

Analytical & Measuring Instruments Business Presentation Materials

**Shuzo Maruyama, Senior Managing Executive Officer and
Analytical & Measuring Instruments Division General Manager
Shimadzu Corporation**

Contents

I. Outline of Analytical & Measuring Instruments Business

Sales Trends	p. 4
Trend of Expanding Sales and Improving Profitability	p. 5
Business Portfolio	p. 6
End Markets.....	p. 7
Strategic Investments.....	p. 8

II. Growth Strategies for Analytical & Measuring Instruments Business

Growth Strategies and their Deployment	p. 10
Measures to Improve “Intelligence”	p. 11
Deploying New Products and Expanding Key Model Lines: LC, MS, GC, and Testing Machines	pp. 12-18
Growth through Contribution to Solving Challenges of Society:	
Healthcare, Environmental/Food Measurement, and Materials	pp. 19-26
Active Compliance with Environmental and Other Standards.....	p. 27
Expanding the Aftermarket Business	p. 28
Strengthening the Network Business	p. 29
Further Expansion outside Japan: North America, Europe, China, and Asia	pp. 30-33
Strengthening Research and Development	p. 34

III. Summary

p. 36

I. Outline of Analytical & Measuring Instruments Business

Sales Trends

- First quarter sales effectively increased, if temporary factors during the previous year (projects in Japan and environmental measuring projects in China) are ignored.
- First quarter sales of mass spectrometers, which is a strategic product category, were strong, particularly to academia and private sector markets in China, such as CROs.
- Starting in the second quarter, results are predicted to follow a gradual recovery trend, with additional help from new products, such as liquid chromatographs.

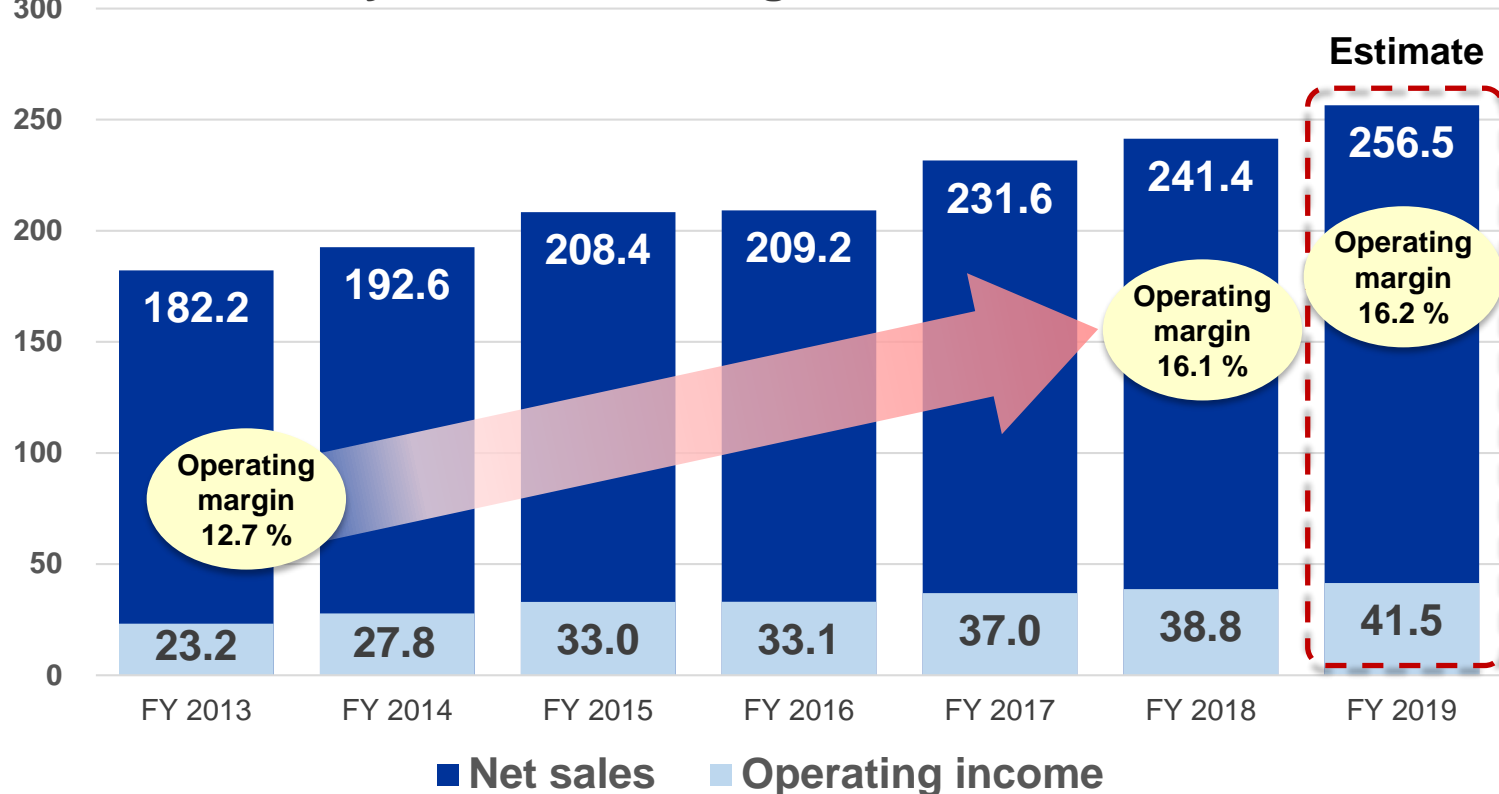
Units: Billions of yen		Apr.-Jun.						
		FY 2019				FY 2018		
		Amount	Increase/Decrease			Amount	Increase/Decrease	
			YoY Change Amount	YoY Change Percent	YoY Change Percent, Excluding Exchange Rates		YoY Change Amount	YoY Change Percent
Analytical & Measuring Instruments	Net Sales	49.7	-2.0	-3.8 %	-3.5 %	51.6	5.5	12.0 %
	Operating Income	4.9	-0.8	-13.8 %	-16.4 %	5.7	0.9	19.9 %
	Operating Margin	9.9 %	1.1 point decrease			11.0 %	0.7 point increase	

I. Outline of Analytical & Measuring Instruments Business

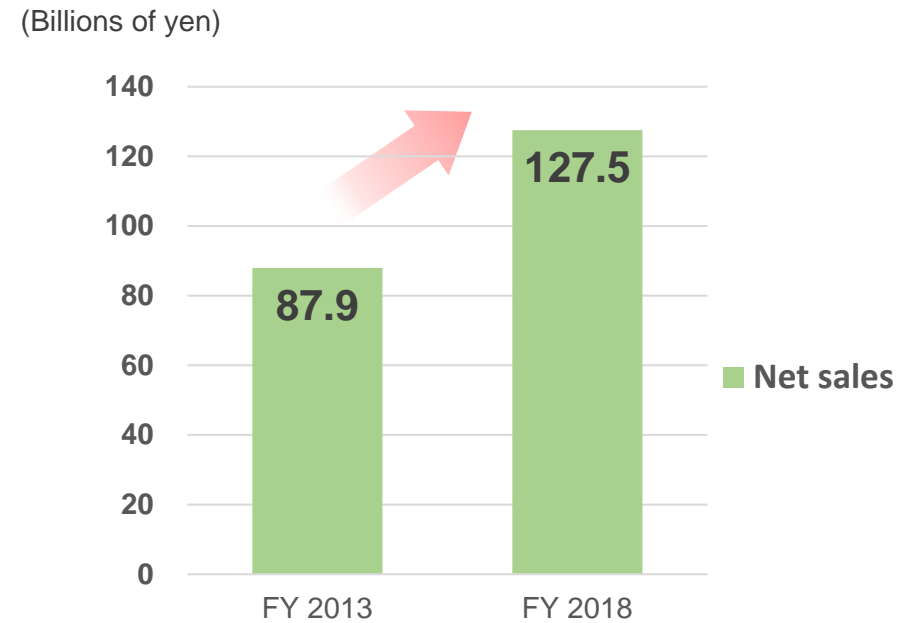
Trend of Expanding Sales and Improving Profitability

Results for analytical and measuring instruments are strong, with results expanding especially for key models, such as liquid chromatographs, mass spectrometers, and gas chromatographs. Sales grew 5.8 % (CAGR) between FY 2013 and FY 2018, which is higher than the analytical instrument market average. Furthermore, profitability improved significantly during that period, with the operating margin increasing by 3.4 percentage points.

(Billions of yen) **Analytical & Measuring Instruments Sales Trend**



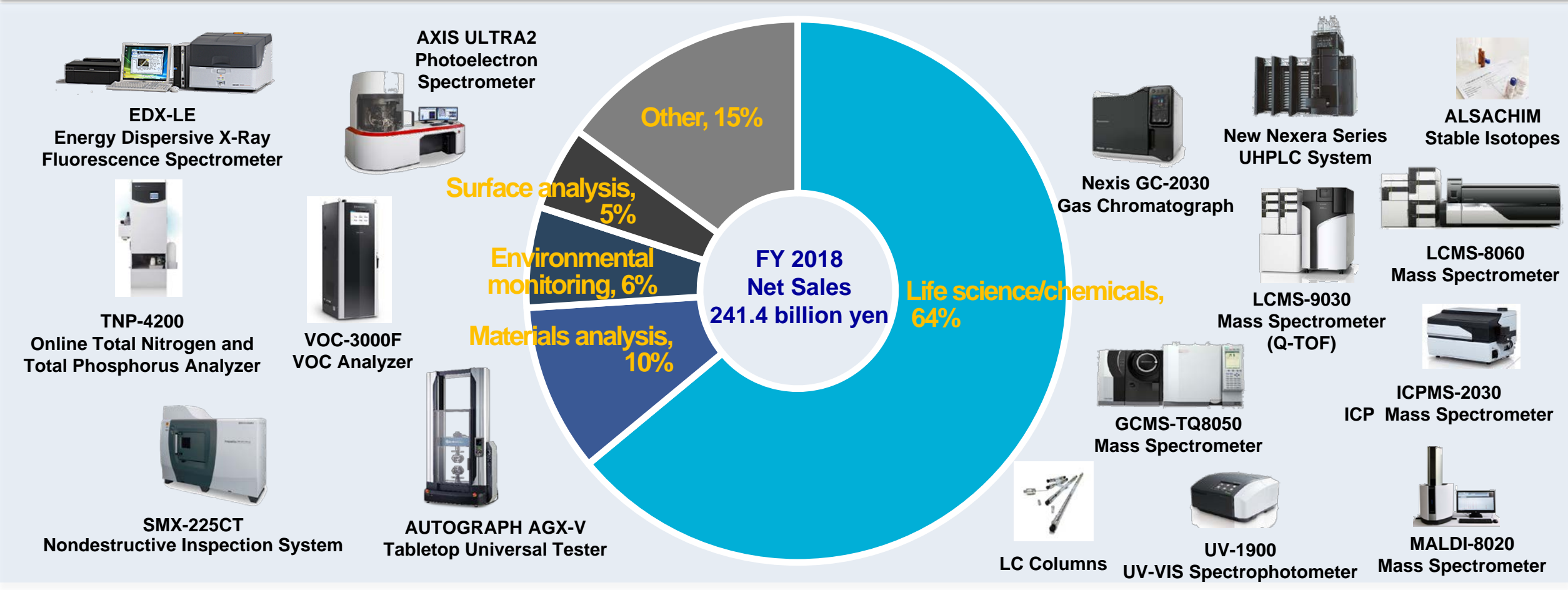
Key Models (LC, MS, GC) Sales Trend



I. Outline of Analytical & Measuring Instruments Business

Business Portfolio

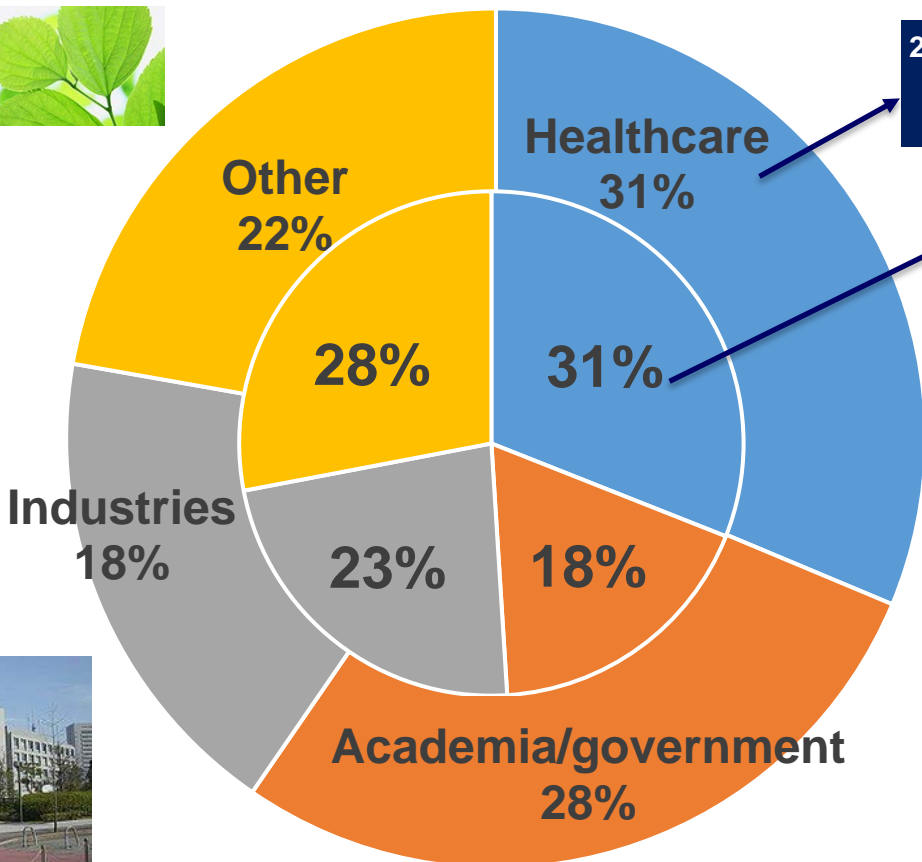
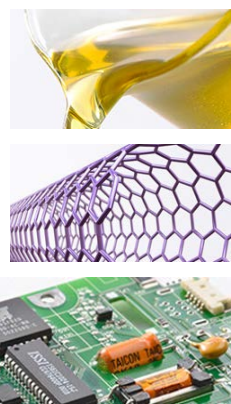
Deploy a broad range of analytical solutions for supporting the infrastructure of society, such as healthcare, environmental, and safety solutions.



I. Outline of Analytical & Measuring Instruments Business

End Markets

In addition to deploying businesses in healthcare and academia fields, actively develop a wide variety of application software to increase our market share in a broad range of industries, such as chemicals, materials, electrical goods, automobiles, and environmental measurement.



2018 global analytical instrument market \$ 63 bil. (2019 SDi Global Assessment Report)

FY 2018 Shimadzu analytical and measuring instruments \$ 2.2 bil.



Predicted End Markets for Analytical Instruments (\$Bil)

Market	Field	2018		2023 Est.	18-23
		Amount	Ratio	Amount	CAGR
Healthcare	Pharmaceuticals, biotechnology, CROs	20	31 %	26	5.3 %
Academia/government		18	28 %	22	4.6 %
Industries	Chemicals, materials, electrical, automotive, etc.	11	18 %	14	4.4 %
Other	Food, environment, clinical, etc.	14	22 %	19	5.6 %
Total		63	100 %	81	5.0 %

(Shimadzu includes food and clinical fields in "Healthcare.")

I. Outline of Analytical & Measuring Instruments Business

Strategic Investments

Main Investments in Recent Years



- **Malaysia Plant operation:** Manufactures eight LC and other models and supplies them to India and Southeast Asia markets.
- **Innovation Centers:** Developed new market demand in the United States by developing dedicated analyzers for cannabis, hemp, and other substances.
- **Alsachim:** Supplies stable isotope-labeled reagents to mass spectrometer customers and is commercializing immunosuppressant analysis kit.

- **Consumables sales subsidiary in China:** Supplies consumable products within China and globally.
- **Analysis centers in China:** Seven analysis centers were built within China to provide technical services based on close contact with regional demand.

II. Growth Strategies for Analytical & Measuring Instruments Business

II. Growth Strategies for Analytical & Measuring Instruments Business

Growth Strategies and their Deployment

Growth Strategies

- Enter Q-TOF (mass spectrometer) and other high-end fields and develop new fields by offering new products and new applications.
- Expand market share of software with advanced functionality, such as “ANALYTICAL INTELLIGENCE” that integrates such software with strong hardware.
- Accelerate measures for solving challenges of society. Promote aftermarket and network businesses.
- Strengthen measures for deploying businesses outside Japan.

Businesses Deployed

Area	Main Business Fields	Challenges in Society	Issues Addressed by Shimadzu
Human health	Clinical Pharmaceutical Life science	<ul style="list-style-type: none"> • Promoting healthcare that is effective for addressing aging society • Promoting preventive healthcare • Routine health management based on a growing interest in health • Development of revolutionary new drugs based on life sciences 	<ul style="list-style-type: none"> ✓ Diagnosis and treatment support ✓ Drug discovery support ✓ Cellular analyses
Global environment	Materials and chemicals Environment	<ul style="list-style-type: none"> • Widespread use of light-weight materials in automobiles and aircraft • Mitigation of global warming and addressing marine plastic trash problem 	<ul style="list-style-type: none"> ✓ Support for developing new materials with lighter weight, lower environmental impact, etc. ✓ Environmental protection
Safety and security	Foods Forensics (academia)	<ul style="list-style-type: none"> • Improving the safety of foods • Stronger countermeasures for illegal drugs and doping 	<ul style="list-style-type: none"> ✓ Support for analyzing residual pesticides and regulated substances

II. Growth Strategies for Analytical & Measuring Instruments Business

Measures to Improve “Intelligence”

“ANALYTICAL INTELLIGENCE”



“ANALYTICAL INTELLIGENCE” consists of new measures only available from Shimadzu for supporting the automation of expert analytical processes that previously required expert knowledge and skills. It enables anyone to acquire data with equal quality as experts, interpret complex data correctly, and avoid common mistakes before they occur, for example.

“ANALYTICAL INTELLIGENCE” is included in the following new products to significantly increase customer support functionality. Then it will be successively introduced in other analytical instruments as well, to accelerate making analytical and measuring instruments more intelligent.

New Nexera series liquid chromatographs

Peakintelligence™ software for liquid chromatograph mass spectrometers

Nexis SCD-2030 sulfur chemiluminescence detection systems

AUTOGRAPH AGX-V materials testing machines



II. Growth Strategies for Analytical & Measuring Instruments Business

Deploying New Products and Expanding Key Model Lines:

1. Liquid Chromatographs (LC)

Culmination of LC Technologies

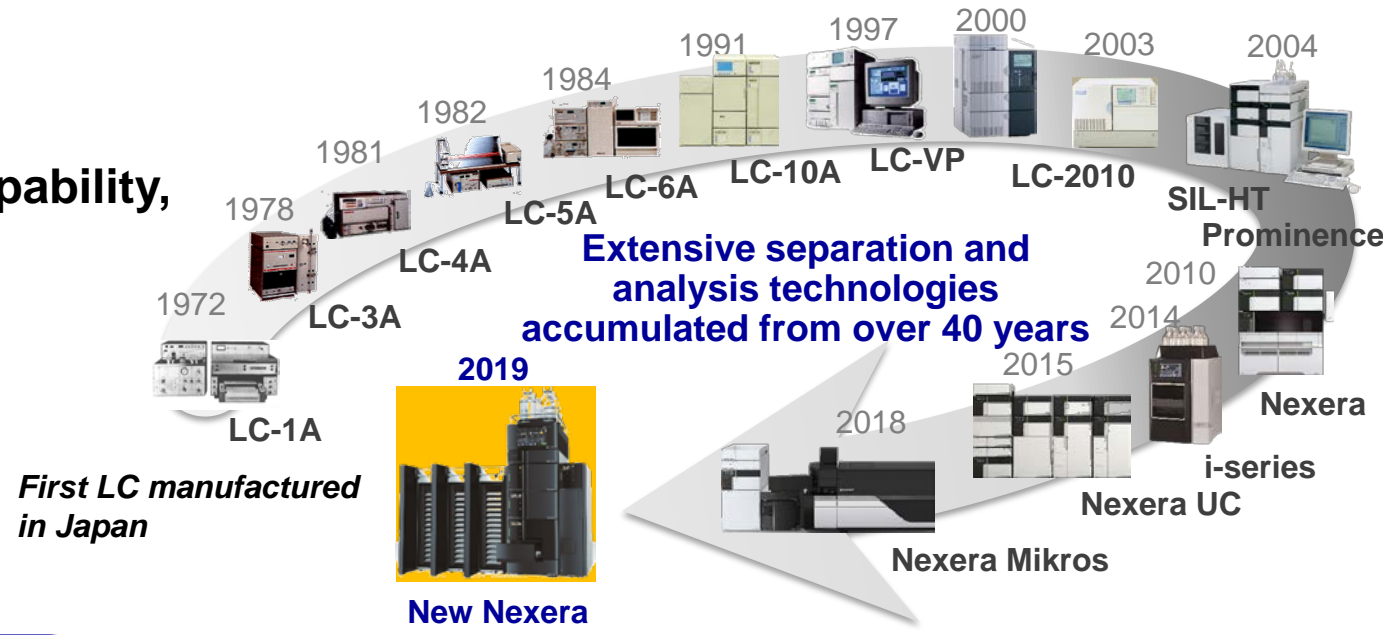
Nexera

Ultra High Performance Liquid Chromatograph



- **Efficiency:** Fast, multianalyte capability, and labor-saving
- **Design:** Space-efficient and sophisticated design
- **Intelligence:** Fewer problems

History of Shimadzu Liquid Chromatographs



“ANALYTICAL INTELLIGENCE”

- Automatic system monitor, self-diagnostics, and auto-recovery
- Automatic analysis control
- Mobile phase monitor

ANALYTICAL INTELLIGENCE



Shimadzu LC

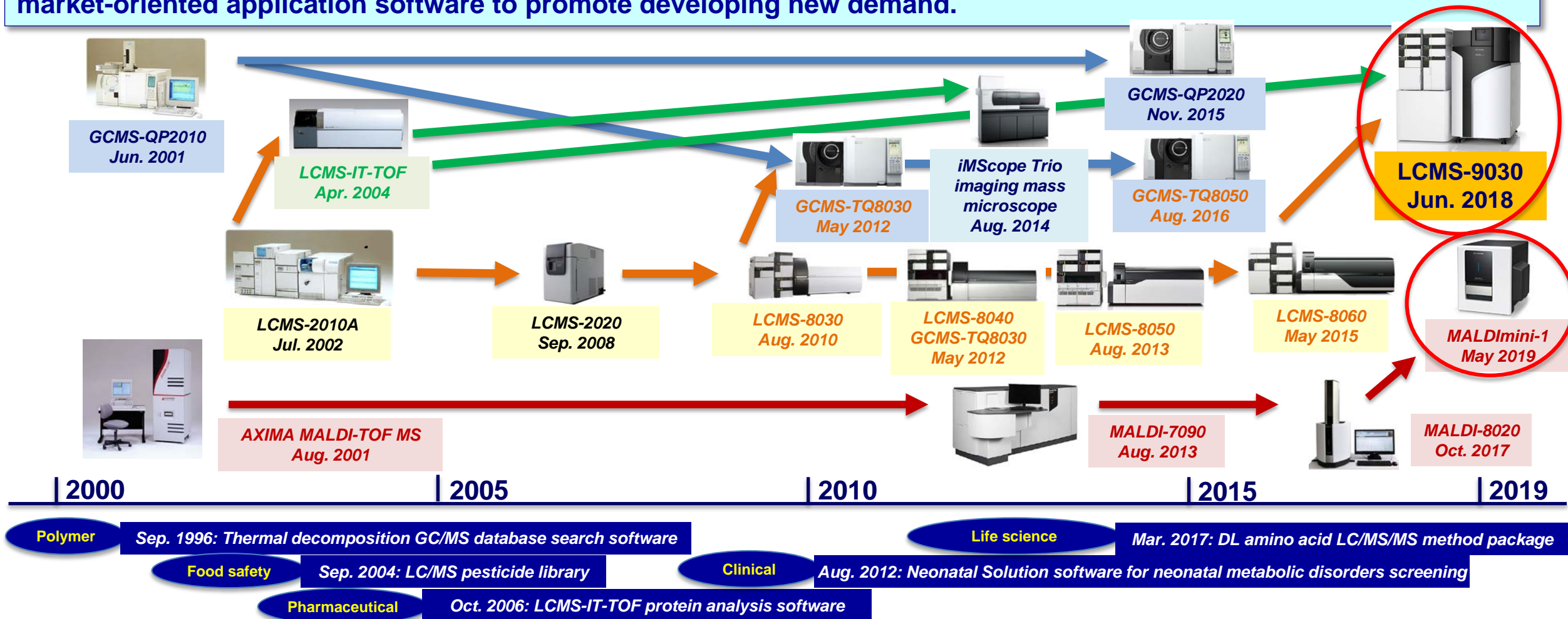
- Low carryover and precise high-speed injection
- High-sensitivity analysis and excellent solvent delivery stability
- Instrument robustness, etc.

II. Growth Strategies for Analytical & Measuring Instruments Business

Deploying New Products and Expanding Key Model Lines:

2. Mass Spectrometers (MS)

Shimadzu has constantly accumulated state-of-the-art key technologies by researching, developing, and adopting new technologies. By integrating such technologies, release new products in a timely manner and simultaneously supply market-oriented application software to promote developing new demand.



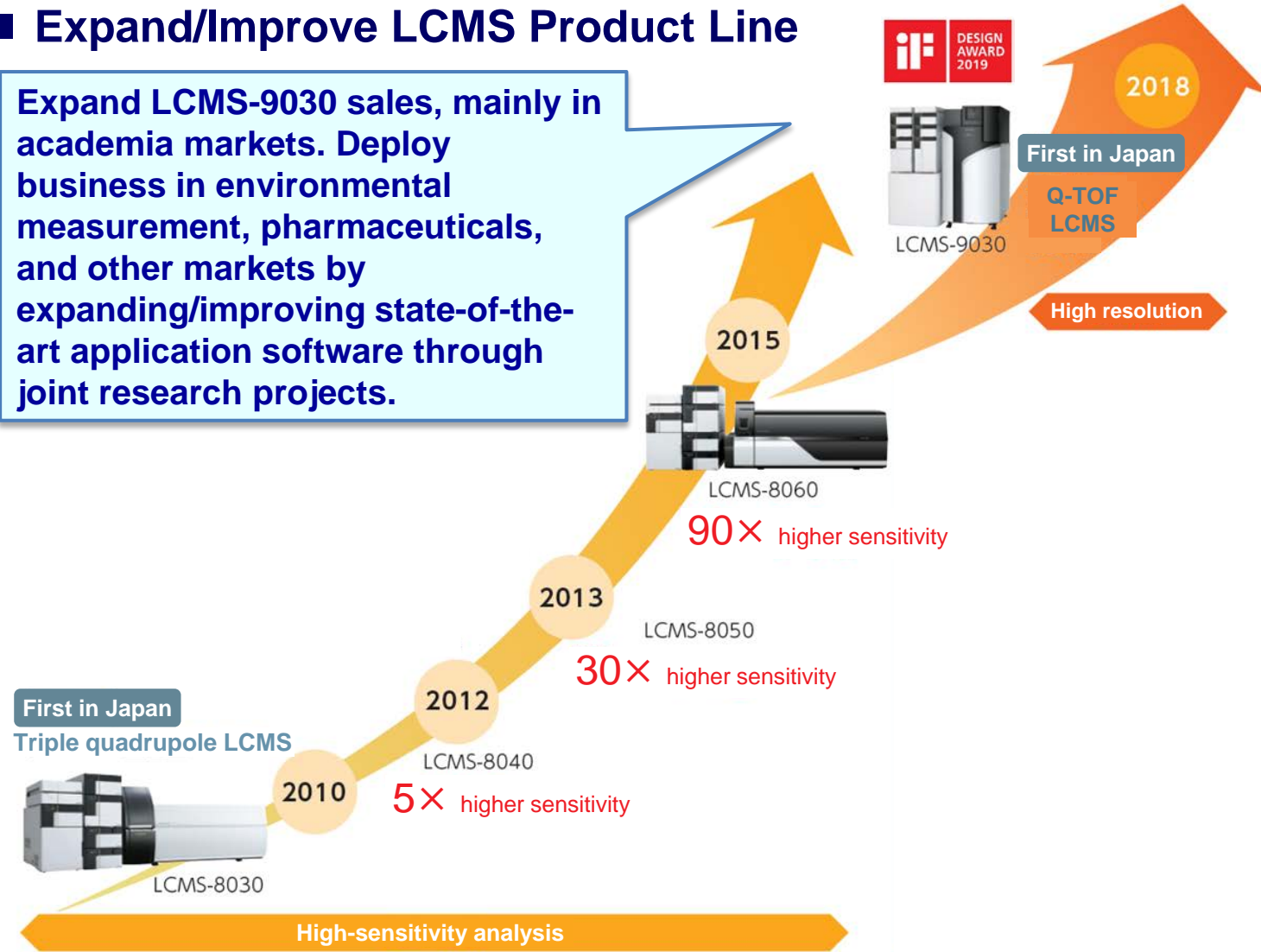
II. Growth Strategies for Analytical & Measuring Instruments Business

Deploying New Products and Expanding Key Model Lines:

2. Mass Spectrometers (MS)

Expand/Improve LCMS Product Line

Expand LCMS-9030 sales, mainly in academia markets. Deploy business in environmental measurement, pharmaceuticals, and other markets by expanding/improving state-of-the-art application software through joint research projects.



Major LCMS Application Software

- LCMS/MS rapid toxicology screening system
- LCMS/MS method package for primary metabolites
- LCMS-9030 metabolites database
- LCMS/MS method for simultaneous analysis of steroid hormones
- LCMS/MS method package for cell culture profiling
- LCMS/MS method package for DL amino acid
- LCMS/MS immunosuppressant analysis kit
- LCMS/MS method package for residual pesticides
- LCMS/MS method package for mycotoxins
- LCMS/MS method package for veterinary drugs
- LCMS/MS method package for water quality and pesticide analysis
- LCMS/MS method package for analyzing hazardous substances in textile products
- AI technology-based automatic peak detection for MS data

II. Growth Strategies for Analytical & Measuring Instruments Business

Deploying New Products and Expanding Key Model Lines:

2. Mass Spectrometers (MS)

■ Direct MS

Expand/improve MS product line based on unique Shimadzu technologies and promote developing new applications.

Compact yet high-sensitivity mass spectrometer with MS³ capability. Deploy it mainly for biopharmaceutical analysis, such as research institutions that analyze sugar chain data.

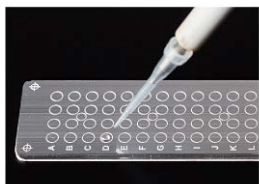
Enables on-site analysis with only simple pretreatment, such as for monitoring impurities in biological samples, food samples, or chemical ingredients.

MALDImini™-1
Digital Ion-Trap Model Mass Spectrometers
 Released in May 2019

DPiMS-8060
Probe Electrospray Ionization Mass Spectrometers
 Released in Dec. 2018



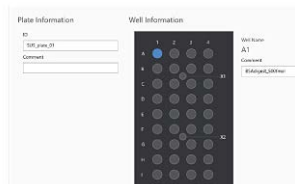
- **Space-Efficient**
Ultra-compact size achieved with digital ion trap and other unique Shimadzu technologies
- **Fast Measurement**
Measures samples immediately after preparation.
- **Measurement of Molecular Weight from Trace Sample Quantities**
Suitable for a broad range of applications, including structural analysis of complex molecules



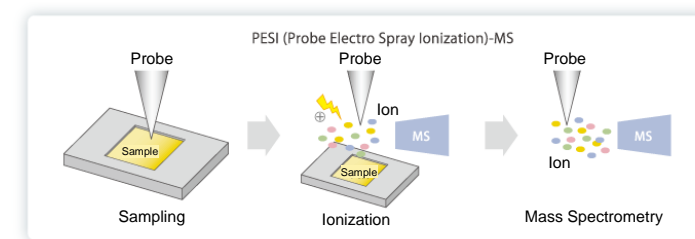
Place sample drops on a plate.
(FlexiMass-SR or FlexiMass-DS can be used.)



Insert the plate in instrument and wait
(for pumping vacuum).



Start analysis.



- Achieves rapid analysis with only simple pretreatment.
- MS unit features high contamination-resistance and low maintenance frequency.
- Suitable for monitoring changes in reactions or degradation over time.

II. Growth Strategies for Analytical & Measuring Instruments Business


Deploying New Products and Expanding Key Model Lines:

2. Mass Spectrometers (MS)

■ LCMS Functionality Improved with Artificial Intelligence

Develop automatic MS data (chromatograms) analysis functionality based on artificial intelligence. Improve accuracy, reduce variability, and significantly reduce labor and time required for analyzing large amounts of data.



“ANALYTICAL INTELLIGENCE”



ANALYTICAL INTELLIGENCE

New “Peakintelligence™” Mass Analysis Software

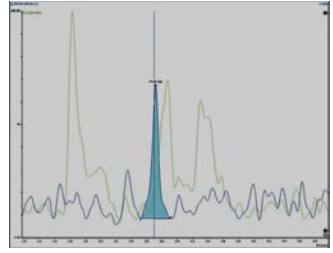
- Liquid chromatogram data analysis (peak picking) automated with AI technology.
- Compared to conventional manual operations, improves accuracy, reduces variability, and significantly decreases labor and time required for data analysis.
- Released as metabolite data analysis software for Shimadzu liquid chromatograph mass spectrometer (LC-MS/MS) systems.
- Priced at 2.5 million yen (one-year license), the product line will be successively expanded for pesticides, water quality, and so on.

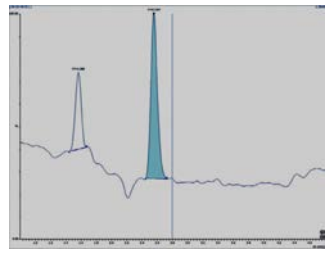
LCMS-8060

Mass Spectrometry Data

Low S/N ratio



High baseline



Automates analysis of this type of chromatogram data that requires expert skills.


II. Growth Strategies for Analytical & Measuring Instruments Business

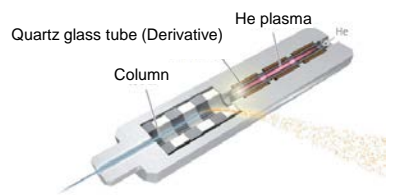
Deploying New Products and Expanding Key Model Lines:

3. Gas Chromatographs (GC)

Accelerate deployment of GC systems for accurate analysis of impurities (sulfur) in petroleum products, for petroleum refining, and for petrochemistry.

Nexis SCD-2030
Sulfur Chemiluminescence Detection Systems
 Released in Feb. 2019

- **Highest sensitivity levels: Achieves about three times higher sensitivity than previous models.**
 - **Optimized application software.**
- 




BID Detector

Shimadzu's unique high-sensitivity detector that can even detect trace components difficult to detect with a general-purpose detector

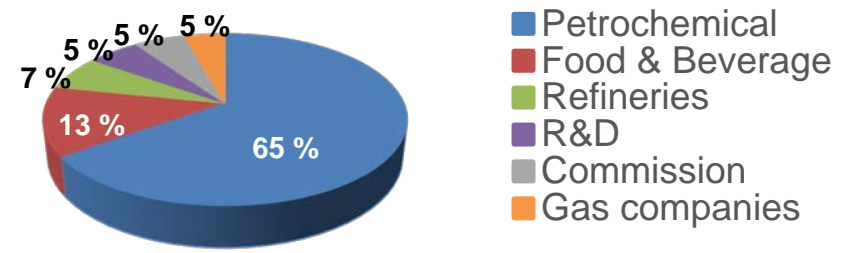
“ANALYTICAL INTELLIGENCE”

- **Automatic startup and shutdown functions**
- **Instrument problem self-diagnostic function**
- **Functions for monitoring the usage status of columns and other consumables and monitoring electric power consumption**



ANALYTICAL INTELLIGENCE

SCD Detector End Markets



II. Growth Strategies for Analytical & Measuring Instruments Business

Deploying New Products and Expanding Key Model Lines:

4. Testing Machines


Released new AUTOGRAPH material testing machine that offers improved data reliability functionality and deploy it globally for ferrous and non-ferrous metals, new materials, automobiles, etc. Offer compliance with international standards, such as ISO, ASTM, etc.

AGX-V
AUTOGRAPH
Released in Apr. 2019

- Achieves ultra-fast and highly accurate control and a touch panel provides improved operability.
- Achieves data integrity (prevents data tampering) using a network system (connecting up to seven units).

“ANALYTICAL INTELLIGENCE”

- Voice assistance for operations
- Self-diagnostic function checks the instrument status.



Healthcare—Extending Healthy Life Expectancy 1/2



Shimadzu Topics

1. Support for developing revolutionary new drugs
2. Establishing techniques for early detection of diseases and implementing them in society
3. Support for routine health management

A. Dementia-Related Measures

A-1. Detect Beta-Amyloids Associated with Alzheimer's

- Identify biomarkers involved in amyloid accumulations in cooperation with National Center for Geriatrics and Gerontology (research paper published February 2018 in online version of Nature, the authoritative English-language scientific journal).
- In August 2018, the contract analysis service dedicated to drug discovery experts using this technique was started. It has already been ordered by multiple research institutions and companies in Japan.
- The contract analysis service is scheduled to start in North America from December 2019 and is also being considered in Europe.

A-2. Screening Examination for Mild Cognitive Impairment (MCI)

- In August 2017, Shimadzu and Taiyo Life Insurance Company invested in MCBI, a mild cognitive impairment testing startup company from the University of Tsukuba. The three companies are jointly deploying an MCI testing business.
- Near-infrared (NIRS) brain function imaging and other technologies are used to estimate the effectiveness of rehabilitation improving symptom and inhibiting the progression of MCI.

Amyloid Deposit Analysis (Minimally Invasive and Low Cost)

micro-volume
blood sample
(0.5mL)



MALDI mass spectrometer



Predict
accumulation of
beta-amyloid in
brain.

II. Growth Strategies for Analytical & Measuring Instruments Business

Growth through Contribution to Solving Challenges of Society

Healthcare—Extending Healthy Life Expectancy 2/2



LIGHTVISION Near-Infrared Fluorescence Imaging System



Liquid Chromatograph Mass Spectrometer



Gas Chromatograph Mass Spectrometer

B. Cancer-Related Measures

B-1. Cancer Photoimmunotherapy Measures

- Support cancer photoimmunotherapy research by Dr. Hisataka Kobayashi at the National Cancer Institute (NCI) in the United States.
- Completely new treatment method that kills cancer cells with no adverse effects by irradiating near-infrared light to the cancer cells captured by photoimmunotherapeutic agents.
- Destroy cancer cells with a Shimadzu near-infrared fluorescence imaging system and determine therapeutic effect with a mass spectrometer.

B-2. Colon Cancer Screening

- Identify biomarkers characteristic of colon cancer in joint research with the Kobe University School of Medicine and National Cancer Center.
- The screening method was introduced in cooperation with a healthcare institution in Kyoto on a trial basis, with verification tests now being conducted.
- Promote improving accuracy of analysis and expanding applicable scope to include breast cancer, pancreatic cancer, stomach cancer, etc.

II. Growth Strategies for Analytical & Measuring Instruments Business

Growth through Contribution to Solving Challenges of Society

Environmental and Food—Achieving a Better Environment and Life 1/2



Shimadzu Topics

1. Using analytical technology to offer solutions for increasingly serious environmental problems, such as global warming and marine pollution by microplastics
2. Analyzing/screening active ingredients and residual pesticides in foods and beverages
3. Offering air, water, and soil environmental monitoring analysis solutions

A. Environmental Protection Measures

A-1. Microplastics Analysis

- Despite the concerns about the impact the large amounts of plastics released into the oceans may have on biological organisms and ecosystems, effective measurement and analytical methods have still not been established.
- Shimadzu will continue to contribute toward preventing marine pollution by using Shimadzu's diverse analytical and measuring technologies to establish effective methods for analyzing increasingly apparent microplastics.

Microplastics: Tiny bits of plastic, from a few microns to a several millimeters in size, generated from plastic trash that flows into rivers, lakes, and oceans and is broken down by UV rays and physical wear. Given the difficulty of recovering microplastics, there is concern about their negative impact on the marine ecosystems.

II. Growth Strategies for Analytical & Measuring Instruments Business

Solutions for Measuring Plastic Trash in Marine Environments

- As marine pollution by microplastics is becoming an increasingly serious problem, a committee was formed in July 2019 (by the Japanese Ministry of Economy, Trade and Industry) to study establishing international standards for marine-biodegradable microplastics. Shimadzu is participating in that committee and has started active measures. <https://www.meti.go.jp/press/2019/07/20190722003/20190722003.html>
- Shimadzu has started studying marine-biodegradable plastics, establishing measurement methods and international standards for marine plastics, and is engaged in establishing effective methods for analyzing plastic materials in marine environments and substances adhered to such plastics.



Solutions for Measuring Marine Microplastics



Microplastics Analysis



FTIR
Identifies the type of plastic (min. 100 μm).



FTIR Imaging
Identifies the type of plastic (max. 100 μm).



iSpect DIA-10
Displays images of plastics and measures particle count concentrations.



DSC
Measures proportional content of plastic components.

Adhered Substance Analysis



GCMS
Analyzes organic compounds.



EDX
Analyzes constituent elements.

II. Growth Strategies for Analytical & Measuring Instruments Business

Growth through Contribution to Solving Challenges of Society

Environmental and Food—Achieving a Better Environment and Life 2/2



B. Food Analysis Measures

B-1. Increasing Added Value in Foods

- Started joint research with the National Agriculture and Food Research Organization (in Tsukuba City, abbreviated NARO below) to develop a new simple and quick method for analyzing components with functional benefits contained in agricultural products and foods from various regions of Japan and, thereby, contribute to improving the international competitiveness of Japanese agricultural products and foods.
- NARO established a laboratory in the Cooperation Lab at Shimadzu's Healthcare R&D Center for accelerating and conducting more in-depth joint research and development with Shimadzu.

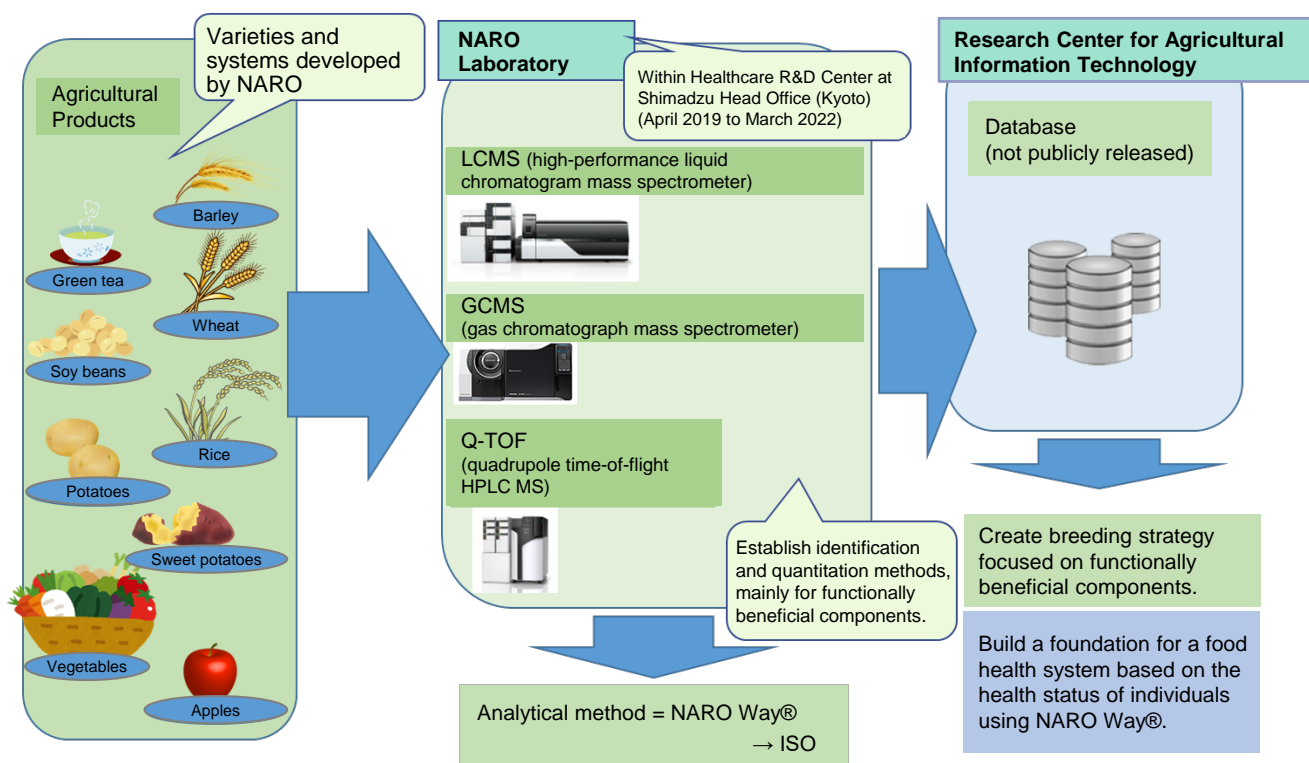


II. Growth Strategies for Analytical & Measuring Instruments Business

New Measures for Food Analysis

Started joint research with NARO to promote developing analytical methods, such as for functionally beneficial components. Aim to build a foundation for establishing food health systems based on the health status of individuals.

Research at NARO and Shimadzu Joint Research Laboratory for Analyzing Functional Benefits of Foods

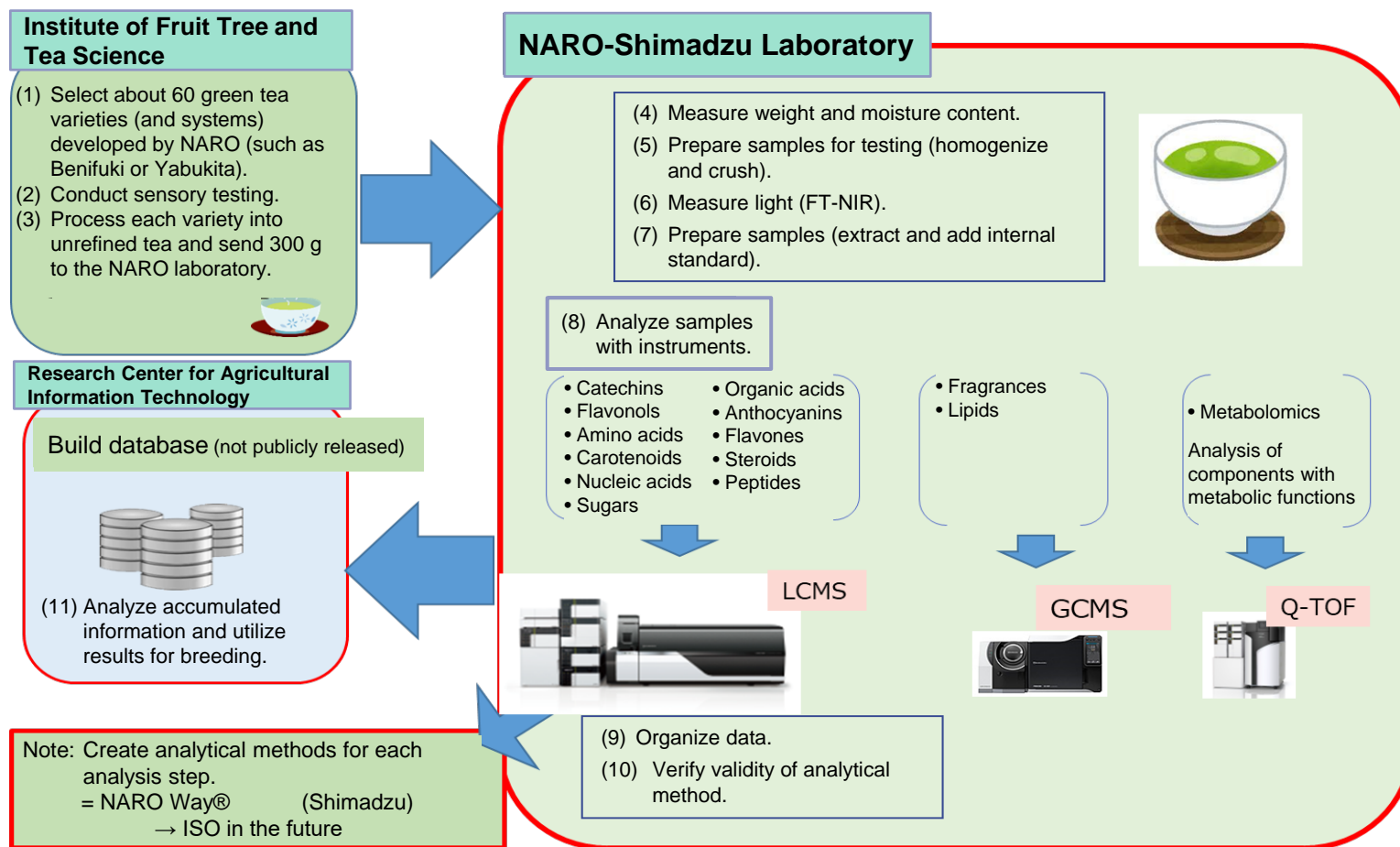


- Implement measures to establish standards and standardize methods.
- Deploy to local governments or other organizations in a cooperative relationship with Shimadzu.
- Expand overseas as a model for advanced applications.

II. Growth Strategies for Analytical & Measuring Instruments Business

New Measures for Food Analysis

2019 Analysis of Green Tea Components by NARO and Shimadzu



II. Growth Strategies for Analytical & Measuring Instruments Business



Growth through Contribution to Solving Challenges of Society

Materials—Contributing to Development of New Materials that are Lighter, More Functionally Advanced, Etc.

New Materials

Ferrous Metals
Nonferrous Metals


- Lighter weight
- Higher strength
- Higher productivity
- Environmental impact reduction
- Data tampering prevention

Aircraft

Automotive

- Lighter weight
- Higher fuel efficiency
- Higher safety
- Electrification
- Automatic operation




New Materials

- More advanced evaluation and measurement technologies
- Position, shape, and size of defects
- Precision measurement, etc.



Lithium-Ion Batteries

- Internal gas analysis
- Strength evaluation
- Contaminant analysis
- Internal structure analysis
- Elemental analysis, etc.



Data Integrity

- Automated reports
- Functionality for managing, using, and protecting data
- Compliance with standards
- JCSS calibration, etc.



II. Growth Strategies for Analytical & Measuring Instruments Business

Active Compliance with Environmental and Other Standards

Contribute to environmental protection and improved food safety by actively participating in establishing standards and standardizing methods.

Marine Microplastics Analysis

Developed software applications compliant with standardization of standards.



AIM-9000 Infrared Microscope

Method for Testing Hardness of Plastics

Participated in creating plastic hardness testing method.



Plastic Hardness Analyzer
(compliant with ISO/TS 19278)

High-Speed Plastic Tensile Testing Method

Participated in creating a high-speed tensile testing method for evaluating the strain-rate dependence of plastics.



HITS High-Speed Tensile Testing Machine

Measurement of Trace Moisture Content in LPG

Application pending for adoption of standard method by ASTM International



Trace Moisture Content Measurement System

Total Nitrogen Analysis Method Compliant with EPA (U.S. Environmental Protection Agency) Chemical Substance Regulations

Already adopted as standard method.



Total Organic Carbon Analyzer

EPA Regulations for PFAS (Per- and Polyfluoroalkyl Substances)

Participated in creating a method for analyzing short-chain PFASs in beverages.



LCMS-8060 Mass Spectrometer

Revised RoHS Directive

Participated in creating a testing method for phthalate esters.



Py-Screener Screening System for Phthalate Esters

II. Growth Strategies for Analytical & Measuring Instruments Business

Expanding the Aftermarket Business

- Promote developing consumable products, such as columns used in chromatographs and mass spectrometers.
- Strengthen coordination among Groups for developing and selling reagents and consumables.
- Strengthen global sales channels for consumables.



 SHIMADZU



Fully Automatic LC-MS/MS Pretreatment System



Liquid Chromatograph Mass Spectrometer

Analysis systems and applications

Reagents

Pretreatment materials

Consumables

Total Solution

ALSA CHIM
a Shimadzu Group Company



Stable Isotopes-Labeled Reagents



Pharmaceutical Analysis in Blood

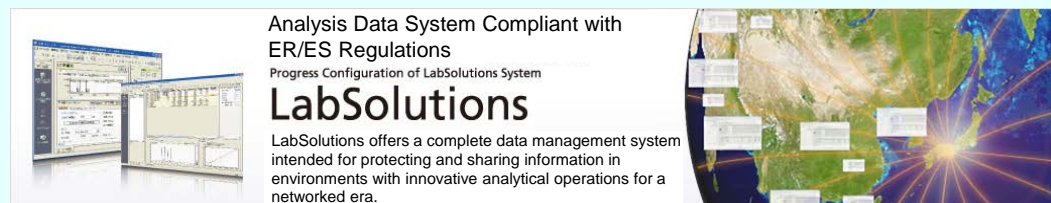
- Immunosuppressants
- Anticonvulsants, etc.



II. Growth Strategies for Analytical & Measuring Instruments Business

Strengthening the Network Business

Use Cumulative Results in Pharmaceutical Field to Deploy Business in Many Other Fields





- Develop total systems for integrated management of analytical instruments and test information, such as systems that improve the efficiency of pharmaceutical testing processes or that offer stronger security functionality.
- Comply with data integrity requirements for all analytical instruments in pharmaceutical and other laboratories.
- Also deploy business in materials fields, where data tampering has become a problem.
- Use AI and IoT technologies to improve network systems and expand the business through cooperation with the service business.





Further Expansion outside Japan

North America: Develop advanced analytical solutions through joint research with key opinion leaders (KOLs).

<p>Operate Businesses Jointly with KOLs</p>	<ul style="list-style-type: none"> • Promote joint research at the Innovation Center in the United States. Develop dedicated analyzers for new markets and deploy cannabis/hemp analyzers to large laboratories in the United States. Expand sales of preparative SFC systems developed jointly with ETC (consortium of pharmaceutical companies). • Promote establishing official methods in cooperation with institutions in the United States, such as the Food & Drug Administration (FDA), United States Pharmacopeia (USP), Environmental Protection Agency (EPA), and ASTM International (ASTM). 	
<p>Offer New Solutions</p>	<ul style="list-style-type: none"> • Deploy new LC models and data integrity in pharmaceutical fields. • Start beta-amyloid contract analysis service dedicated to drug discovery experts(scheduled for December 2019). • Expand sales of material testing machines and high-speed video cameras in materials fields. 	
<p>Strengthen Capabilities</p>	<ul style="list-style-type: none"> • Strengthen measures to win product-package projects in academia fields where investment in cutting-edge technologies is strong. • Prepare, improve, and expand sales channels and service networks in Canada, Mexico, and other countries near the United States. 	

Further Expansion outside Japan



Europe: Develop new solutions for Europe at the European Innovation Center.

Measures for Key Fields

- CRO and contract analysis: Strengthen deployment to major contract analysis companies.
- Pharmaceuticals: Expand business to small/medium-sized pharmaceutical companies, based on new LC models and data integrity.
- Foods: Deploy for cannabis demand in Europe (horizontal deployment of success case in North America).
- Automotive: Strengthen support for adoption of new materials, such as lighter weight materials.



Strengthen System Products

- Expand sales of systems intended for specific applications.
- Offer total solutions (products packaged with MS and pretreatment unit, reagents, consumables, and so on).
- Strengthen system development function at European Innovation Center.

Strengthen Business Base

- Expand informatics departments to strengthen the software business.
- Strengthen specialized sales function intended to expand MS sales to a new level.



Further Expansion outside Japan



China: Focus efforts on healthcare, academia, and other fields where growth and advancement is predicted.

Healthcare

- Accelerate deployment for clinical MS applications and strengthen cooperation with representative advanced healthcare institutions.
- Satisfy demand for improving quality of generic drugs and herbal remedies and demand for compliance with the revised Chinese Pharmacopoeia (2020).



Academia Research Institutions

- Demand will expand, due to not only the Double First-Class University Plan intended to promote advancement of academia, but also due to the 2019 start of the Double Ten Thousand Plan, for establishing new high school educational institutions, and the Double High Plan, for establishing new more advanced specialized technical schools.
- Strengthen deployment of high-end models, such as new LC models, high resolution MS models, and imaging mass spectrometers.

Double Ten Thousand Plan: Plan to establish ten thousand first-class university departments at national-level universities and ten thousand first-class departments at prefecture-level technical schools.

Double High Plan: Plan to establish about 50 high-quality vocational schools and about 150 technical schools every five years.

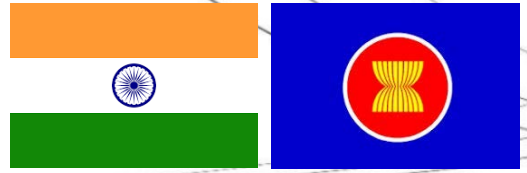


Environmental Monitoring

- Strengthen cooperation with applicable environmental authorities in China to help create environmental analysis standards (such as standard methods for offline monitoring of atmospheric VOCs, methods for soil analysis by GCMS/MS, and dioxin analysis criteria).
- Promote cooperation with environmental contract analysis companies and expand supplying monitoring systems.



Further Expansion outside Japan



Other Asian countries: Accelerate expansion in key fields by capitalizing on diverse demand.

**Expand
Pharmaceuticals
Market Share in
India**

- Expand sales of high-end models, such as new LC models and LCMS models.
- Expand GCMS sales for sartan-based drug analysis applications, where impurity analysis became a problem.
- Strengthen approach to contract testing companies.
- Strengthen regulatory compliance through LCMS software improvements.



**Develop More
Pharmaceuticals
Market
Opportunities in
ASEAN**

- Expand sales of network systems for small/medium-sized pharmaceutical companies.
- Expand sales of i-Series integrated LC systems.
- Strengthen regulatory compliance and provision of information to customers.



**Markets Other
than
Pharmaceuticals**

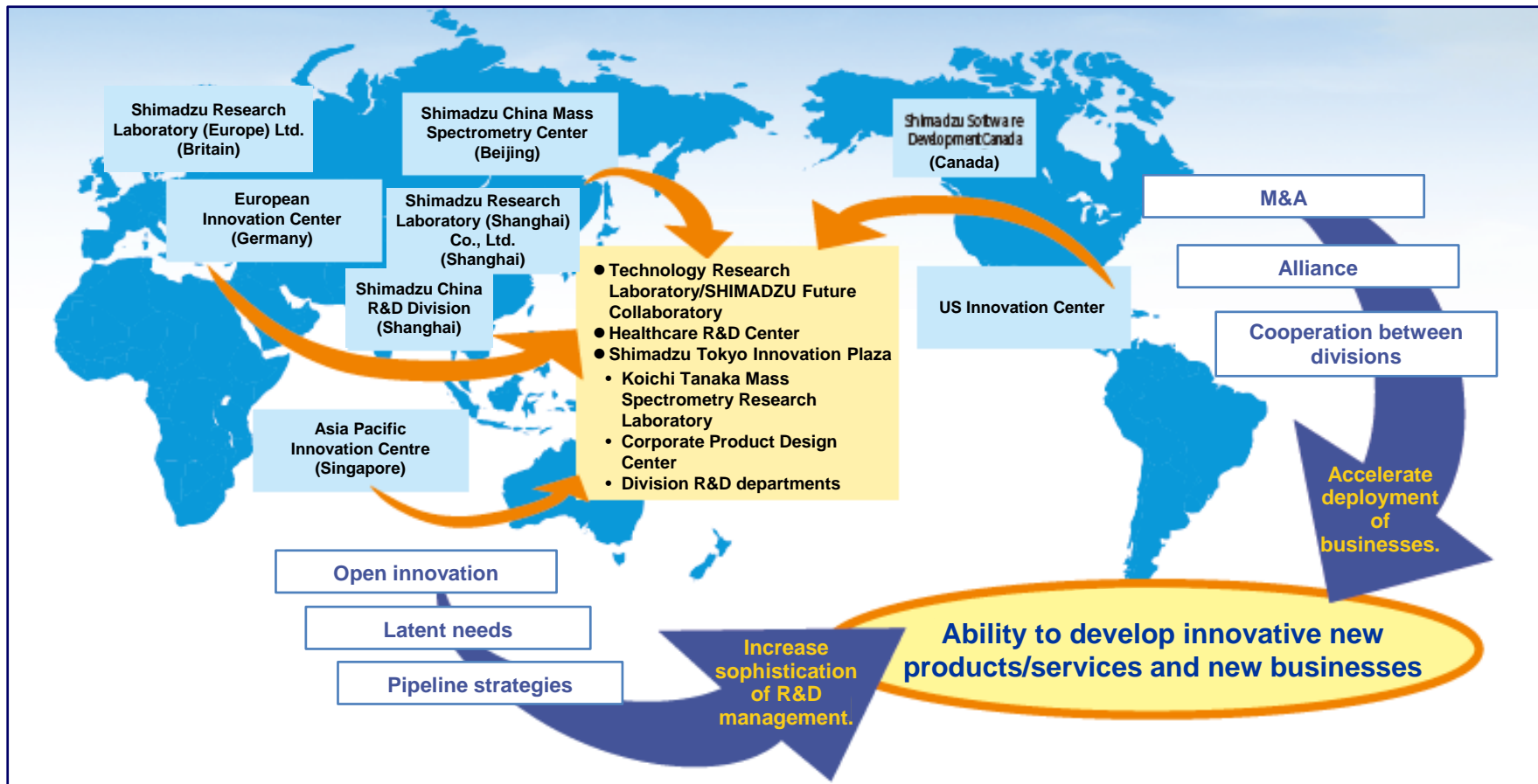
- Expand MS sales to private-sector contract testing companies, such as for food safety, environmental, or diagnostic testing.
- Expand sales to government-based laboratories, mainly for food safety, with efforts especially focused on academia.
- Implement measures for analysis demand in low-end markets.



II. Growth Strategies for Analytical & Measuring Instruments Business Strengthening Research and Development



- Strengthen and expand/improve basic research, product/service development, and application technology/software functions.
- Significantly strengthen R&D in accordance with the medium-term management plan.
- Contribute to solving challenges of society by implementing advanced research and development results in society.



Contributing to Solving Challenges of Society by Implementing Advanced R&D Results in Society

- **Healthcare**
Early detection of diseases, promotion of good health, etc.
- **Infrastructure**
Development of safety systems, etc.
- **Materials**
Evaluation of new material performance, etc.
- **Environment/energy**
Environmental monitoring
Support for extending battery life

III. Summary

III. Summary

Improving Global Presentations for Analytical and Measuring Instruments

Offer extensive line of products and services and solutions for new demand, strengthen new product development, and accelerate advanced joint research.

- Satisfy broad demand for analytical systems, for applications ranging from cutting-edge to general-purpose, by offering an extensive line of products and services.
- Offer new solutions not only for the healthcare field, but also in other growth fields, such as new materials, environmental measurement, and food safety.
- Strengthen the deployment of new products, such as by updating the line of liquid chromatograph products, by entering high-end fields and reducing product size to develop new fields for mass spectrometers, by offering detectors with unique characteristics for gas chromatographs to expand market share in petrochemical fields, and by offering highly accurate materials testing for a diverse range of materials for testing machines.
- Increase added value and strengthen competitiveness of analytical instruments based on **“ANALYTICAL INTELLIGENCE.”**
- Participate in creating and standardizing global environmental and food safety standards.
- Strengthen R&D functions within and outside Japan, mainly at Innovation Centers and the Healthcare R&D Center, accelerate joint research with universities and other advanced institutions, and create number-one and truly unique products.





SHIMADZU

Excellence in Science

This document contains forward-looking statements. Forecasts of future business performance that appear in this document are predictions made by the company's management team that are based on information available when these materials were prepared and are subject to risks and uncertainties. Consequently, actual results may differ materially from the forecasts indicated above. Factors that may influence actual business performance include, but are not limited to, economic conditions within and outside Japan, changes in technologies in markets, and fluctuations in exchange rates.

Contact: Investor Relations Group
Corporate Communication Department
Shimadzu Corporation

Phone: +81-75-823-1673 E-Mail: ir@group.shimadzu.co.jp