

# **Analytical and Measuring Instrument Business Briefing**

**Shimadzu Corporation** 

Yoshiaki Mase, Senior Managing Executive Officer and

Analytical and Measuring Instrument Division General Manager



# **Agenda**

- I. Overview of AMI Business
  - 1) Performance Trends
  - 2) Percentage of Sales
  - 3) Product Portfolio
- **II. Growth Strategy for AMI Business** 
  - 1) Growth Strategy Overview
  - 2) Healthcare Strategy
  - 3) GX (Green Transformation) strategy
  - 4) Product Strategy
  - 5) Strategy in North America
- III. Introduction of Shimadzu Tokyo Innovation Plaza

**General Manager, Mase** 

Deputy General Manager, Matoba Deputy General Manager, Nakai Deputy General Manager, Tomita Deputy General Manager, Okazaki Deputy General Manager, Okazaki



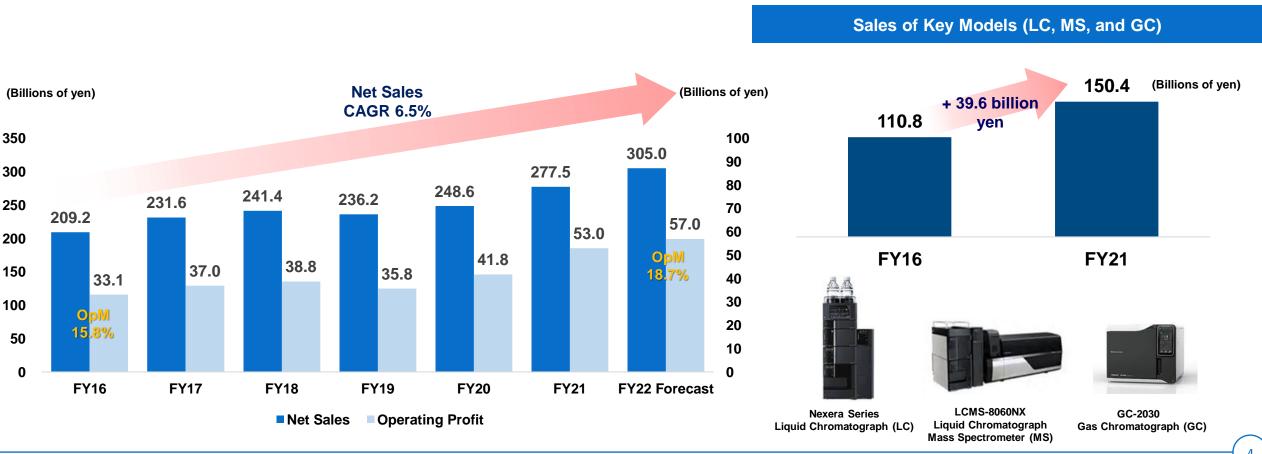




I. Overview of AMI Business

# 1) Performance Trends

- Sales CAGR of 6.5% in FY 2016 to FY 2022 (forecast), higher than the analysis equipment market average of 4.5%
- Operating profit margin for measuring instruments is expected to significantly improve to 18.7%, an improvement of 2.9%pt, driven by high-profit, key models (LC, MS, and GC)

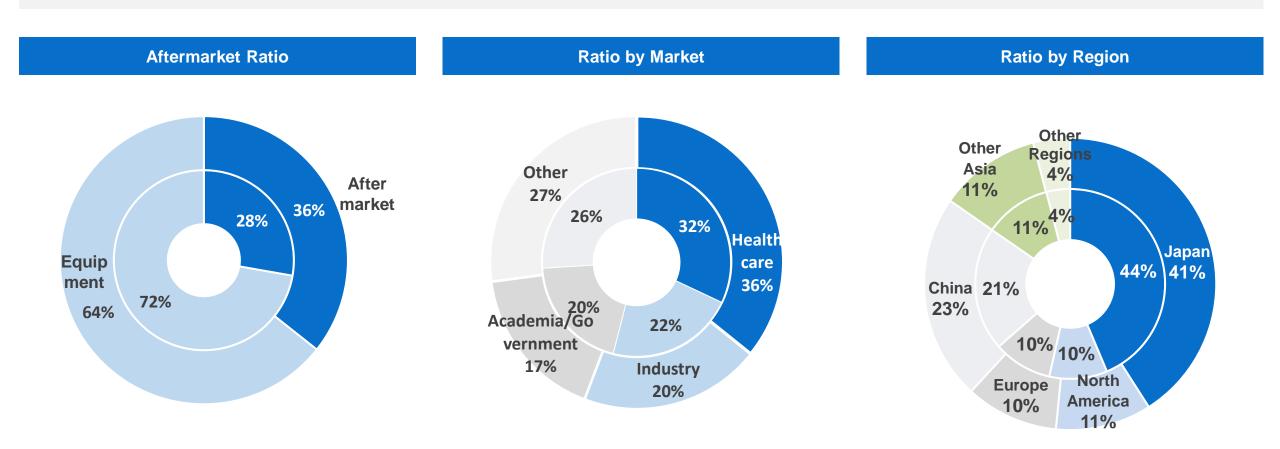




I. Overview of AMI Business

# 2) Percentage of Sales

- Aftermarket ratio improved 8pt to 36% in FY 2016 to FY 2021 by promoting consumables development
- By market, Healthcare grew. By region, overseas sales ratio increased

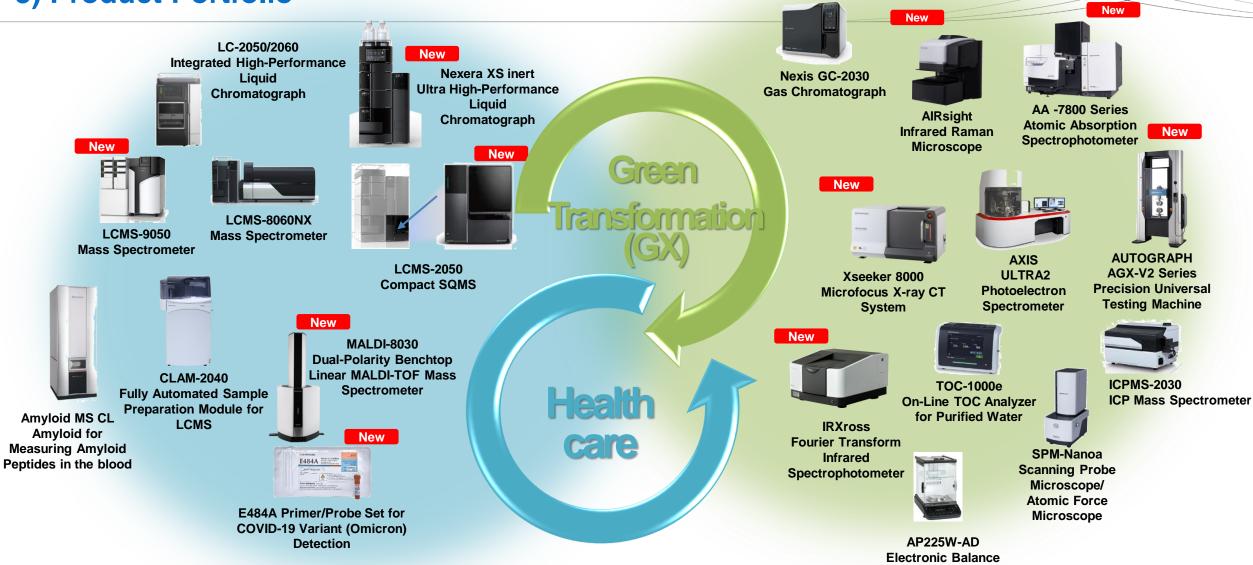


<sup>\*</sup>Pie chart outer rings indicate FY 2021 results and innert rings indicate FY 2016 results



I. Overview of AMI Business

# 3) Product Portfolio













**II-1. Growth Strategy for AMI Business** 

# 1) Policy and Business Areas of the New Mid-term Plan

### **Basic Policy**

Strengthen relationships with global partners and co-create a sustainable society focusing on healthcare and GX (Green Transformation), the areas of creating social value.

### **Business Areas**

Field	Business areas	Issues for Achieving a Sustainable Society	Our Company's Initiatives
Wellbeing of Mankind	Healthcare	<ul> <li>Overcoming diseases such as cancer, lifestyle-related diseases, infectious diseases, neurological and mental diseases</li> <li>Efforts to increase healthy life expectancy as global population ages</li> </ul>	<ul> <li>Pharmaceutical market: Expand business with focused investment on nucleic acid field and North America</li> <li>Clinical market: Expand business by focusing clinical diagnostics, microbiological testing, and cell related</li> <li>Supporting the provision of functional foods and other products that contribute to human health through collaboration with partners</li> </ul>
Wellbeing of the Earth	GX(Green)	<ul> <li>Realization of a sustainable society through the spread of new energy sources such as hydrogen and biomanufacturing</li> <li>Measures to address environmental pollution and regulations, such as new issues such as microplastics and PFAS</li> </ul>	<ul> <li>Supporting R&amp;D toward a sustainable society and providing total measuring solutions in the supply chain</li> <li>Contributing to the creation of new industries such as biomanufacturing and hydrogen</li> <li>Development and global standardization of measurement methods for new environmental pollution regulations</li> </ul>



II-1. Growth Strategy for AMI Business

# 2) Basic Strategy

		<b>3</b> 7	
_	Strategic Area	ltem	Main Measures
	Field Strategy	Healthcare (Pharmaceutical, Food, and Clinical)	<ul> <li>Focusing on nucleic acids and gaining market share of western pharmaceuticals in small molecules</li> <li>Increase market share and brand by working on functional foods and alternative proteins</li> <li>Business development focused on clinical diagnostics, microbiological testing, and cell-related business, and system establishment to acquire the Pharmaceutical and Medical Device Act</li> </ul>
		GX (Green)	<ul> <li>Building new standard measuring methods by strengthening relationships with regulatory setters such as NEDO</li> <li>Global business expansion by both application and new product strategy</li> <li>Providing total measuring solutions for new industries such as bio-manufacturing and hydrogen energy</li> </ul>
	Dovolonment	Key Businesses (LC, MS)	<ul> <li>For LC, launch new products and promote collaboration with column vendors</li> <li>For MS, launch new products of LCMS, GCMS and increase competitiveness through software applications</li> </ul>
	Development Strategy	Strengthening Business	<ul> <li>Meeting automation needs and enhancing pre-processing, including robots</li> <li>Introducing new testing machines for EV market and microplastic analysis equipment</li> </ul>
	Regional	North America	<ul> <li>Establishing a development base in the North America, developing advanced technologies, and acquiring a clinical business base</li> <li>Promotion of application, sales and service strategies</li> </ul>
St	strategy	*Other Areas	<ul> <li>Developing green markets in Europe and food markets in Asia</li> <li>Targeting high-end customers in China and strengthening software in India</li> <li>Expand global business such as by strengthening global sales base</li> </ul>
		*Manufacturing And Service	<ul> <li>Response to preferential treatment for domestic products in China and supply chain issues</li> <li>Building foundation such as quality platform and simplified installation</li> </ul>
	Strategy by function	Application Development (Solutions COE: Solutions Center of Excellence)	<ul> <li>Providing solutions by market-in based at Shimadzu Tokyo Innovation Plaza</li> <li>Strengthen collaboration with industry partners to develop business models for social implementation</li> </ul>







# **Pharmaceutical Strategy by Classification**

- The pharmaceutical market as a growth market, small molecules growing globally, large molecules growing in Europe and Asia, and nucleic acid drugs growing in Europe and America
- Building competitive advantage by focused investment in medium-molecular nucleic acid drugs and upfront investment in North America in cell
  and gene therapy

Classification	2020 to 2026 CAGR*	Market Environment	Our Company's Strategy
Small Molecules	3.5%	<ul> <li>More generic manufacturers, CROs and CDMOs</li> <li>Continuous production and real-time release testing are trending</li> </ul>	<ul> <li>Increasing the market share of LC and LCMS with preparative LC and supercritical fluid chromatograph (SFC) as core products</li> </ul>
Large Molecules (Antibodies)	6.1%	<ul> <li>Expansion in Europe, China, India and South Korea</li> <li>Biosimilars are limited due to the complexity of the process</li> <li>More CROs and CDMOs</li> </ul>	Sales expansion of sugar chain analysis pre-treatment system and MS product development
Medium Molecules (Nucleic Acid)	16.6%	<ul> <li>Growing rapidly, mainly in Europe and America</li> <li>More CDMOs</li> </ul>	Expand business by increasing lineups to include customers using competitors' products with our preparative purification products
Cell Therapy Gene Therapy	36.3% 27.1%	<ul> <li>Growth markets in Europe and North America</li> <li>Regulation in progress</li> </ul>	<ul> <li>Promote acquisition of cutting-edge technologies in North America</li> <li>Enter the therapy market from the media business and search for LCMS applications</li> </ul>



# Initiatives for the Food Field

- Increase market share in the food industry through initiatives in the functional food field, such as collaboration with NARO.
- Promoting market creation and standardization in new markets such as the alternative protein industry
- Providing a total solution of pre-processing + analysis + data analysis
- Standardization Strengthen application development and human resource development in standardization efforts

### **Current Initiatives**

- Databases such as method packages are our company's strength
- Mainly providing pesticide residues, mycotoxins, food deception and microbial identification
- Enhance digital marketing while expanding LCMS and GCMS applications
- Strengthen standardisation strategies in the food sector

### **Future Initiatives**

### **Functional Food**

- Development of new methods with NARO
- Standardization of Methods

- €農研機構
- Collaborative development with customers in testing labs
- Contributing to the realization of a healthy and long-lived society
  - Provision of functional foods
  - Empirical validation in a cohort

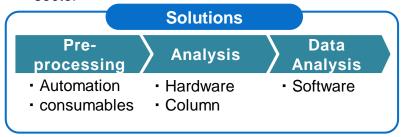
# ー般社団法人 セルフケアフード協議会

### **Participation in New Field Start-up**

- Initiatives toward the alternative protein industry
- New market development and regulatory trend research

### **Acquisition of Products and Technologies**

Competitively advanced solution offerings in the food sector



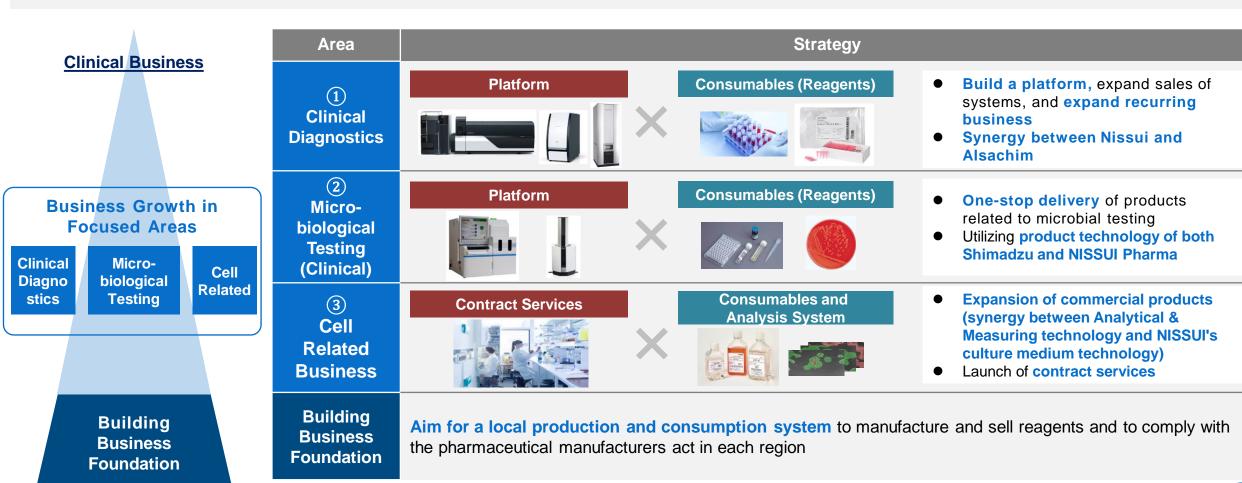
### **Initiatives for Standardization**

- Rapid application development
- Human resources development
- Starting in Japan and expanding to Asia



# **Basic Strategy of Clinical Business**

- Focusing on the three areas of Clinical Diagnostics, Microbiological Testing, and Cell Related Business
- With the use of NISSUI PHARMACEUTICALS (Shimadzu Diagnostics from April 2023) and proprietary technologies, accelerate growth in this business with an eye toward M&A and other opportunities





Instruments

Consumables

(Reagents)

II-2. Healthcare Strategy

# Regional Strategies (1) Clinical Diagnosis

- Build platforms in three areas: LCMS, immunoassay and genetic testing
- Synergies with Alsachim and Development of clinical laboratory systems, including consumables (reagents), and expansion of recalling business through with NISSUI PHARMACEUTICALS

Ideal Business Model

Hospitals/laboratories: Laboratory Automation System (LAS) / Laboratory Information System (LIS)

### **LCMS Platform**

<u>CLAM (Automatic LCMS Pretreatment System) + LCMS</u>
<u>Features:</u>

Approved LCMS for clinical use (First in Japan)

**Strengths** 

Component analysis technology (Mass Spectrometry)



1) Biochemical test

2) TDM (IVDR\* supported)

\*IVDR = In Vitro Diagnostics Regulation

### **Immunoassay Platform**

Amyloid MS CL, microbial identification

Features:

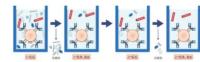
The world's first test (amyloid  $\beta$ ) compliant with PMD Act

**Characteristic database (microbes)** 

Strengths

Accurate proprietary diagnostic formula (amyloid β) Inspection lineup (microorganisms)

1) Amyloid β blood test kit



2) Microorganism identification test kit

### **Genetic Testing Platform**

AutoAmp (fully automated PCR test equipment)

Features:

No sample processing required (AutoAmp)

**Strengths** 

**Institutional measurement** 

(Test results available promptly)

- 1) Testing for infectious diseases (mainly IVDR\* compliant)
- 2) Disease-related genetic testing

\*IVDR = In Vitro Diagnostics Regulation



NISSUI PHARMACEUTICALS





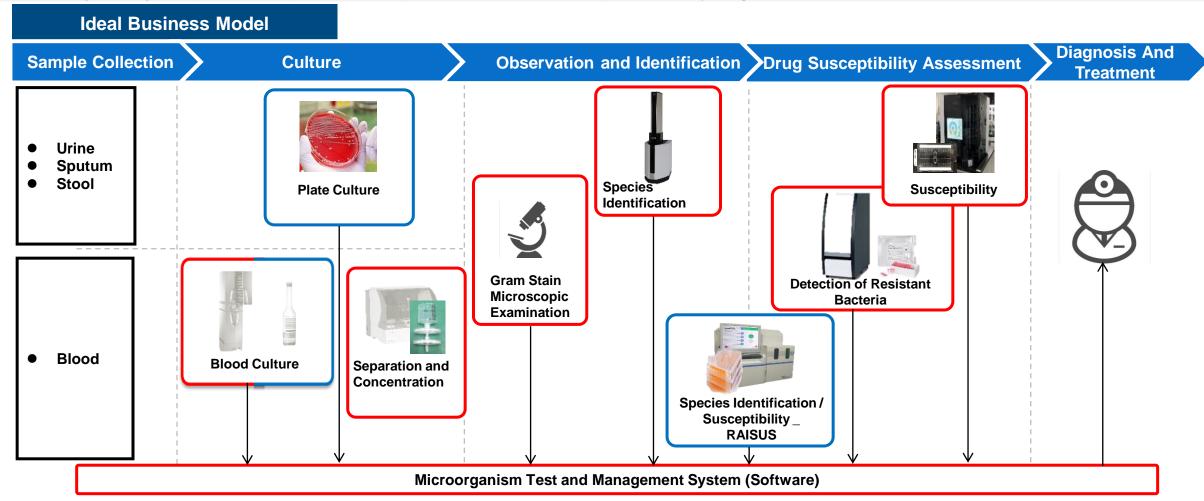
# Regional Strategies (2) Microbiological Testing

Our company Development

NISSUI PHARMACEUTICALS PRODUCTS

Information flow

- Microbiological testing is a battery of tests to identify pathogens and select effective antibiotics.
- One-stop distribution of microbiological testing-related products throughout the entire Shimadzu Group in each process to improve testing workflows
- Using testing equipment as a platform to expand consumables to expand the recycling business





# Regional Strategies (3) Cell-related Business

- Enter the regenerative medicine/cell therapy market by utilizing our company's measuring and analysis technology and NISSUI's culture medium technology, and Shimadzu Techno Research/NISSUI's contract functions.
- Supporting pharmaceutical/venture companies to bridge from R&D to clinical application to advance global expansion

	R&D			Clinical Application		
	Medium Analysis	Image Analysis	Custom Media	Safety Test Kit		
Ideal Business Model	LCMS Al optimization of culture conditions	Cell Pocket	The state of the s	Negative test • Mycoplasma • Virus • Microorganisms Pyrogen test	Product Residue Testing	
Headquarters	Product sales	Product sales	Product sales	Product sales		
Shimadzu Techno Research	Fiduciary Services	Fiduciary Services			Fiduciary Services	
NISSUI PHARMACEUTICALS	For Custom Media Fiduciary Services	Based on LCMS data Customization	Product sales	PCR Product sales Fiduciary Services		







II-3. GX (Green) Strategy

# **GX Vision**

### Contributing to Society by Providing Solutions to New Measurement Needs

Strategy

- Focus on four areas: bio-manufacturing, new/creating/storing energy, environment/regulation, and materials/next-generation mobility
- Expand business from both strategies of application and new product
- For standardization and regulatory response, strengthen relationships with NEDO in Japan, EPA\* and ISO in overseas

### GX 4 field **Short-term Initiatives** Mid- to Long-term Initiatives **GX**, Environment and Energy Support sales activities using existing applications **Bio-manufacturing** Promotion of development of new GX applications and Biochemicals and biofuels Standardizing and overseas expansion offering globally **Application New/creating/storing energy** Materials/ **Strategy** New/ Made from CO2 Environment/ Hydrogen/Ammonia Creating/ **Next-generation Bio-manufacturing** Regulation Next-generation batteries Storing Energy **Mobility** renewable energy **Environment/Regulation New Product** Standardization and regulation from the development stage CO<sub>2</sub> Absorbing Concrete PFAS • Introduce new products from lab scale and scale up **Strategy** · Microplastics and greenhouse gases **Materials** Standardization. Providing total solutions, Regulatory • Strengthening relationships with NEDO in Japan and EPA\*, ISO including sensors and **Materials/Next-generation** and other standards accreditation bodies overseas Response

\*EPA = U.S. Environmental Protection Agency

consumables

**Mobility** 

Development of new materials

(lightweight materials, etc.)



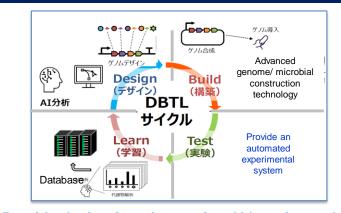
II-3. GX (Green) Strategy

# Initiatives in Bio-manufacturing Technology using CO<sub>2</sub> as Raw Material

- Short-term: Building a development base for high-dimensional, multi-specimen, high-speed productivity evaluation system from the R&D stage to the plant stage. In R&D, shortening R&D cycles through automation and Al and standardizing analytical methods mainly by Autonomous Labs.
- Mid- to long-term: Providing total measuring solutions with Analyzers such as GC systems, process analysis technology, culture media, consumables, etc., in the plant process.

**Short** -term

R&D



**Shortening R&D cycle** 

Autonomous Lab

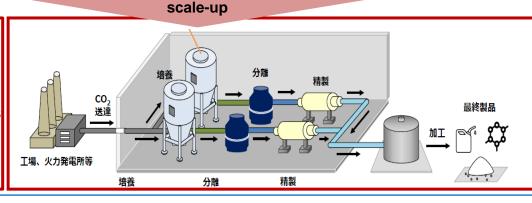
Provide design functions using AI learning web apps etc.

with an automated experimental system

**Expand globally with Autonomous Lab as a focal point** 

midto longterm

**Plant** Process



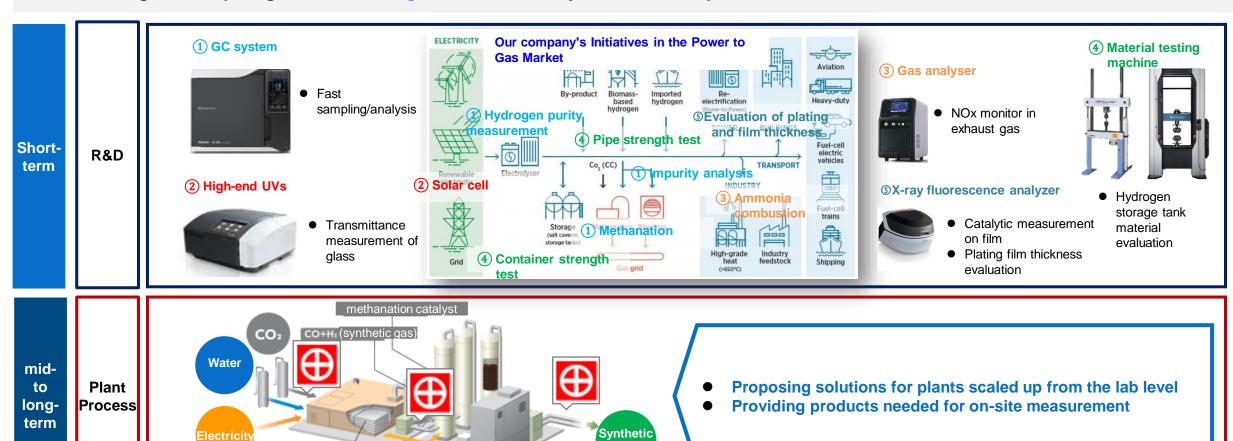
Aiming to expand business and become an industry standard by providing measurement total solutions



II-3. GX (Green) Strategy

# **Initiatives for a Hydrogen Society**

- Short-term: Leveraging the strengths of our product lineup to provide applications for the stages of hydrogen production, transportation, utilization, etc.
- Mid- to long-term: Proposing on-site measuring solutions such as System GC etc., for plants



methane

Methane synthesis equipment

waste heat

SOEC electrolytic apparatus







# **Promotion of Development for Future Lab**

- Across models, IT and automation technology will be a key part of supporting the entire customer field
- Using AI technology to help run labs struggling to develop experts, not relying on individual expert's skills

### **Analytical & Measuring Instruments Lineup**















### **Test Planning and Execution**

**Experimental Protocol** 

**Management Software** 

Setting required preprocessing

Test setting

Prioritizing analysis

### **Method Development**

### **Method Development Support Software** (Labsolutions MD)



- Automatic Method Development
- Visualization in a design space

### **Pre-processing**

### **Pre-process Automatic Machine**



Robot pre-process automatic machine

### **Post-processing**

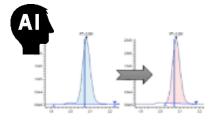
### Post-process Automatic Machine



 Automatic setting/execution of preparative purification and continuous cultivation

# **Analysis Software by Al**

**Automating Analysis** 



- Automatic analysis
- Error determination of analysis results and automated processing

### **Robotic System**

Automatic sample transport and analysis



# **Automation Technology**

IT Technology



# **Liquid Chromatograph**

	Looking Back	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Product Launch History	<ul> <li>Extensive coverage of the entire market with a wide range of equipment</li> </ul>	i-Series (1st) Integrated LC & UHPLC-like  Nexera UC High Performance Analysis SFC and SFE			i-Series Plus (2nd)		Nexera UC Prep		i-Series (3rd)		
	Integrated LC i-series grew into flagship product					Nexera Prep					
	<ul> <li>Active use of pretreatment automation, etc. started</li> </ul>							Nexera 40		Nexera XS iner	Nexera lite inert
	<ul> <li>Widespread product enhancement including preparative and supercritical fluid chromatographs</li> </ul>							Series	HIC-ESP		

- Enhance preparative LC, analysis & preparative SFC with focus on Drug Discovery & Synthesis Division/CRO
- Enhance collaboration with column vendors
- Promote the Automatic Pretreatment Business with a Focus on the Clinical Market
- Easy-to-use LC systems such as chip LC



# **Mass Spectrometer**

**Looking Back** 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 LCMS-9030 LCMS-8050 LCMS-8060 LCMS-9050 LCMS-8060NX LCMS-TQ expanded its mid- to high-end models, while SQ released new products with a reduced footprint. LCMS-8045 **Product** Launch Launched Q-TOF to GCMS-TQ8040 areas with lower entry **History** LCMS-2050 barriers GCMS-QP2020NX GCMS-TQ8050NX/8040NX Strengthened brand by upgrading products with GCM\$-QP2020 GCMS-TQ8050 a series of functional improvements

- Strengthen core products
- Build a business base in clinical fields such as amyloid MS
- In addition to automated pretreatment + LCMS, expand sales to the clinical field with middleware (new external collaboration) that connects with hospital informers and reagent kits
- Jointly develop software with customers for each field
- Enhance usage method packages



# **Gas Chromatograph**

**Looking Back** 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 AOC-30 Tracera **HS-10** SCD-2030 (BID Detector) GC-2030 **Expanded product** lineup by introducing high-end models and **Product** mid-range products Launch GC-2014S **History** GC-2030 Strengthened auto HS-20NX GC-2010Pro samplers and other peripherals to expand sales in chemical and pharmaceutical markets

- Strengthen core products
- Develop new markets by capturing the GX field
- Expand System GC globally



# **Testing Machine**

2013 2014 2015 2017 2019 **Summary** 2016 2018 2020 2021 2022 Launch of middle-low **StrainView** LabSolution AG **High Capacity** Type 76 valve HITS-X Extensometer end pull testing machine AGSX increased sales mainly in TRAPEZIUMX the Asian market EMT-5kN Expanded applications **Product** with the introduction of a Launch high-end tensile testing **NJ-SERVO** AGX-V **History** machine with enhanced TRAPEZIUMX-V Micro **functions Vickers** Micro **HMV-G 21 Vickers**  Introduced an **HMV-G 31** automated robotic machine system that New TCE combined multiple measurement modules

- Promote automation by combined system of testing machine and robot
- Enhance data integrity features to prevent data tampering
- Expand sales in the GX market with the introduction of large testing machine related to green power generation such as hydrogen and wind power







II-5. Strategy in North America

# **Strategy in North America**

- Expend business in pharmaceutical and clinical fields, with North America leading the world. In the environmental field, strengthen app development and increase GTA customers share.
- Pharmaceutical field: Strengthen market awareness with our strength in preparative purification system, develop technologies & products in line with market needs, and launch competitive products.
- Clinical field: Establish a business base in the three focused markets of clinical diagnostics, microbiological testing and cell-related business

	Pharmaceutical	Clinical	Environment
Purpose	<ul> <li>Establishing competitive advantage in nucleic acids</li> <li>Increase market share by preparative LC system in the small molecular field</li> </ul>	<ul> <li>Building a business base in the markets of clinical diagnostics, microbial testing, cell-related business</li> </ul>	Creating leads and increasing market share among GTA* customers, who are heavy users of GCMS and LCMS
Target Customer	Large pharmaceutical companies, bio-ventures, CROs, CDMOs	Hospitals, clinics, bio-ventures, CROs, CDMOs	Testing lab (public and private)
Function	<ul> <li>In addition to sales, expand development, manufacturing, and services to improve the supply chain</li> </ul>	<ul> <li>Clinical diagnosis and microbiological testing: Sales of equipment/reagents, development of new markets and development of products</li> <li>Cell business: Aim to launch CDMO business from contract testing</li> </ul>	Marketing by sector, application development, and technical support for GTA customers
Strategy	Establishing development base in North America  Product development of LC and MS targeting the pharmaceutical industry with local needs	<ul> <li>System establishment to respond to FDA</li> <li>Establish a system to obtain FDA</li> </ul>	<ul> <li>Initiatives for International standardization</li> <li>Developing apps to solve social issues</li> <li>Identify customer needs through collaboration with GTA customers</li> </ul>



II-5. Strategy in North America

# Strengthening the North American Development Structure

- Establishing Application Centers and Development Centers on the West and East Coasts, respectively. Together with Maryland, building a development structure at three sites
- The North American Development Center will pick up needs close to customers while working closely with innovation centers and development units and launching timely products
- For LC, enhancing preparative purification technology. For MS, developing cutting-edge technology products

### Phase 2

# West Coast Development Center (Newly Establishing)

Collaborating with pharmaceutical and biotechnology companies and ventures to develop products that meet customer needs



### Phase 3

# East Coast Development Center (Newly Establishing)

 Collaborate with leading pharmaceutical upstream divisions and academia to develop MS equipped with cutting-edge technology

# in Maryland <a href="Innovation Center">Innovation Center (Expanded)</a>

- Purpose: Promote joint research and development with important customers with advanced technologies
- Founded: 2015

### **Application Development Center**

- Purpose: LCMS-centric application development and customer support for North American customer needs
- Founded: 2021

Phase 1





### **SHIMADZU**

III. Introduction of Shimadzu Tokyo Innovation Plaza

### **Global R&D Base**

- Expansion of application development functions to strengthen the global growth base
- Development of basic technologies to accelerate innovation and promote new business creation
- Promoting advanced technology development and commercialization through joint research and open innovation



Provide **Products** Development of Needs and application **Services** technologies Research of Development of products basic and services



**US Innovation Center** (2015)

Research Key **Technologies** 

China Shimadzu Research Laboratory (Shanghai) Co., Ltd. (2003)

Shimadzu China R&D **Division** 

•Koichi Tanaka Mass Spectrometry Research Laborat(2010) (2003)

- Shimadzu Research Laboratory (Europe) Ltd. (UK) (1997)
- Acquired Kratos in the UK. (1987)

• Development of Application **Technologies** 

**European Innovation Center** (2017)



**Asia Pacific Innovation Center (2017)** 





# **Shimadzu Tokyo Innovation Plaza**

# **Concept:**

"Fascinating and Connected Innovation Plaza"

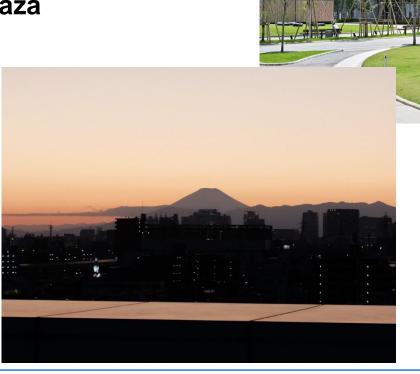
 Name: Shimadzu Tokyo Innovation Plaza (Tonomachi Works)

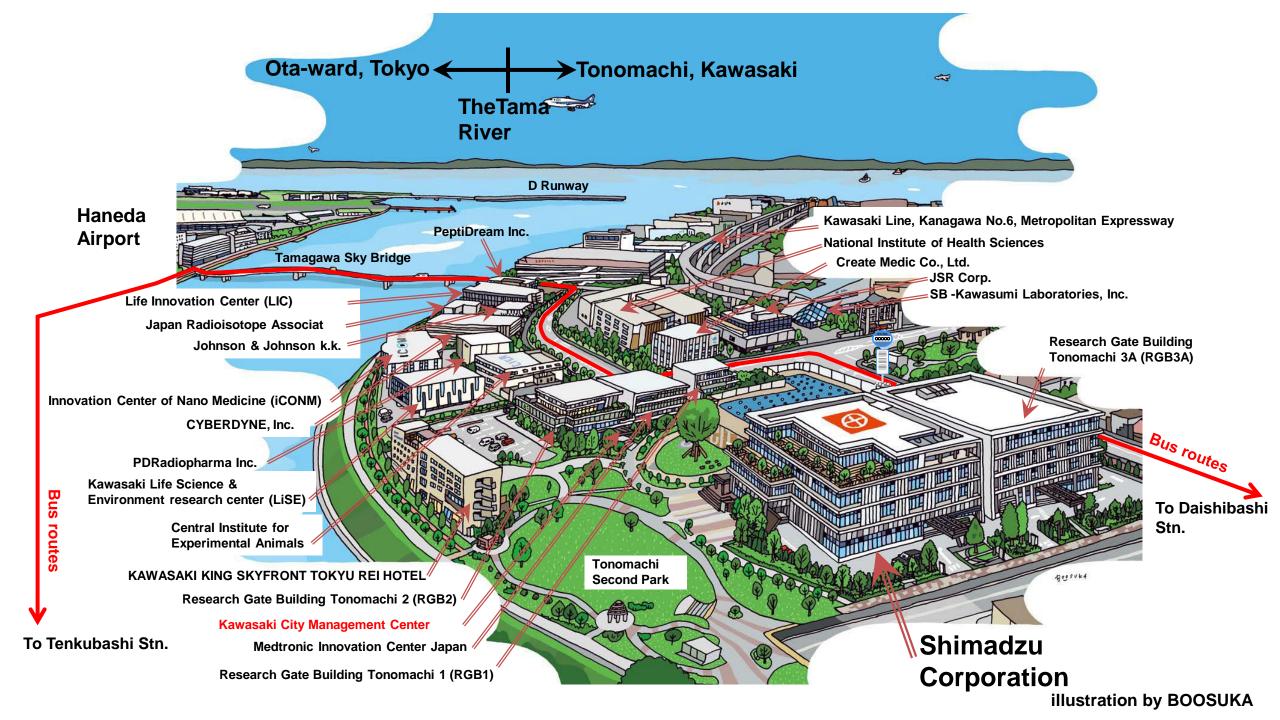
Building: Four stories above ground

• Floor Area: 9,503 m<sup>2</sup>

Staff Capacity: approximately 100

Completion: October 2022







# Purpose of Shimadzu Tokyo Innovation Plaza

Equipment tour and demonstration when considering purchase

Facilities and operations to serve as a reference when a new lab is built

Technical follow-up after equipment delivery

Development of Advanced Analytical Methods

Development of analytical methods (applications) that contributes to solving social problems

Technical
Support for
Customers

External Collaboration

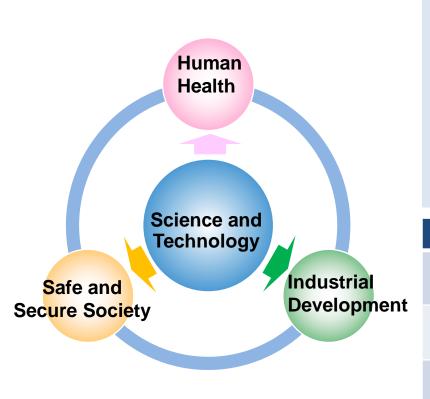
Joint research utilizing location and facilities

Inviting and holding events and academic conferences



Develop applications that contribute to solving social issues

# **Application Development - Focus Areas -**



### **Human Health**

Extension of healthy life expectancy, provision of appropriate medical care, etc.

# **Safe and Secure Society**

Conservation of the natural environment, food safety, diagnosis of aging infrastructure, etc.

### **Industrial Development**

Supporting new materials development, saving energy and reducing weight of transport aircraft, etc.

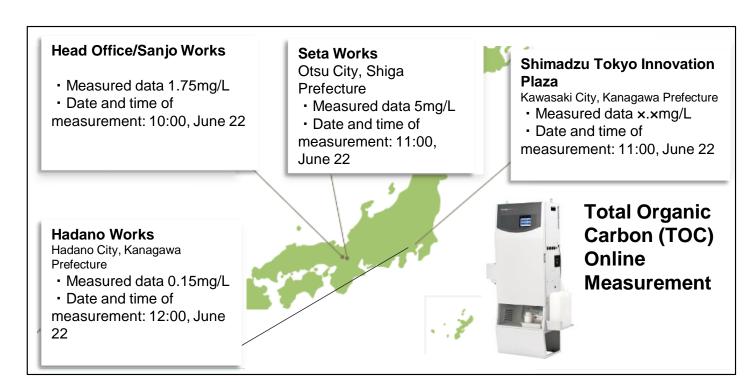
Key Growth Areas	Key Themes		
Healthcare	Medical, Life Sciences, Pharmaceuticals, Food Safety/Functional Foods		
Infrastructure	Various Infrastructure Inspections, R&D and Manufacturing Facilities		
Materials	New Materials, Functional Materials, Composite Materials		
Environment/Energy	Environmental Measurement/Regulatory Compliance, Renewable/Hydrogen Energy		



# **Technical Support for Customers - Fascinating Labs -**

# 1)Advanced Labs to Support Customers

Open laboratories seen from the hallway present advanced experimental environments and ways of working.



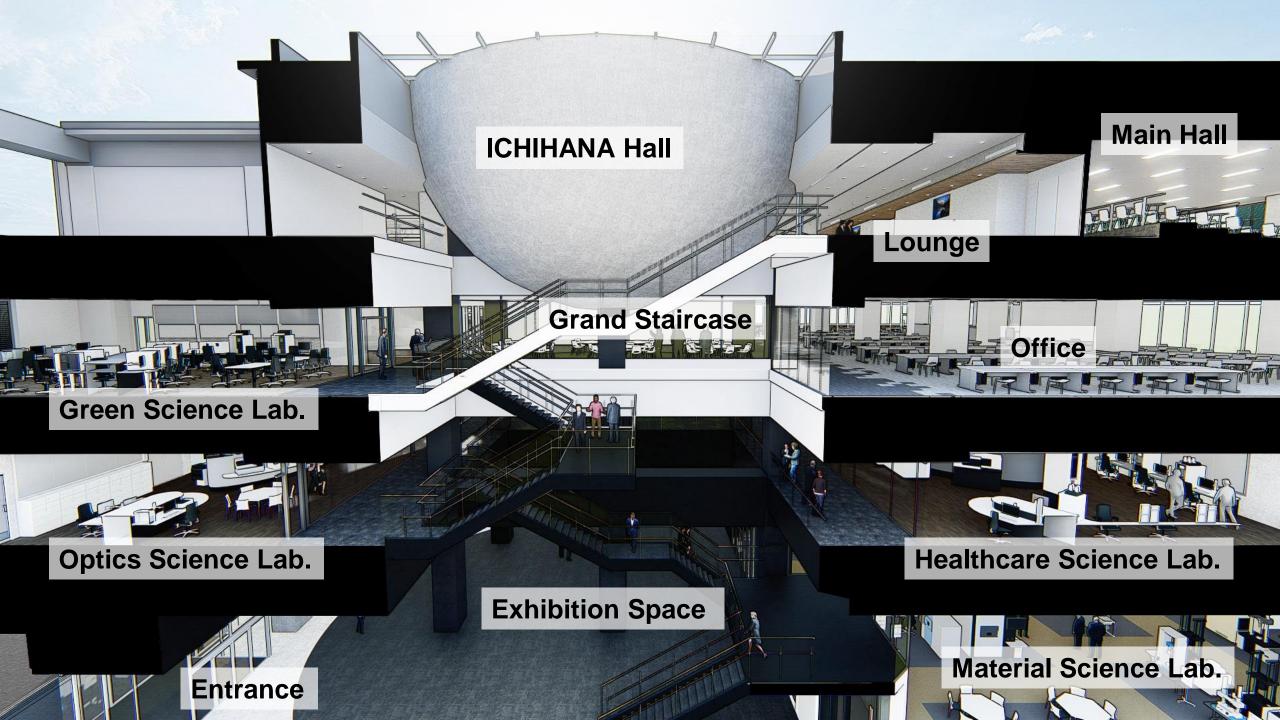


- Fascinating Labs -

# 2)Latest Lab Total system

The TOC constantly monitors experimental effluent to ensure that it is below regulatory limits before releasing it, and automates the management, monitoring and ordering of gas and reagent storage.

Monitoring of experimental effluent using our company analytical instruments





For holding international conferences and symposiums

# **Outside Collaboration: Cultivating a Network of Researchers**



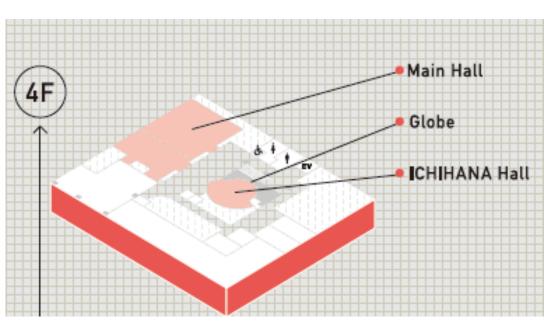
**4F Lounge** 



**Bar counter** 



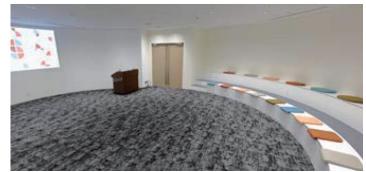
Night view from the lounge



# Both halls are equipped for online events as well



Main Hall



**ICHIHANA Hall** 





The forward-looking statements contained in this briefing material may differ materially from forward-looking of external factors, including economic conditionstatements due to a variety s, foreign exchange rates and technology.

Contact: Shimadzu Corporation

IR Group, Corporate Communications Department

Phone: 075-823-1673

E-Mail ir@group.shimadzu.co.jp