

## Chimney Vent Remote Sensing System (SO<sub>2</sub>, NO<sub>2</sub>, Carbon Black)

# GF300

### Feature

- Remote sensing monitoring: it can be detected 1Km away from the target without needing to be close to the target;
- No sampling required: complete remote sensing monitoring technology;
- Rapid detection: 0.03s measurement time;
- Continuous measurement: 30Hz monitoring speed;
- Emission estimation;
- Accurate ranging: Built-in laser ranging, the maximum distance is 2Km;
- Built-in GPS positioning;
- Accurate quantification: not disturbed by clouds;
- Simple operation: only simple training can be precise operation;
- On-site testing: all the instruments, reagents and other accessories required for testing are packed in a test box with a 20-inch suitcase.

### Application

- Industrial chimney discharge;
- CEMS



GF300HH handheld detector



GF300OL on-line monitor

### Description

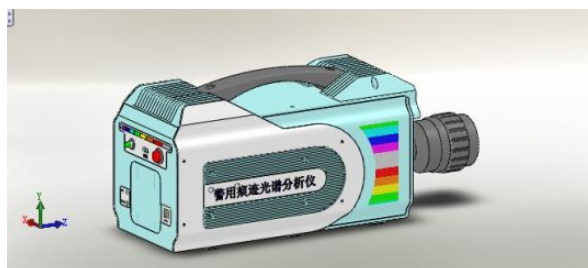
While promoting economic development, industrial development has also brought serious environmental problems. The main pollution components of industrial waste gas are SO<sub>2</sub> and carbon black particles. The waste industrial gas of changes in real time. How to monitor it quickly, accurately and remotely is the hot spot and difficult point in the field of environmental remote sensing.

GF300 chimney vent remote sensing system, using the world's advanced ultraviolet imaging technology, designed and developed a new chimney vent remote sensing system, compared with the traditional methods, this technology has obvious technical advantages in terms of temporal resolution, spatial resolution and detection accuracy, and has been widely used in SO<sub>2</sub> remote sensing in foreign countries.

The system uses UV camera to image SO<sub>2</sub> from industrial pollution, puts forward the imaging monitoring method of carbon black particulate matter, which realizes the monitoring of SO<sub>2</sub> and carbon black particulate matter emission in industrial chimney vent, and breaks through that violet external camera can only be used to detect SO<sub>2</sub> in the world. The monitoring system has high spatial, resolution and accuracy, can realize rapid remote sensing monitoring, important application value in real-time monitoring, ship exhaust pollution emissions.

GF300 also built-in GPS, laser ranging and other functions, very practical.

Model	Feature
GF300-SO <sub>2</sub>	Monitoring SO <sub>2</sub> and carbon emissions
GF300-NO <sub>2</sub>	Monitoring NO <sub>2</sub> emissions



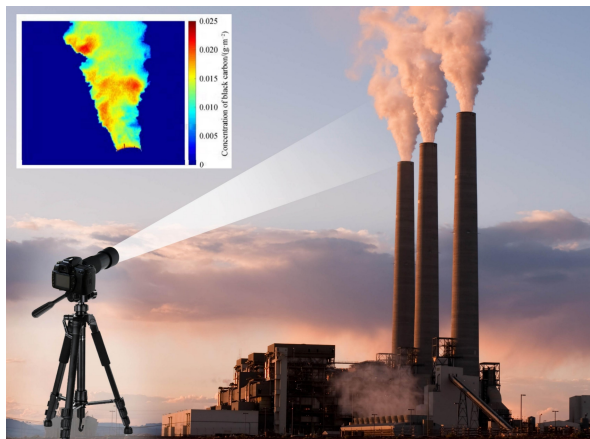
GF300PT portable chimney emission monitor

## 1. Principle

In view of the current pollution situation in the world, coal-fired, heavy oil and other fuel sources such as power plants, steel mills, shipyards and other pollution sources as well as illegal emissions of "scattered pollution" enterprises are still the main source of SO<sub>2</sub>, NO<sub>2</sub> and other pollution gases. There are also some problems when measuring these sources of pollution:

- 1) Lack of spatial distribution and diffusion trend distribution of pollution gas concentration near the source;
- 2) For the emission of pollution sources that change rapidly, it is difficult to accurately reflect the actual emission rate of pollution gases by using related meteorological data as the emission rate of pollution sources;
- 3) When measuring the pollution source, it is difficult to measure near the source, which is usually hundreds of meters or even several kilometers away from the source. Therefore, imaging telemetry technology with high temporal resolution (seconds) and high spatial resolution is needed. The rapid imaging technology using the filter as the split-light device and the "frame" imaging mode has certain advantages in measuring the emission of pollution sources, the visual spatial distribution of the concentration of pollution gas and the trend of pollution diffusion.

This product is for pollution discharge atmospheric pollutants and the urgent need of rapid imaging was carried out by ultraviolet-visible nondispersive pollution gas distribution research. Gui fast imaging, based on filter is constructed the ultraviolet-visible spectroscopic nondispersive system, combined with the full frame ccd-array detector imaging, and through the quantitative analysis of the technology for pollutant two-dimensional histogram. The quantitative analysis method of the two-dimensional distribution of pollutant gas concentration, the correction method of the imaging system response consistency, and the system real-time calibration method combined with passive differential absorption spectroscopy (DOAS) technology were mainly studied. The high time resolution full-frame imaging of the SO<sub>2</sub> and NO<sub>2</sub> distribution of the pollution source plume was realized.



## 2. Monitor renderings

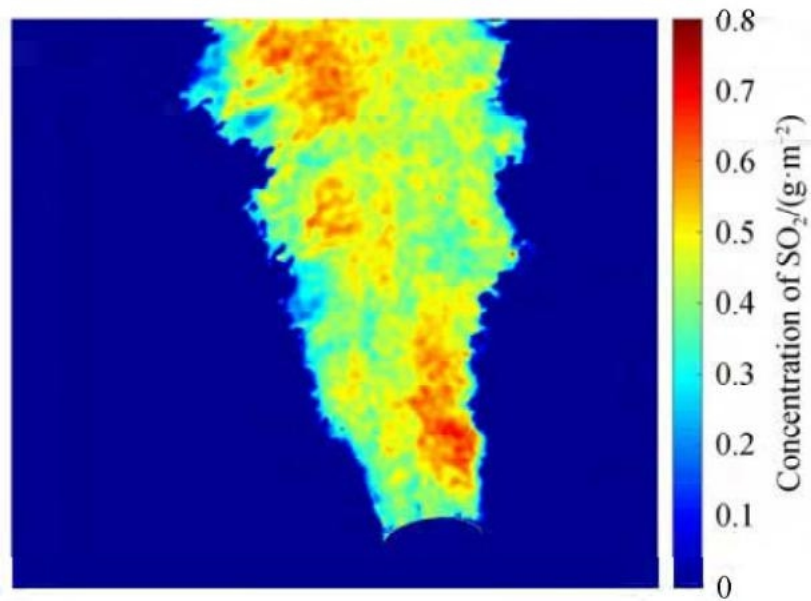


Figure 1 Monitor chimney emissions for SO<sub>2</sub>

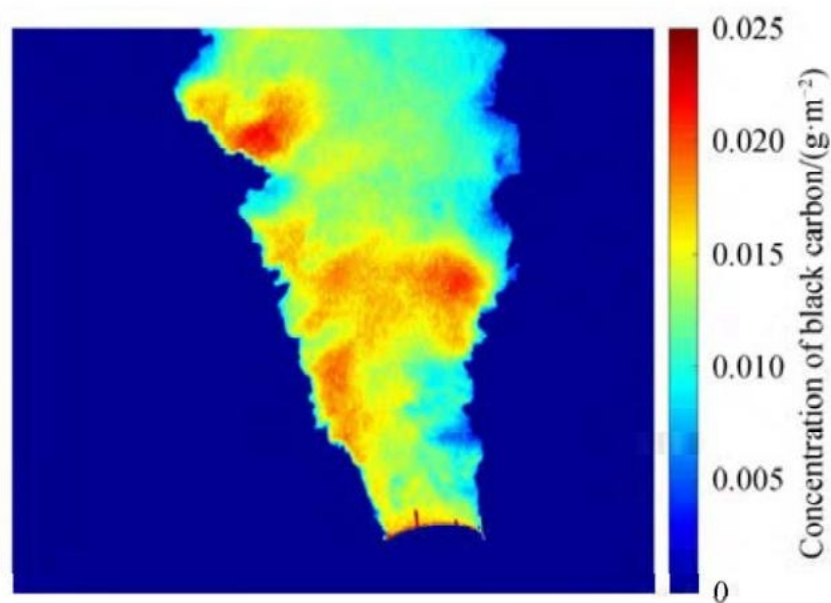


Figure 2 Emissions of black carbon particles

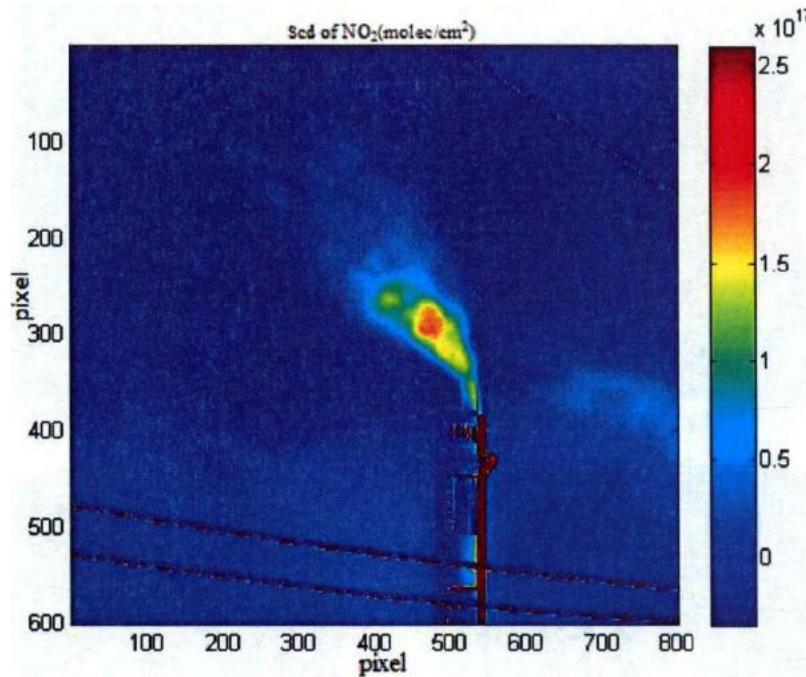




Figure 3 NO2 emission diagram

## 2. Environmental Monitoring Products



**Airborne Patrol System:**


- Water quality: COD, Total phosphorus, total nitrogen, chlorophyll, blue-green algae, red tide
- Ocean oil spill patrol system



**Boat Patrol System:**

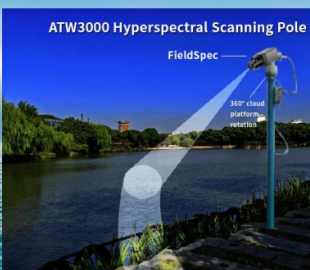
**Water quality:**

- blue-green algae, red tide;
- Ocean oil spill patrol system
- In-deign: Dissolved oxygen, nitrite, ammonia nitrogen, pH, salinity, COD, total phosphorus, total nitrogen, chlorophyll



**Underwater Patrol System:**

- Water Quality:** Dissolved oxygen, nitrite, ammonia nitrogen, pH, salinity, COD, total phosphorus, total nitrogen, chlorophyll, blue-green algae, red tide; Ocean micro plastics



**Online Seashore Monitor:**

**Water quality:**

- blue-green algae, red tide;
- In-deign: COD, Total phosphorus, total nitrogen, chlorophyll,

Figure 4 Water quality monitoring products produced by Optosky (as of December 2020)



**ATW6000**  
Dissolved oxygen monitor



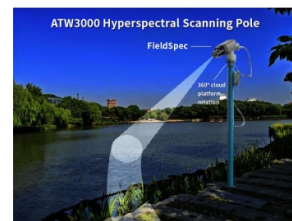
**ATW6500**  
Fish farming water quality monitor

- Dissolved oxygen
- Temperature
- Conductivity
- PH value
- Turbidity



**ATP9100W**  
Handheld water quality monitor

- Red tide, blue-green algae



**ATW3000**  
Hyperspectral Scanning Pole

- Red tide, blue-green algae
- Plankton



**ATW2000**  
Underwater UV-VIS-Spectrophotometer



**ATW2300**  
Underwater Fluorescence monitor chlorophyll



**ATW2310**  
Underwater Fluorescence Analyzer

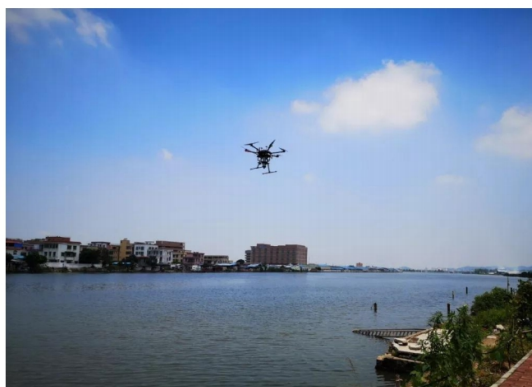


**ATW2320**  
Underwater Hyperspectral Analyzer



**ATR2000W**  
Underwater Raman Analyzer

Figure 5 Water quality monitoring products produced by Optosky (as of December 2020)



**ATH9012W**  
Airborne Water Quality Remote Sensing Monitor



**ATE2000**  
Reagent-free multi-parameter water quality analyzer



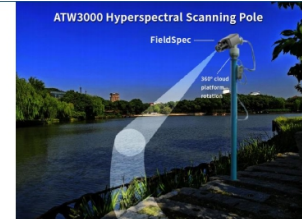
**ATE3000**  
Portable multi-parameter water quality analyzer

Figure 6 ATH9012W Airborne Water Quality Remote Sensing Monitor, ATE2000 Reagent-free multi-parameter water quality analyzer, ATE3000 Portable multi-parameter water quality analyzer (as of December 2020)



**ATE5000YW**  
Airborne Fluorescence Imaging Oil Pollution Remote Sensing System

Work Day & Night

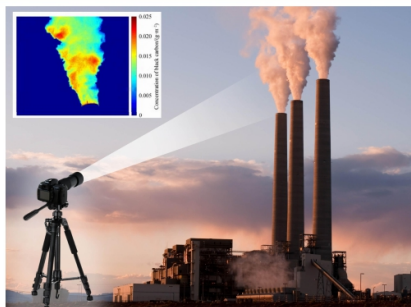


**ATF2500ONL**  
Online Oil Pollution Monitor  
River cross-section



**ATF2500**  
Handheld Fluorescence  
Oil Pollution Monitor

Figure 7 ATE5000YW Airborne Fluorescence Imaging Oil Pollution Remote Sensing System, ATF2500ONL Online Oil Pollution Monitor River cross-section, ATF2500 Handheld Fluorescence Oil Pollution Monitor



**GF300**  
Chimney Vent Remote Sensing System  
(SO<sub>2</sub>, NO<sub>2</sub>, Carbon Black)



GF300HH



GF300OL



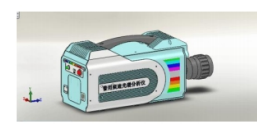
GF300PT



**GF320**  
Methane and VOCs leak Monitor



GF320OL



GF320PT

Figure 8 GF300 chimney vent emission remote sensing monitoring system, GF320 methane and VOCs leak monitor produced by Optosky

## 3. Company Profile

Optosky company is an first-class spectroscopy solution provider, with the headquarter locates in the 7<sup>th</sup> floor of the research institute of the Chinese Academic of Science at an area of 2500 square meter in Xiamen city where successfully held the international 9<sup>th</sup> BRICK summit in 2017. The subsidiary company locates in Wuhu city with an area of 2035 square meter.

The company founder Dr.Hongfei,Liu graduated Doctor degree from Chinese Academic of Science and postdoctoral degree from Xiamen University, by integrating both of top Universities' spectroscopy technology background into Optosky company aiming at developing the leading spectroscopy equipment in the world.

The company bases on unique technologies of Optomechatronics, Spectroscopy Analysis, Process Weak Optical and Electrical Signals, Cloud Computing, and have been developed wide products line of the competitive Raman spectroscopy instruments, micro spectrometer, hyperspectral imager, field spectroradiometer, fluorescence spectroscopy, LIBS etc. Driven by advanced technologies and products, Optosky brand has been well-known to customers all over the world.

Optosky company base on technologies innovation, market driven direction, customer first, provides first-class products and services, and one-stop solutions to many fortune 500 companies in many industries. The company received praise from different industries companies, as well as many innovative intellectual property, software copyright, qualification certification, and winner awards over hundred numbers.

Optosky receives top class A introduced high-tech company to international Xiamen city, the national high-tech and new innovative technology company award. The founder Dr.Hongfei Liu receives the innovation talent award by ministry of science and technology.

The company is currently conducting the exclusive project of major industrialization national oceanic administration with a total fund of five million us dollar. The company in charge of drafting national industry standard of VNIR and SWNIR Field Spectroradiometer, and six national standard drafter, including China National Standard Drafter for Hazmat detector based on Raman spectroscopy, China National Standard Drafter for Buoy-type Monitor eco-environment, China National Standard Drafter for water quality monitor in unmanned boat, China National Standards drafter for online water quality monitor by spectroscopy, China National Standard Drafter for UV-absorbent measure fabrics.

The company has over 70 IPs and over 20 innovative patents.

The company received ISO9001:2015 certification, CE certification, Police Administration Certification, FDA approval compliant, IQOQPQ compliant.



Figure 9 Optosky (Xiamen) Photonics Inc. Company Headquarter

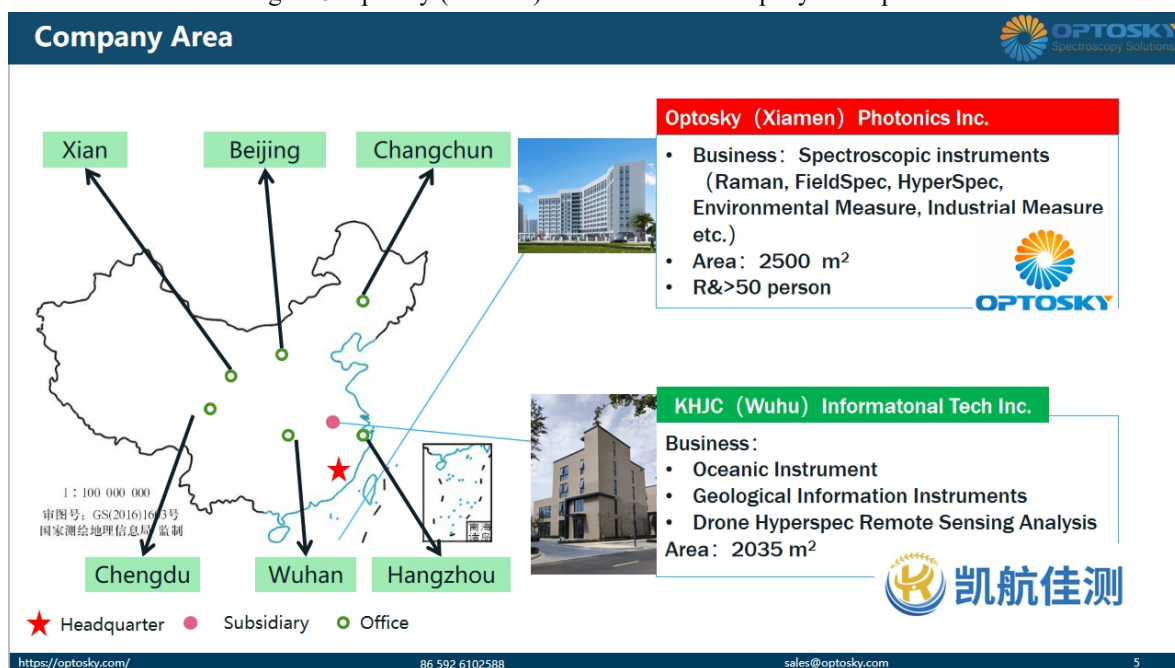


Figure 10 Optosky Company Area

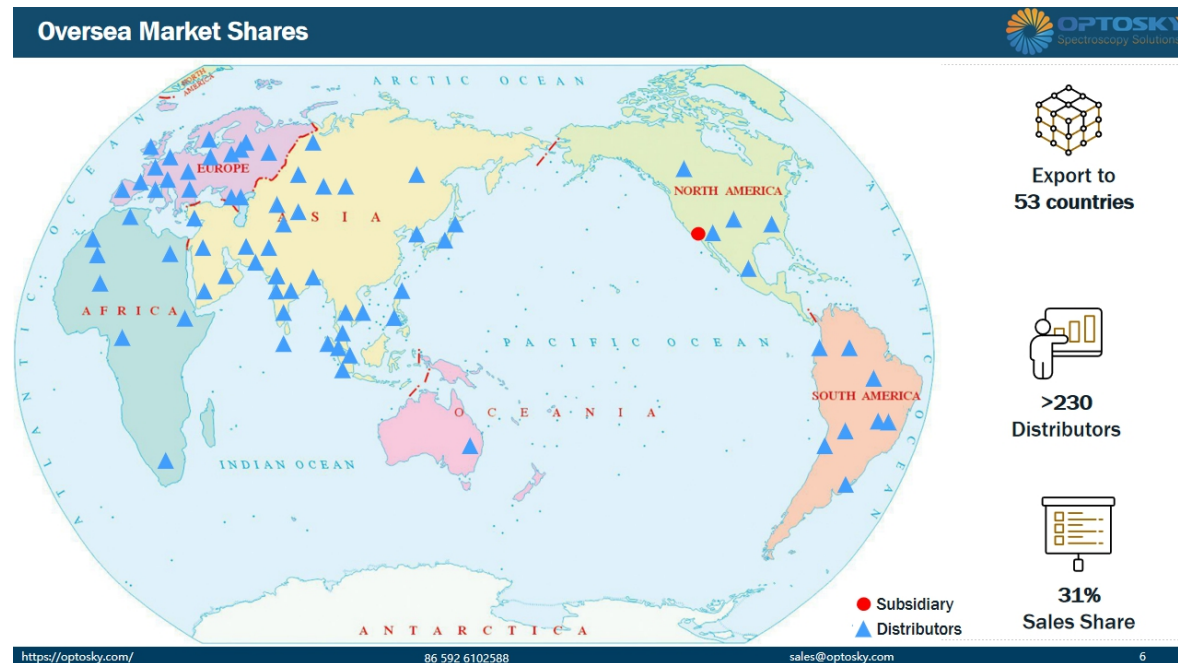


Figure 11 Oversea Market Shares



Figure 12 Optosky Chair and Draft National Standards Lists.

**Qualification**

**ISO9001:2005**

**GB/T 23001**  
 Informationization  
& Innovation

**CE, RoHS, LVD**  
 17 models

**Police Approval**  
 11 models

**GB/T 29490**  
 IP implementation

**5 Innovative patents**

**35 patents**  
 new utility design

**32 Software copyright**

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Figure 13 Qualification

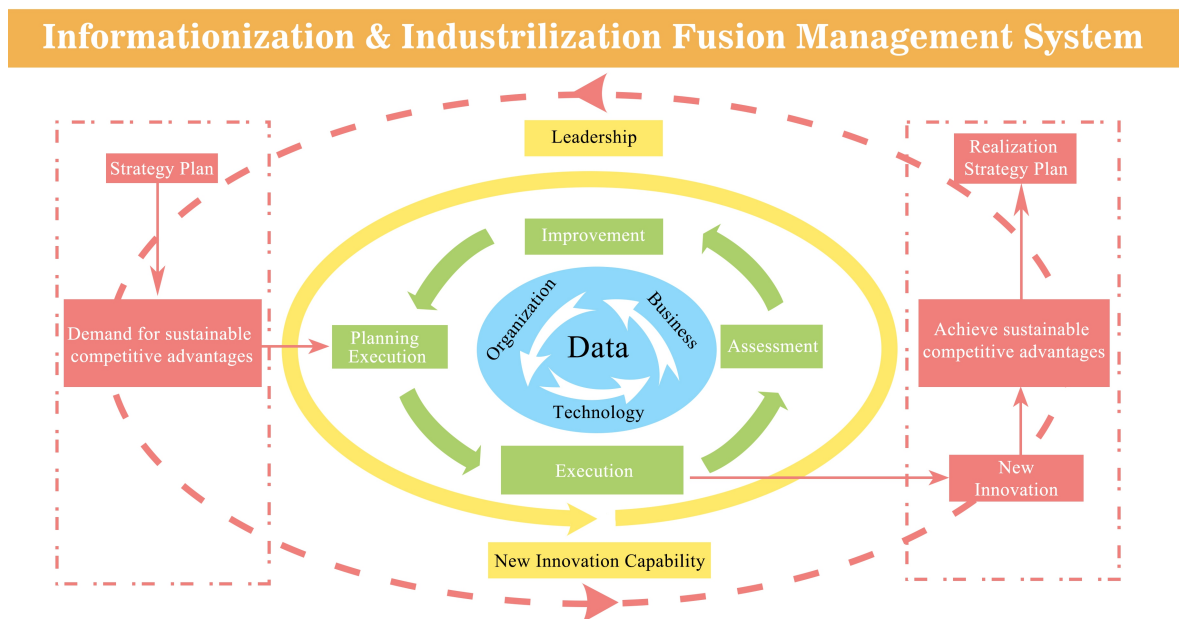


Figure 14 GB/T 23001\_Informationization & Industrilization Fusion Management System

## Co-Founder—Dr. Hongfei Liu



### Postdoctoral Hongfei Liu

- Selected "Innovative Talent" by Science and Technology ministry
- Top Class A Talent by Xiamen City
- CCTV Science & Technology Interview
- Fortune 500 experience in Agilent, II-VI

#### Honors

- Selected by science & technology ministry as "Innovation Talent"
- CCTV Science & Technology Interview
- Top Class A Talent credited by Xiamen City
- **Innovation Hero**

#### Education

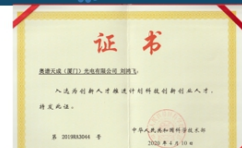
- PhD • Chinese Science of Academic • Prof. Gui-Lin Chen, Originator in spectroscopy
- Postdoctoral • Xiamen University • Prof. Zhong-Qun Tian guided by the SERS founder M.Fleischmann

#### Career

- Engineer → R&D Manager → GM
- **Agilent**, Leader of instrument, Fortune 500 company, Job: engineer
- II-VI Incorporated (Nasdaq: IIVI) leader in optical & electrical industries, Job: GM of Instrumentation and Automation

#### Academic

- University graduate tutor
- obtain more than 60 IPs, more than 10 Innovation patents;
- Publish more than 20 papers, 2 recorded SCI, 8 recorded EI



Selected "Innovative Talent" by Science and Technology ministry



Top Class A Talent by Xiamen City



Founder & Tutors

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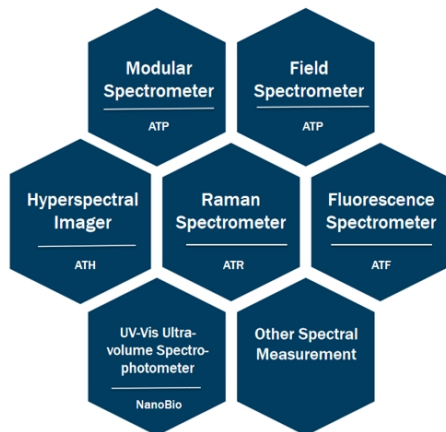
[sales@optosky.com](mailto:sales@optosky.com)

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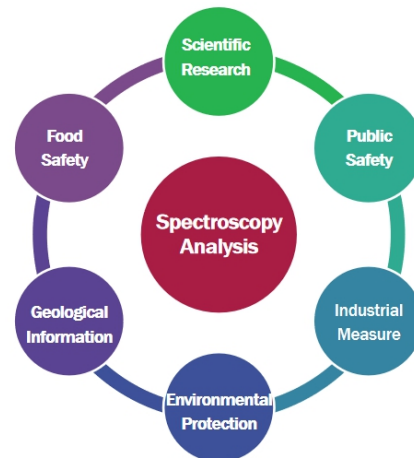
Figure 15 Optosky's Co-founder\_Dr. Hongfei Liu

## Category & Application

### Category



### Application



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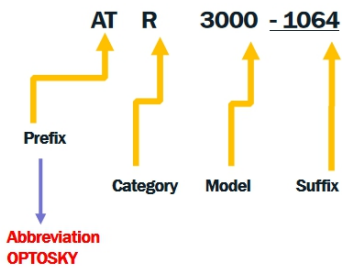
Figure 16 Category & Application

**Model Name Rule**



**Model Name Rule:**

- Prefix
- Category
- Model
- Suffix



- ATR – Raman Spectrometer
- ATP – Micro Spectrometer
- ATH – Hyperspectral Imager
- ATF – Micro Fluorescence Spectrometer
- ATL – LIBS
- ATW – Water
- ATE – Environment Protect
- ATFD – Food Safety
- GA – Public Safety (Gong An)
- GF – Gas Monitor (Gas Finder)
- GY – Industrial Monitor (Gong Ye)

eg:

- Raman Microscope: ATR8300MP-1064
- Hyperspectral Imager: ATH9500

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Figure 17 Model Name Rule

End