Infrared camera

Selection Catalog

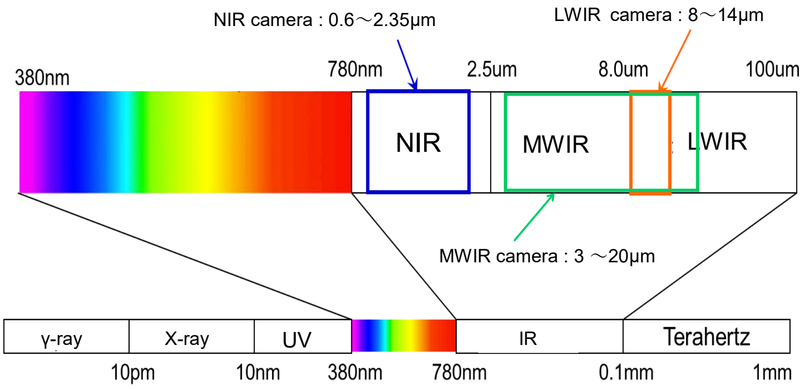
LWIR 17 mm f/1.2
LWIR 6.8mm f/1.4

Vision Sensing

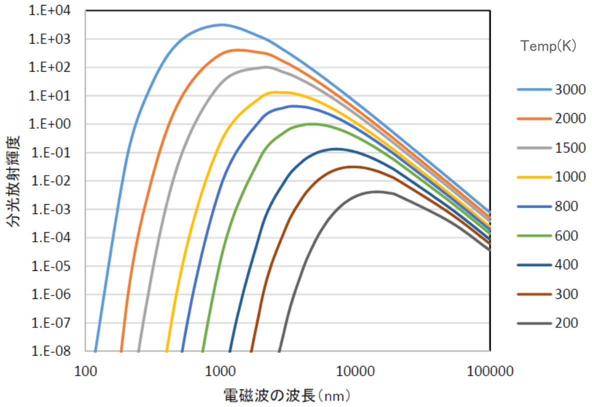
Vision Sensing Co., Ltd.

Features of Uncooled far infrared camera

Infrared rays mean the electromagnetic wave of the wavelength from 780nm passed out of sight to 100μm. By the wavelength, it is divided into near infrared rays, middle infrared rays and far infrared rays. This invisible light is emitted from a surface of all objects with thermal energy, and the emission spectrum changes by its temperature (Planck's radiation law). Using those characteristics, the temperature is able to be measured contactless by the energy emitted from materials.

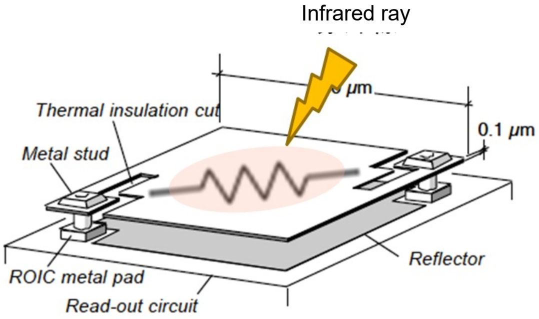

NIR camera : 0.6～2.35μm
LWIR camera : 8～14μm
380nm
780nm
2.5um
8.0um
100um
NIR
MWIR
LWIR
MWIR camera : 3 ～20μm
γ-ray
X-ray
UV
IR
Terahertz
10pm
10nm
380nm
780nm
0.1mm
1mm

Infrared wavelength domain

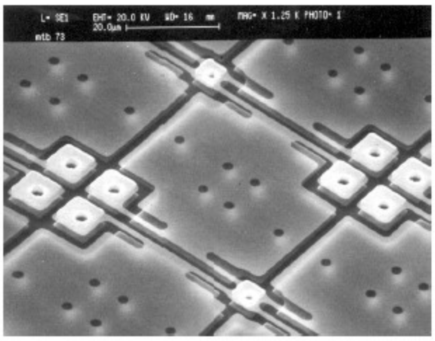


Planck's radiation law graph

Infrared cameras are mainly used with the quantum type detector utilizing the photoelectric effect and the bolometer type detector measuring changes of electrical resistance value. The quantum type detector cameras are high sensitivity, but require cooling devices to suppress the dark current. The bolometer type cameras work in a room temperature and easy for a size reduction. Our far infrared cameras are equipped with an uncooled bolometer array detector using amorphous silicon in a light receiving side.

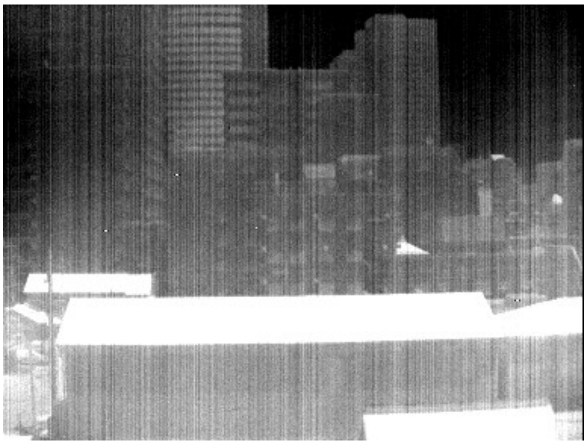

Infrared ray
μm
0.1 μm
Thermal insulation cut
Metal stud
ROIC metal pad
Read-out circuit
Reflector

Structure of the Bolometer element

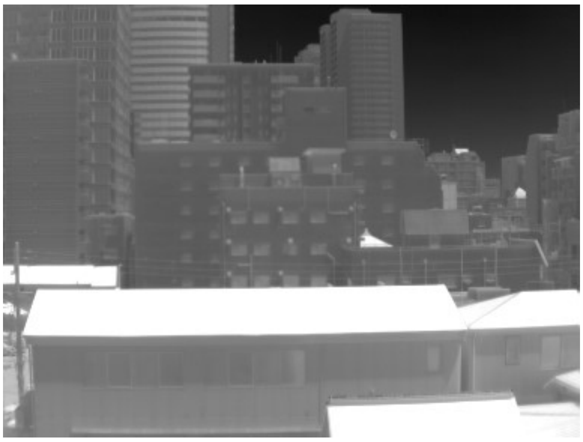

L= SE1
EHT= 20.0 KV
WD= 16 mm
MAG= X 1.25 K
PHOTO= 1
20.0μm
mtb 73

The element surface (Amorphous silicon)

The bolometer array detector is produced with MEMS technique, but the sensitivity unevenness appears in each detector and pixel due to the processing inhomogeneity. Furthermore the infrared detector incidents the infrared ray from the temperature of lens body tube, camera housing and detector itself, besides the infrared ray of shooting objects transmitted through the lens. Except the infrared ray from shooting objects, it changes by the influence of an ambient temperature and affects a bad influence upon the image.



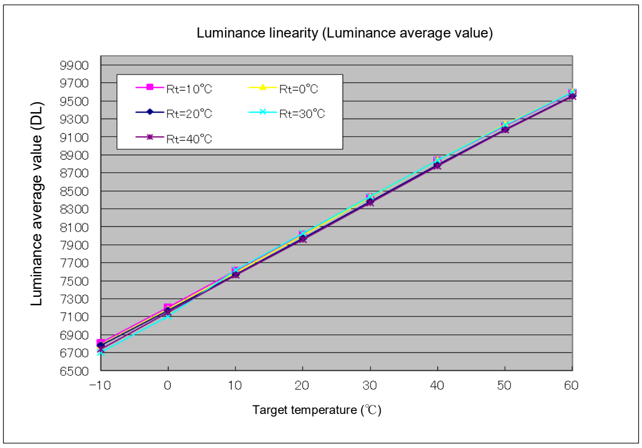
Output image before the correction



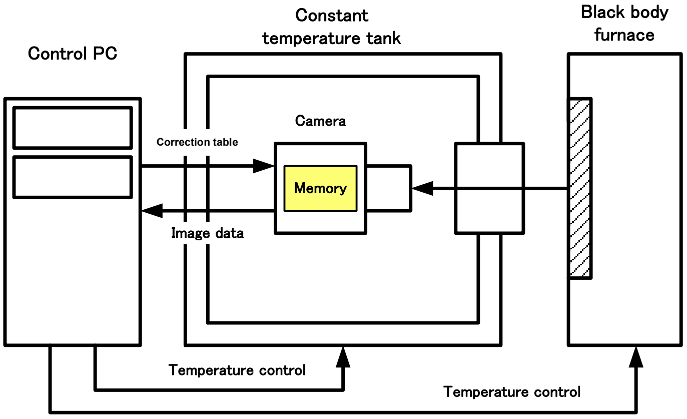
Output image after the correction

Shutter-less temperature correction technology

As technique to correct the sensitivity unevenness of each pixels and the influence of an ambient temperature changes, general infrared cameras are equipped with correction functions using a shutter. The image output breaks off during operating a shutter, continuous photography and temperature measurement are not possible. Our cameras make correction tables with the target photography and an ambient temperature in advance, and write to the memory stored inside (We call this as "Calibration"). The photography image is output with changing the correction table automatically according to an ambient temperature. We call this correction technique as "Shutter-less correction".



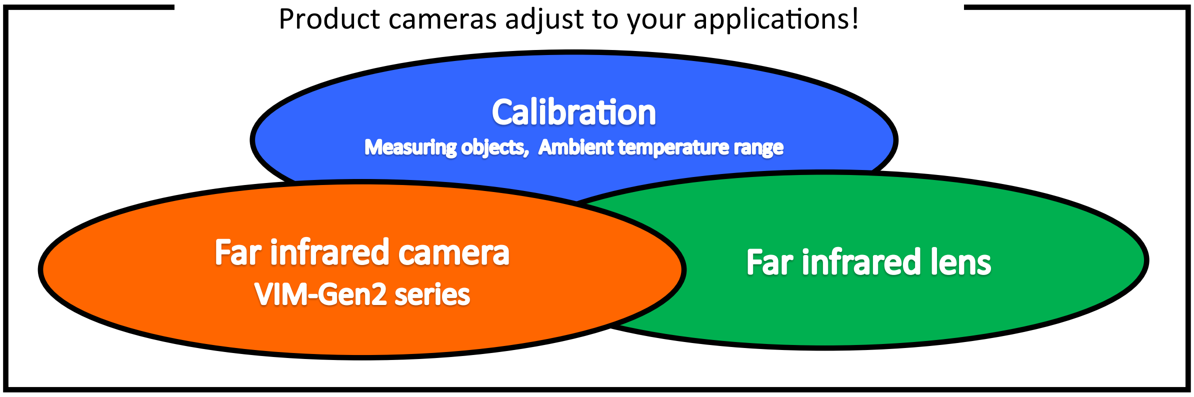
Input/output characteristics in an ambient temperature changes

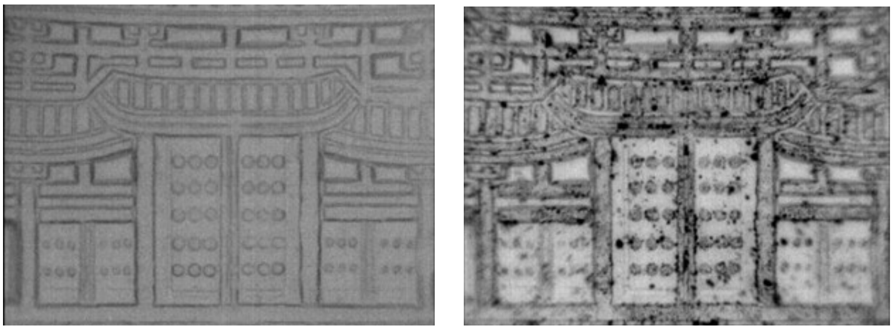

Control PC
Constant temperature tank
Black body furnace
Camera
Correction table
Memory
Image data
Temperature control
Temperature control

Calibration equipment components

Suggest the most suitable system for your application!

We provide uncooled infrared cameras with various line-up of VIM series and wide range of lenses, and satisfy the customers demands. Calibration is carried out by the necessary temperature range, so it is possible to manufacture original far infrared cameras which fit to customers required temperature range and resolution.

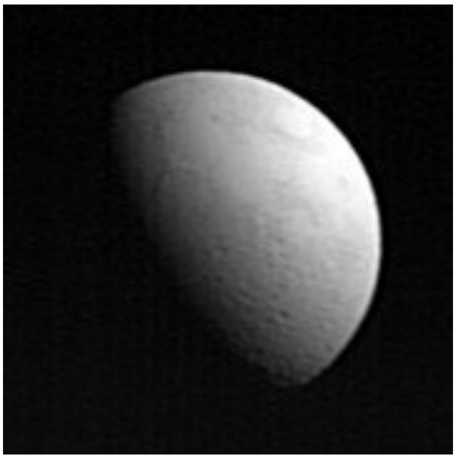

Product cameras adjust to your applications!
Calibration
Measuring objects, Ambient temperature range
Far infrared camera
VIM-Gen2 series
Far infrared lens



Room temperature

Cooling time

Dirt on 10 yen coin (x4 microscope lens)



Moon surface far infrared image (f=225mm telephoto lens)

Infrared camera line-up

Various model selection from high pixel high-end devices to low pixel compact type with adapting to customers applications.

Far infrared camera ：8-14μm

VIM1024G2
1024×768pix
NETD＜50mK

VIM384/640GS
384×288pix
640×480pix
NETD＜40mK

VIM384/640G2
384×288pix
NETD＜70mK
640×480pix
NETD＜60mK

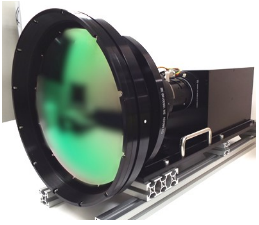
VIM640AP
640×480pix
NETD＜60mK

Mid-Infrared Cameras ：1-5μm

Mid-Infrared Cameras(Wideband) ：3-20μm

High sensitivity

HMIR640PL
640×512pix



MIR1280BB
1280×1024pix

WIR384/640G2
384×288pix
640×480pix

MIR640DB
640×480pix

WIR640VO
640×480pix
（Vox）

Near Infrared Cameras ：0.6-1.7μm

NIR640LN
640×512pix
（InGaAs）

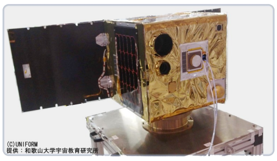
NIR640SN
640×512pix
（InGaAs）

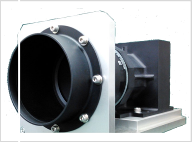
Far-Infrared Camera Microscope

3X Lens

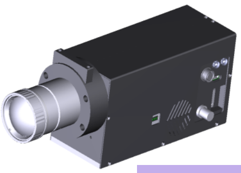
1X Lens

Spaceborne Far-IR Cameras

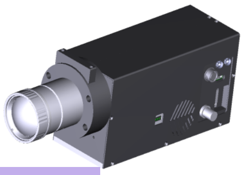




New products under development



HMIR1280iC
1280×1080pix



Temporary enclosure.
Subject to change.

HMIR1280BB
1280×1080pix

HVIM640G2
640×512pix

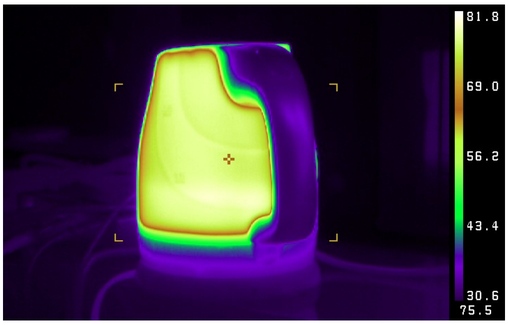
HVIM1280G2
1280×1080pix

VIM series camera specifications

Supplying 2 types of image size QVGA and VGA. 4 kinds of interface are prepared so as to support various needs. Regarding to the temperature correction, there are models equipped with an additional shutter correction function (Available in option), in addition to the conventional shutter-less correction mode, and it is selectable by applications.

Day time street and people

Night time road overhead view



Electric pot

Camera specifications

Items	Specifications	
Model（＊1）	VIM-384G2	VIM-640G2/GS
Detector	LYNRED　PICO384Gen2	LYNRED　PICO640Gen2
Area pixel number	384×288	640×480
Diagonal length of detector light receiving section	8.16mm	13.6mm
Pixel pitch	17μm/pixel	
Sensitivity wavelength	8～14μm	
NETD（＊2）	＜70mK	＜60mK(G2)/40mK(GS)
Digital output	14bit	
Maximum frame rate	30fps	
Correction processing	Shutter-less correction or Internal shutter correction	
Photography (Thermal measurement range)	Standard：-20 ～ +120℃ Option：50 ～ 500 ℃ is available (Other temperature range is consulted)	
Lens	Various lenses are attachable	
Image output interface	①Camera-link : Base config. 1Tap, Connector/MDR, CC1 supports external trigger, Serial communication control	
	②USB2.0 : Output image : UVC, Control : UVC or USB serial (Original command control)	
	③Ethernet : 100Base-TX, Image : UDP communication (Original format), Control : Telnet, Connector : RJ45	
	④Analog video : NTSC or PAL　BNC connector	
	⑤Gig E Vision : 1000 Base-TX, Connector : RJ45	
External trigger mode	CameraLink, External trigger with USB or External IO input photography (Frame synchronizing / Asynchronous trigger photography)　(*3)	
Partial scan	Available in option	
Power	DC +5V (USB bus power supply (*4))	
Operating / Storage temperature	-10~+50℃(No due condensation)　/ -25~+60℃(No due condensation)	
Dimensions	W33xH33xD52mm (With lens f=13mm）	W38xH38xD72mm（With lens f=17mm）
Weight	83g (Camera body only)	118g (Camera body only)

＊1）This is a basic model. It is formed by an interface, with/without an internal shutter or each interface specification details.
＊2）It is the value with lens F/1.0 at the target temperature 300K. Camera total NETD changes depending on lens usage.
＊3）External asynchronous trigger photography only corresponds to CameraLink output..
＊4） Regards to VIM640 series, if it connect to USB2.0, please use at an ambient temperature under 40°C. If the temperature exceeds 40°C, please use USB3.0.

Interface for VIM series

4 kinds of interface are prepared, every specifications are equipped with original functions. Please select according to your application.

CameraLink output type：For image processing and In-line high speed inspection!

- Output：Base Configuration 1Tap, Clock frequency 20 MHz
- Support external trigger photography operation via CC1
- Command controllable with serial communications via Camera-link
- Full frame high speed image is capturable
- Corresponding to each makers' grabber of Dalsa/Matrox/Linx etc.
- Ideal for high speed image processing such as In-line inspection!

USB output type：Supporting UVC connected to PC directly, Thermal camera like WEB!

- Output：USB2.0
- Support UVC2.0（USB Video Class）（Operation is confirmed by Amcap）
- Operatable by Linux and Android*, not only Windows

*Operatable with application for WEB camera with smartphone or tablet which correspond s USB On The Go.

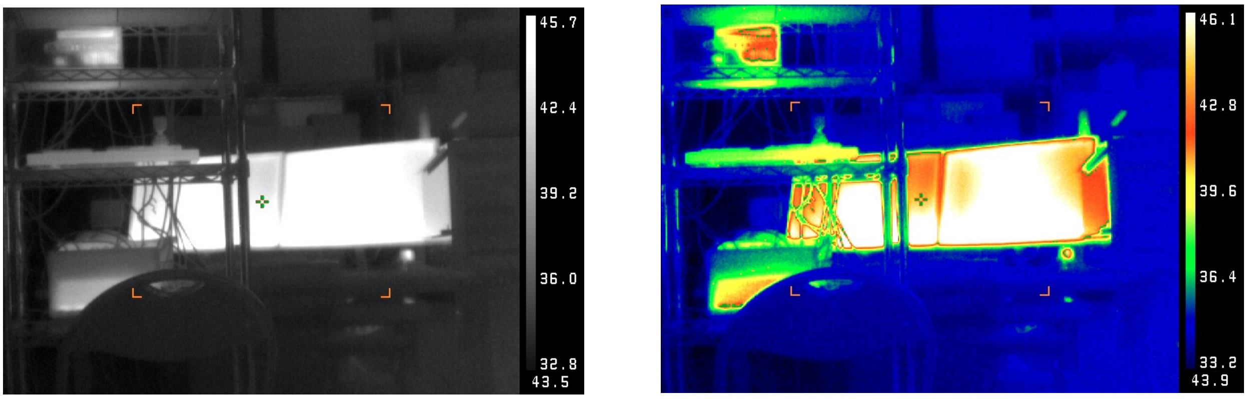
- Maximum frame rate 30 fps
- Camera control：UVC or original command control
- Ideal for camera system of facility thermal monitoring and remote monitoring!

Ethernet output type：For thermal monitoring and remote monitoring system！

- Output：100BaseTX UDP communication（original format）
- Maximum frame rate 30fps（In case of VIM-384G2）
- Command controllable by Telnet (TCP/IP)
- Built-in alarm monitoring function, contact output and mail transmission is enable at abnormal occurrence.
- Sample program source for receiving is attached
- Ideal for camera system of facility thermal monitoring and remote monitoring!

NTSC output type：Night surveillance and monitoring applications！

- Output：NTSC interlace output（720×480 dot-by-dot display）
- Frame rate 30fps
- Enable to show color bar and specified point temperature in a display
- Capable to fetch the specified point temperature information by serial communications
- Command controllable by RS-232C/422 serial communications
- Ideal for monitoring applications such as night monitoring camera！



USB output UVC mode display（Left ：monochrome　Right ：Rainbow color display）

XGA far Infrared camera VIM1024G2

High– definition model with the best pixel number for consumer cameras
Effective for wide area night surveillance!

- Area pixel number：1024 x 768 pixel
- Sensitivity：60mK (*1)
- Digital output : 14bit
- Pixel pitch：17μm
- Frame rate：Standard 30fps（Maximum 50fps）

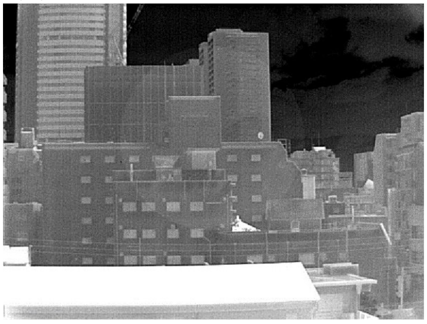
Zoom lens is available!

- f = 40～300mm Zoom lens
- Lens F value：1.5

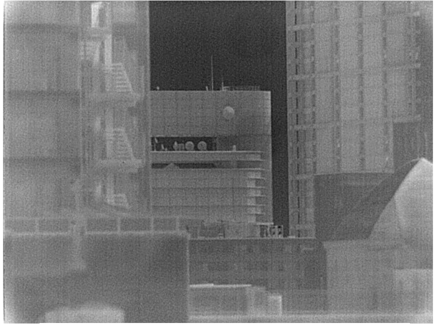
＜Horizontal viewing angle in use＞

- Wide angle：25.5°
- Telephoto：3.33° （Optical zoom use）
- Telephoto：0.42° （Digital zoom use）

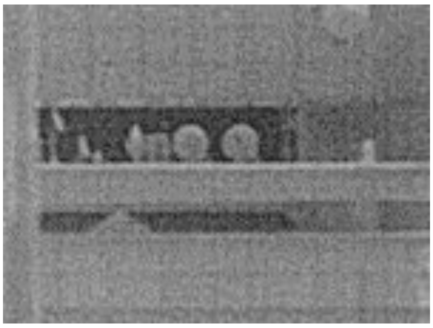
(*1) It is the value with lens F/1.0 at the target temperature 300K. Camera total NETD changes depending on lens usage.



Zoom with Wide angle lens



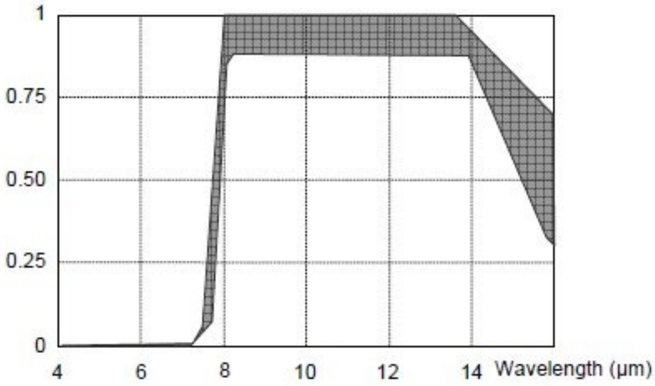
Zoom with Optics 7.5times！



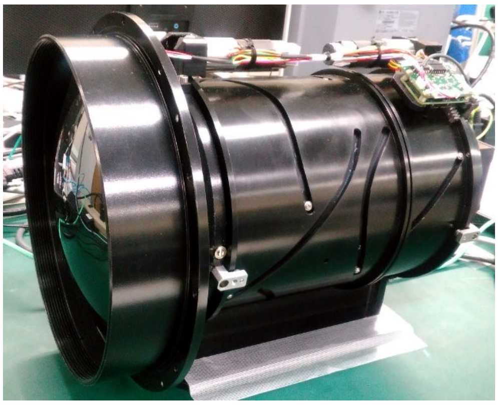
Optics x Digital 60 times！

Camera specifications

Items	Specifications
Sensitivity wavelength	8~14μm（refer the worst data in below chart）
Image output interface	HD-SDI output or GigE Vision
Control interface	RS-232C（via Camera-link）
Power	DC １２V ±１V
Operating temperature	-10~+50℃ (No due condensation)
Storage temperature	-25~+60℃ (No due condensation)
External trigger mode	External trigger input installed (Frame synchronization trigger photography)
Thermal control function	Non (TEC-less)
Correction processing	Shutter-less correction (Corresponding to internal/external shutter correction)
Dynamic range	Cut out bit number and offset is settable optionally, Auto-off set function
Lens mount	Corresponding to various lens maker
Camera body dimensions	W80mm × H80mm × D60mm (Body only)



Sensitivity wavelength



Camera body appearance photo (with f = 40～300mm Zoom lens)

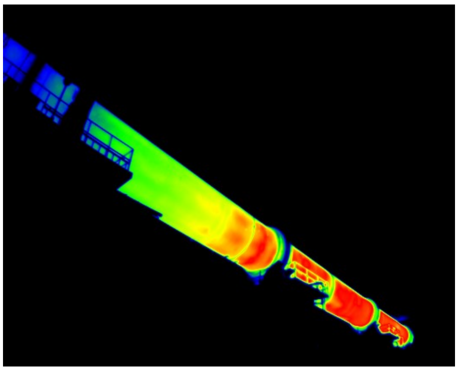
GigE Vision supported cameraVIM640G2-PSL

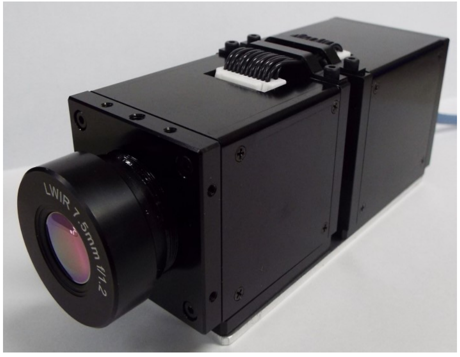
High speed full frame rate transferable interface model via Ethernet

〈Features〉
- Area pixel number：640×480 pixel
- Pixel pitch ：17µm
- Frame rate：30fps
- Output : GigE Vision (PoE available)

＜Applications＞
- Night surveillance system
- Inline thermal measurement
- Plant ignition monitoring
- Railway failure monitoring

Shinkansen (traveling)


Plant ignition monitoring

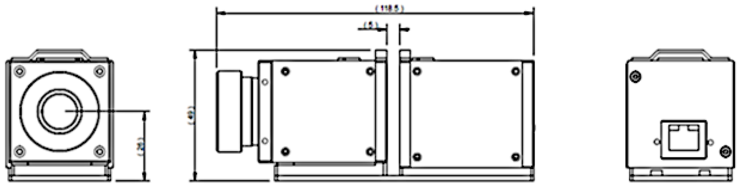


Camera appearance
（Assemble with lens f=7.5mm F/1.2）

Camera specifications

Items	Specifications
Area pixel number / Pixel pitch	640 x 480 pixel • 17µm/pixel
Frame rate	30 fps
Thermal measurement range	Standard：-20 ～ +120℃ Option：50 ～ 500℃ is available (Other temperature range is consulted)
Absolute temperature accuracy	Larger one from ±2℃ or ±2%
Sensitivity wavelength	8 ～ 14µm
Image output interface	Gig E Vision 2.0（conforms GenICam)
Control Interface	Command control via Gig E Vision Pleora SDK
External DIO	Input (External synchronizing trigger)
Lens	Corresponding to various lenses
Correction processing	Shutter-less correction
Software	Provide with ShutterLess Viewer (Image display, record and area determination function etc.)
Power	① PoE supply（Class2) ② DC12V(AC adapter)
Operating temperature	-10 ~ +50℃ (No due condensation)
Storage temperature	-25 ~ +60℃ (No due condensation)
Dimensions / Weight	W38mm × H49mm × D119mm, under 400g

External drawing



VIM640AP with pixel pitch 12µm detector

Shutter-less far infrared camera equipped with ATTO640D of LYNRED

＜Features＞
- Area pixel number : 640×480 pixel
- Pixel pitch：12µm
- NETD：60mK less (*1)
- Output：Same as VIM series

＜Applications＞
- Night monitoring system, Railway failure thermal measurement, fire monitoring system

＜Features＞
- Approx 1.4 times of telephoto image is captured compared with conventional 17µm element assembling with same optics

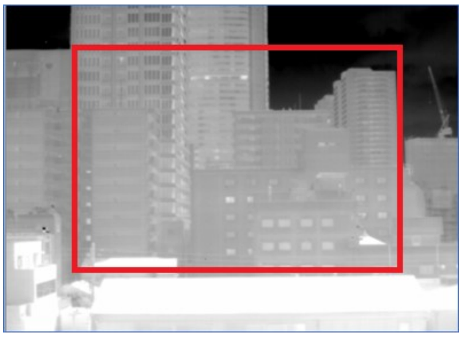


Image of element pitch 17µm camera

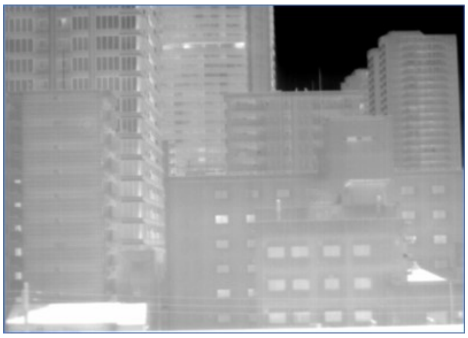


Image of ATTO640D detector

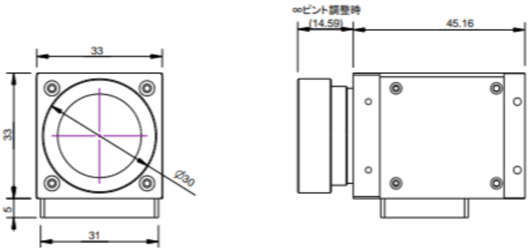
VIM640AP-USL over view

Camera specifications

Items	Specifications
Area pixel number / Pixel pitch	640 × 480 pixel • 12µm/ pixel
Camera NETD(*1)	60mK（VIM640AP）
Frame rate	30 fps
Thermal measurement range	Standard：-20 ～ + 120℃ Option：50 ～ 500℃ is available (Other temperature range is consulted)
Absolute temperature accuracy	Larger one from ±2℃ or ±2%
Sensitivity wavelength	8 ～ 14µm
Image output interface	USB / Ethernet / CameraLink/NTSC/GigE
Control interface	Same as above
External DIO	Input (External synchronizing trigger)
Lens	Corresponding to various lenses
Correction processing	Shutter-less correction
Software	Provide with ShutterLess Viewer (Image display, record and area determination function etc.)
Operating / Storage temperature	10~+50℃ (No due condensation) / -25~+60℃ (No due condensation)
Dimensions / Weight	W33mm × H33mm × D60mm, Under 160g

*1) It is the value with lens F/1.0 at the target temperature 300K. Camera total NETD changes depending on lens usage.

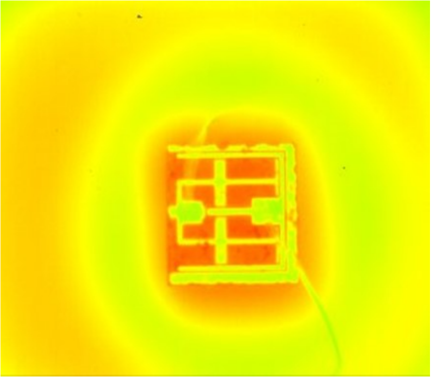
External drawing



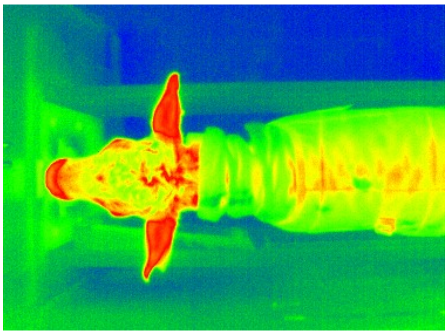
Application: Far Infrared Camera

Far-infrared cameras output images of the temperature distribution and emissivity distribution of an object's surface. Taking advantage of this characteristic, they are used in a variety of fields as cameras for temperature measurement and non-destructive testing.

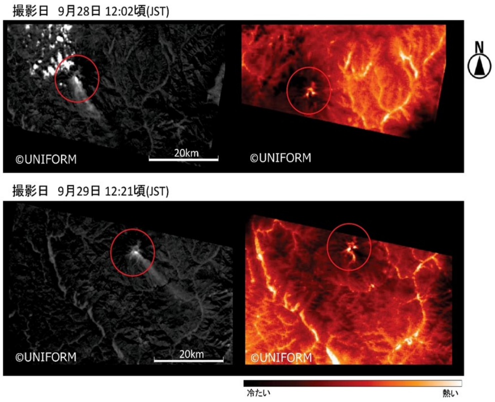
Measurement temperature



Illuminate LED
- Camera：VIM640G2-USL
- Lens：x3 Microscope



Animal temperature
- Camera：VIM640G2-ENL
- Lens：f=19mm


撮影日　9月28日 12:02頃(JST)
©UNIFORM
20km
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撮影日　9月29日 12:21頃(JST)
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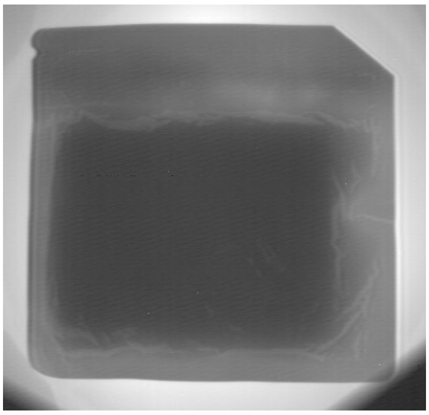
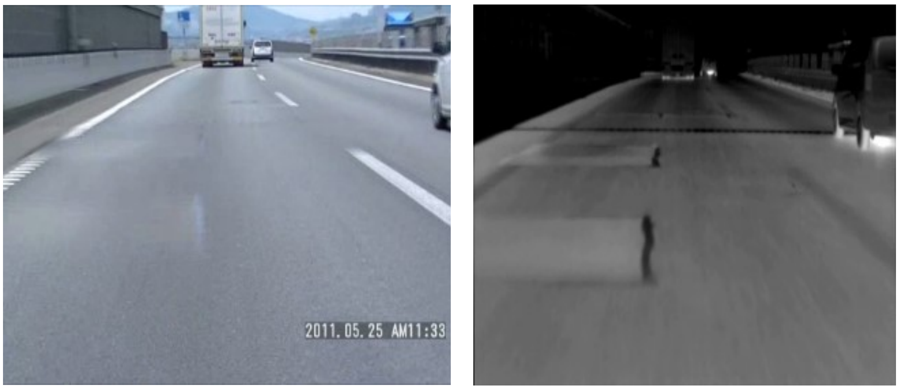
冷たい
熱い

Volcano (From satellite)
- Camera：ULVIPS-04171S
- Lens：f=100mm

Defect inspection



Cataplasm inspection
- Camera：VIM640G2-USL
- Lens：f=25mm


2011.05.25 AM11:33

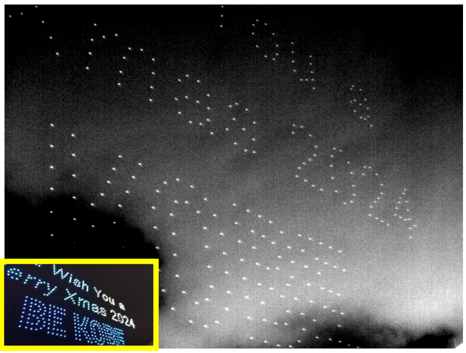
Visible image

FIR image

Condition of road surface
- Camera：VIM640G2-USL
- Lens：f=19mm

Surveillance/Night vision

Air plane（dist.1.5km）
- Camera：VIM1024G2
- Lens：f=225mm


Wish You a
erry Xmas 2024

Drone（dist. 10～20m）
- Camera：VIM640GS
- Lens：f=19mm

Yokohama（dist. 3km）
- Camera：VIM1024G2
- Lens：f=225mm

Space camera development

Development results

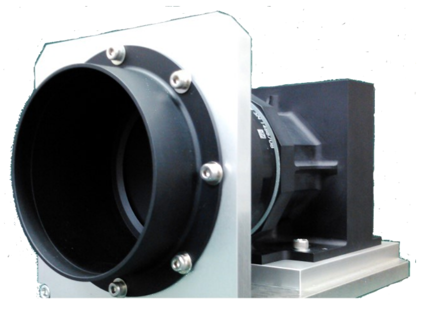
Mounted on the satellite UNIFORM-1 launched in 2014！

Succeed to obtain the far infrared image of ground surface from the space.
Based on this achievement, we provide the customized development of the infrared camera which is able to operate stably in the space environment. We support in every phases, such as design, manufacture and various tests.

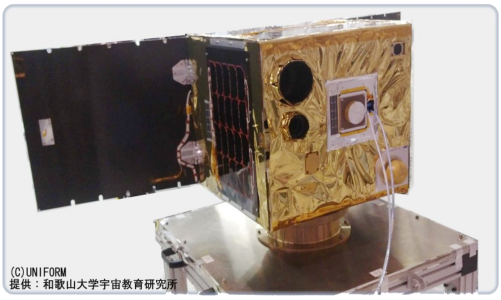
- Lynred 640G2 VGA detector is mounted
- Corresponding to shutter operation in the space (Vacuum calibration technique)
- Lens：f=100mm F/1.5
- Pass the radiation test（20krad）
- Pass the vibration test of QT level
- Low cost with using electric devices of industrial class

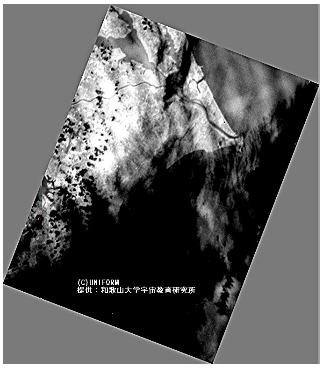
Far-Infrared Camera onboard the February 2024 3U satellite “TIRSAT” to be launched into space by H3 rocket!

Camera appearance



UNIFORM-1 appearance





Loaded on the robot arm of the international space station (ISS)
Japanese Experiment Module “Kibo” ！

Camera appearance

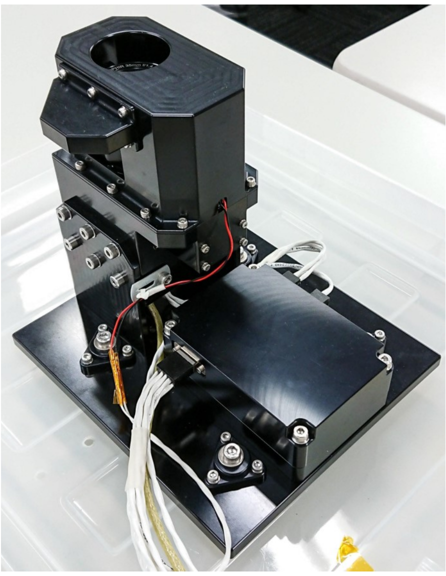
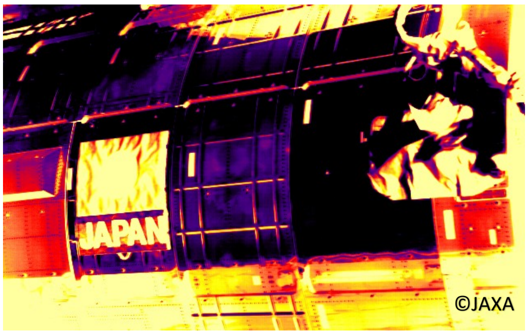
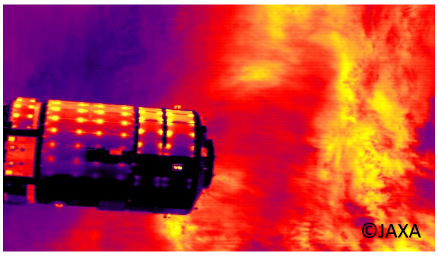


Image captured in May 2020

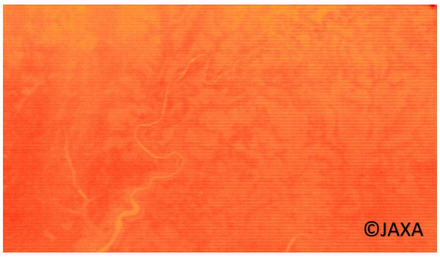
Kibo Pressurized Module exterior (Forward side)



H-II Transfer Vehicle “KOUNOTORI 9” Approaching to ISS



River on the earth



Uncooled MWIR camera MIR640DB

This is an uncooled mid-infrared camera equipped with a sensitivity wavelength of 3 to 5 μm developed uniquely. This model has higher sensitivity in the mid-infrared region than our previous products and is available at a lower price.

＜Features＞
- Area pixel：640×480 pixel
- Pixel pitch：17μm
- Sensitivity wavelength：3～5μm
- Framerate：30fps

＜Applications＞
- Through flame in-furnace monitoring
  Incinerator internal condition monitoring
- High temperature measurement
- Glass melting furnace temperature measurement

Visible image of in-furnace

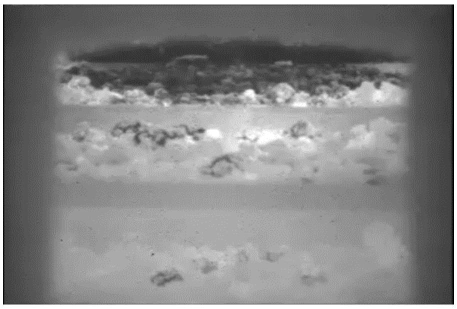
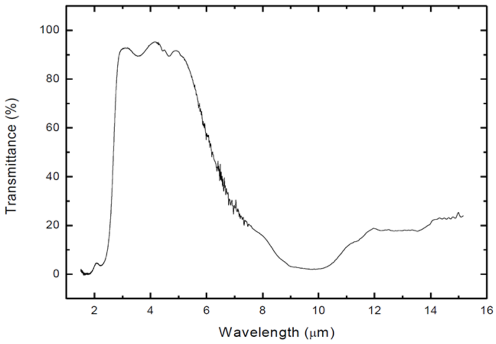


Image with through flame camera, same as left

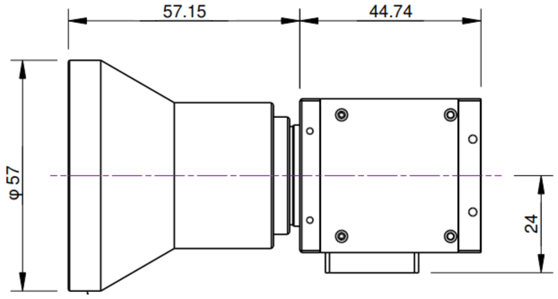
Camera overview（With f=14mm lens）

Specification

Item	Specification
Detector	Uncooled micro bolometer
Area pixel number	640 × 480 pixel
Pixel pitch	17μm/pixel
Sensitivity wavelength	3 ～ 5μm
Frame rate / Digital output	Maximum30fps・14bit
Image output interface	CameraLink/USB2.0/Ethernet/NTSC/GigE Vision（Equivalent to VIM-Gen2 series）
Power	DC5V（USB bus power supply (*1) and GigE Vision is available to supply from PoE）
Operating temperature	-10 ～ +50℃（No due condensation）
Housing	Installable with water-cooled heat resistant housing
External trigger function	Asynchronous trigger photography available（Trigger input via CameraLink CC1）
Lens mount	M25 × 0.5 pitch or M34 × 0.5 pitch
Camera dimensions	W38mm × H38mm × D44.74mm（Without lens）



Sensitivity wavelength chart



Overview (With f=7.5mm lens)

Features of MIR640DB

The temperature of low-emissivity objects can be measured with high accuracy!

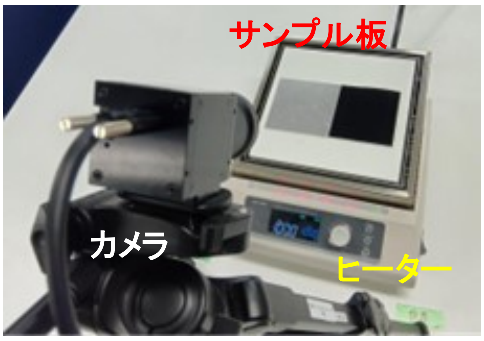
MWIR (3-5μm band) is less affected by reflected light at room temperature than LWIR (8-14μm band), so it is possible to measure the temperature of low-emissivity objects such as metals with a glossy surface with high accuracy. The results of verifying the effect using metals with different emissivities are shown below.

〈Experimental method〉

An aluminum piece with one side painted black is heated to 100°C on a hot plate and photographed with a far-infrared camera and a mid-infrared camera. The temperatures of the unpainted aluminum surface and the black-coated surface are measured from the infrared images obtained by each camera.

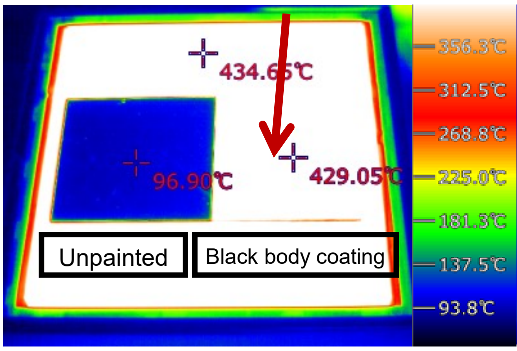
(The emissivity ε of each camera is set so that the temperature of the unpainted aluminum surface is 100°C.)

〈Images〉



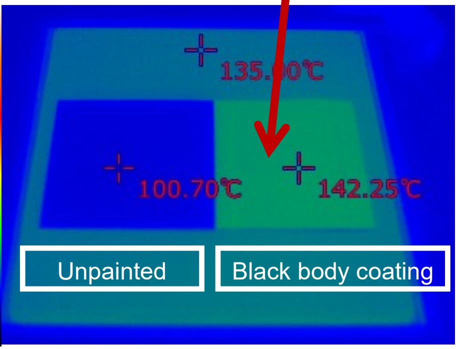
Measurement environment

Difference：329℃



LWIR camera image (ε=0.09)

Difference：42℃



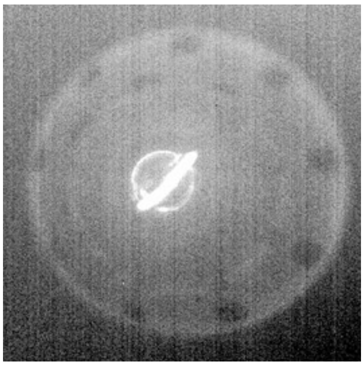
MWIR camera image (ε=0.45)

The difference between the actual temperature of the black-painted surface and the camera output temperature is as large as 329°C in the far-infrared image, but is suppressed to 42°C in the mid-infrared image. In addition, the emissivity is also higher at 0.35 for mid-infrared compared to 0.09 for far-infrared, enabling highly accurate temperature measurement with little fluctuation.

High sensitivity ! (Possible to get clear MWIR image)

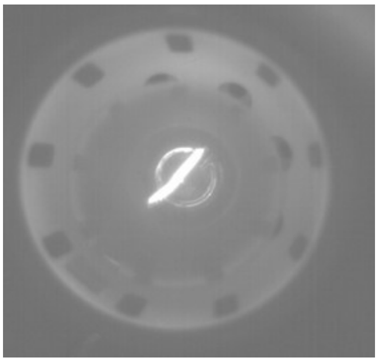
Uncooled MWIR detector which developed us has three times the sensor sensitivity of our previous products. Taking advantage of this feature, it is possible to obtain clearer mid-infrared images than with previous devices.

＜Incandescent bulb＞

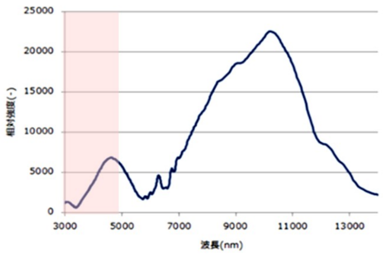


Pervious camera image

**Low noise
Clear image !**

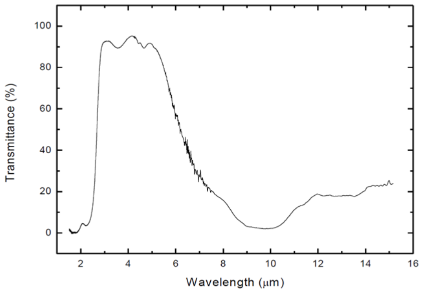


MIR640DB image



Previous camera sensitivity

3 times higher sensitivity at 3-5μm!



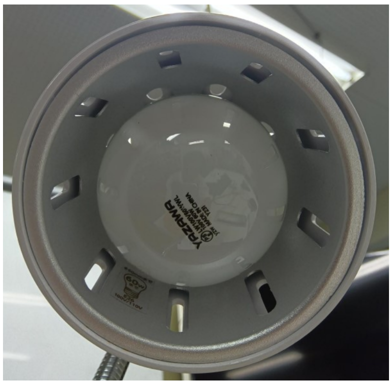
MIR640DB sensitivity

Application of MIR640DB

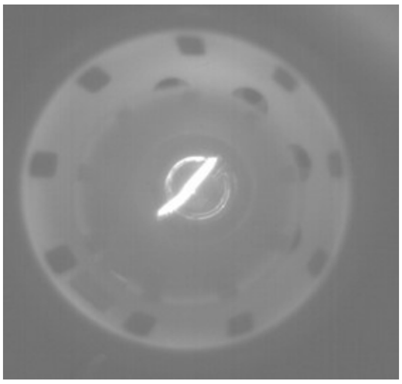
Conventionally, cooled cameras have been used to capture images in the mid-infrared region of 3 to 5 µm, but their applications have been limited due to their large size and high cost. Our uncooled mid-infrared camera MIR640DB uses an uncooled bolometer sensor developed in-house, and is small, low-cost, and does not require replacement of the cooler, making it suitable for a wide range of applications.

< Incandescent bulb >

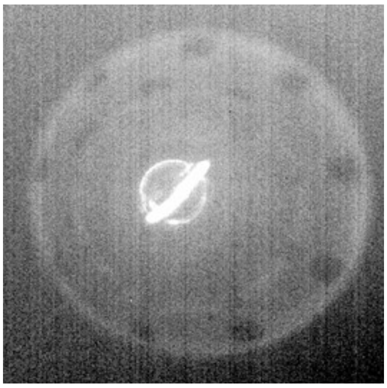
Since light bulb glass transmits far-infrared rays of 3 to 4 µm, a mid-infrared camera can capture the high-temperature filament when the light bulb is lit through the glass. The MIR640DB can capture clearer images with less noise than previous models.



Visible image



MIR640DB image

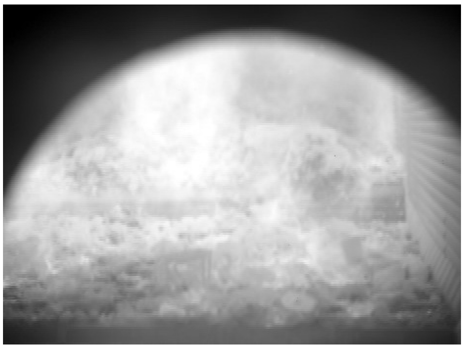


Recent camera image

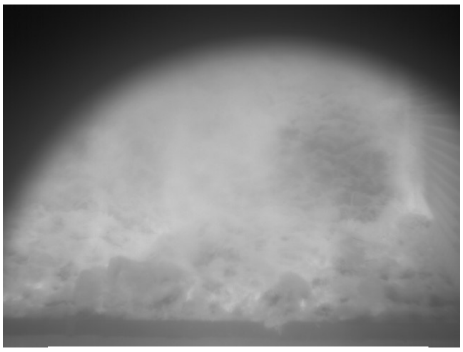
< Image of inside the incinerator >
Furnace walls and garbage debris can be seen through the flames

Flames inside furnaces such as those in waste incineration plants mainly contain CO2 resonance radiation (wavelengths around 4.4 µm). By combining this with an optical filter that filters out this radiation, it is possible to visualize the condition inside the furnace through the flames. The MIR640DB has higher sensitivity than previous models, making it possible to obtain clearer images of the inside of the furnace.

Visible image



MIR640DB image (with filter)

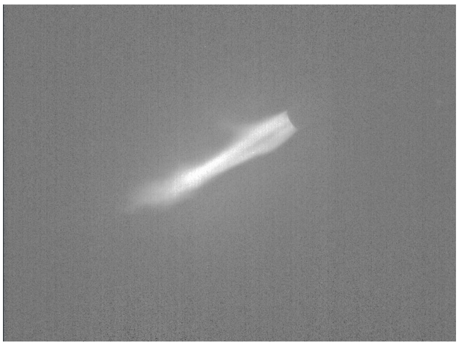


Recent camera image

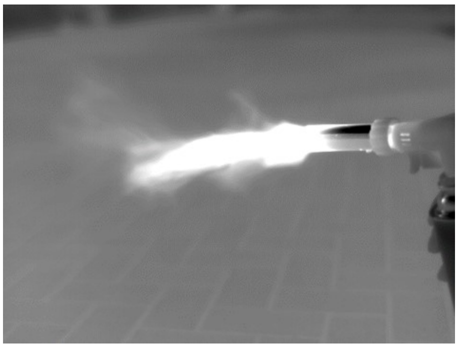
< Burner flame detection image: Only the flame is visible >

By using an optical filter that transmits only the emission wavelengths of flames, it is possible to exclude high temperature areas such as the burner tube and visualize only the flames.

Visible image



MIR640DB image



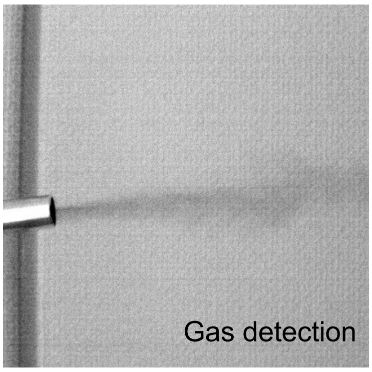
FIR camera image

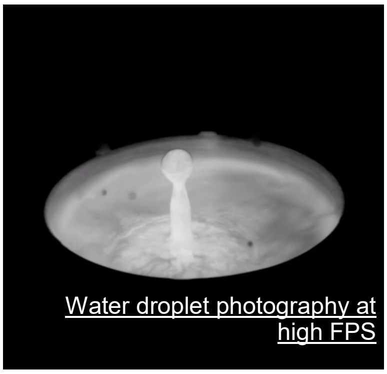
Cooled high-sensitivity mid-infrared camera HMIR640PL

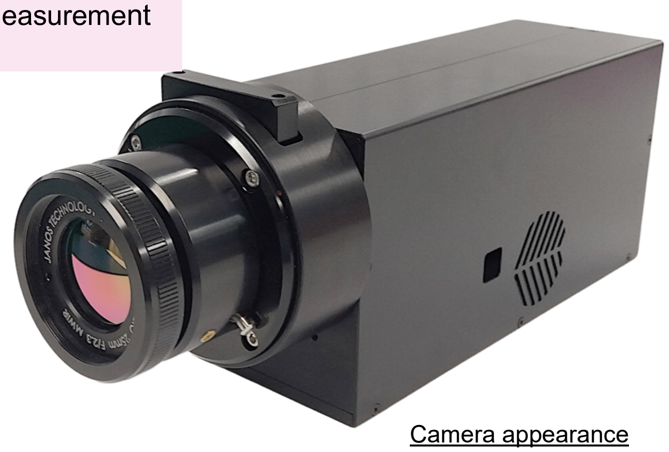
This is a high-sensitivity mid-infrared area camera equipped with a cooled InSb sensor. Compared to previous models, the frame rate is faster at up to 240 fps and the size is more compact.

＜Features＞
- Area pixel number : 640x512 pixel
- Pixel pitch：15μm
- Sensitivity wavelength：1.5～5.4μm
- Maximum frame rate : 240fps

<Applications>
- Resin material identification
- Gas detection
- High temperature measurement


Gas detection

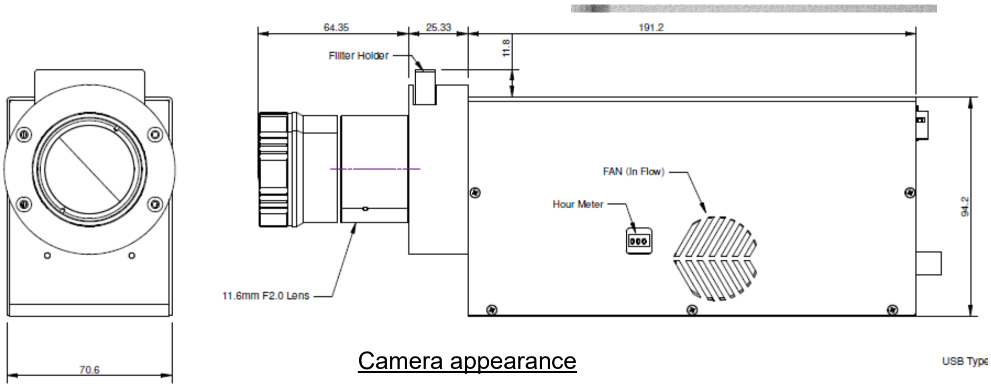

Water droplet photography at high FPS


Camera appearance

Camera specifications

Items	Specification
Sensor	InSb array sensor (Quantum cold shielding: F/4 or F/2.24)
Area effective pixels	640×512 pixels
Pixel pitch	15um/pixel (photosensitive area: 9.6mm×7.68mm)
Spectral response range	1.5～5.4um
Frame rate, AD resolution	240 frames/sec, 13bit
Sensor NETD	20 mK or less
Cooling system	Stirling Cooler (K508N MTTF> 17,000 hours ＊1
Image output interface	SDI or Gig E Vision output (Gigabit Ethernet), Camera Link
Control interface	Serial communication or virtual serial command control via Pleora ebus SDK
power	Voltage:DC 24V
Operating / Storage temperature	-30~+50°C(non-condensing)/-30~+50°C(non-condensing)
size	W71mm× H90mm× D281mm (design value including lens)

＊1）MTTF is a mean time to failure and does not guarantee operating life. We recommend replacing the cooler on a regular basis.



Camera appearance

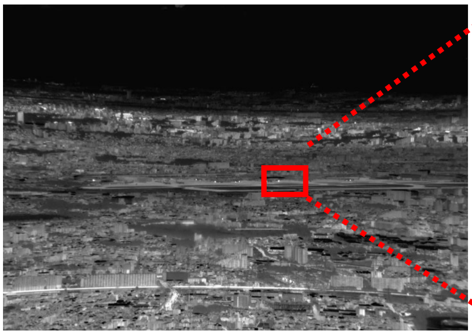
Cooled high-sensitivity mid-infrared camera HMIR1280SM

This is a high-sensitivity mid-infrared area camera equipped with a cooled InSb sensor.
Compared to the previous model, the frame rate is up to 60 fps
and the size is more compact.In combination with a zoom lens,
it is also ideal for nighttime telecom monitoring.A 1-inch size filter is also available.

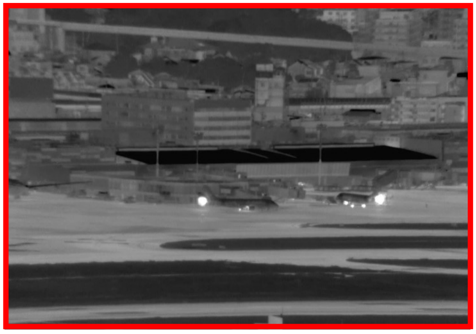
＜ features>
- Effective pixels: 1280×1024 pixels
- Element pitch: 10 μm
- Spectral response range: 3.4～5.6um

Maximum frame rate: 60fps

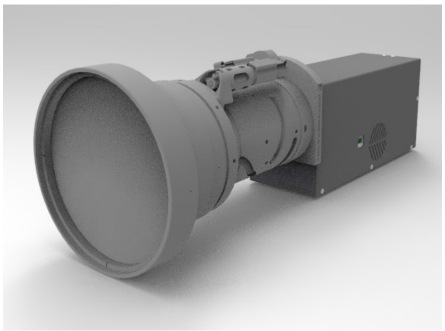
＜ Applications>
- Resin material identification
- Gas detection
- High-precision temperature measurement
- High-resolution surveillance at night



Osaka International Airport f=35mm



Same as left: f=690mm



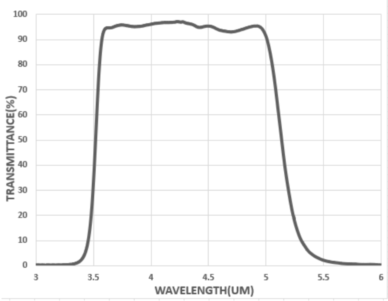
Exterior of the camera *

Camera specifications

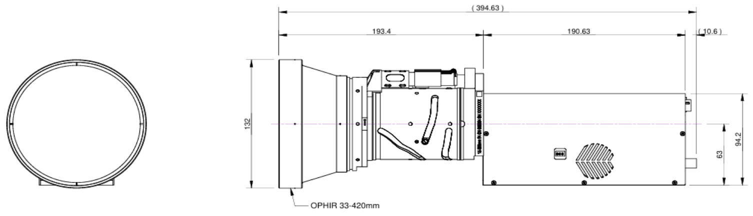
*It is only a temporary appearance. Subject to change.

Items	Specifications
Detector	InSb array detector（Quantum type Cold shield：F/4）
Area pixel number	1280 ✕ 1024 pixel
Pixel pitch	10μm/pixel（Light receiving section ：12.8mm✕10.24mm）
Sensitivity wavelength	3.5 ～ 5.2μm
Frame rate / Digital output	60fps / 13bit
Detector NETD	25mK less
Cooling system	Stirling cooler （K548N　MTTF＞18,000 hours） ＊1）
Image output interface	SDI or Gig E Vision output (Gigabit Ethernet), Camera Link
Control interface	Serial communication or virtual serial command control via Pleora ebus SDK
Power	DC 24V
Operating / Storage temperature	-20 ～ +65℃ (No due condensation) / -30 ～ +60℃ (No due condensation)
Lens	Corresponding to various lenses
Dimensions	W132mm ✕ H132mm ✕ D394mm (with lens ＊Subject to change)

＊1)　MTTF is average outage time and an operational life is not guaranteed. We recommend the maintenance for replacing every 2years.



Spectral response



Camera Exterior Drawing

＊ This is only a temporary appearance. Subject to change.

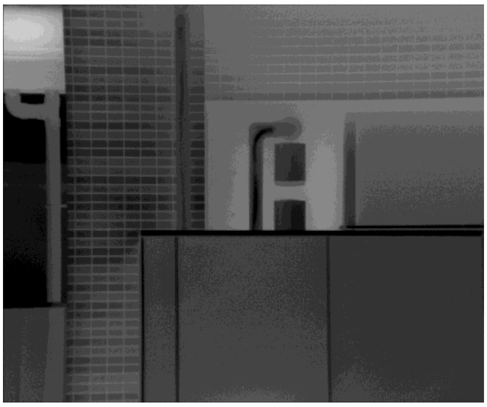
SXGA cooled middle infrared camera MIR1280BB

High sensitivity middle infrared area camera with cooled XBn detector. High-definition image of SXGA format and ideal for night long range surveillance in combination with telephoto lenses.

＜Features＞
- Area pixel number：1280×1024 pixel
- Pixel pitch：10μm
- Sensitivity wavelength：3.6～4.15μm
- Maximum frame rate：30fps

＜Applications＞
- High resolution night surveillance
- Gus detection
- High sensitivity thermal measurement
- Tracking system seeker

TV station with f=72mm



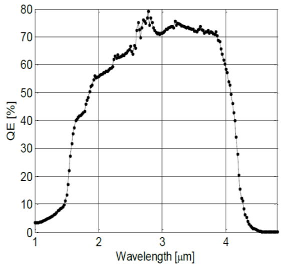
Zoom with f=900mm same as left

Camera appearance with f=72-900mm

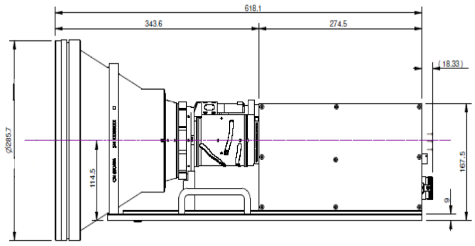
Camera Specifications

Items	Specifications
Detector	XBn array detector（Quantum type Cold shield：F/4）
Area pixel number	1280 × 1024 pixel
Pixel pitch	10μm/pixel（Light receiving section ：12.8mm×10.24mm）
Sensitivity wavelength	3.6 ～ 4.15μm
Frame rate / Digital output	30fps / 12bit
Detector NETD	25mK less
Cooling system	Stirling cooler （K508N MTTF＞17,000 hours） ＊1）
Image output interface	HD-SDI
Control interface	Serial communications via Ethernet
Power	DC 24V
Operating temperature	-20 ～ +65℃ (No due condensation)
Storage temperature	-30 ～ +60℃ (No due condensation)
Lens	Corresponding to various lenses
Dimensions	W286mm × H286mm × D618mm (with lens)

＊1) MTTF is average outage time and an operational life is not guaranteed. We recommend the maintenance for replacing every 2years.

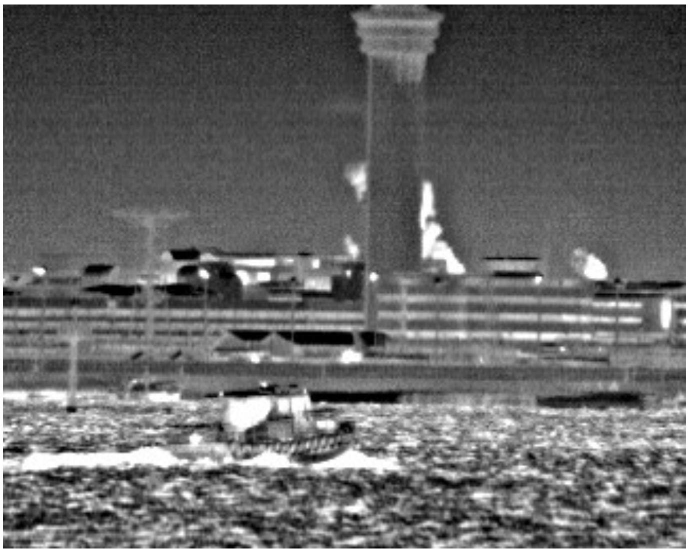


Sensitivity wavelength

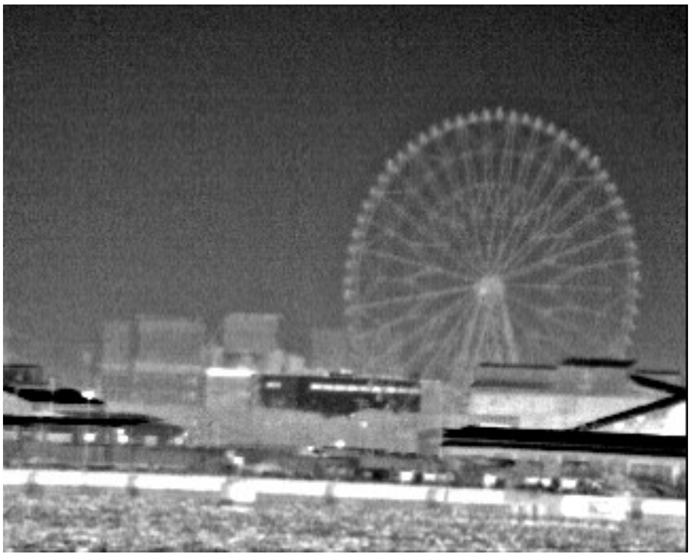


External drawing

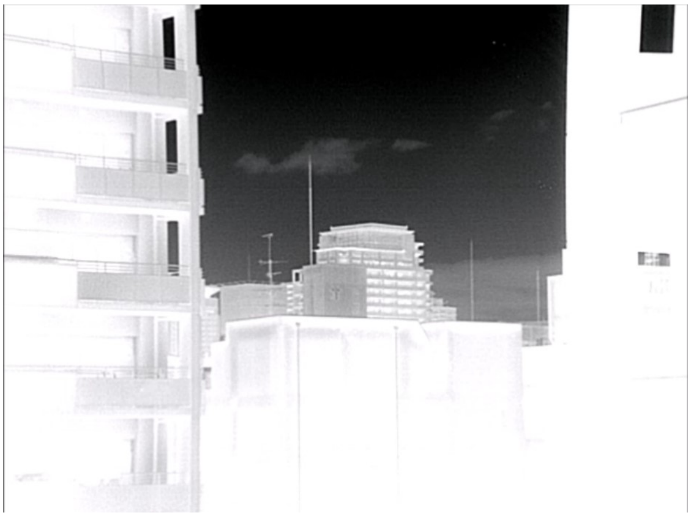
Sample image of Cooled camera



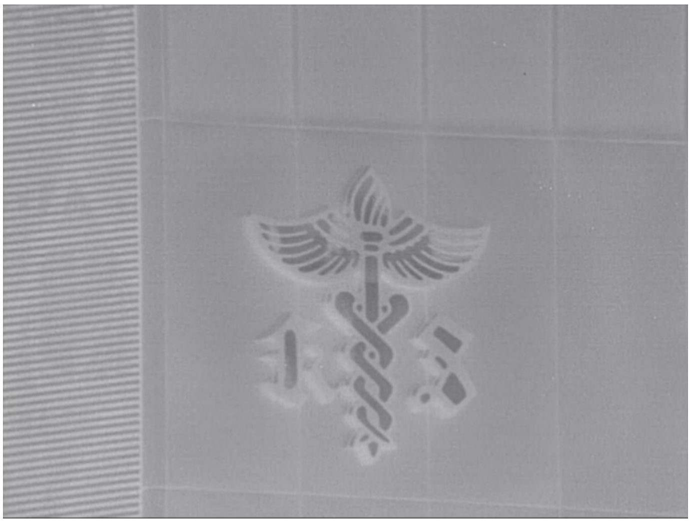
Haneda airport from Odaiba Akatsuki Futo Park
（f=300mm）



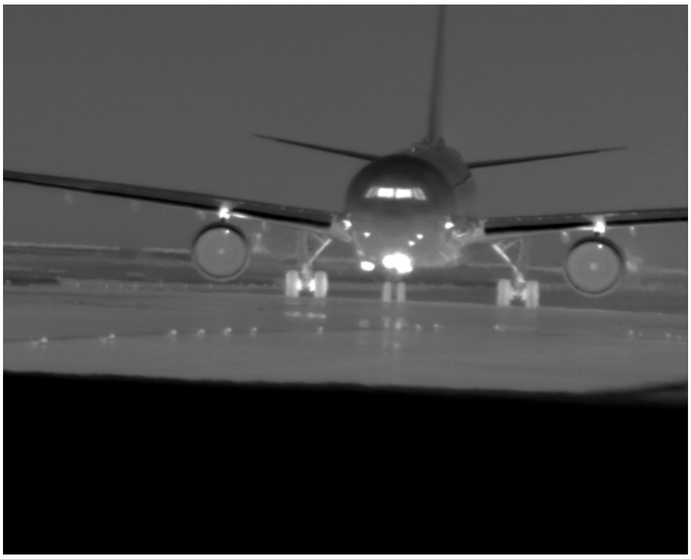
Kasai Rinkai Park from Odaiba Akatsuki Futo Park
（f=300mm）



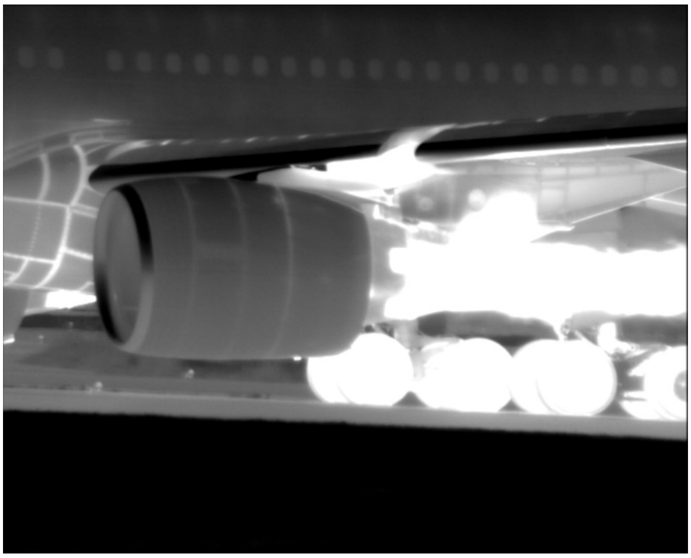
200m forward Emblem of building, Wide（f=35mm）



Same as left, Telephoto（f=690mm）



Airplane after landing



Around engine of airplane

InGaAs near infrared camera　NIR640SN

- Temperature control function (TEC) is built-in a detector and stable near infrared images are capturable.
- Ideal for acquiring spectacle images with assembling a filter by using high sensitive characteristics.
- While it is high sensitivity, achieved lower price than conventional models.

＜Features＞

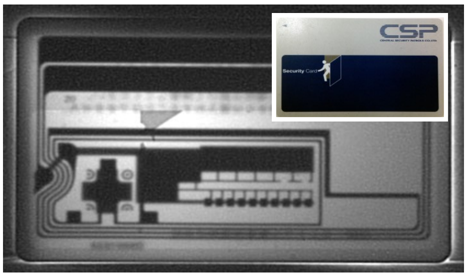
- Area pixel number：640×512 pixel
- Pixel pitch：15μm
- Sensitivity wavelength：0.9～1.7μm
- Maximum frame rate：98fps

＜Applications＞

- Moisture detecting
- Dissimilar material identification（Pharmaceutical products etc.）
- Silicon wafer transmission detecting
- High temperature measurement (Over 200℃)

Camera appearance

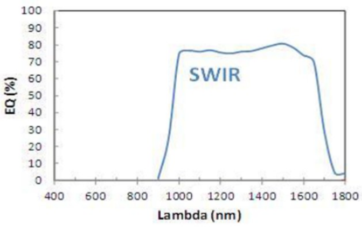
Indoor person



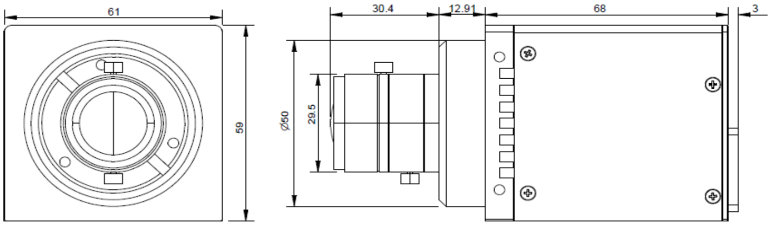
Transmission image of IC card

Camera specifications

Items	Specifications
Detector	InGaAs array detector
Area pixel number	640 × 512 pixel
Pixel pitch	15μm/pixel（Light receiving section：9.6mm×7.68mm）
Sensitivity wavelength	0.9 ～ 1.7μm
Full Well Capacity	43Ke– (High sensitivity)/120Ke–(Middle sensitivity)/1.44Me-(Low sensitivity)
Black current	30fA Noise with ROIC <30e-(High sensitivity)
Frame rate / Digital output	1 ～ 98 frame / 16bit
Exposure time	Variable in 1μm ～ 900ms（Maximum limit depends on specified value of flame rate）
Optical filter	Diameter 25.4mm filter attachable（Insert between lens-detector）
Image output interface	CameraLink Base Configuration × 1TAP　Connector：SDR
Control interface	RS-232C（via CameraLink）
Power / Consumption current	Voltage：DC 12V ± 1V　/ Consumption current：Maximum 9W
Operating / Storage temperature	-10~+50℃ (No due condensation) / -25~+60℃ (No due condensation)
Thermal control function	With TEC built –in detector
External trigger function	Frame synchronization / Asynchronous trigger photography available
Lens mount	Standard：C mount or M42 mount combined use
Dimensions	W61mm × H59mm × D81mm（Without lens）



Sensitivity wavelength

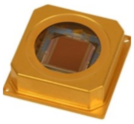


External drawing

Near infrared area camera NIR640LN

Low noise InGaAs detector is equipped • Gated Imaging is possible!

- Area camera with InGaAs element FPA has the sensitivity range from visible to near infrared
- Stable near infrared images are capturable by operating TEC built in a detector
- High sensitive features enable a high-speed frame photography up to maximum 200 fps
- Gated Imaging mode is possible
- Available for laser ranging and laser tracking



Gated Imaging amplifier

＜Features＞

- Area pixel number：640×512 pixel
- Pixel pitch：15μm
- Sensitivity wavelength：0.9～1.7μm
- Maximum frame rate：200fps
- Gated Imaging mode is possible

＜Applications＞

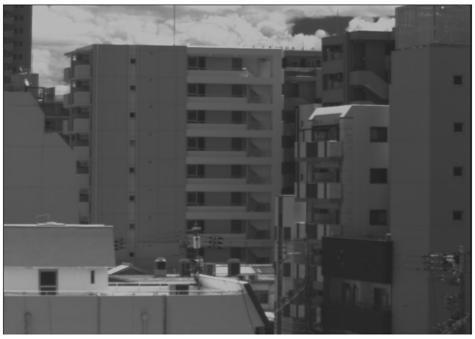
- Moisture detecting
- Dissimilar material identification（Pharmaceutical products etc.）
- Night surveillance under the low light
- High temperature measurement (Over 200℃)
- Laser ranging, laser tracking

Assemble with f=50mm lens

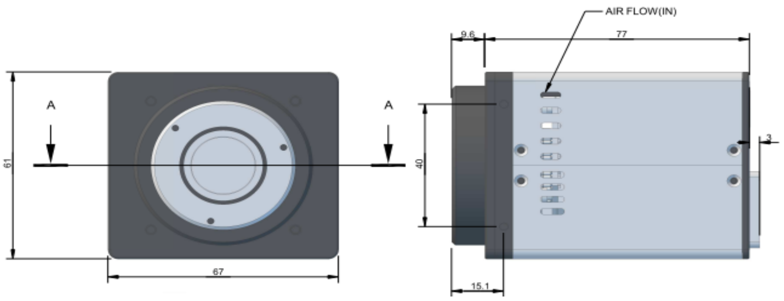
Camera specifications

Items	Specifications
Detector	InGaAs array detector
Area pixel number	640 × 512 pixel
Pixel pitch	15μm / pixel（Light receiving section：9.6mm × 7.68mm）
Sensitivity wavelength	0.9 ～ 1.7μm
Digital output	12bit
Dark current	2fA less (@283K)
Maximum frame rate	200fps
Exposure time	0.6μs ～ Maximum limit depends on specified value of flame rate
Optical filter	Diameter 25.4mm filter attachable (Insert between lens – detector)
Image output interface	CameraLink Base Configuration × 2TAP（12bit）　Connector：SDR
Control interface	RS-232C（via CameraLink）
Power / Power consumption	Voltage：DC12V / Power consumption：Maximum 15W
Operating temperature	-10 ～ +40℃ (No due condensation)
Storage temperature	-25 ～ +60℃ (No due condensation)
Thermal control function	With TEC built in detector
External trigger function	Frame synchronization / Asynchronous trigger photography available
Lens mount	Standard：C mount or M42 mount combined use
Dimensions	W67mm × H61mm × D90mm (Without lens)

Actual photography image



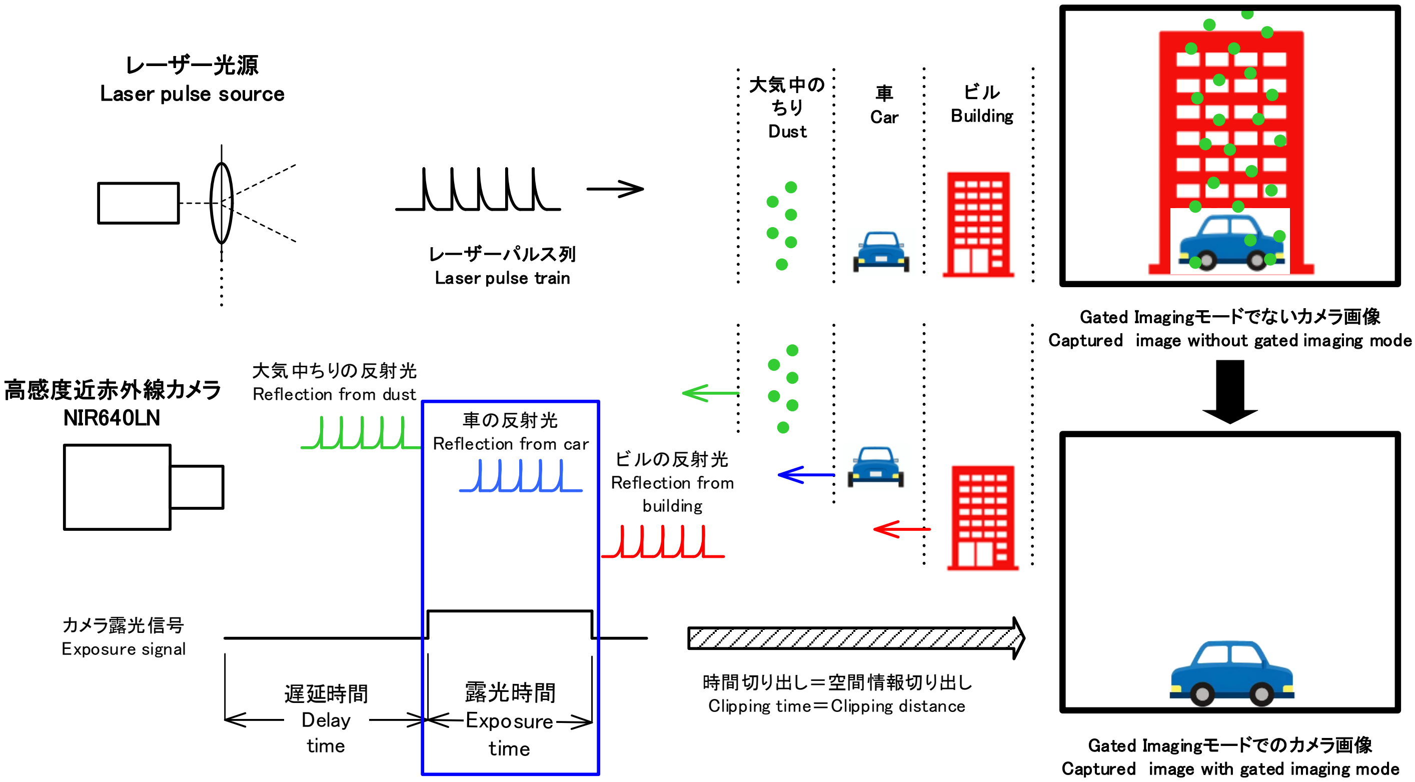
External drawing



Gated imaging mode on SWIR camera

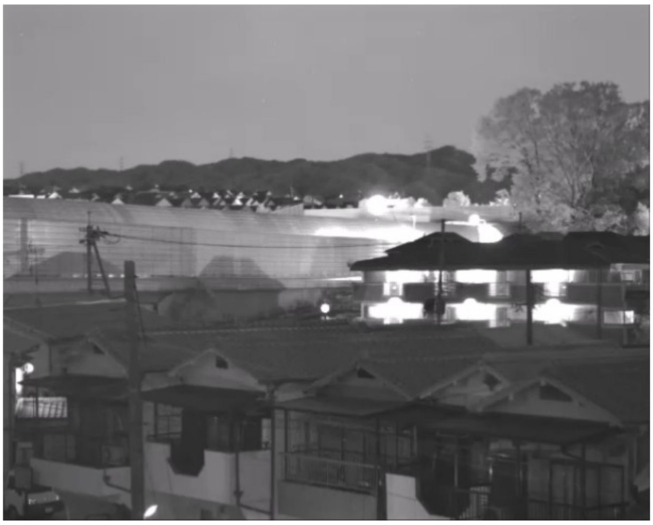
The Gated Imaging system uses a method to clip image information within a specific distance range, eliminating the effects of dust and water vapor in the air in front of the target, and enables to acquire only the target image and measure the distance to the target. Our near-infrared camera "NIR640LN" achieves high-speed operation with the shortest **exposure time of 1 μs** compared to the 10 μs of conventional models, and the highly accurate Gated Imaging system can be constructed by synchronizing nanosecond order laser pulse light sources.

＜*Principal of Gated Imaging method*＞

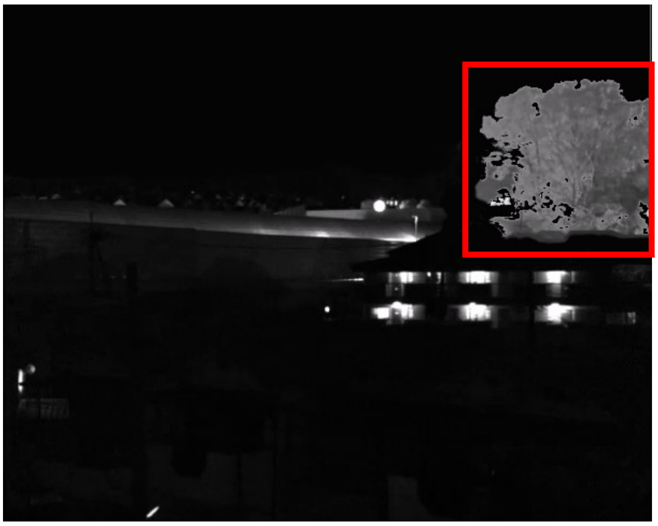

レーザー光源
Laser pulse source
レーザーパルス列
Laser pulse train
大気中のちり
Dust
車
Car
ビル
Building
Gated Imagingモードでないカメラ画像
Captured image without gated imaging mode
高感度近赤外線カメラ
NIR640LN
大気中ちりの反射光
Reflection from dust
車の反射光
Reflection from car
ビルの反射光
Reflection from building
カメラ露光信号
Exposure signal
遅延時間
Delay time
露光時間
Exposure time
時間切り出し＝空間情報切り出し
Clipping time＝Clipping distance
Gated Imagingモードでのカメラ画像
Captured image with gated imaging mode

- An optical pulse train of nanosecond order is output from a laser light source.
- A train of light pulses reflects off the surface of each object and returns to the camera.
  At this time, in proportion to the distance to the object surface, the arrival time of the reflected pulse train becomes longer.
- By controlling the camera exposure delay time and exposure time according to this arrival time, only the image information of a specific distance range is extracted.
  (Above illustration shows a sample only the car is extracted from a dust in the air or a building in a back.)

＜*Image sample*＞



Normal mode image (Mixed all object)



Gated imaging mode image (Clipped tree only)

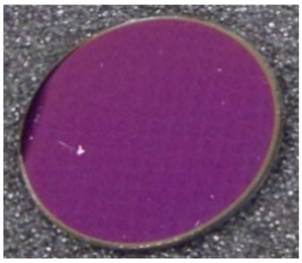
This content describes application examples of our cameras, and does not guarantee the operation and performance of systems such as laser ranging.

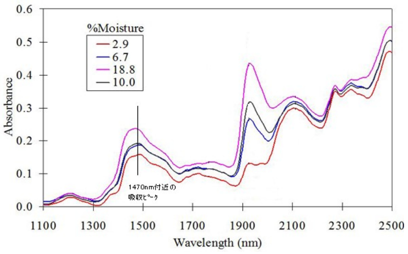
Near infrared camera applications examples

In the wavelength range of near infrared cameras, the light absorption and the transmission characteristics appear remarkably depending on the difference of materials. Those characteristics are used in the difficult fields for visible cameras, such as moisture detection and inspection over silicon wafers etc.

Applications of near infrared camera with bandpass filter

Applications of near infrared camera are extended by extracting the certain wavelength range with using bandpass filter.
For example, the water has absorption bands near 1.4μm and 1.9μm. Shooting image seems dark by extracting with using a bandpass filter of a specified band.
Colorless moisture can not see with visible cameras and it is effective to detect in near infrared cameras.

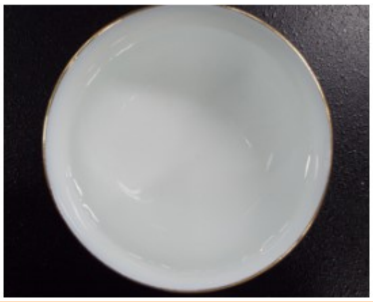




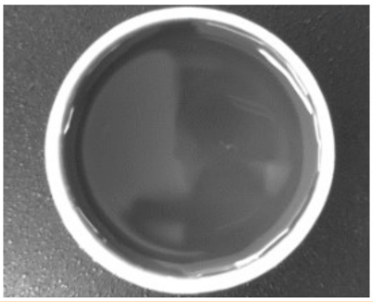
【Filter】λ0　1450nm　λ1/2　32.0nm

Image sample1：Water in a cup

Visible image



Near infrared image



Near infrared image (with a filter)

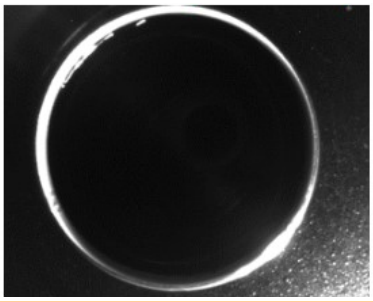
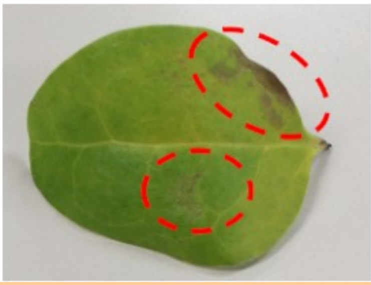
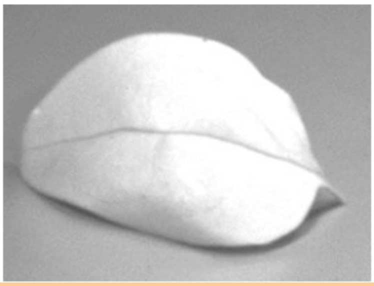


Image sample 2：Fallen leaf

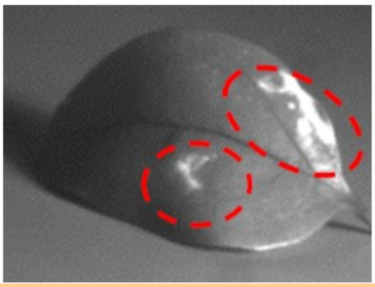
Visible image



Near infrared image

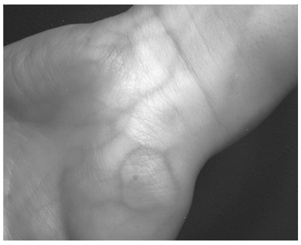


Near infrared image (with a filter)



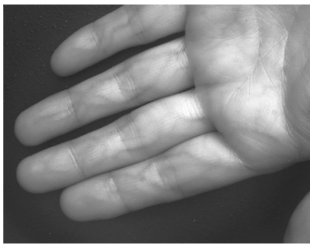
Vascular detection

Visible image

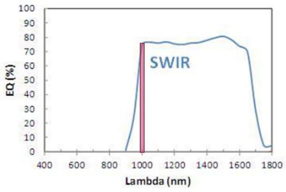


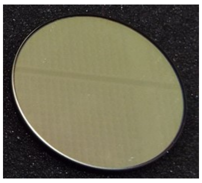
Near infrared image

Visible image



Near infrared image





【Filter】
λ0　1000.0
λ1/2　21.0nm

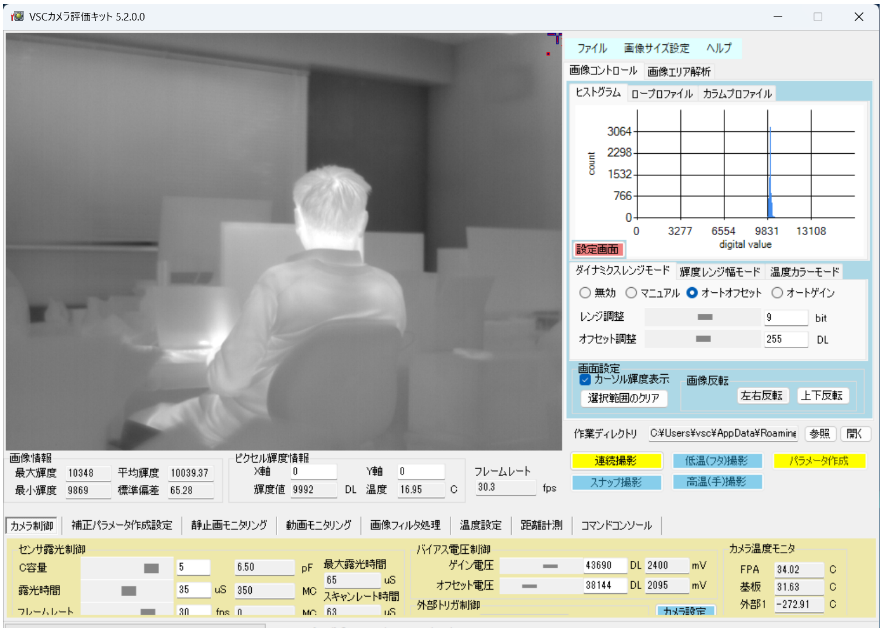
Possible to capture the vascular image more precisely by extracting the wavelength range of hemoglobin (600~1000nm) in the blood.

All image samples are captured by NIR640SN

Application Software

We prepare "Camera evaluation software" as an environment that customers can change the detector parameter and make the simple correction table by own. Customers can search the temperature range required for defect detecting, evaluate the field of view and the sensitivity of monitoring camera, and compose the most suitable far infrared camera.
The application of "ShutterLess Viewer" is provided with our camera after calibration for free. ShutterLess Viewer displays an image and a temperature as a thermography camera, and has a function to save the data.
In addition, the temperature judgement function within specified area is implemented, it is possible to build a simple temperature inspection system easily.
We will support the customized function to be required besides standard software.

Camera evaluation software


ファイル
画像サイズ設定
ヘルプ
画像コントロール
画像エリア解析
ヒストグラム
ロープロファイル
カラムプロファイル
count
3064
2298
1532
766
0
0
3277
6554
9831
13108
digital value
設定画面
輝度レンジ幅モード
温度カラーモード
選択範囲のクリア
画像反転
左右反転
上下反転
参照
開く
連続撮影
低温(フタ)撮影
パラメータ作成
スナップ撮影
高温(手)撮影
カメラ制御
補正パラメータ作成設定
静止画モニタリング
動画モニタリング
画像フィルタ処理
温度設定
距離計測
コマンドコンソール
外部トリガ制御
カメラ設定

VSCカメラ評価キット 5.2.0.0

ダイナミクスレンジモード
○ 無効 ○ マニュアル ● オートオフセット ○ オートゲイン
レンジ調整 9 bit
オフセット調整 255 DL

画面設定
☑ カーソル輝度表示

作業ディレクトリ C:¥Users¥vsc¥AppData¥Roaming

画像情報
最大輝度 10348 平均輝度 10039.37
最小輝度 9869 標準偏差 65.28

ピクセル輝度情報
X軸 0 Y軸 0
輝度値 9992 DL 温度 16.95 C

フレームレート 30.3 fps

センサ露光制御
C容量 5 6.50 pF
露光時間 35 uS 350 MC
フレームレート 30 fps 0 MC
最大露光時間 65 uS
スキャンレート時間 63 uS

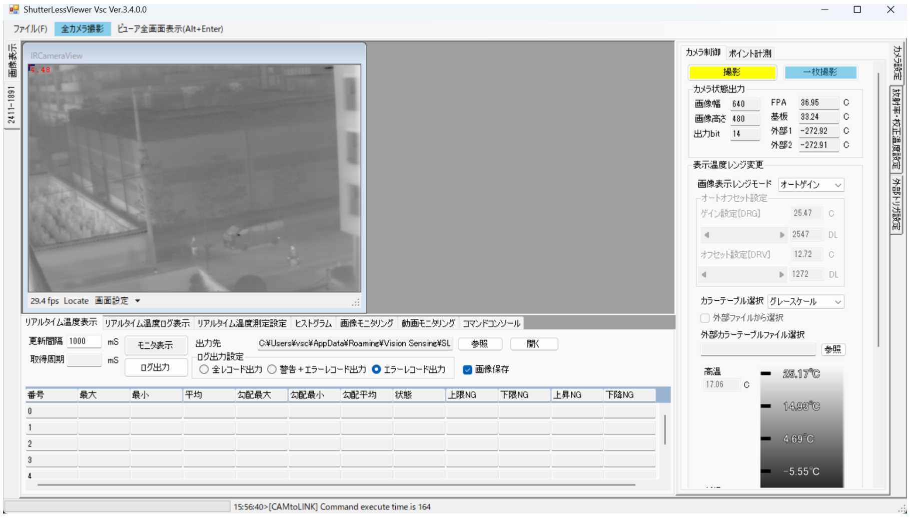
バイアス電圧制御
ゲイン電圧 43690 DL 2400 mV
オフセット電圧 38144 DL 2095 mV

カメラ温度モニタ
FPA 34.02 C
基板 31.63 C
外部1 -272.91 C

View of application

<Main functions>
- Setting the detector parameter
(Gain / offset voltage, TINT, C capacity)
- Temperature correction table between two points
- Dynamics mode setting
(Dynamics range / offset setting / auto-off set)
- Various statistics processing
(Maximum / minimum / average / standard deviation)
- Detector dot defect correction processing
(Defect pixel automatic detection)
- Photography image sampling preservation function (Preservation space / time designation, RAW/BMP/CSV form support)
- Animation preservation function (AVI form)
- Camera inside temperature indication
- Partial scan Setting (option)
- FPA temperature control setting
(with only some models)
- Image interface: USB connection

Shutter-less viewer


ファイル(F)
全カメラ撮影
ビューア全画面表示(Alt+Enter)
画像表示
2411-1891
IRCameraView
4.48
Locate
画面設定
リアルタイム温度表示
リアルタイム温度ログ表示
リアルタイム温度測定設定
ヒストグラム
画像モニタリング
動画モニタリング
コマンドコンソール
モニタ表示
ログ出力
参照
開く
カメラ制御
ポイント計測
撮影
一枚撮影
外部カラーテーブルファイル選択
参照
25.17℃
14.93℃
4.69℃
-5.55℃
カメラ設定
放射率・校正温度設定
外部トリガ設定

ShutterLessViewer Vsc Ver.3.4.0.0

29.4 fps

更新間隔 1000 mS
取得周期 mS
出力先 C:¥Users¥vsc¥AppData¥Roaming¥Vision Sensing¥SL
ログ出力設定
○ 全レコード出力 ○ 警告＋エラーレコード出力 ● エラーレコード出力
☑ 画像保存

番号	最大	最小	平均	勾配最大	勾配最小	勾配平均	状態	上限NG	下限NG	上昇NG	下降NG
0											
1											
2											
3											
4											

```
15:56:40>[CAMtoLINK] Command execute time is 164
```

カメラ状態出力
画像幅 640
画像高さ 480
出力bit 14
FPA 36.95 C
基板 33.24 C
外部1 -272.92 C
外部2 -272.91 C

表示温度レンジ変更
画像表示レンジモード オートゲイン
オートオフセット設定
ゲイン設定[DRG] 25.47 C
2547 DL
オフセット設定[DRV] 12.72 C
1272 DL
カラーテーブル選択 グレースケール
☐ 外部ファイルから選択
高温 17.06 C

View of application

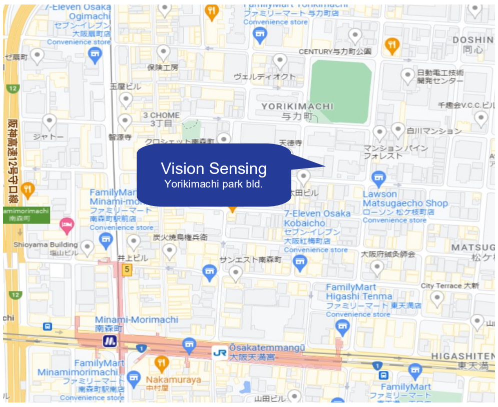
<Main function>
- Dynamics mode setting
(Dynamics range / offset setting / auto-off set)
- Color bar indication
(Color table reshuffling, upper and lower limit temperature set)
- Digital zoom function (x1, x2, x4, x8)
- Temperature monitoring function
(8 domains add up maximum / minimum / average)
- Temperature judgement function
(Alarm output)
- Photography image sampling preservation function (preservation space / time designation, RAW/BMP/CSV form support)
- Animation preservation function (AVI form)
- The monitoring data log output (CSV form)
- Image interface: USB connection, Ethernet connection, Cameral-link connection
(DALSA grabber or Pleora)
- Alarm email transmission function

<Company profile>

- *Establishment* ： *December 16, 2008*
- *Capital* ： *JPY 3,300 million*
- *Executive Officers* ： *Chief Executive Officer Yasuo Mito*
- *Business* ： *Development, design and manufacture of various cameras include far infrared cameras*
  Development, design and production of image processing system
  Development and design of image recognition algorithm

Osaka head office

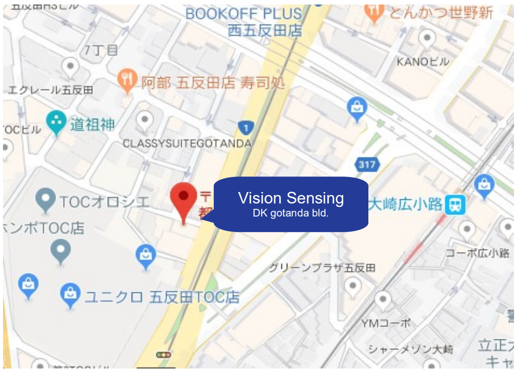
Building appearance


Vision Sensing
Yorikimachi park bld.
YORIKIMACHI
Minami-Morimachi
Osakatemmangū

7 minutes walk from Minami-morimachi and Osaka Temmangu station

Tokyo branch office

Building appearance


Vision Sensing
DK gotanda bld.
大崎広小路

7 minutes walk from JR Gotanda,
5 minutes walk from Tokyu Osakihirokoji

Vision Sensing Co., Ltd.

＜Osaka head office＞
〒530-0036
Yoriki-machi park building 5F, 1-5 Yoriki-machi, Kita-ku, Osaka, Japan
TEL：+81-6-4800-0151　FAX：+81-6-4800-0152
URL：https://www.vision-sensing.jp
＜Tokyo branch office＞
〒141-0031
DK gotanda building 4F, 7-13-5 Nishi-gotanda, Shinagawa-ku, Tokyo, Japan

We may change specifications mentioned without a notice. Thank you for your understanding.