



Ambient Air Monitoring Technology for Indonesian Environmental Pollution Improvement

HORIBA, Ltd

International Sales Department

KOBAYASHI Takeshi

2021/1/14

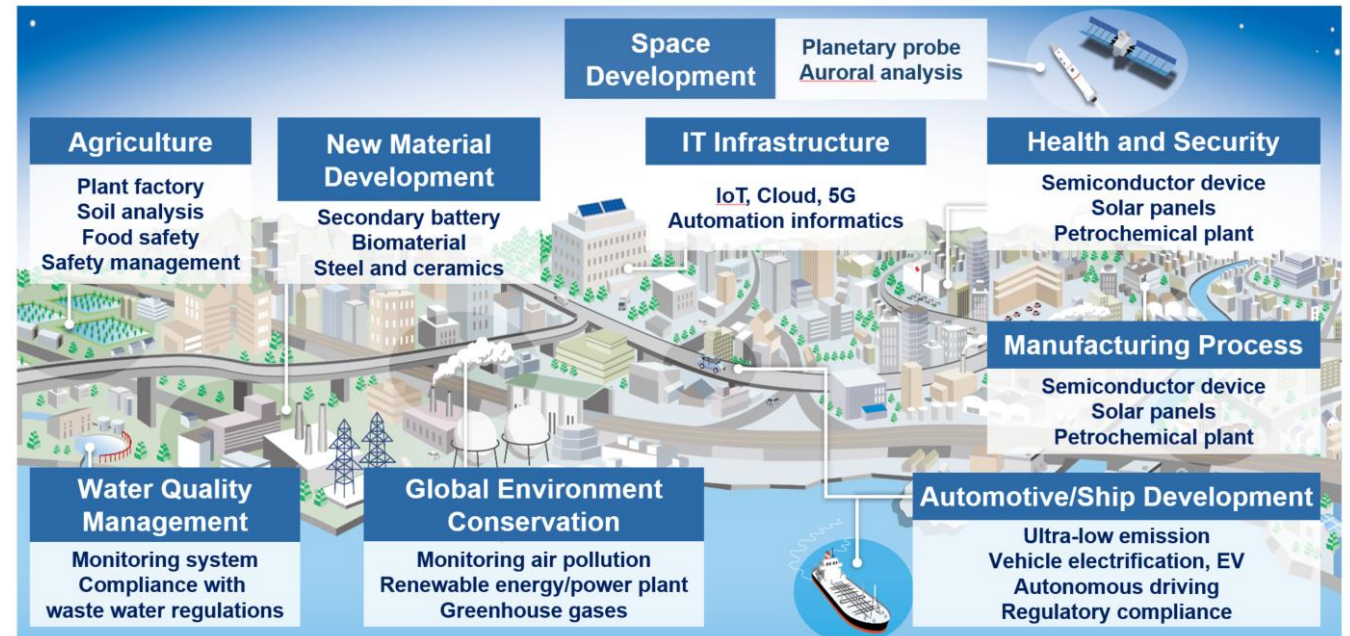
HORIBA Company

- Founded October 17, 1945
- Net Sales 200.2 BJPY (FY2019)
- Number of Employees 8,288 (FY2019)
- Line of Business Manufacturing, Sales, Services of analysis and measurement equipment



Chairman & Group CEO
Atsushi HORIBA

HORIBA's Business Domain



Head Office: Kyoto, Japan

Five Business Segments & Major Products

Figures are the sales composition ratio for FY 2019


**Automotive
(40%)**




**Emission Measurement
Systems**



**Process &
Environmental
(10%)**



Stack Gas Analyzers




**Medical
(13%)**



**Automatic Blood Cell
Counters plus CRP**



**Semiconductor
(23%)**



Mass Flow Controllers



**Scientific
(14%)**



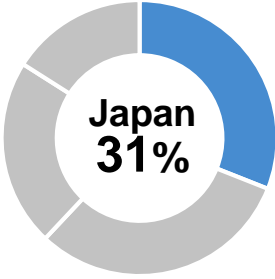
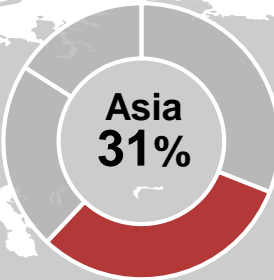
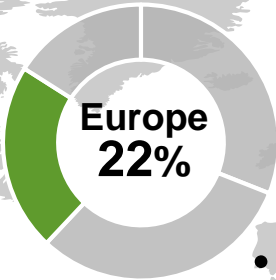
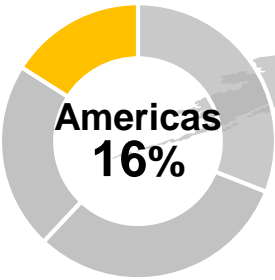
Raman Imaging Device



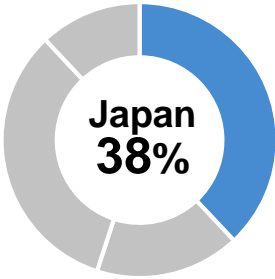
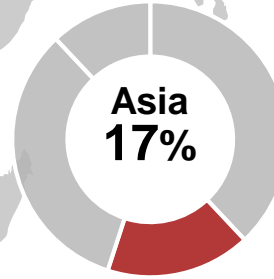
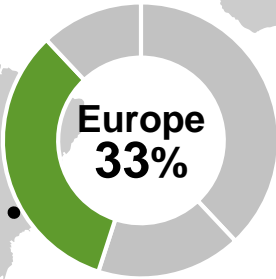
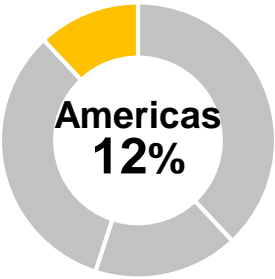
HORIBA Global Network

Sales by region (as of Dec 2019)

● : Major business hubs



Employee headcount by region (as of Dec 2019)



PT HORIBA Indonesia
Jl. Jalur Sutera Blok 20A, No. 16-17, Kel.
Kunciran, Kec. Pinang
Tangerang 15144
Indonesia



Number of companies
(as of Dec 31, 2019)

49



Overseas sales ratio
(as of Dec 2019)

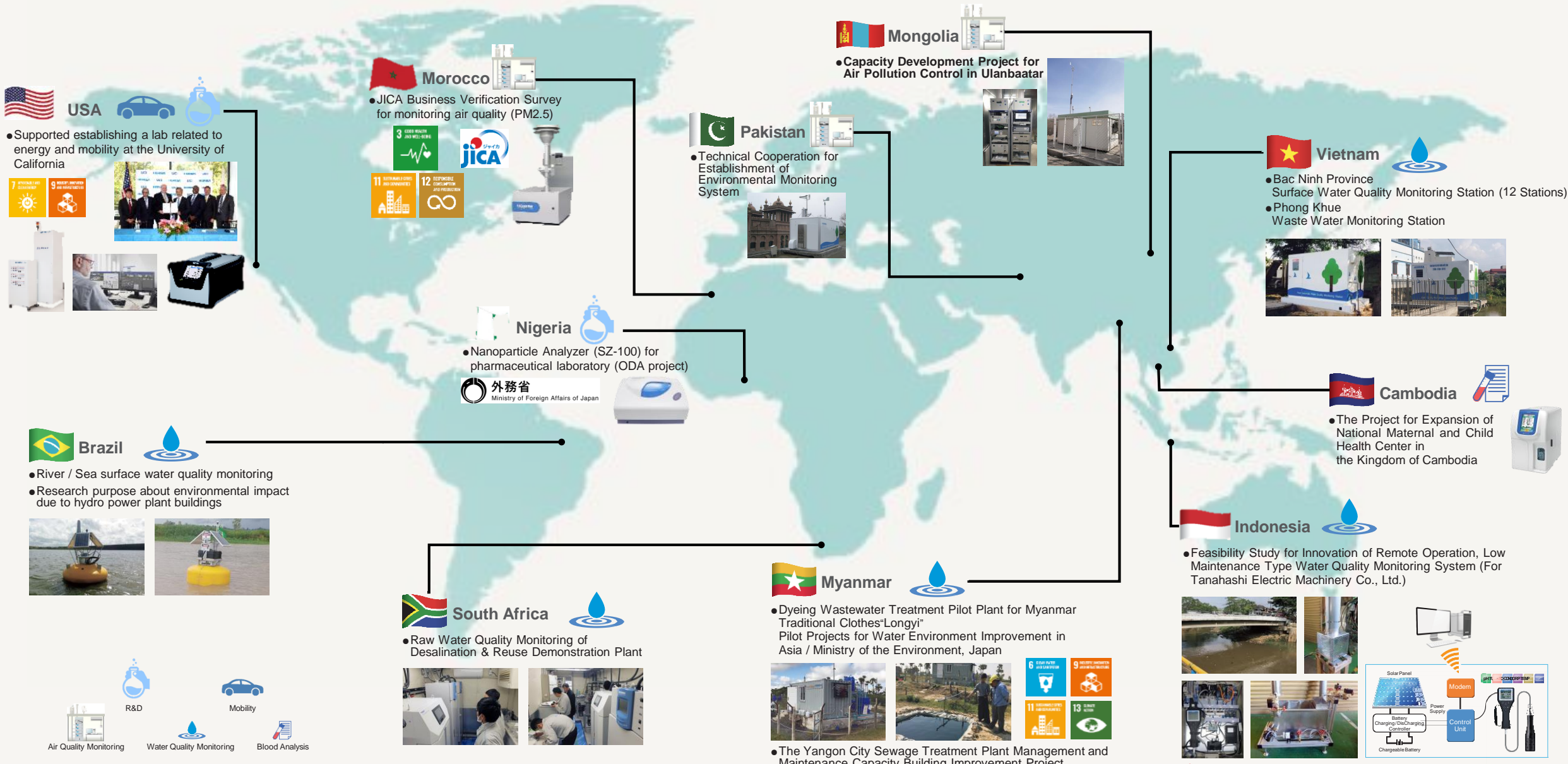
69%



Foreign employee ratio
(as of Dec 31, 2019)

63%

~HORIBA's Global Activities and Contribution~



USA

- Supported establishing a lab related to energy and mobility at the University of California

Morocco

- JICA Business Verification Survey for monitoring air quality (PM2.5)

Pakistan

- Technical Cooperation for Establishment of Environmental Monitoring System

Mongolia

- Capacity Development Project for Air Pollution Control in Ulanbaatar

Vietnam

- Bac Ninh Province Surface Water Quality Monitoring Station (12 Stations)
- Phong Khue Waste Water Monitoring Station

Nigeria

- Nanoparticle Analyzer (SZ-100) for pharmaceutical laboratory (ODA project)

Brazil

- River / Sea surface water quality monitoring
- Research purpose about environmental impact due to hydro power plant buildings

Cambodia

- The Project for Expansion of National Maternal and Child Health Center in the Kingdom of Cambodia

Indonesia

- Feasibility Study for Innovation of Remote Operation, Low Maintenance Type Water Quality Monitoring System (For Tanahashi Electric Machinery Co., Ltd.)

Myanmar

- Dyeing Wastewater Treatment Pilot Plant for Myanmar Traditional Clothes "Longyi"
- Pilot Projects for Water Environment Improvement in Asia / Ministry of the Environment, Japan

South Africa

- Raw Water Quality Monitoring of Desalination & Reuse Demonstration Plant

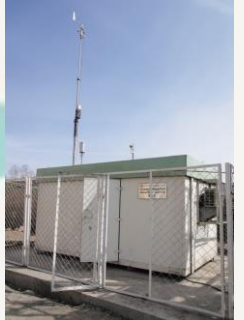
R&D **Mobility**

Air Quality Monitoring Water Quality Monitoring Blood Analysis

TANAHASHI

HORIBA's Global AQMS Records

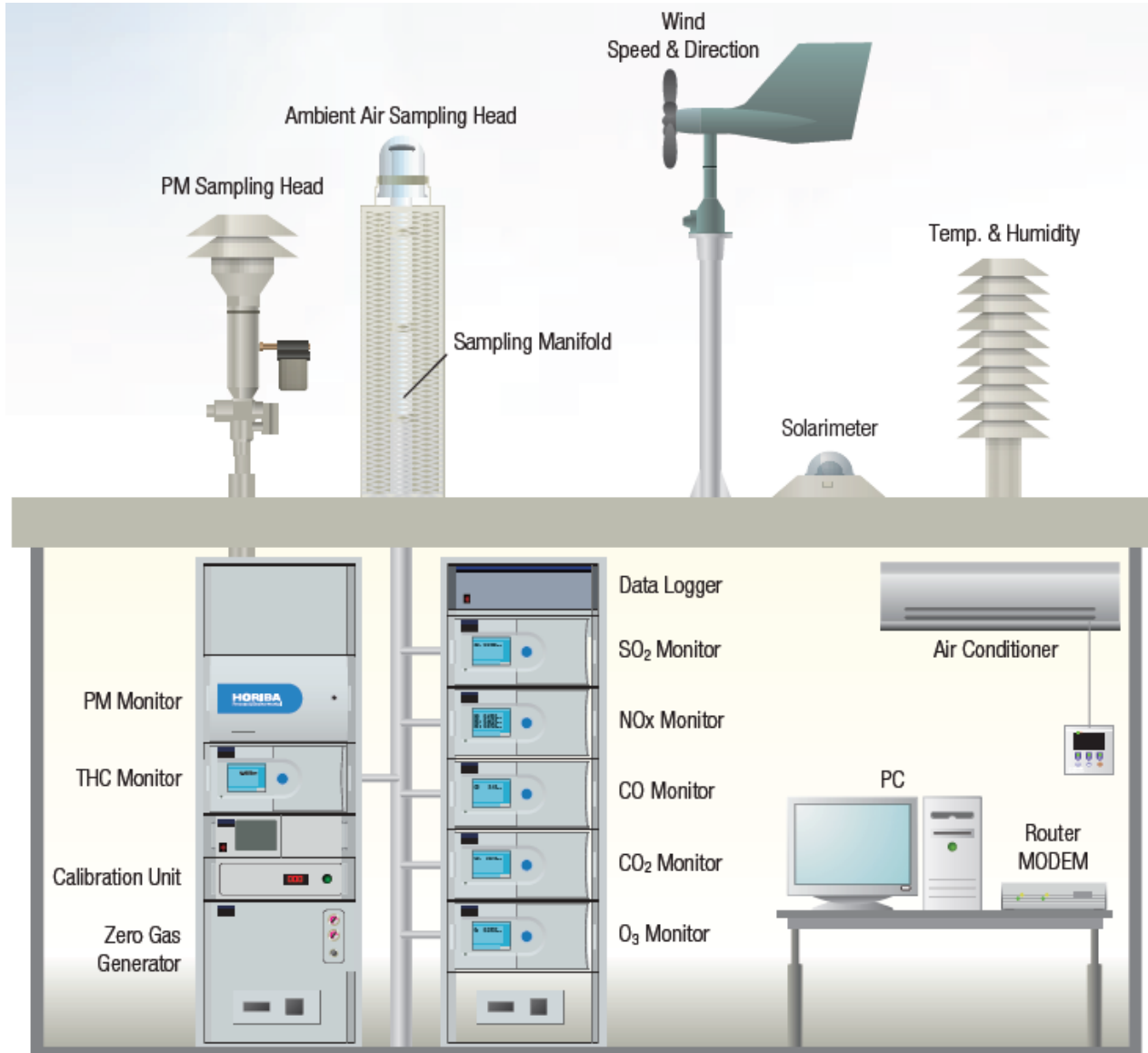
~more than 40 years of experience in air pollution monitoring~



Sales record of over 10,000 analyzers over the past 10 years.



Air Quality Monitoring System



POLLUTANT	MODEL	MEASUREMENT PRINCIPLE
SO _x (SO ₂)	APSA-370	UVF (UV fluorescence)
NO _x (NO, NO ₂)	APNA-370	CLD (Chemiluminescence)
HC (THC, CH ₄)	APHA-370	FID (Flame ionization detection)
O _x (O ₃)	APOA-370	NDUV (Ultra-violet-absorption)
CO	APMA-370	NDIR (Non-dispersive infrared)
CO ₂	APCA-370	NDIR (Non-dispersive infrared)
PM _{2.5/10/TSP} SPM	APDA-371 PX-375	Beta Ray attenuation

**US-EPA / TUV
Certification**

HORIBA Solution to High Humidity Condition

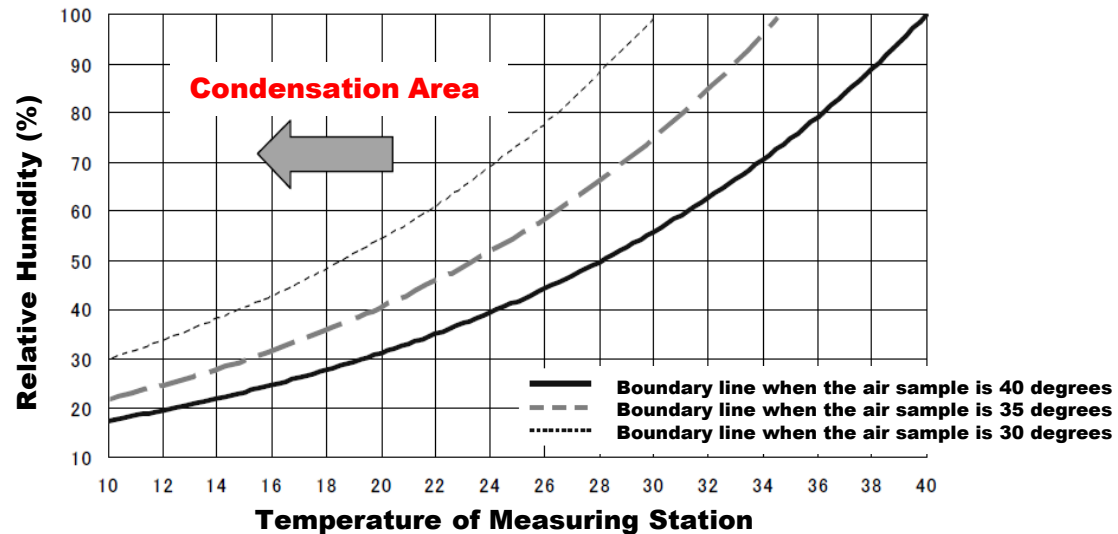
High Temperature & High Humidity

Problem:

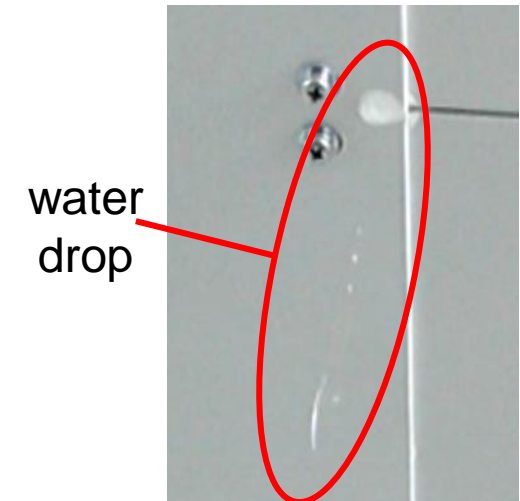
Errors due to water drops

Possible Solutions:

- Set the room temperature considering the temperature difference outside
- Cover the cooler to prevent air from directly hitting the analyzer

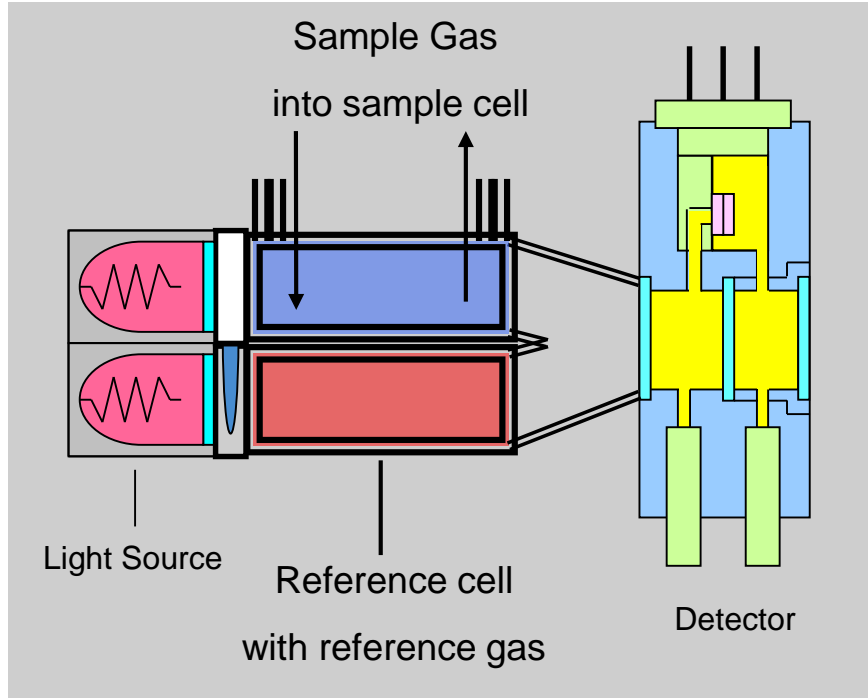


Reference: Ministry of the Environment Government of Japan



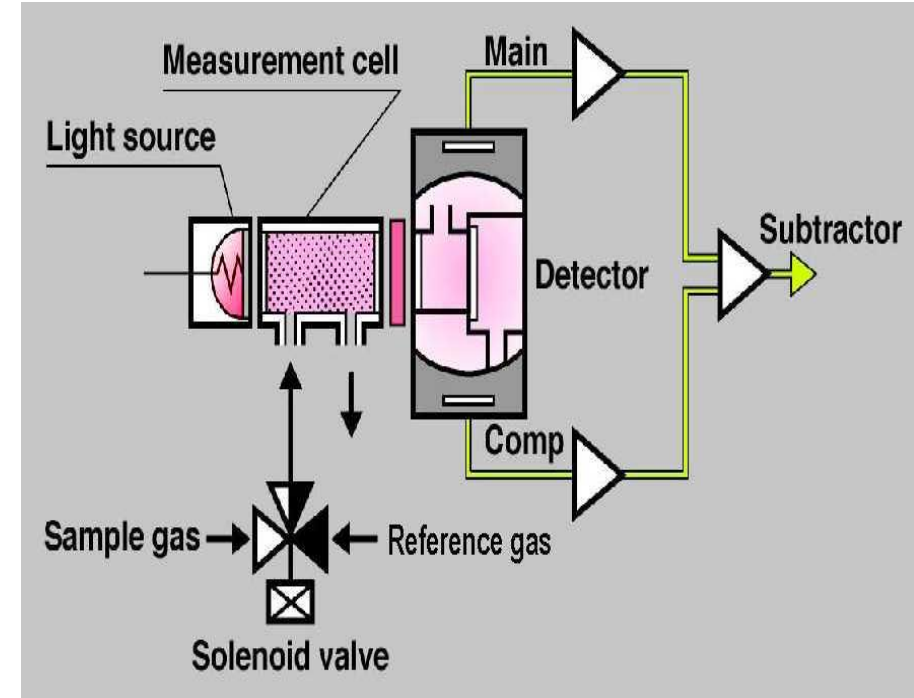
NDIR (Non-dispersive infrared)

Conventional Method



2 Light sources and 2 cells:
Difference cells for Sample
and Reference gas

HORIBA Cross-flow Modulation



1 Light sources and 1 cells:
Use same cell for Sample
and Reference gas

Example of Monitoring Network

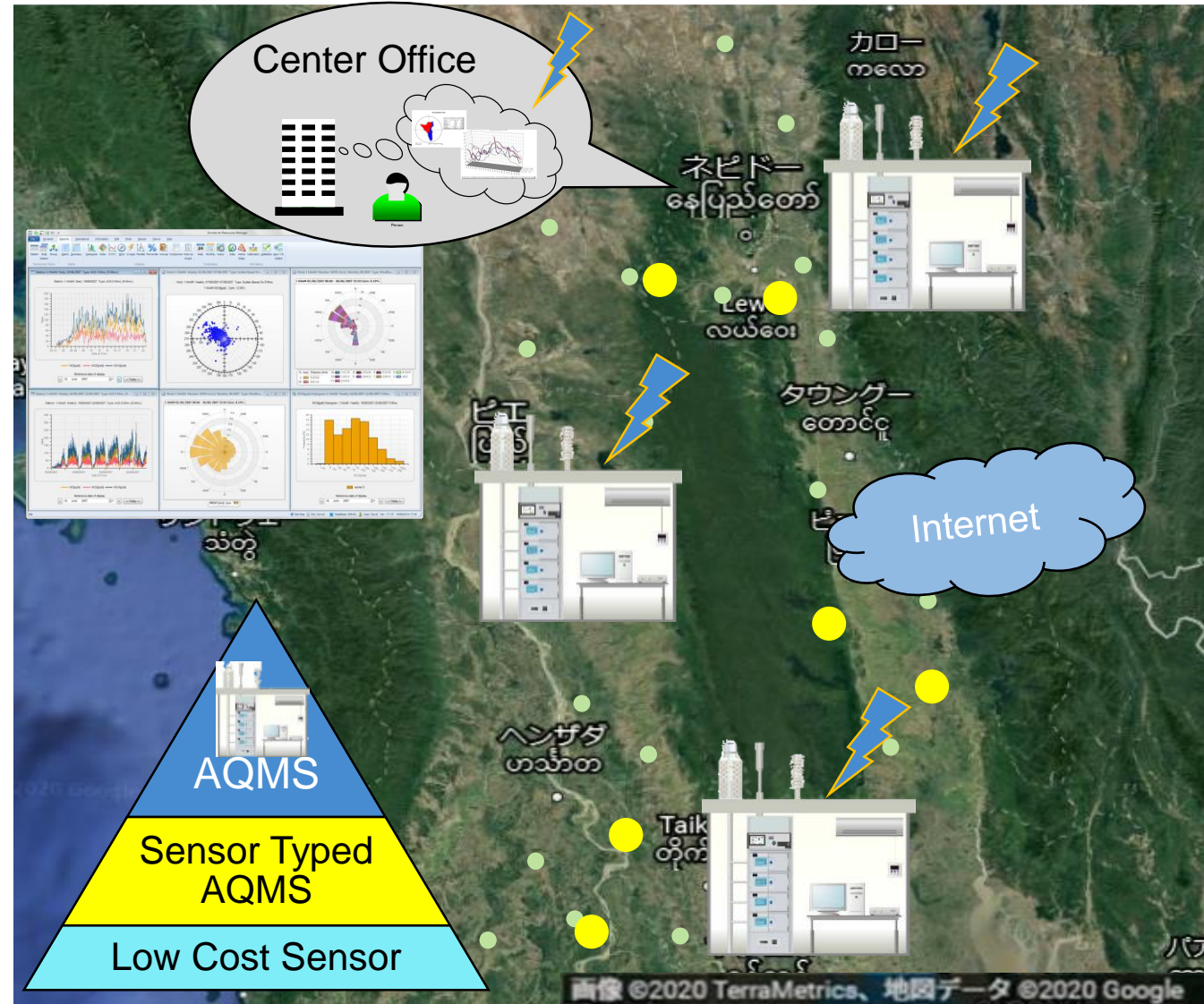
Ambient Monitor

- NO/NO₂/NO_x, SO₂, CO, O₃, CO₂, PM (10, 2.5, 1.0 etc.)



Meteorological Monitor

- Temperature
- Relative humidity
- Precipitation
- Ambient pressure
- Wind direction
- Wind speed



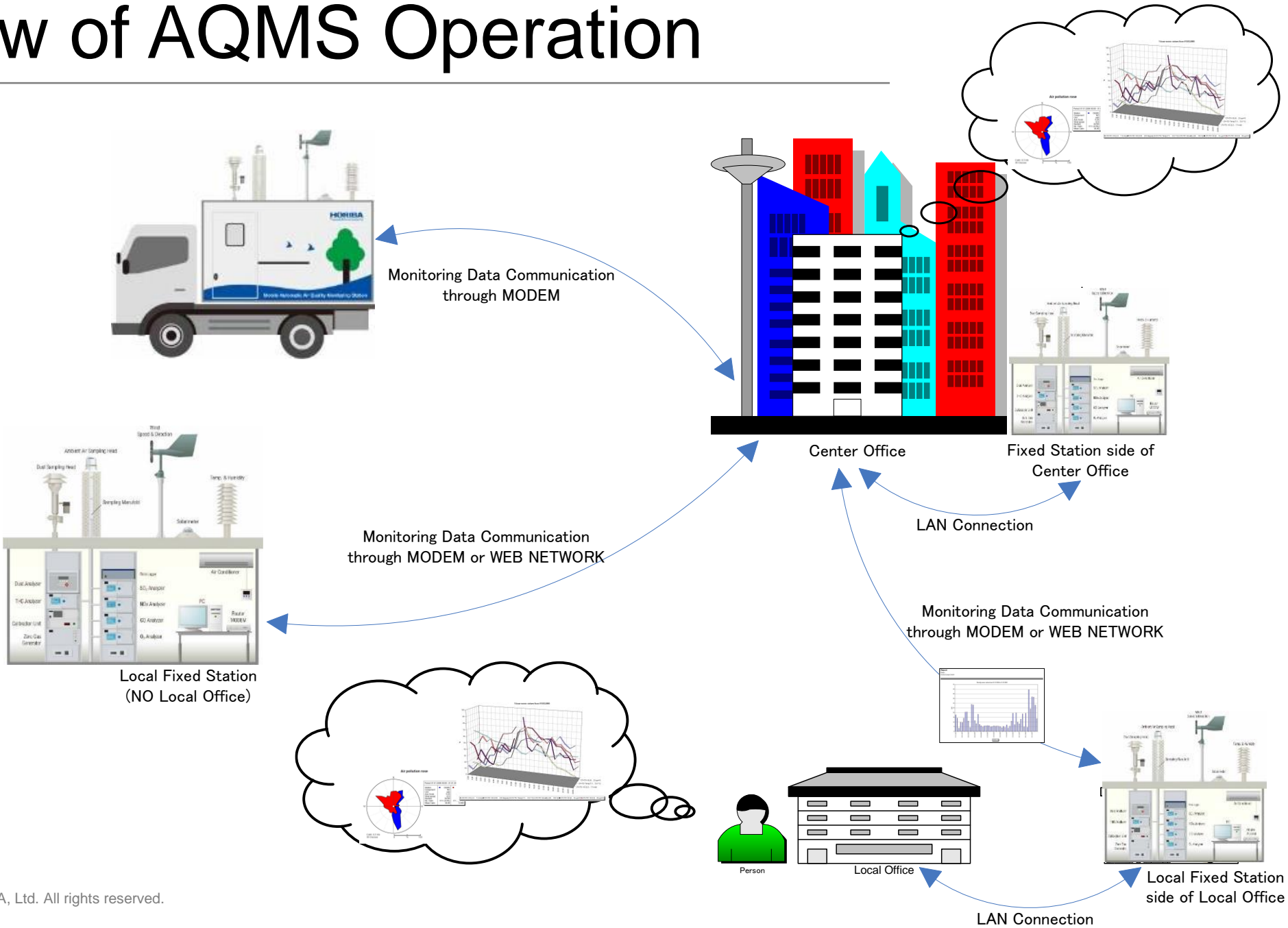
Example of Air Quality Monitoring Operation

No Carrier Gas : Running Cost ↓ Stability ↑

Type	Objective	Usage	Maintenance	Drift
Certified AQMS	Regulatory monitor	Relate health issues with air quality change over time	Auto calibration per up to 3 weeks	(Example) ±2% per week
Sensor Typed AQMS	Short-term studies	Construction/ roadside traffic/ community exposure studies	Co-location calibration for 2 weeks to adjust against humidity, temperature, pressure change	(Example) ±2% per day
Low Cost Sensor	Multi-point monitor	Installation at community, individual scale	Co-location calibration for 2 weeks to adjust against humidity, temperature, pressure change	(Example) ±10%

Combination is important !

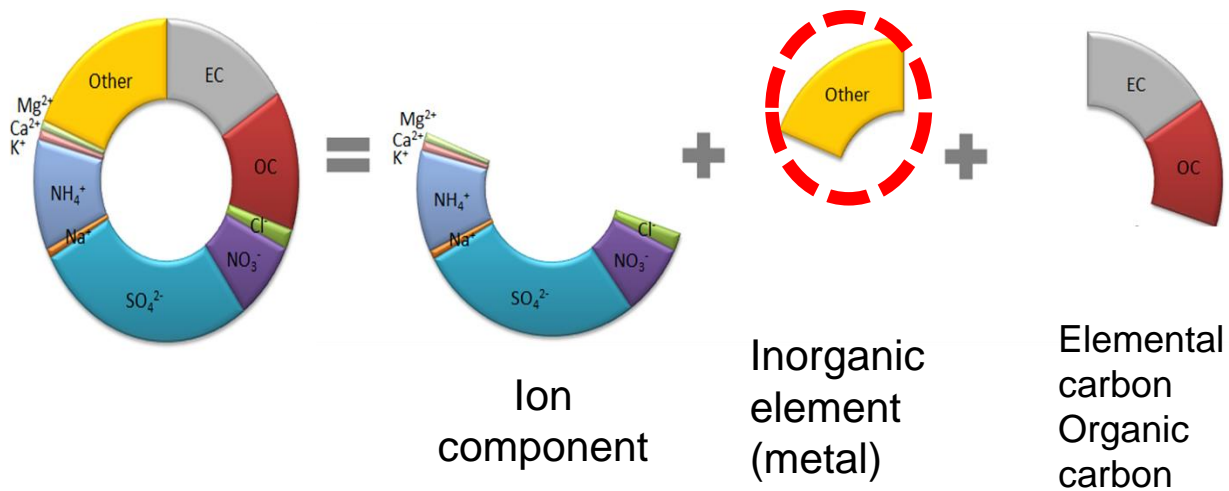
Overview of AQMS Operation



How Metal Monitor Helps Advanced Air Quality Improvement Approach?

Metals

1. Hazardous to human health
2. Trace elements to identify contamination generation sources (Source apportionment)



Finger print of various pollution sources

Element	Na	Al	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Sb
Sea Salt	✓														
Soil		✓		✓	✓	✓									
Road Dust		✓		✓	✓	✓				✓					
Brake Dust						✓				✓			✓	✓	✓
Tire wear														✓	
Steel Manufacture				✓		✓		✓	✓	✓		✓	✓	✓	
Oil Combustion							✓					✓			
Waste incineration	✓		✓					✓					✓		✓
Open Burning			✓												

Reference : Ministry of the Environment Government of Japan

Solution To The Challenges In Your Research

Image of conventional Method

Sampling



Analysis

Sample
Preparation



On-Line Ambient Metals
and Mass Monitor

PX-375



- 1. Automated continuous monitor of PM mass concentration and metal composition**
- 2. Sampling and analysis completed on site**
- 3. High time resolution data shortest at frequency of 30 minutes enables capturing rapid outbreaks of unique element concentration.**

Fence Line Monitoring For Coal Fired Steel Plant



Situation

- Health damage reported

Challenge

- PM pollutants contribution from each generation source is not clear.



Solution

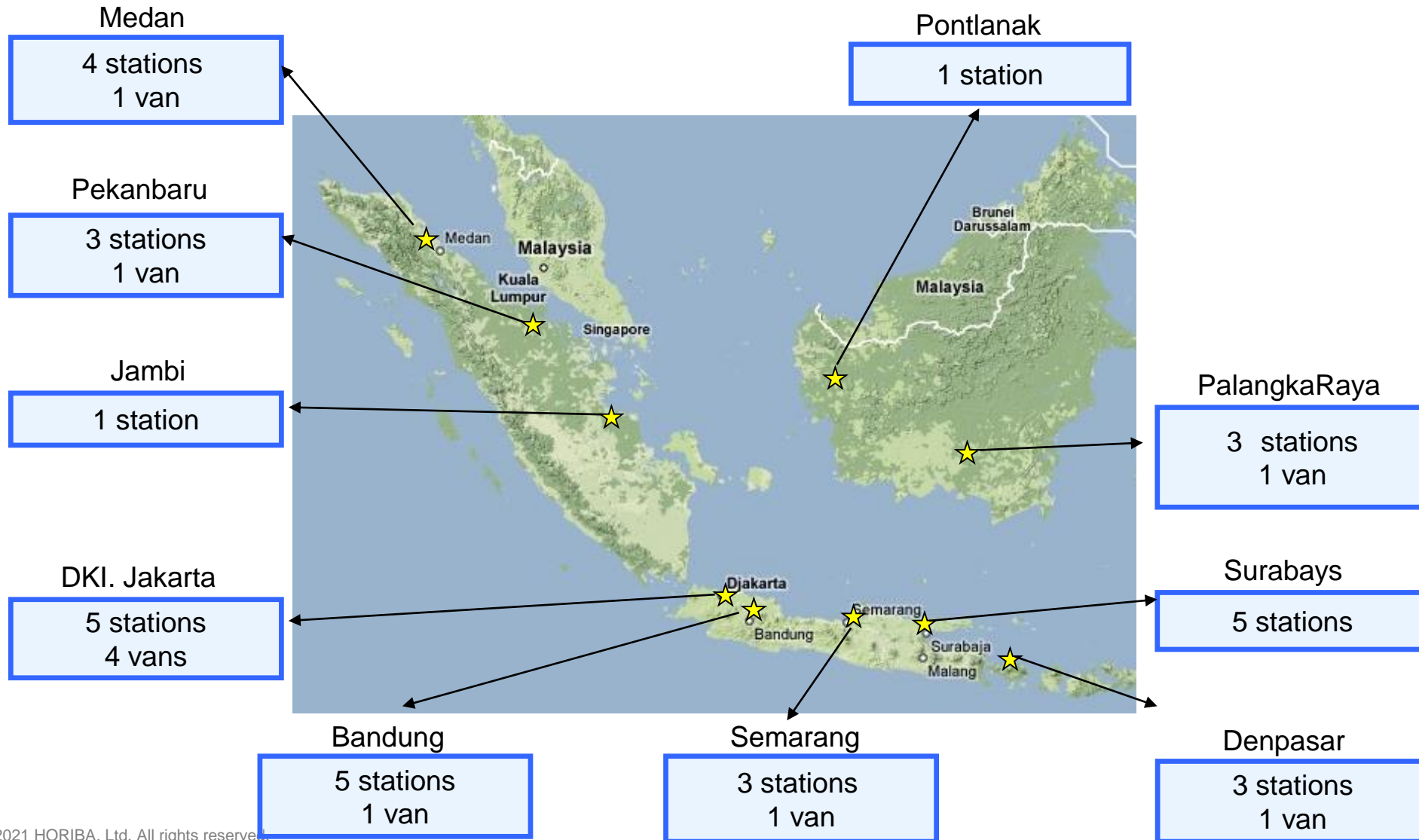
- Visualization by combination of data of PX-375 , wind speed, wind direction, and geographic data.

Omoshiro-okashiku
Joy and Fun

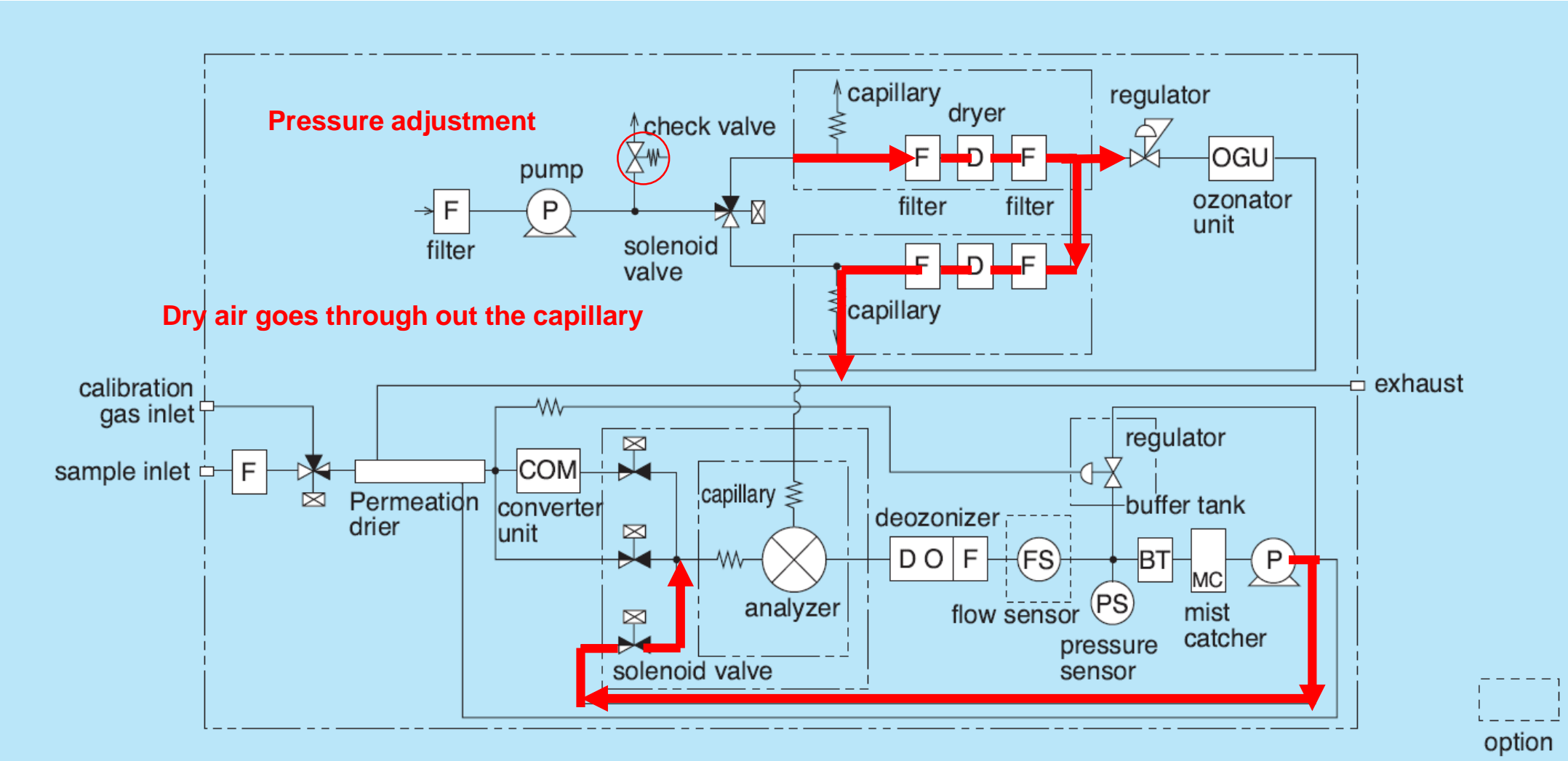


Terima kasih
谢谢
Gracias
Σας ευχαριστώ πάρα πολύ
धन्यवाद
شُكْرًا
Danke
Tack ska du ha
Grazie
THANK YOU
ขอบคุณครับ
Большое спасибо
Merci
감사합니다
Dziękuję
Cảm ơn
ありがとうございました

HORIBA Sales Record in Indonesia



Create Clean Reference Gas for Measurement Accuracy



Reference gas (zero): NO is present after Chemical reaction at the analyzer unit