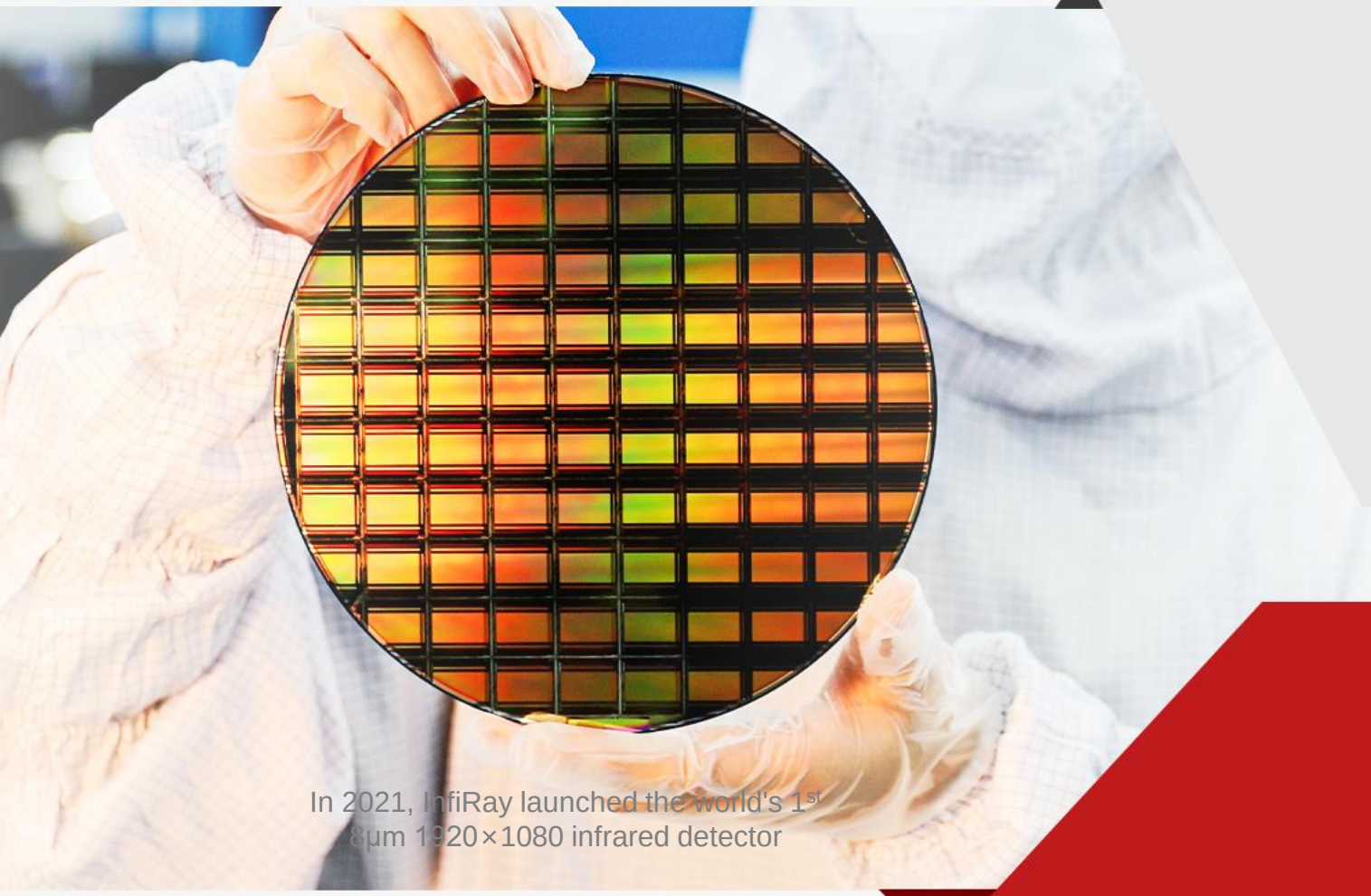


In 2021, InfiRay launched the world's 1st 8μm 1920×1080 infrared detector

InfiRay, a brand of Raytron Technology Co., Ltd.
(SSE: 688002)

Leading Manufacturer of Uncooled IRFPA

1 About InfiRay

2 About IRay

3 Products

4 Quality Assurance

Overview of InfiRay

InfiRay

World’s leading manufacturer of infrared thermal imaging chips

R&D and Production Bases in China

InfiRay

Infrared detectors, thermal camera cores, and terminal thermal cameras

Research Institute

THz chips and imaging systems, next-generation infrared chips, smart infrared modules, and high-end optical MEMS chips

InfiRay Headquarter

Yantai Photoelectric Sensing Industrial Park

A R&D platform integrating the design, testing and packaging of new smart photoelectric sensors

InfiRay Chengdu

Laser, microwave components, high-end optoelectronic systems

Manufacturing Center

A smart factory integrating automation, informatization and digitization

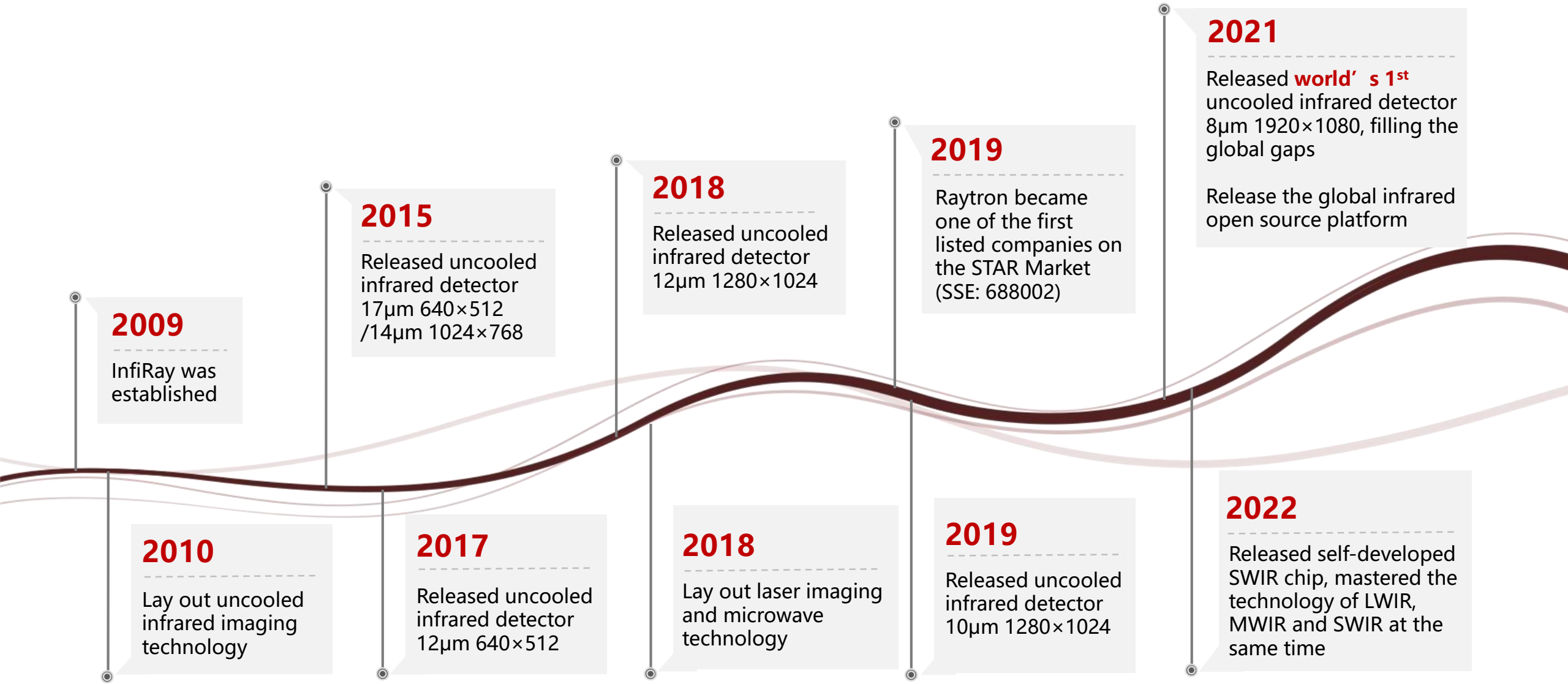
InfiRay Hefei

Terminal photoelectric application products of smart infrared

InfiRay Wuxi

Semiconductor business R&D base

Innovation and Development History



2009

InfiRay was established

2010

Lay out uncooled infrared imaging technology

2015

Released uncooled infrared detector 17μm 640×512 /14μm 1024×768

2017

Released uncooled infrared detector 12μm 640×512

2018

Released uncooled infrared detector 12μm 1280×1024

2018

Lay out laser imaging and microwave technology

2019

Raytron became one of the first listed companies on the STAR Market (SSE: 688002)

2019

Released uncooled infrared detector 10μm 1280×1024

2021

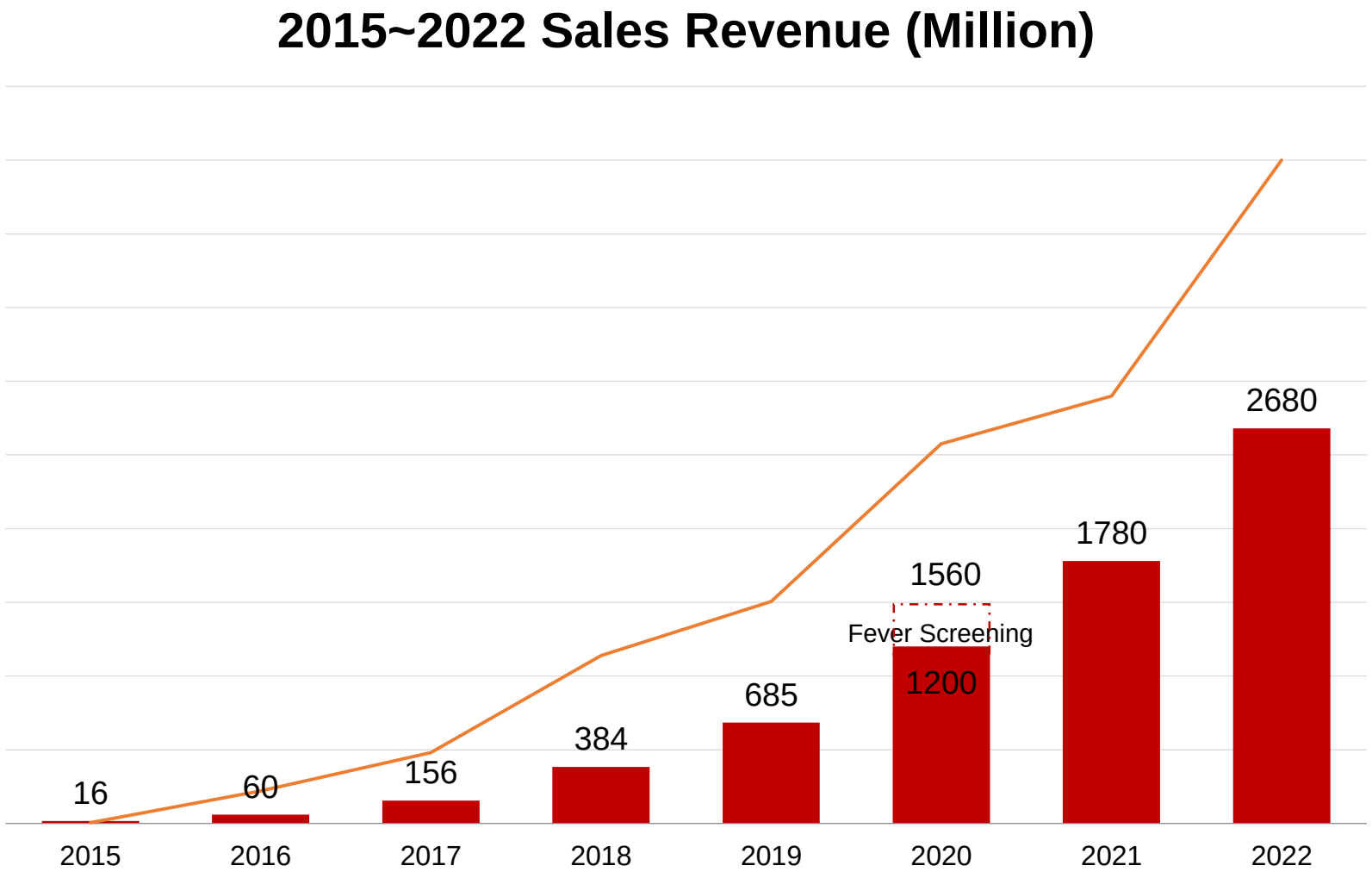
Released **world's 1st** uncooled infrared detector 8μm 1920×1080, filling the global gaps

Release the global infrared open source platform

2022

Released self-developed SWIR chip, mastered the technology of LWIR, MWIR and SWIR at the same time

Sales Revenue



R&D Strength

1000+
R&D Personnel

48%
Proportion of R&D Personnel

600+
Masters and Doctors

5
Provincial and Municipal R&D Centers/Platforms

Strong R&D Capability

Experienced experts in the fields such as IC, MEMS sensor, semi-conductor, AI, robot, AR, laser detecting, infrared image processing algorithm, precise control algorithm

Multi-spectral Sensing R&D Capability

Long-wave, medium-wave, short-wave infrared, laser, microwave, THz, etc.

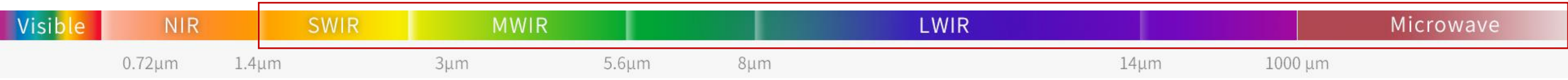
Leading Chip R&D Platform

Industry-leading uncooled infrared chip and ASIC specific processing chip R&D and design platform

Multi-dimensional Perception and AI Algorithm R&D Capability

Industry-leading infrared image processing algorithms

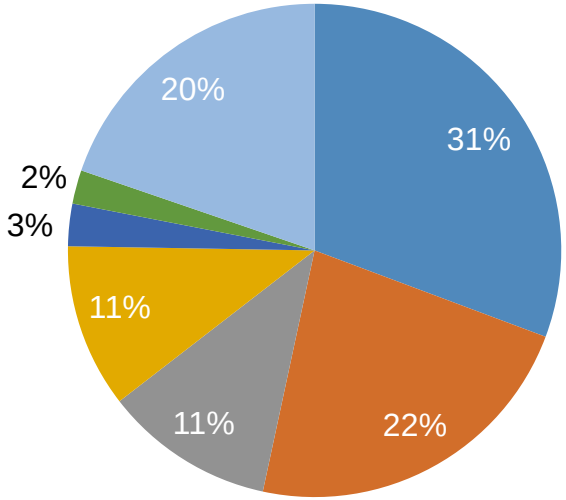
Industrial innovative AI algorithm breakthroughs



Intellectual Property

Applied for **1945** intellectual property rights

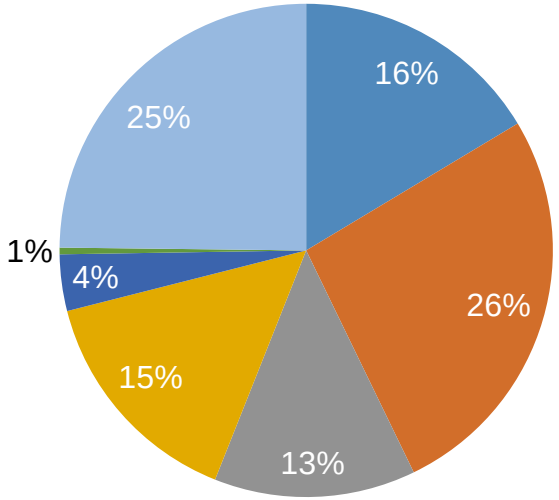
- Invention Patents 597
- Utility model patents 441
- Appearance design patents 217
- Software copyrights 209
- Layout design rights 54
- Foreign related patents 43
- Others 384



GB/T29490
Intellectual Property
Management
System Certification

Authorized **1378** intellectual property rights

- Invention Patents 226
- Utility model patents 364
- Appearance design patents 182
- Software copyrights 207
- Layout design rights 51
- Foreign related patents 6
- Others 342



The above data is as of 02/08/2023

Sales Network

Sell to 100+ countries and regions

Asia Europe North America South America Oceania Africa

Industrial Contributions

Established World’ s 1st Infrared Open Source Platform

http://openai.raytrontek.com/E_new/

Covering more than 10 data sets including infrared sea ships, infrared aerial vehicle detection, infrared cities, infrared images, etc.

Infrared
AI Research

Infrared
Data Share

Empower
Infrared Ecosystem

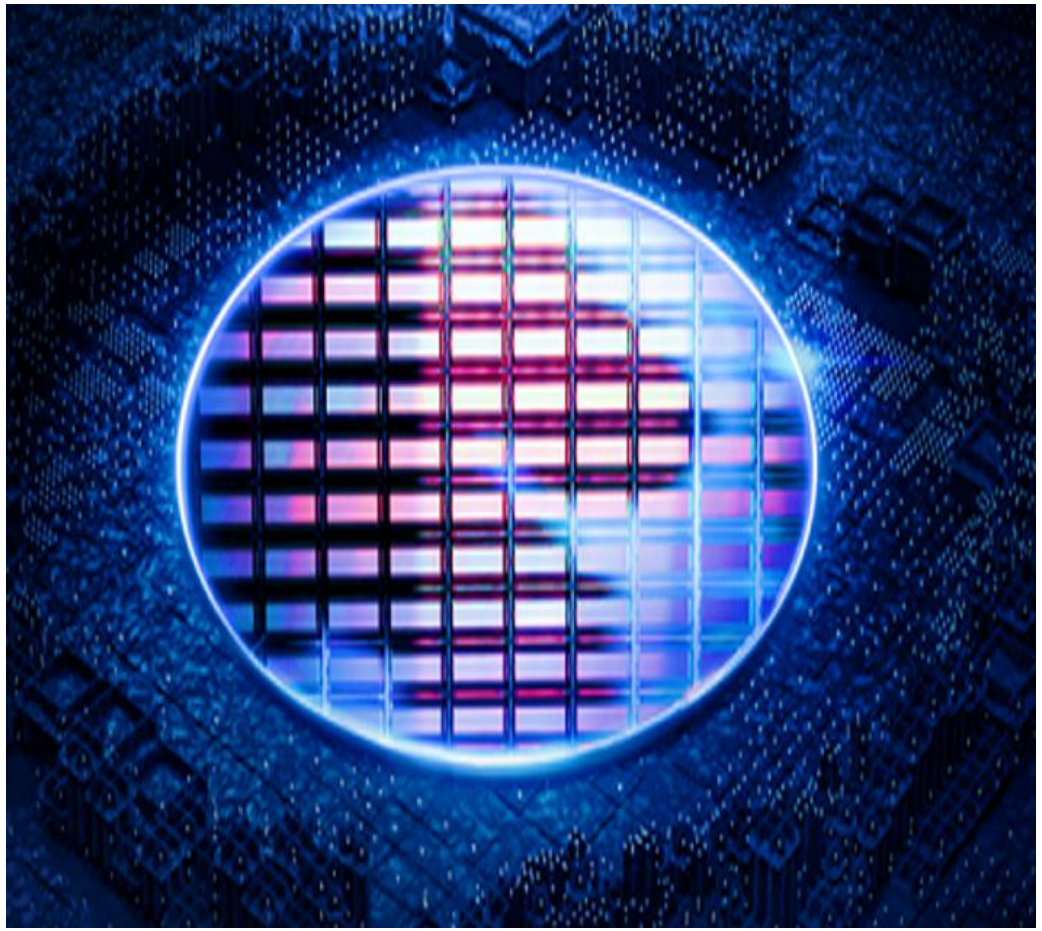
1 About InfiRay

2 About IRay

3 Products

4 Quality Assurance

Overview of IRay



- A brand of Raytron Technology Co., Ltd. (SSE: 688002), a listed company on STAR Market, a leading manufacturer of uncooled IRFPA, focusing on the R&D and manufacturing of infrared thermal imaging products
- Products cover infrared detectors, thermal camera cores, thermal modules, and finished thermal imaging products
- Leading the global technology, released the **world's 1st 8μm 1920×1080** uncooled infrared detector
- Realize mass supply of **12μm 1280×1024、640×512、384×288 、256×192、160×120** uncooled infrared detectors and thermal camera cores

Global Detector Development Overview

US, China, Israel and France master the core technology of infrared detector. US has a prominent advantage. China has made remarkable progress in the past decade.

IRay has reached the world leading level in uncooled infrared technology.

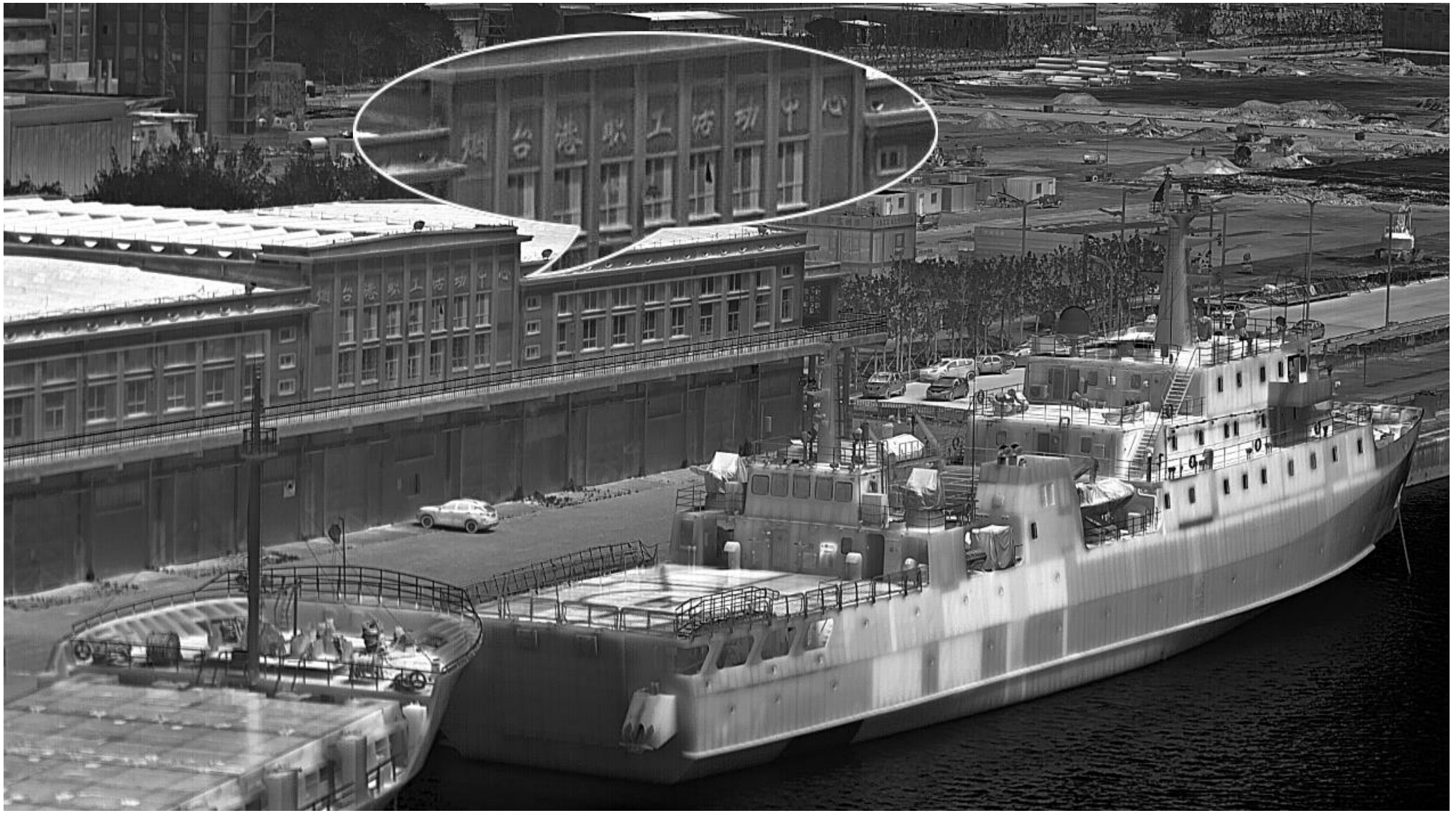
List of the World's Leading Uncooled Infrared Detector Manufacturers

Specifications	IRay (China)	IRay (China)	DRS (US)	BAE (US)	FLIR (US)	ULIS (France)	SCD (Israel)
Technical Route	VOx	VOx	VOx	VOx	VOx	VOx	VOx
Min. Pixel Pitch	8μm	10μm	10μm	12μm	12μm	12μm	17μm
Max. Array	1920×1080	1280×1024	1280×1024	1920×1200	640×512	1280×1024	1024×768
Max. Frame Rate	30Hz	30Hz	30Hz	60Hz	60Hz	30Hz	60Hz
NETD	<50mK	<40mK	<50mK	50mK	<20mK	<50mK	<45mK
Integrate ADC Or Not	Yes	Yes	No	Yes	Yes	Yes	No
Release Time	2021	2019	2015	2019	2022	2021	2010

Note: The above data are updated in January 2023 and come from the public information literature or the official website.

12μm 1280 Thermal Imaging Real Shot

8μm 1920 Thermal Imaging Real Shot (World’s 1st)



1 About InfiRay

2 About IRay

3 Products

4 Quality Assurance

InfiRay Business Field

Industrial Market

Medical and Health · Smart Home · Consumer Electronics · UAV · Livestock Breeding · New Energy · Smart Driving · Security Monitoring · Industrial Monitoring · Enforcement

Big Data Service

Data

Data Directory	IoT Directory	Interface Directory	Resource Directory
Subscription Push	Data Exchange	Data Integration Tools	Data Processing Tools

Basis

Network Device Universal Server	Security Appliance Smart Server	Display Device General Storage	Streaming Storage
			……

Guarantee Systems of

- **Operation and Maintenance**
- **Standards**
- **Safety**

Applications

Public Safety	Transport -ation	Park Management	Smart Building	Energy and Metallurgy	.. .

Industry General Applications

Embedded Application Open Platform	Edge Intelligent Application Platform	Cloud Center Intelligent Application Platform

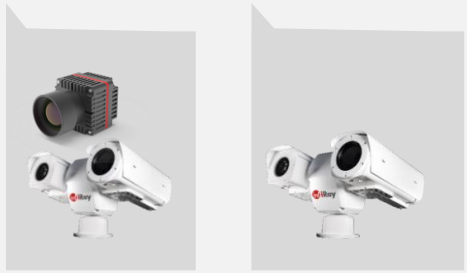
Platforms

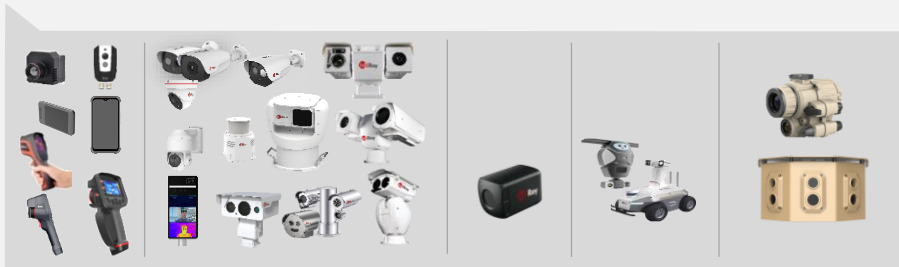
Converged Media Cloud Platform	Temperature Measurement Service Cloud Platform	IoT Elements Governance Platform	AI Development Platform
Digital Twin Platform	Intelligent Perception Networking Platform	Infrared Intelligent Algorithm Platform	

Multi-spectral Intelligent IoT and Sensing Devices

Safety production detection, park monitoring, fire monitoring, environmental pollution detection

Visible · NIR · SWIR · MWIR · LWIR · Microwave





Infrared Industry Chain

Our products mainly include infrared detectors, thermal modules, and terminal thermal cameras

Integrated Circuits

Sensors

Infrared Detectors

Thermal Modules

Terminal Thermal Cameras

12μm Infrared Detector Full-series Mass Production

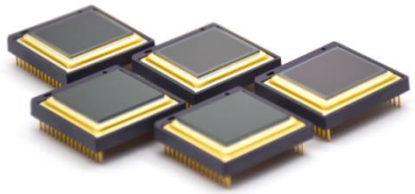
Metal Packaged

Array: 1280×1024/1024×768

Batch supply,
Mature and reliable,

Annual production capacity 300,000+ for 640 and above resolutions

Ceramic Packaged



Array: 640×512/384×288

Batch supply, cost effective,

Small size, light weight,

Annual production capacity 500,000+

WLP

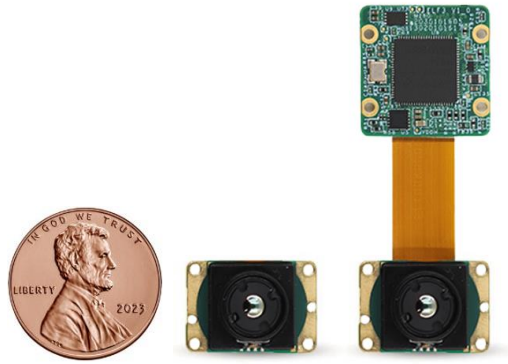
Array：256×192/160×120

Wafer level mass production craft,

Cost effective, mass production,

Annual production capacity 2,600,000+

WLP Micro-module



Array：256×192/160×120

Small size

Easy to integrate,

Applicable to massive consumer grade products

Thermal Camera Cores Series

FT Ⅱ Thermal Camera Core for Observation

- 4 kinds of resolution optional: 384×288, 640×512, 1024×768, 1920×1080
- Support BT.656, BT1120, LVDS, LVCMOS, network interface
- Provide a variety of continuous zoom lenses to meet the needs of various wide-area target detection within 20 km
- Used in railway safety, parameter security, forest fire prevention…

Quarter dollar

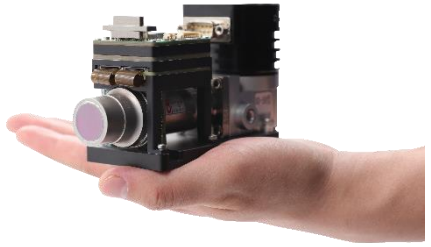
MicroⅢ Series Small-size Thermal Camera Core

- Small size (21×21mm), low power consumption
- With -20℃~+150℃, 0℃~+550℃ two temperature measurement modes
- Temperature measurement accuracy reaches ±2°C or within ±2%
- Meet highly integrated application requirements such as drone pods and personal devices

MWIR Cooled Infrared Module & Thermal Camera

MWIR Cooled Thermal Camera Cores

GENE640M (Micro)



GENE640E (Enhanced)

1-100Hz

High frame rate

High performance

Low power

Compact size

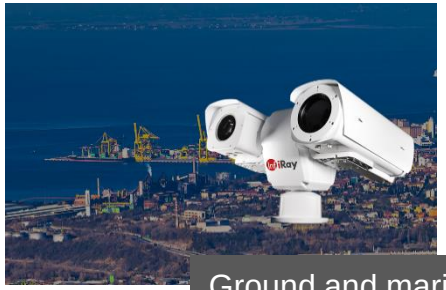
MWIR Cooled Thermal Cameras

32mm~800mm continuous zoom

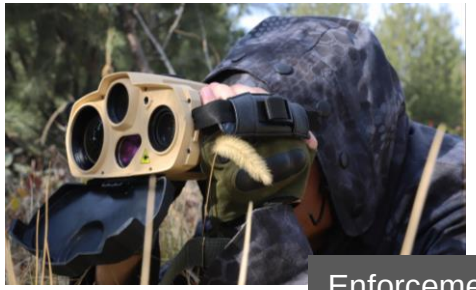
22.5mm~500mm continuous zoom

15mm~300mm continuous zoom

Electro-optical pod



Ground and maritime surveillance



Enforcement

Maritime patrol

SWIR Camera Core

IRIS Series
SWIR Camera Core

IS615B

With 25/50Hz
standard frame rate

- Support 25Hz, 50Hz frame rate image output
- Support USB, Camera Link digital video
- Various optional SWIR lenses
- Used for situational awareness, laser imaging, star-sensitive navigation...

48×48 mm	<2.5W	72dB	TEC	RS232 RS422 UART
Small Size	**Low Power**	**Wide Dynamic Range**	**TEC Control**	**Rich Interfaces**
Save space for design	Improve system endurance	Rich details	Low noise	Easy to integrate

Vision Enhancement

Monitor and Recognition

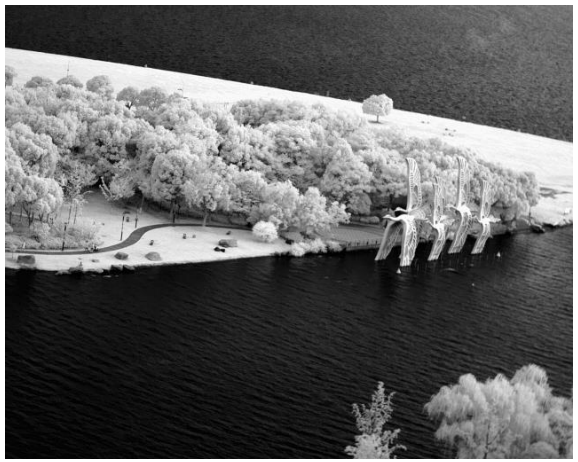
Active Imaging

Industrial Thermal Imaging Product Lines

From industrial temperature measurement, gas detection to SWIR detection, IRay has formed a complete infrared product system, provide comprehensive and professional infrared and thermal imaging solutions for the market and customers.

Electric power temperature measurement

Gas detection



SWIR imaging

General Patrol
C/P Series

5G Terminal
PX1

Professional
M Series

Expert
T Series

Master
S Series

Gas detection
CG/G Series

Dual-Spectral
AT Series

Fixed-focus
ATF Series

Electric-focus
AT Series

Ultra-high temperature
ATU Series

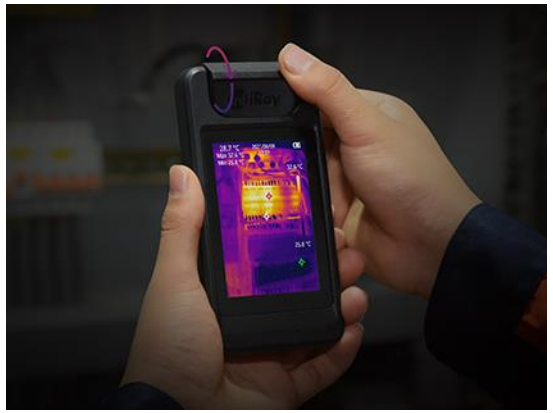
SWIR
IS615B

Industrial Thermal Imaging- Handheld Thermal Cameras

With the advantages of high accuracy in temperature measurement, high-definition image quality, intelligent analysis software, high reliability and ease of use, InfiRay temperature measurement handheld thermal cameras are widely used in professional fields, such as industrial automation, electric power engineering, scientific research and other fields.

Tianshu C Series
Handheld thermal camera for temperature measurement

Tianxuan M Series
Handheld thermal camera for temperature measurement



Tianquan P Series
Pocket thermal camera

Yaoguang S1280
1.3-megapixel flagship android thermal camera

Industrial Thermal Imaging
- Online Thermography and Gas Detection

Online Industrial Thermographic Cameras

With the advantages of high accuracy, high definition, intelligent analysis software, high integration and easy application, they are widely used in fields, such as industrial automation, electric power engineering, scientific research.

AT20/30
Online dual-spectrum thermographic camera

AT31/61P
Electric-focusing online dual-spectrum thermographic camera

AT1280
1.3-megapixel online thermographic camera

Gas Detection Infrared Cameras

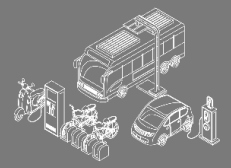
Focus on the gas detection market, to expand the applications of industrial thermal imaging in environmental monitoring, equipment maintenance and the third-party testing.

Tianji CG300C
Gas detection cooled infrared camera

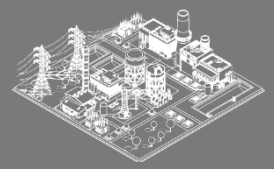
Tianji G600F/C
Gas detection uncooled infrared camera

Multi-dimensional Vision Product Lines

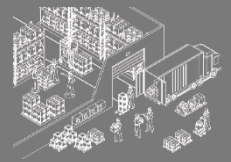
Application Fields



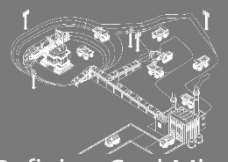
New energy charging monitoring



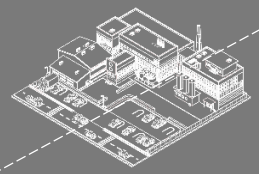
Electric power thermography



Indoor Security and fire monitoring



Refining Coal Mine Monitoring



Smart park management

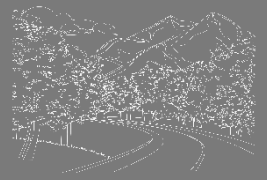
Airport monitoring

Multi-dimensional Vision Products

Core Abilities

- Leading SWIR, MWIR and LWIR multi-dimensional sensing technology
- Excellent image/thermography/gas detection/behavior analysis algorithms
- Perfect integrated solution of photoelectric sensing products and platform software

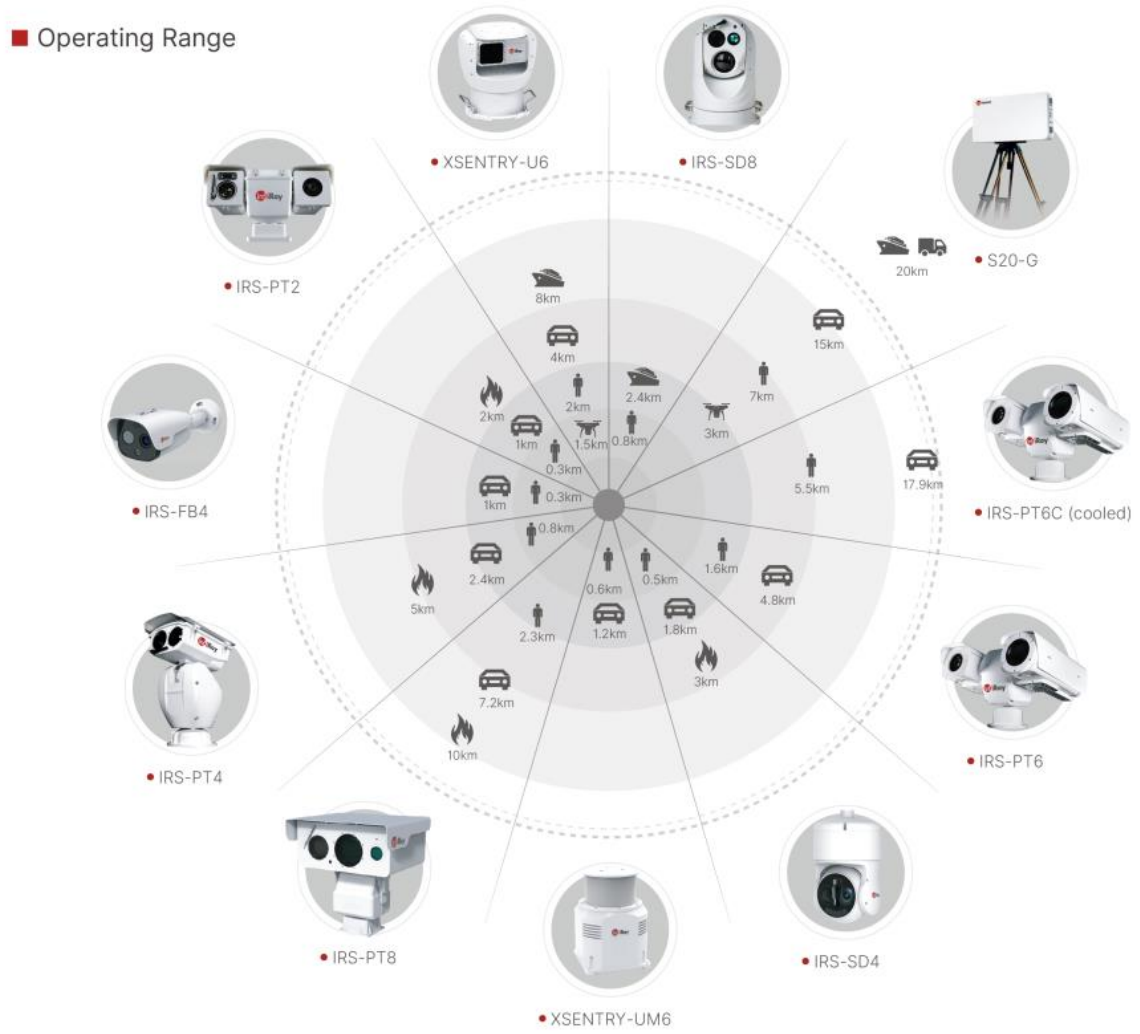
Ground and maritime surveillance



Forest fire prevention

...

Multi-Dimensional Perception-Anti Fire Solutions



Ultra Clear, Ultra Secure

Large-scale, long-distance, 24h continuous online monitoring function are used for scene surveillance radar, photoelectric thermal imaging PTZ and panoramic scan products at the same time. It has the core technology and capabilities of chips, components, finished machines and systems.

Target Size	Radar Cross Section
Axle base: 0.45m	RCS：0.01㎡
Height: 1.8m	RCS：0.5 ㎡
Length: 4m	RCS:：4 ㎡
Length: 8m	RCS：30 ㎡
Dimension: 2m×2m	RCS:：100 ㎡

Multi-Dimensional Perception-Anti Fire Solutions

Ultra Clear, Ultra Secure

■ Ground and Maritime Security

Heavy-load PTZ Thermal Camera

Panoramic Thermal Camera

10km
Ultra-long Detecting distance 10km+

360°
360° No Blind Spot Panoramic Coverage

1280×1024 Mega-pixels High Definition

■ Forest Fire Prevention

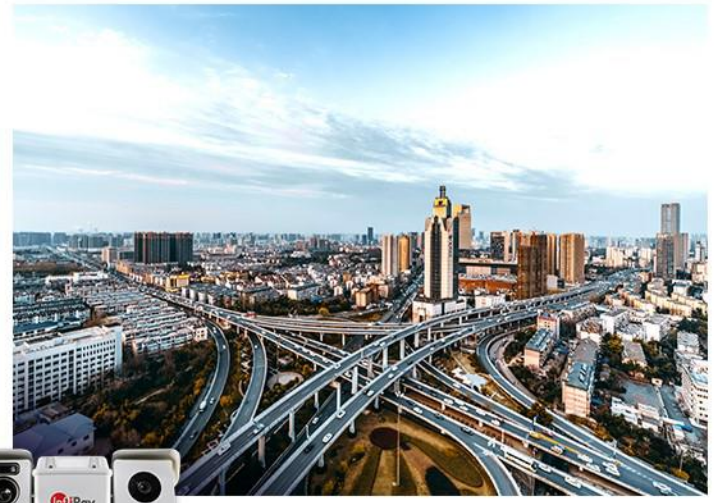
Mid-load PTZ Thermal Camera

10km
Ultra-long Detecting distance 10km+

Fire Detection Quick Location Advanced Alarm

256 Preset Points Quick and Efficient Inspection and Scan

■ Public Security



Light-load PTZ Thermal Camera

Dome Thermal Camera

12μm Self-developed Clear Images Rich Details

Regional Security Detection Effectively Protection

256 Preset Points Quick and Efficient Inspection and Scan

Multi-Dimensional Perception-Anti Fire Solutions

■ Public Security

FB4 Bullet Thermal Camera

- 12μm Self-developed Clearer Images
- iTEA Intelligent Analysis Algorithm Without Fault
- Fusion Algorithm Thermal Image Detail Enhancement

■ Intelligent Building

FB2 Bullet Thermal Camera

- Smoking Detection Fire Alarm
- iTEA Intelligent Analysis Algorithm Without Fault
- Visable IoT Remote Manage Sound and Light Alarm

Half-dome Thermal Camera

■ Energy Manufacturing

Explosion-proof Bullet Thermal Camera

- ±2°C -20°C~+550°C Accuracy -20°C~+550°C Range
- Explosion-proof Shell IP68
- Various Dara Multiple Analysis

Explosion-proof PTZ Thermal Camera

■ Mobile Deployment

Light-load PTZ Thermal Camera

- Certification Reliable
- Easy to Deploy Quick Networking
- 256 Preset Points Quick and Efficient Inspection and Scan

Deployment and Control Dome Thermal Camera

Automotive Night Vision

InfiRay products cover infrared thermal camera, dual-light fusion thermal imaging camera, and complete set of automotive thermal imaging night vision system. InfiRay can provide full-scene professional automotive infrared night vision solutions to solve the effects of bad weather, poor nighttime lighting, dazzling, and other key issues that affect safe driving, to help the industry to apply autonomous driving technology to the last mile.

IR-Pilot Series

IR-Pilot 640-IS

IR-Pilot 640DS

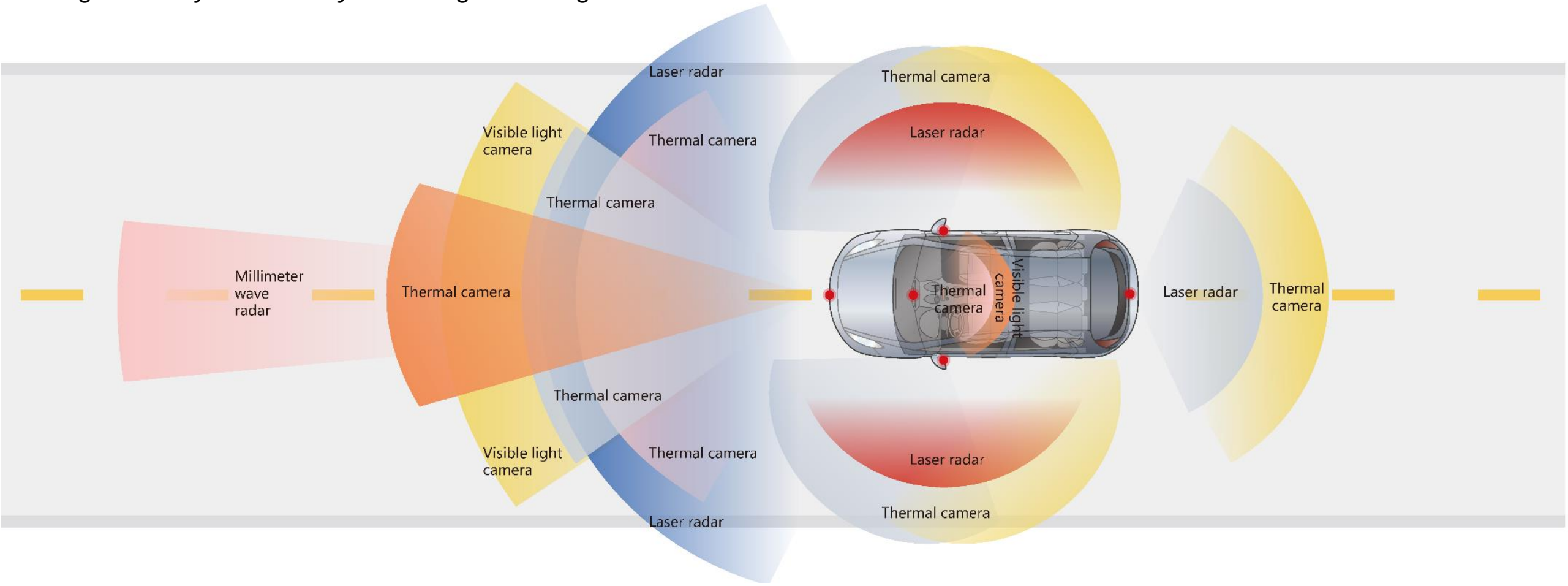
IR-Pilot 256MS

IR-Pilot IR.Box ID

IR-Pilot 180P

Intelligent Driving / Multi-sensor Fusion Perception

Laser radar + millimeter wave radar + visible light camera + thermal camera **multi-sensor fusion perception** provides higher safety redundancy for intelligent driving.

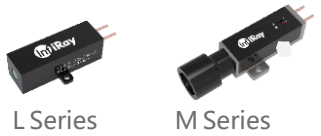


AI and Robot

- Self-developed multi-sensor fusion SLAM, path planning, dynamic obstacle avoidance, motion control, human-computer interaction, image recognition and other full-link artificial intelligence and robotics technologies
- Self-developed software application platform and technology

Laser Ranging

InfiRay® erbium glass laser and rangefinding module series feature eye safety, small volume, light weight, high accuracy (±1m), high reliability, and low power consumption. With the maximum rangefinding from 3km to 20km, the series can be widely used for handheld rangefinders, multi-functional observers, photoelectric scopes, electro-optical pods, and other photoelectric equipment.



Erbium Glass Laser

Laser Rangefinding Module

Outdoor Mountaineer

Geological Survey

Engineering Surveying

Emergency Rescue

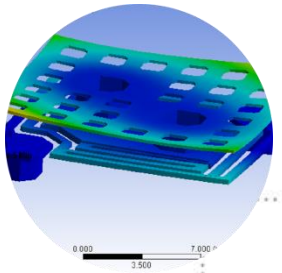
1 About InfiRay

2 About IRay

3 Products

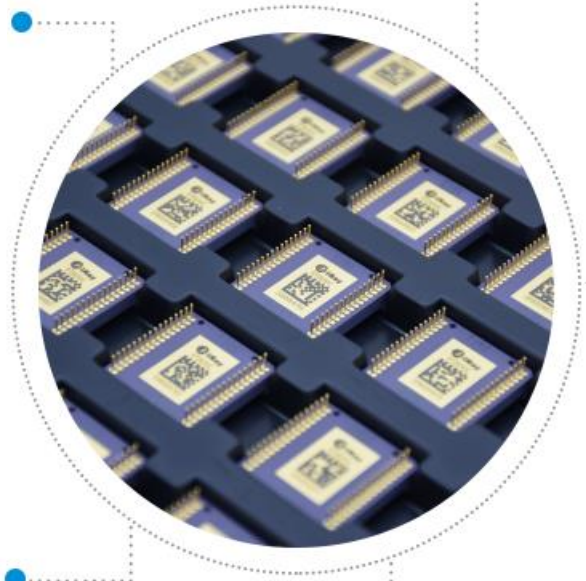
4 Quality Assurance

Mass Production Guarantee



10+ years
Product Design Experience

Real-time
Production Tracking
Management



1,500,000+
Mass Production Experience

Strong
Supply Chain
Operation System

8 inches/200mm Wafer Manufacture
Processing Line

Quality Guarantee/Infrared Detector Manufacture

Relying on the industry-leading packaging technology and all-round and multi-level inspection system, InfiRay infrared detector is well-known for the high reliability in the world.

Automation: Process detection mainly relies on automatic detection platform, including infrared inspection equipment, automatic optical inspection equipment, X-ray inspection equipment, ATE test equipment, to realize real-time defect monitoring.

Quality Guarantee/Infrared Detector Manufacture

58 Manufacturing Processes

From raw materials to finished products, each detector needs to go through 32-58 manufacturing processes

26 Optical and Electrical Tests

To ensure that the products in the whole process are good, each detector needs to go through 26 times of optical inspection.

210 Monitoring Points

To ensure the best product quality, each detector process contains 75-210 monitoring points to guarantee each step in real time

Quality Guarantee/Thermal Camera Manufacture

Each thermal camera has 32-66 procedures **66**

Each thermal camera has undergone at least 16 optical tests **16**

The whole process includes 120-285 monitoring points **285**

37 Each thermal camera has experienced 21-37 stations of production and processing

100 Each thermal camera has more than 100 times of data analysis

Environment simulation platform has all kinds of harsh limit environment

Quality Guarantee/Quality Management System

Perfect Quality Management System

System Certification:
ISO9001/IATF16949/ISO14001
GJB9001C/ISO45001
QC08000/ISO17025

Product Certification:
CE/FCC/RoHS/REACH/CB/BC/Nrcan/Medical Apparatus and Instruments

Internal Control & Advanced Quality Tool
Incoming / process quality control,
Delivery quality inspection,
Automated manufacturing and inspection platform,
6 Sigma Management,
QC seven tools / FMEA / SPC

Covering The Whole Process of Product Manufacturing

Reliable R&D quality management system
Perfect inspection system
Periodic ORT test
Automated manufacturing and inspection platform

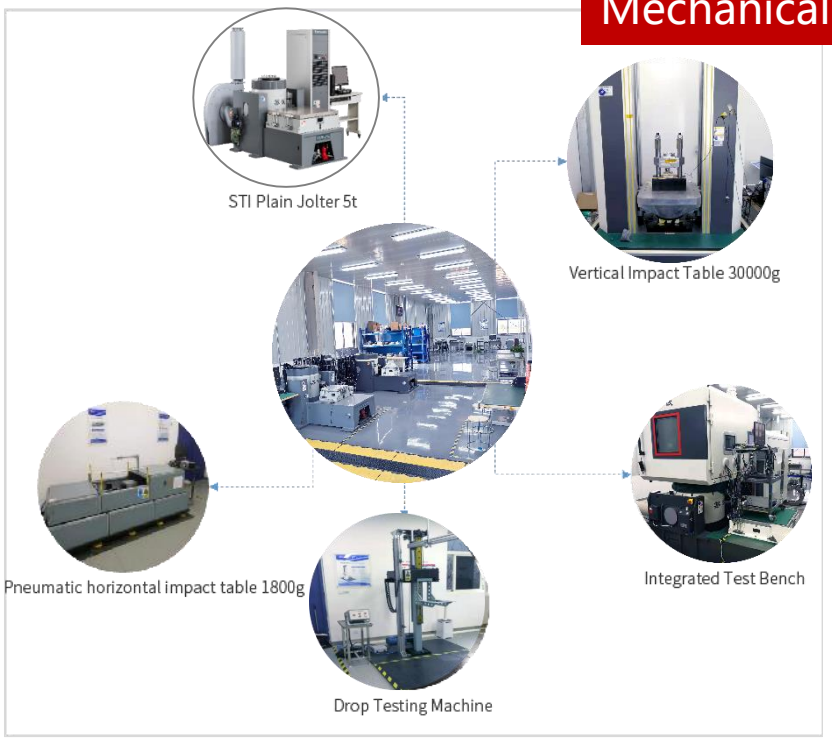
High Quality Customer Service

Pre sales: product selection and customization support
On sale: on site installation and debugging support
After sales: comprehensive after-sales service guarantee

Quality Assurance/Reliability Test Platform

Our reliability lab is certified in **CNAS**, covering a total area of **1200㎡**. It is equipped with nearly **60** equipments, such as high/low temperature test chamber, walk-in oven, thermal shock /rapid temperature change test chamber, IP test, vibration and shock test, with an investment of ￥**tens of millions**. It can meet the standards such as **GJB150A and GJB548**.

Mechanical Test



+ Environment Test

Thank you!

Please visit our official website for more information.