Life Business Common Technology

Calibration & Validation

NKS provides the calibration services for about 700 types of measuring instruments, regardless of manufacturers or models, and the validation services for manufacturing facilities and equipment for the pharmaceutical, medical device, food, and cosmetics industries.

〈 Calibration 〉

- Thermometer
- Flowmeter
- Analyzer
- Timemeter
- Massmeter
- Torquemeter
- Environmental measuring instrument
- Pressuremeter
- Electricmeter
- Lengthmeter
- Tachometer
- Forcemeter
- Hardnessmeter

〈 Validation 〉

- Incubator
- High-pressure steam sterilizer
- Dryer
- Refrigerator / Freezer
- Clean room / Bench

Flow Imaging Microscopy

FlowCam series developed and manufactured by Yokogawa Fluid Imaging Technologies are the instruments that automatically image fine particles and microorganisms in liquids. By introducing a liquid sample into the instrument, it is possible to analyze the feature value of fine particles from 0.3 μ m to 1 mm in the liquid and to classify the fine particles.

〈 Applications 〉

- Pharmaceutical : Aggregates, Contamination detection
- Life Science : Observation of cell and microbe
- Food & Beverage : Evaluation of yeast and emulsion
- Water : Cyanobacteria detection / Water environment measurement
- Chemical industry : Evaluation of toner and battery material

Biological Contamination Management Solution (Under development)

Yokogawa is the proponent of a robust genetic testing method that can be carried out with overwhelming quickness and simplicity. This testing method is possible using Yokogawa's highly sensitive fluorescence measurement technology that has been developed over the years, and the newly developed non-label gene analysis device. With this technology, it is possible to detect rapidly microbial contamination in food and other products, and Yokogawa believes that this can greatly contribute to the reduction of food manufacturers' operating costs.

〈 Applications 〉

- Beverages in general and fermentation-related manufacturing fields
- Pharmaceutical and cosmetic manufacturing control
- Bioethanol production control
- Water quality management (water and wastewater)
- Infectious disease diagnosis
- Environmental monitoring
- QC in regenerative medicine

VEGETABLE OIL INK

MIX Paper from responsible sources FSC® C111730

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YOKOGAWA Co-innovating tomorrow™

YOKOGAWA Co-innovating tomorrow™

Well-being

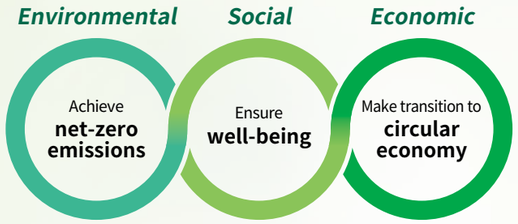
Life Business

Bulletin 80A01A01-01EN

Making the world a better place for future generations

Yokogawa's Sustainability Goals (Three goals)

With the adoption of the Paris Agreement at the 21st Framework Convention on Climate Change (COP21) and the Sustainable Development Goals at the United Nations Sustainable Development Summit, momentum is building in the global effort to achieve a sustainable society. In light of these developments, in August 2017 Yokogawa established sustainability goals (Three goals) for achieving sustainability. These aim to make the world a better place by means such as enabling the use of low-carbon energy sources and the recycling of materials. As described below, the company is committed to transforming itself in several key ways to better position itself to achieve these goals.



Three goals

Three goals Life Business contributions

The life business aims to contribute to the well-being of all people, and will leverage Yokogawa's strengths in the food and pharmaceutical industries to provide solutions that improve productivity throughout the value chain, from research and development to production and distribution. In the water sector, we will strengthen our efforts to facilitate a digital transformation (DX) by introducing analytical technology that has been acquired through our work in the genetic analysis and scientific equipment fields.

Improving efficiency in society & industry

Value chain optimization for pharmaceutical and food customers (Consultation, ERP, MES, EMS)

Improving health & safety

Life science business
Pharmaceuticals and food
Lifeline, water and sewage business

Creating a resource-recycling ecosystem

Contributing to functional chemical and biochemical industries, Supporting the improvement of the efficiency of recycling business

Accelerate Growth 2023

Making full use of the expertise in measurement, control, and information technologies that it has acquired over the years, Yokogawa addresses social issues through its business activities. To attain these goals, the company's core business of industrial automation and control business has been divided into three segments: energy and sustainability, materials, and life.

Life Business

Main Markets | Pharmaceutical | Food | Water

The growing global population is putting a strain on the production and supply of food and water. Demand for pharmaceuticals is also rising steeply. Yokogawa's life business supports the supply of medicines and food and water so that people everywhere can live safely and enjoy good health.

Industrial Automation to Industrial Autonomy (IA2IA)

IA2IA™ Industrial Automation to Industrial Autonomy
YOKOGAWA Co-innovating tomorrow™

IA2IA is what Yokogawa foresees as the transition from Industrial Automation to Industrial Autonomy. Industrial Autonomy is the future manufacturing industry that will be able to solve various industrial problems and generate maximum profits in an optimized value chain by realizing autonomous operations.

Automation Person responsible for safe operations, human intervention between sequences of tasks

Autonomy System responsible for safe operations, no human intervention between sequence of tasks

Aiming for the development of a future embracing global harmony

Life Business Vision

We will lead the world in advancing
"Bio Industrial Autonomy (BIA)", and
contribute to a future embracing global harmony.

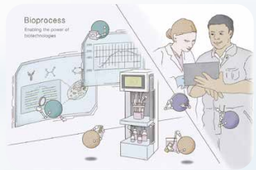
Our hope is…

Life Science

To realize a new research style that matches the times by creating a world where researchers can focus on science.

Bioprocess

To shorten the distance between research and mass production; and provide the power of biotechnologies to the world by providing an environment where researchers can focus on high-value-added work and improve new lifestyles and working environments.

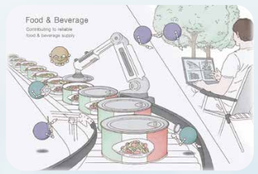


Pharmaceutical

To have access to safe and reliable medication for all patients in need of medicines by helping to ensure a stable and efficient supply of high-quality, safe pharmaceuticals.

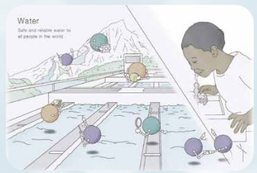
Food & Beverage

To build an environment where people can concentrate on higher value-added work and create a new normal by helping transform the entire food value chain and create a world without food shortages.



Water

To support a stable and efficient water supply and the creation of a peaceful society without water risks by helping provide safe and reliable water for people in all world regions.



We will contribute to a future embracing global harmony.

Please check the video for details

Life Science

We provide solutions that enable quantification, speed-up and automation in response to technological advances and scale-up. We will continue to contribute to the advancement of life science by making collaborative research and data sharing across organizational boundaries commonplace.

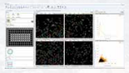
Confocal Scanner Unit CSU

Confocal Scanner Unit CSU-W1 SoRa

High Content Analysis CellVoyager™

High-Content Screening System CellVoyager CV8000

Benchtop High-Content Analysis System CQ1



High Content Analysis Software CellPathfinder

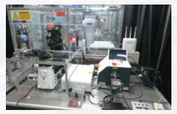
Single-cell Analysis Solution Single Cellome ™

Subcellular Sampling System Single Cellome ™ System SS2000

Nano-point Delivery Single Cellome ™ Unit SU10

Realization of lab automation

CSU-W1 SoRa is used to capture images if cells cultured by MAHORO, a robot system for automating lab work developed by the Artificial Intelligence Research Center (AIRC) of the National Institute of Advanced Industrial Science and Technology (AIST).

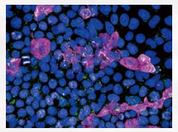


The Artificial Intelligence Research Center (AIRC) of the National Institute of Advanced Industrial Science and Technology (AIST)

Contribution to COVID-19 therapeutic drugs development

Yokogawa contributes to the research and development of COVID-19 vaccines and therapeutic drugs at universities and research facilities in Japan and overseas through its CellVoyager series of high-content screening system.

Dr. Jonathan Sexton, Ph. D.



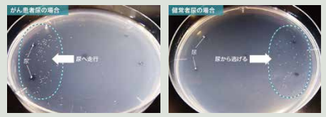
SARS-CoV-2 infected Huh-7 cells all nuclei(Blue)/neutral lipids(green)/SARS-CoV-2 NP protein(magenta)

〈〈 New Business 〉〉

YOKOGAWA ✦ × HIROTSU BIO SCIENCE

In February 2021, YOKOGAWA and HIROTSU BIO SCIENCE INC. (HBS) signed an investment and partnership agreement to expand the use of HBS's N-NOSE® cancer screening test service, which utilizes the highly sensitive olfactory sensory functions of nematodes to detect cancer. In the future, Yokogawa will be responsible for the manufacturing and maintenance of N-NOSE's automatic analysis equipment. The two companies are also aiming to develop new automatic analysis equipment and promote the global growth of the N-NOSE business, and aim to achieve well-being for all.

N-NOSE® cancer screening test service



Nematodes detect cancer from trace amounts of odorants in urine samples.

Bioprocess

For the bio-production of drug substance and food/beverage products, we are providing the solution not only to improve the productivity, but also to shorten the period from clinical trials to launch for pharmaceuticals by incorporating the Digital Twin technology into the automation technology and production control solutions (MES, LIMS, QMS) that Yokogawa has been providing the market for a couple of decades. This solution is called BDX (Bio Digital Transformation) and contributes to a society where people can live with peace of mind.

▶ Bioprocess Digital Twin Technology

Yokogawa Insilico Biotechnology has been providing the services that contribute to shortening the process development period and stabilizing product quality over the past several years by using the simulator technology called Digital Twin that provides high fidelity simulation of the behavior of bioprocesses.

▶ Advanced Control Bioreactor System BR1000

High-precision real-time monitoring and advanced control automate the culture operation of the bio reactor in the process development phase, which usually fully relies on manual operation. By shortening the development period of high-precision production processes, it is a system that enables early transition to the production of investigational drugs and over-the-counter drugs.

Advanced Control Bioreactor System BR1000

Pharmaceutical

In addition to integrated management of GMP（MES）, Quality Control（LIMS）, and Risk Management（QMS）as a quality assurance mechanism, by utilizing technologies such as simulation technology and ML to eliminate factors that impair quality, we can accelerate launch speed of medicines. We will continue to contribute to solving global issues by supporting the prompt provision of the required amount of medicines.

New Modality / New Manufacturing Method

- Regenerative medicine
- Peptide synthesis
- Continuous production

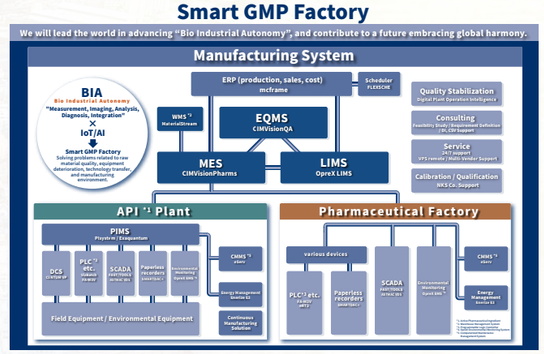
Quality management system for products such as regenerative medicine (Bio-MES)

Accumulation and utilization of data are important for quality management of products such as regenerative medicine, and early system introduction is also effective. However, existing MES has operational problems. A new system is under development to overcome the obstacles.

〈Main improvement〉 Under development

- Correspondence to conditional branching according to cell conditions
- Check the details of SOP at a glance
- Correspondence to quality management tests in the process
- Added purchasing function for kitting

Smart GMP Factory



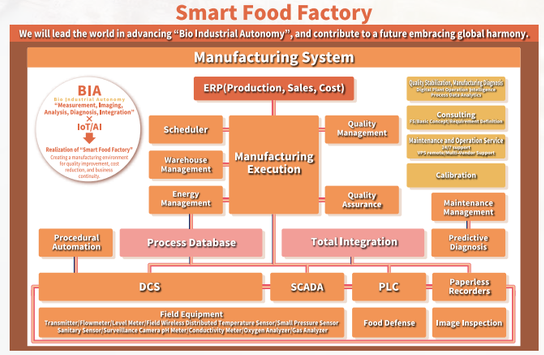
Food & Beverage

The equipment of Smart Food Factory learns and adapts itself to realize the "autonomous operation" of the system from startup to shutdown. We will continue to contribute to optimal and highly efficient operations based on demand forecasts and the pursuit of quality, including deliciousness.

New Solutions

- Next-generation smart factory (system /equipment cooperation)
- Realization of unmanned operation by introducing robots

Smart Food Factory



Water

We will support the entire water cycle from the source to the water supply, application, sewerage, and discharge areas and contribute to safe water supply by strengthening the acquisition and improvement of the quantity and quality of water resources essential for daily life and economic activities.

- Integrated management
- Wide-area water operation
- Optimal operation of waterworks
- Equipment management
- Operator training simulator
- Field instruments
- Liquid Analyzers
- Desalination of seawater
- Agricultural water (irrigation)
- Emerging countries ODA (Official Development Assistance)

New Solutions

- Potable Water Reuse
- Water distribution management & Water leakage management
- Energy saving of wastewater treatment
- Analysis of underwater particles
- Water quality / climate change reduction (land-based aquaculture)