agency

Background of the Establishment of This Project

(1) In Japan, there is the indication that the equipment of the measurement or analytical technique depends on foreign countries.

(2) In 2002, Dr. Koichi Tanaka (Shimadzu Corp.) has got the Novel Prize in chemistry (for "the development of methods for identification and structure analyses of biological macromolecules").

Based on such background, “Development of System and Technology for Advanced Measurement and Analysis ” has started from 2004 in JST.

Development of System and Technology for Advanced Measurement and Analysis

Japan Science and Technology Agency

Technology Development Program for Advanced Measurement and Analysis which is called "Program-T"

System Development Program for Advanced Measurement and Analysis, which is called "Program-S"

Prototype Validation/Practical Realization Program for Advanced Measurement and Analysis, which is called "Program-P"

Software Development Program for Advanced Measurement and Analysis which is "Program-SW"<from 2009>

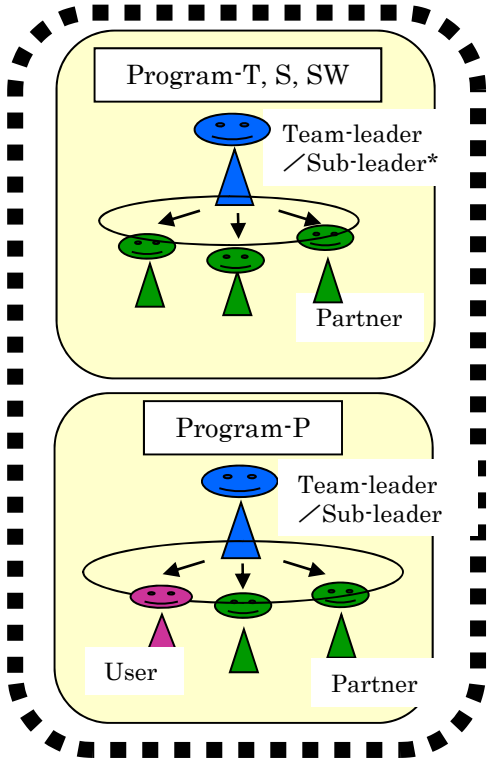
- "The Review Committee" select proposals.
- "Program Officer" manage each theme and overall project.

Closely Co-operation between Industry and Academy or Government

Call for Proposals

Contract

Promotion of Development



* In Program-T, Sub-leader is not assigned.

Features of This Project

(1) This project promotes the development of systems and technology for advanced measurement and analysis in order to meet frontier research needs or future use at actual production sites.

(2) This project carries out innovative development, based on the above approach, through four types of programs (Program-S, T, P, SW).

(3) This project is competitive fund, so JST widely calls for proposals from development teams, and reviews and selects proposals.

(4) Development teams are formed around team leaders, while maintaining close co-operation between industry, academia and government.

(5) The appropriate development period and budget are established based on the development plan of each proposal.

(6) JST conducts contracting with organizations to which developers belong.

(7) Program Officer (PO) manages each theme and overall program.

Number of Proposed and Accepted Themes

	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Budget (million US$)	33	40	42	48	55	63
Number of Proposed Themes						
Program-T	292	209	127	86	101	142
Program-S	230	71	48	44	47	107
Program-P	–	–	–	–	21	27
Program-SW	–	–	–	–	–	34
Total	522	280	175	130	169	310
Number of Accepted Themes						
Program-T	11	10	8	9	19	27
Program-S	18	8	4	6	12	21
Program-P	–	–	–	–	10	17
Program-SW	–	–	–	–	–	14
Total	29	18	12	15	41	79

Typical Development Period and Budget for Each Program

	Period	Budget (of direct cost)
Program-T	2.5 or 3.5 years	100~200 thousand US$ per each FY (Total 400~800 thousand US$)
Program-S	3.5 or 4.5 years	200~1,000 thousand US$ per each FY (Total 1,000~5,000 thousand US$)
Program-P	2.0 or 3.0 years Begins in April (At the beginning of fiscal year)	500~1,000 thousand US$ per each FY (Total 1,000~3,000 thousand US$) Matching Fund System Adopted
Program-SW	2.5 or 3.5 years	100~300 thousand US$ per each FY (Total 500~1,000 thousand US$)

Roles of Program Officer

To manage the individual theme and overall program, Program Officers of this project

1) Attend the "On-site Meetings" of the individual theme.
2) Attend the "PD-PO Meetings" to discuss our overall project.
3) Attend the Mid-term Evaluation and the Post Evaluation to follow the theme.
4) Arrange the extra budget according to their discretion.

Member of Program Officer

In charge of Program-T and Program-S

Dr. Mitsuhiro Motokawa
(Physics)

Dr. Tsuguo Sawada
(Chemistry)

Dr. Yuzuru Fushimi
(Life-science)

Dr. Makoto Takagi
(Chemistry)

Dr. Norimasa Okui
(Chemistry)

Dr. Takeyuki Wakabayashi
(Life-science)

Dr. Kozo Tsunoyama
(Materials)

Dr. Hitoshi Ogata
(Physics)

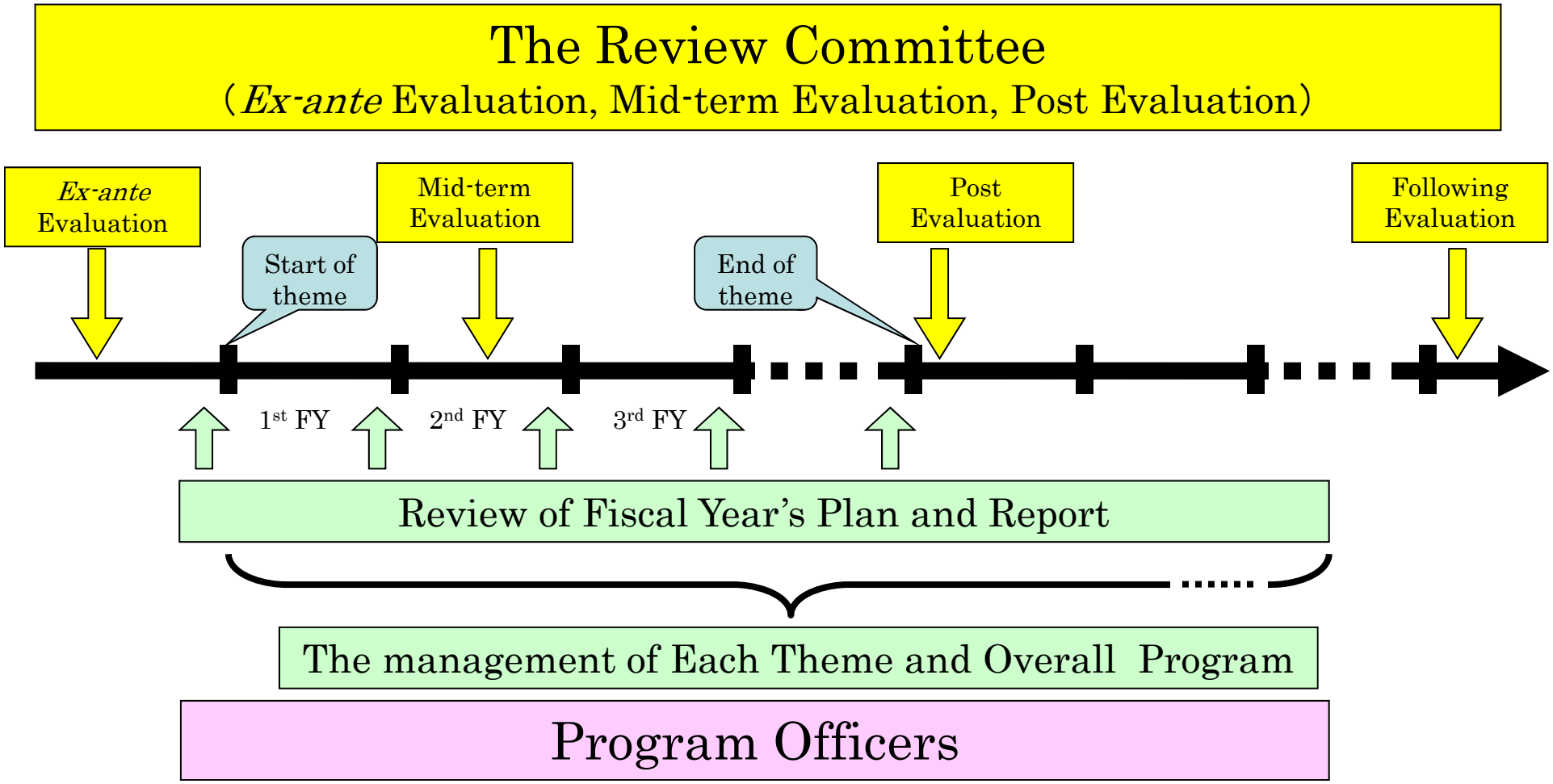
In charge of Program-P

Dr. Junji Yoshii
(Software)

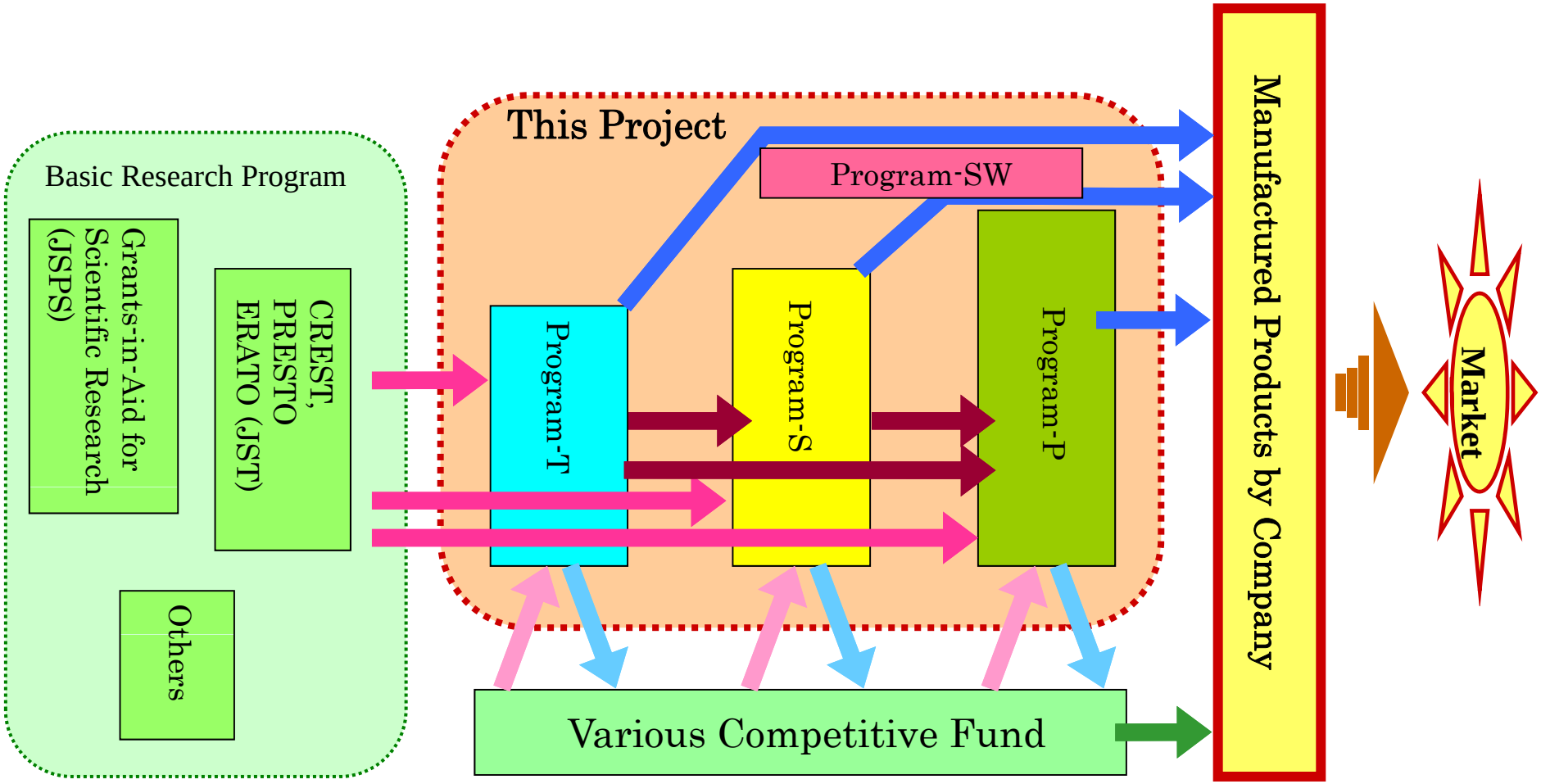
In charge of Program-SW

( ): specialty

Evaluation and Management of the Themes



Roadmapping of Developments for Measurement Systems Marketing

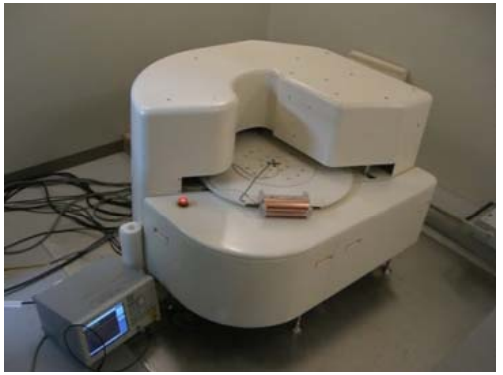


Spreading This Project's Result

Samples of This Project's Result

Chemoselective Glycoblotting System
"Sweet Blot"

3-D Tomography
System of Anterior Eye



Overhauser-enhanced
MRI System

Mass Microscope System

Ionic Liquid Salt Bridge
for pH Detection

Portable Auto Immuno Assay System

Solid State NMR Probehead

Four-tip Scanning
Tunneling Microscope

Exhibition of This Project's Result (Domestic) -1-

1. JAIMA SHOW
(Japan's Exposition of Analytical Instruments and Solutions)

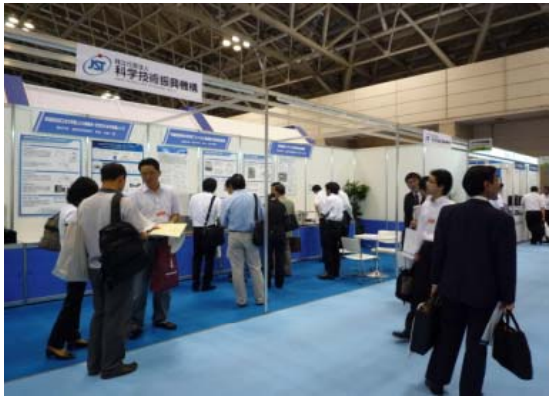
JAIMA SHOW started its first exhibition in 1962 at Tokyo, and 2009 show would be the 47th exhibition, the biggest annual Conference and Exposition of Analytical Instruments and Solutions in Asia. It is targeting to be "the one stop show where all about analytical instruments and technologies are shown" by opening the show to non-association member companies and planning various concurrent sessions like technical seminars and academic conferences. This show is enjoying 15 consecutive years' increase of exhibitors and 14 consecutive years' increase of total booths, and gains the reputation of "highly vibrant, active event".

Period: September 2 - 4 (in 2009)
Site: Makuhari Messe, Chiba Japan (every year)
Host: Japan Analytical Instruments Manufacturers' Association (JAIMA)
Size: 329 exhibitors with 1,133 booths (in 2008)
Attendees: over 23,000 (from industry, academia and government)

Exhibition of This Project's Result (Domestic) -2-

JST Booth at JAIMA SHOW

(August 2007)



(September 2008)

2. Scientific Instruments Show

Period: November 26 - 28 (in 2008), October 21-23 (in 2009)
Site: Tokyo Big Sight (in 2008), Intex Osaka (in 2009)
Host: Japan Federation of Scientific Instrument Associations (JSIA)
Attendees: over 40,000 (from industry, academia and government)

Exhibition of This Project's Result (Overseas)

Pittcon
(Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy)

Pittcon is the world's annual Conference and Exposition on laboratory science. It is organized by The "Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy", a Pennsylvania not-for-profit educational corporation.

Period: February 28 - March 5 (in 2010)
Site: Orange County Convention Center, Orlando, FLORIDA USA (in 2010)
Host: Pittcon Committee
Attendees: over 20,000 (from industry, academia and government from 90 countries worldwide)

JST Booth (March 2009 in Chicago)

Developing a New Mass Microscope System Based on a Ion-Trap-Time-Of-Flight

(Mitsutoshi Setou, Hamamatsu University School of Medicine)

To visualize tissue distribution of variety of biomolecules at once, a new tool, a mass microscope (Fig.1) has been developed .

This system is composed of the following two elements; a microscope and a mass spectrometer which is based on matrix-assisted laser desorption/ionization (MALDI), ion trap (IT), and time-of-flight (TOF).

This system will have super high mass-resolution and mass accuracy, which are expected to identify major components in tissue samples. In the future, this mass microscope will be a daily tool for discovery of biomarkers in diseases, development of drugs, and quality control of the industrial products.

Fig. 1 Mass Microscope

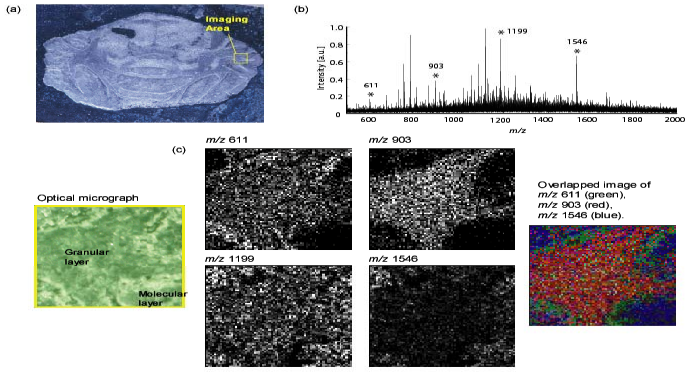
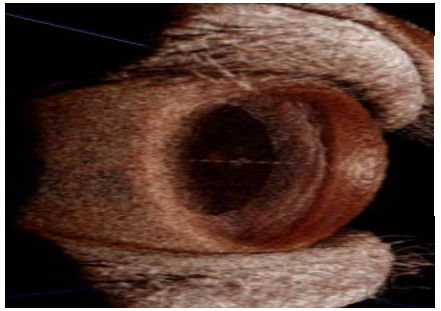


Fig.2 Results obtained by mass microscopy

High-Speed Three-Dimensional Tomography of Anterior Eye

(Chihiro Kato, TOMEY Corporation)

This tomography system aims at developing a comprehensive and 3-D tomography of the anterior eye in a clinical quality.



The really high speed of the system enables full 3-D investigation of an *in vivo* human anterior eye in a real clinic. And a variety of measurement protocols has been implemented which are optimized for a variety of specific diseases including glaucoma and keratoconus.

This tomography system provides a full 3-D numerical model of the eye, so can be utilized any kinds of clinical examination and intervention. Clinicians can try the surgery with several parameters and/or protocols before a real surgery, and can find the optimal solutions. This minimizes the risk and maximize the outcome of medical treatments.

Contact

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