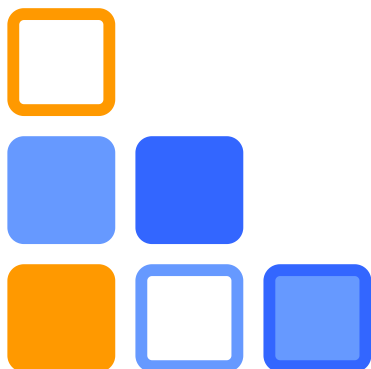


New Product Introduction

New

Thermo Shot

F30 Series



November 4, 2008

NEC Avio Infrared Technologies Co., Ltd.



Design Concept





Design Concept

□ **Small & light weight like a compact digital camera !**

- 1) Low power consumption by using TEC-LESS detector.
- 2) Using FPC for configuration of PCB.
- 3) Installed DSP

□ **Low cost !**

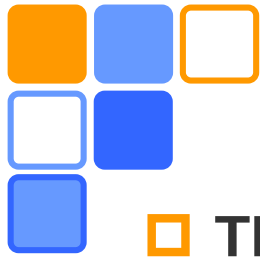
- 1) Using TEC-LESS detector and SOC (System On A Chip)
- 2) Reducing PCB by high density mounting

□ **Easy operation !**

- 1) Operation button, Menu, Icon

□ **Alliance with NEC HQ !**

- NEC Central Research Laboratory :
Heat design, EMC measures, Mounting design
- NEC Guidance & Electro-Optics Division :
TEC-LESS technology, Image processing



Development Risk & Measure

□ **TEC-LESS technology**

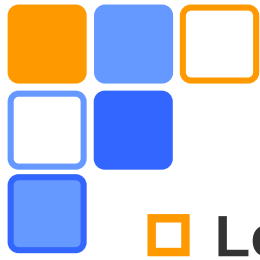
- ⇒ Using GEN IV detector technology under developing by NEC Guidance & Electro-Optics Division.

□ **Heat & EMC measure**

- ⇒ Implemented heat analysis and circuit design meeting with NEC Central Research Laboratory.

□ **Miniaturization**

- ⇒ Implemented mechanical design meeting with NEC Central Research Laboratory.



Development Risk & Measure

□ Low cost

- ⇒ Using TEC-LESS detector, ARM core DSP and mechanical design considering productivity.
- Equipped production facility for mass-production

□ Development time

- ⇒ Reduced backslide-man-hour by preliminary design review meeting with NEC.
- Used reliable out-sourcing for ARM and DSP design.
- Took design time longer and enriched debugging on trial board.



Product Overview





Feature 1: Size & Design

- Easy to carry for quick shot!
 - Compact & lightweight Approx. 300g or less
 - Designed like a digital camera
 - Ergonomically designed to help grasp
 - Large focus ring for easy handling

Reliable tool but compact as fits in pocket of work clothes



Feature 1: Size & Design

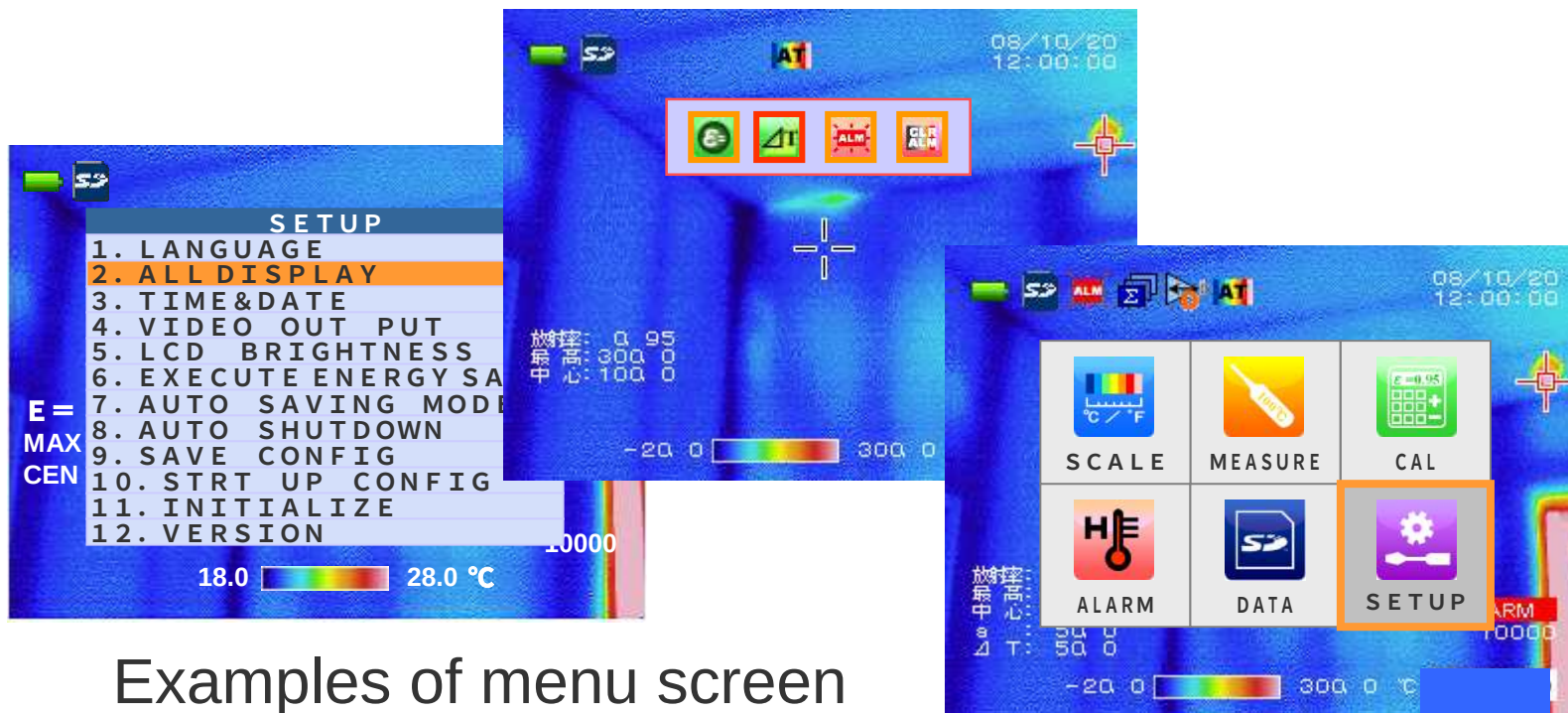
- Well-designed buttons and layout
 - Temperature scale setting with fewer button controls
 - Large 2.7" color LCD
 - Dial for mode selections





Feature 2: Outstanding operability

- Intuitive operation with clear-cut GUIs.
 - Easy operability like a mobile phone
 - Operation understandable by 'looking', not 'reading'
 - Short-cut function for setting and activating often-used functions with less time

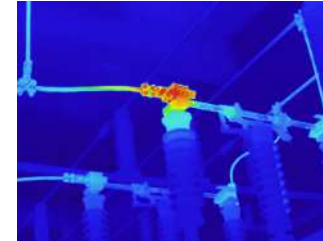
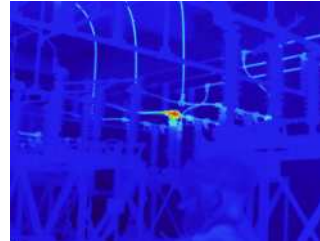
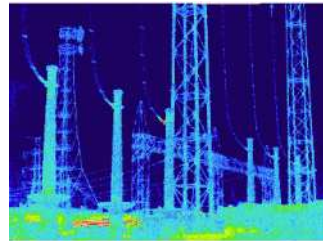


Examples of menu screen

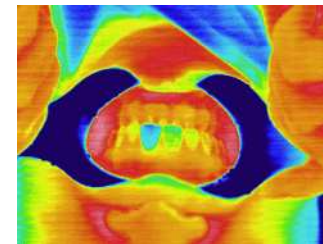
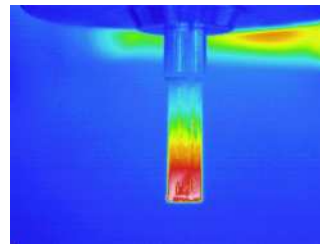
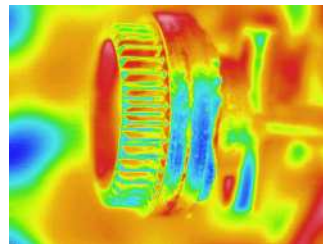


Feature 3: Fully-considered optical design

- Focus-free from 1.3m to infinity: Quality images even by entry-level users



- Minimum focal length 10cm: For imaging of small parts



- Simple correlation between resolution and field of view
 - FOV of 1m(H) x 0.75m(V) at 2m distance
 - ⇒ Easy calculation Q. Required distance to image area of 1m wide?
A. 2m



Feature 4: Built-in visible camera

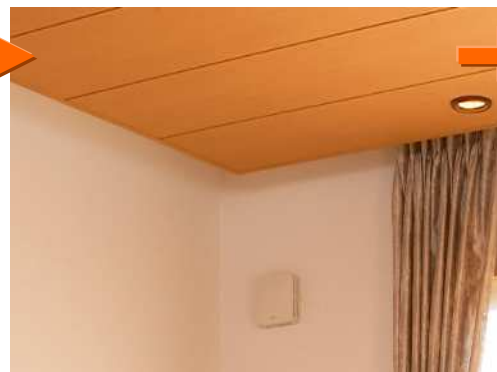
- Visible camera with 700K pixels
 - Linked saving of thermal & visible images for easy report
- Quick mode change with a dial key
- First in industry! Temp data on visible image
 - Measure-on-Picture function
 - Adjustment of image position



Thermal image

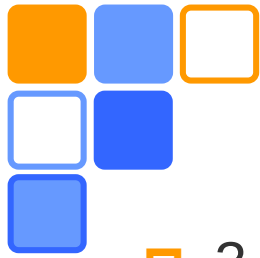


Visible image



Measure-on-Picture function





Feature 5: Useful functions at fields

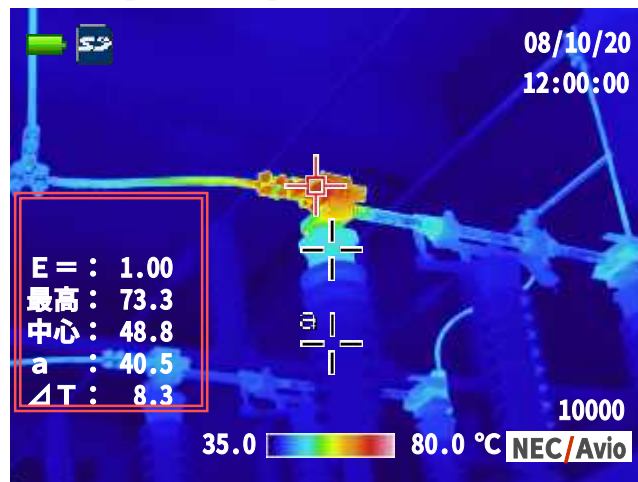
3-point temperature measurement

- Center(fixed), max or minimum & selected one point
- ΔT function for displaying temperature difference of the center and selected one point

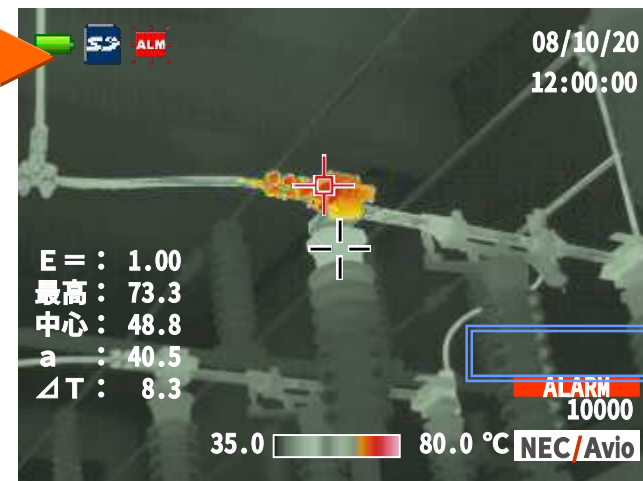
Alarm

- Displays 'Alarm' message if temperature in screen rises beyond preset threshold.
- Colored-alarm function(ISO) for separating areas at high & low temperature.

3-point temp measurement



Colored-alarm & alarm





Feature 6: Using goods with easy accessibility

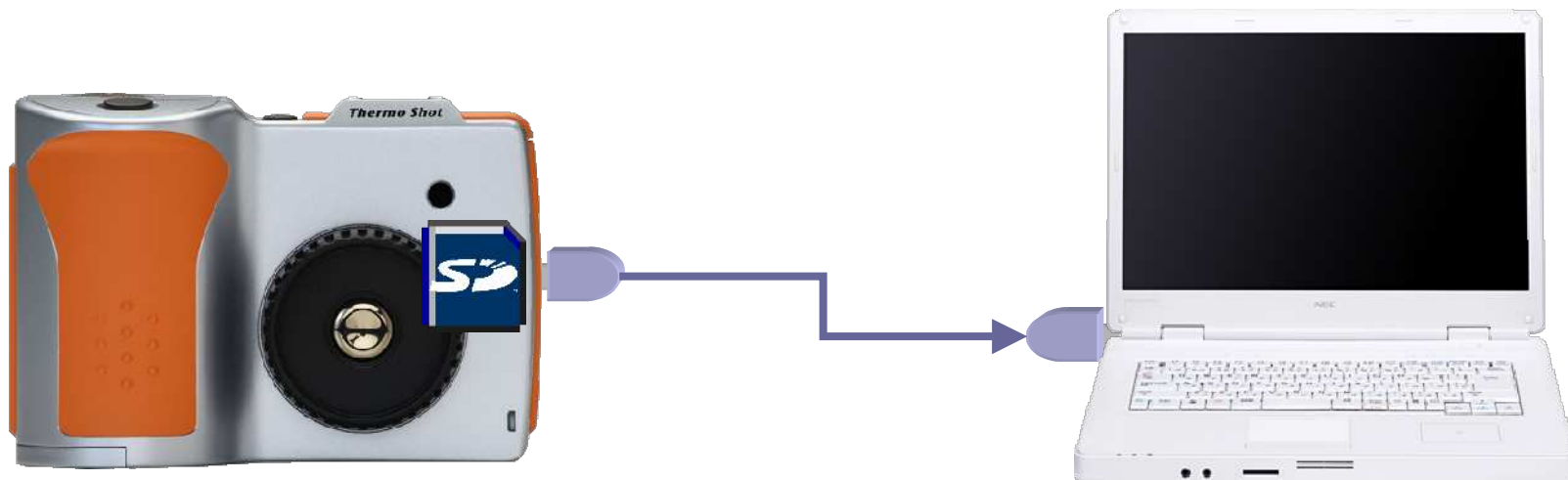
- Uses rechargeable battery on the market, which is environmental-friendly and easily available.
 - Up to 1000 images with 3 x AA batteries at 2000n
- Hot shoe for mounting accessories
 - Camera accessories on the market can be mounted.
 - LED light, external optical finder, etc.





Feature 7: User-friendly interfaces

- Data saving by SD card
 - No special data storage medium required.
 - JPEG image can be sent via mobile phone using microSD card and card adapter.
- USB 2.0 for data transfer
 - Fast data transfer via USB connecting PC and camera
 - USB 2.0 for transferring large data fast

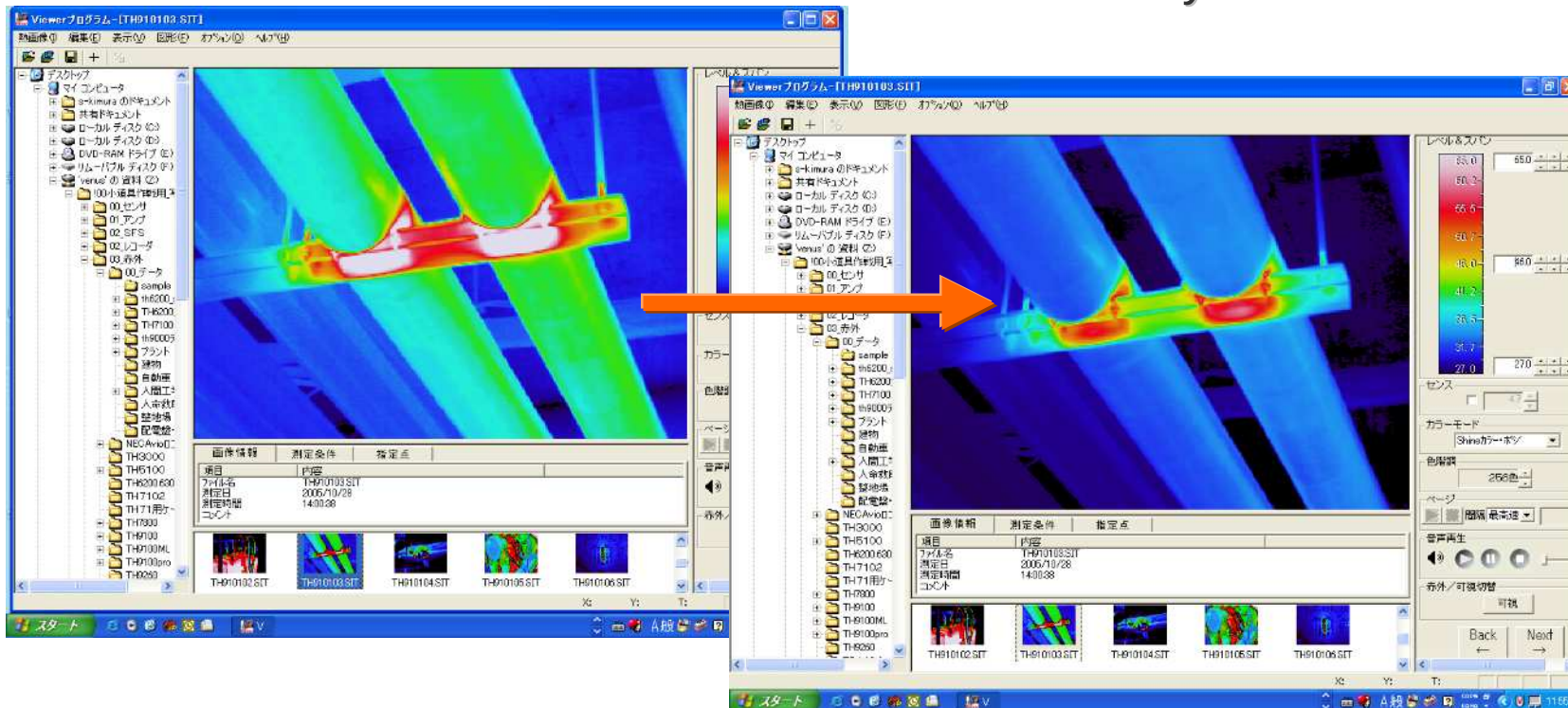




Feature 8: JPEG with data & software

- ❑ Saves JPEG file with data
 - What is JPEG with data?
 - ❑ As a JPEG file, it can be opened by generic software.
 - ❑ It is saved with data, so temperature can be checked with provided software.

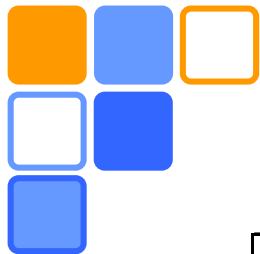
Software as standard accessory





Feature 9: Selectable Color Variation





Specifications 1

Thermo Shot Type		F30W	F30S
Basic Specifications	Measuring range	-20 to 350°C	-20 to 100°C
	Resolution	0.2°C/0.1°C(at S/N improvement)	0.1°C
	Infrared Detector	Uncooled focal plane array (microbolometer)	
	Spectral range	8 to 13μm	
	Frame time	8.5 frames/sec	
	Thermal image pixels	160×120	
	Field of view	28°(H) x 21°(V)	
	I.F.O.V.	3.1mrad	
	Focusing range	10cm to infinity	
	Focus	Manual (or focus-free at 1.3m or over)	
	Accuracy	±2°C or 2% whichever greater	
Measuring Functions	Visible camera	CCD camera, 700K pixels	
	Point values	Center, max/min, movable (1 point), ΔT	
	Emissivity correction	Provided	Provided
	Background compensation	Provided	Provided
	Isotherm(ISO)	Provided	Provided
	Alarm	Alarm display, colored alarm(ISO)	
	Image improvement	Provided	
	Color palette	3 (Rainbow, iris, brightness)	



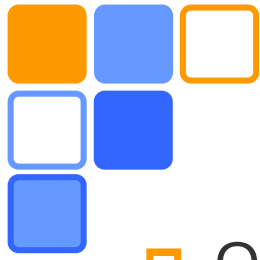
Specifications 2

Thermo Shot Type		Standard	High Sensitivity
Image display	Monitor size	2.7" LCD	
Data Storage	Format	JPEG with data (change of temp scale & post-analysis available)	
	Storage medium	SD card	
	Thumbnail display	9 images	
Interfaces	USB 2.0	Provided	
	Video output	Provided	
Power supply	Batteries	Rechargeable NiMH batteries (3 pcs) 2000mAh	
	Battery Life	Approx. 2.5 hours (with sleep mode)	
	Max images in battery time	Approx 1000 images	
	AC power	Provided	
	Sleep mode	Provided	
	Automatic shutoff	Provided	
Environmental Specifications	Operating temperature	-15 to 50°C	
	Protection	IP43	
	Dimensions	Approx. 100 x 65 x 45mm	
	Weight	Approx. 300g or less (including 3 batteries)	



Competitive Measures





Thermo Shot vs FLIR i5

- ❑ Overwhelming size difference (see the below comparison photo)
 - Thermo Shot overwhelm in the size !
- ❑ Visual camera
 - Visual camera built in Thermo Shot !
- ❑ Number of image pixels
 - Thermo Shot has 3 times image pixels !
- ❑ Rich measuring functions
 - Three point measurement
 - Delta-T
 - Color alarm
 - JPEG with data



100×65×45[mm]



223×79×83[mm]

**Logo will be “NEC” for Overseas market



Application Development

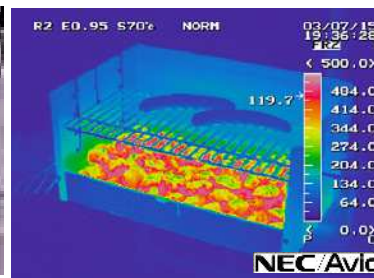
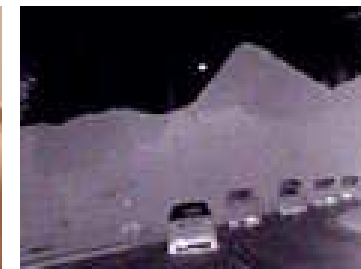
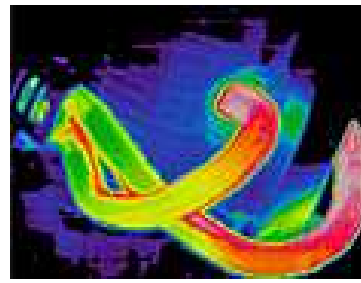
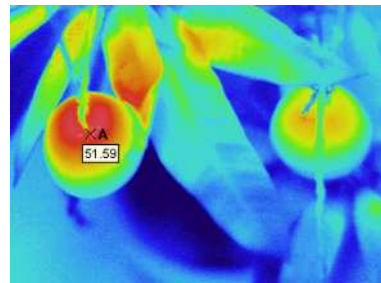




Development for New Application

Proposal of New Application

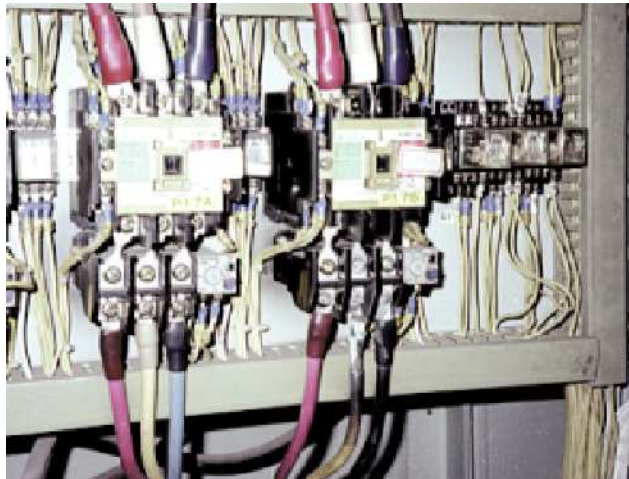
- Affordable price for Agricultural, Forestry and Livestock Industry, and Food Industry
- Zoo, Veterinary and Pet shop
- Presentation tool for Ecology, Environmental & Healthy goods, and Cosmetics
- Esthetic clinic, Massage, Sports club, Spa & Cure house
- Housing exhibit, Heat equipments showroom and exhibition hall
- Science museum, Art museum, resource center, recreation hall for children
- Junior high school, High school, Technical college and Academy
- Police, Fire fighting, Security company
- Maintenance shop for automobile, motor cycle and boat



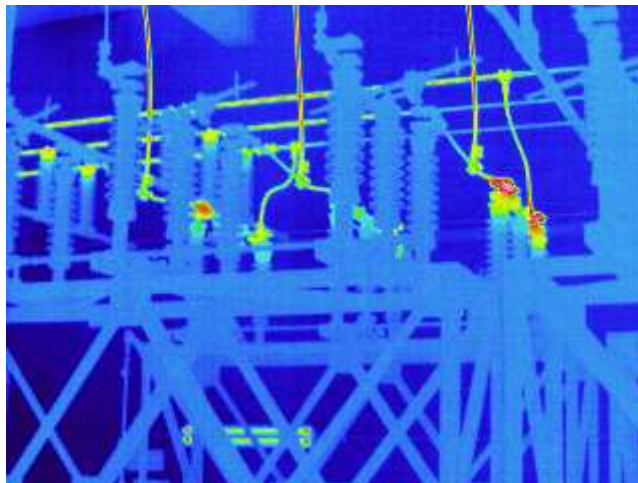


Main Market Electric & Power Facilities

Short-circuit in switch board



Short-circuit in transformer station

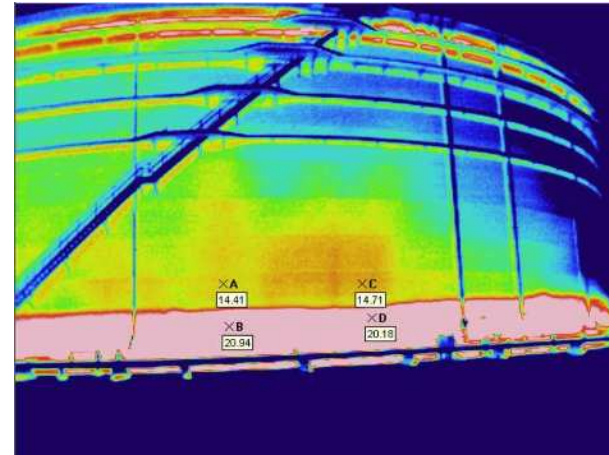




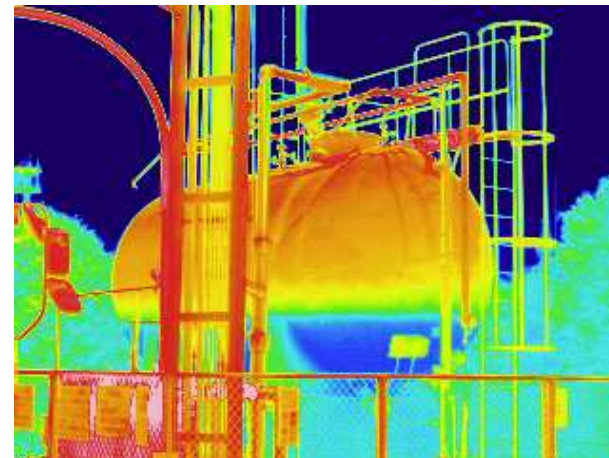
Main Market

Plant Facilities

Sludge in Tank



Liquid Level in Tank

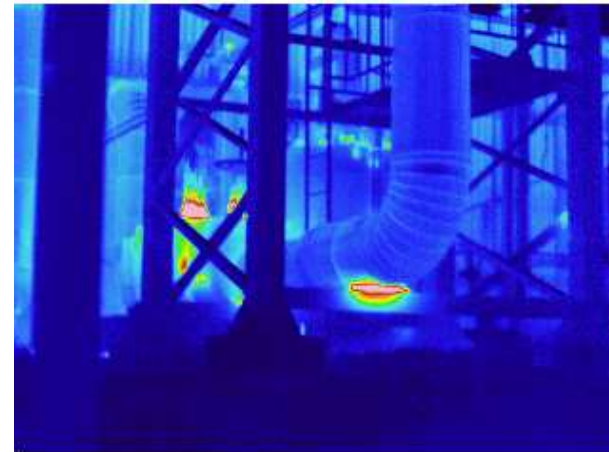




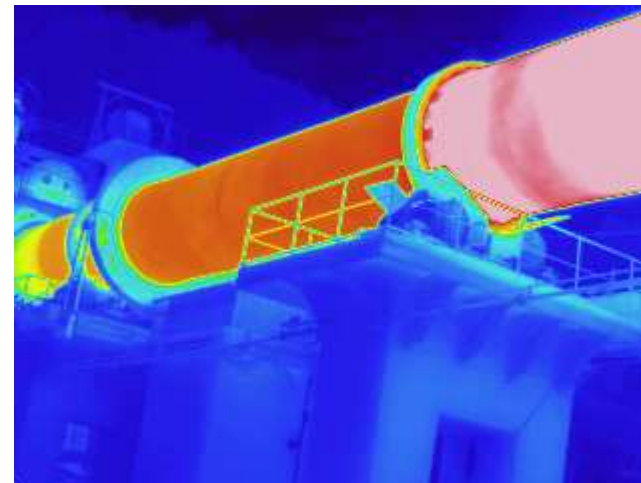
Main Market

Plant Facilities

Heat-Resistance Failure



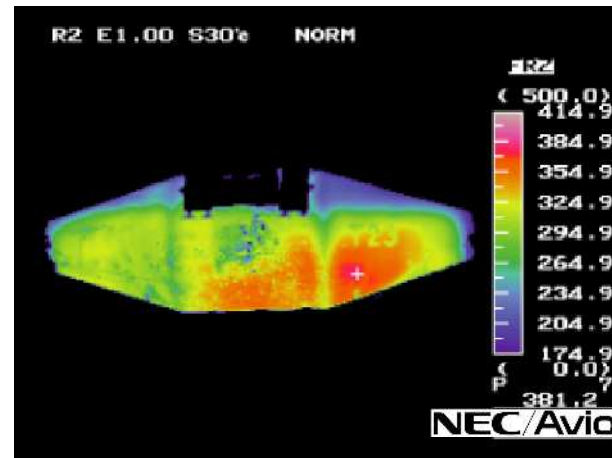
Rotary Kiln



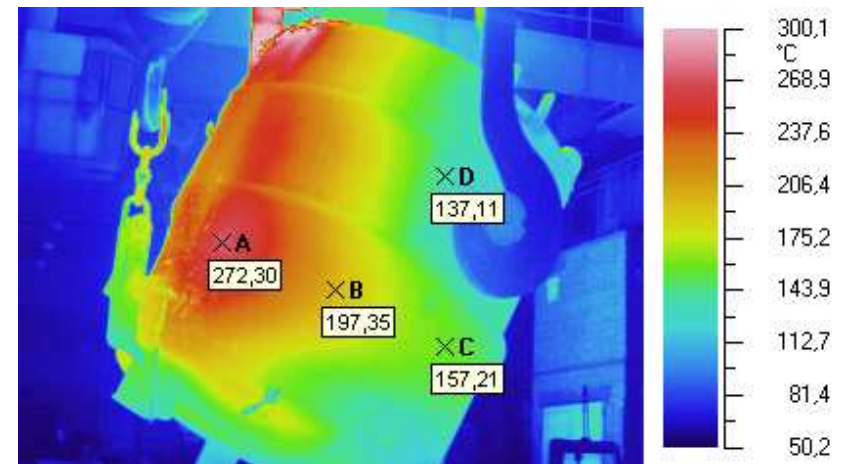


Main Market Steel & Furnace Materials

Torpedo Car Heat-Resistive Material Ablation



Molten Steel Ladle Material Control





Expansion to Existing Market 1

Market		Application		Sales Method
Existing Market	Steel	First process	Monitoring coke dept, coke belt	Expandsales by current sales method
			Monitoring rotary kiln, sintering furnace palette	
			Monitoring torpedo car	
			Monitoring vacuum gas LF/ RH	
			Monitoring heat stretching	
		Later process	Monitoring hot-blast furnace, gas jet cooling	
			Monitoring CLC steel plate/ H steel temperature	
			Mnitoring seamless steel pipe temperature	
	Chemical	Low cost model	Sales to maintenance workers for all process	Aim a lot sales by current sales method
		Oil	Monitoring refinery plant manitenance	Expandsales by current sales method
			Monitoring Inside of heating furnace	
		Cement	Monitoring Rotary kiln	
			Monitoring heating furnace	
			Monitoring plant facility	
		Coal	Monitoring rotary kiln	
			Monitoring heating furnace	
		Low cost model	Monitoring plant facility	
			Sales to maintenance workers	Develop new maintenance and tool trading company



Expansion to Existing Market 2

Market		Application		Sales Method
Existing Market	Power	Generator/transformer	PPM for Motor, turbin, transformer	Expand of sales by current sales method
		Transmission	PPM for power transmission line	
		Distribution	PPM for distribution line, electric pole transformer, switch board	
		Low cost model	Sales to maintenance workers for all process	Expand divisions of existing user
			Monitoring nuclear waste	
			Diagnosis of saving energy	
	Automobile	Metal mold	QC for casting, forging, plastic production metal mold	Expand of sales by current sales method
		Engine	Evaluation of heat design and performance	
		Assembly	Facility maintenance for production line	
			Expand sales to maintenance workers	Expand divisions of existing user
			Diagnosis of saving energy	
	Civil & building	Outdoor	Inspection of tile, concrete outer wall delamination	
		Indoor	Inspection of water leakage	Expand of sales by current sales method
			Inspection of heat-resistive performance	
		Low cost model	Inspection of dew condensation	Develop secondary office of tool trading company
			Expand sales to small and middle building constructor	
			Expand sales to organization of performance for house performance	



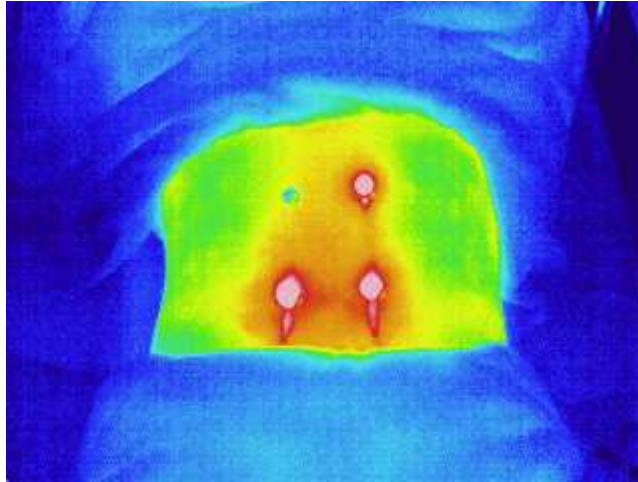
Example of New Market Development

New Market	Food	Quality	Temperature control of freshness and processed food
		Maintenance	Expand facility maintenance worker
	Cosmetic	Poor circulation	Evaluation of blood circulation condition at a shop
	Sports	Poor circulation	Evaluation of blood circulation condition after playing sports
	Esthetic	Poor circulation	Evaluation of blood circulation condition after massage
	Fabric/textile	Thermal insulation effect	Evaluation of pleasant cooling sensation and thermal insulation effect (R&D)
	Ceramic (small & middle)	Quality	Heating furnace measurement and quality evaluation
	Industrial waste industry	Maintenance	Simple maintenance of industrial waste plant
	Amusement	Maintenance	Amusement facility maintenance
	University (human engineering)	R&D	Biometric study
	Livestock experimental station	R&D	Farm animal biometric study
	Chicken farm	Farm	Health control of chicken
	Factories	Maintenance	Small and middle factories of power distribution facilities
	Automobile maintenance factory	Maintenance	Monitoring facility
	Environment measurement	Measurement	Restrain of heat-island by afforestation of country, state and city government

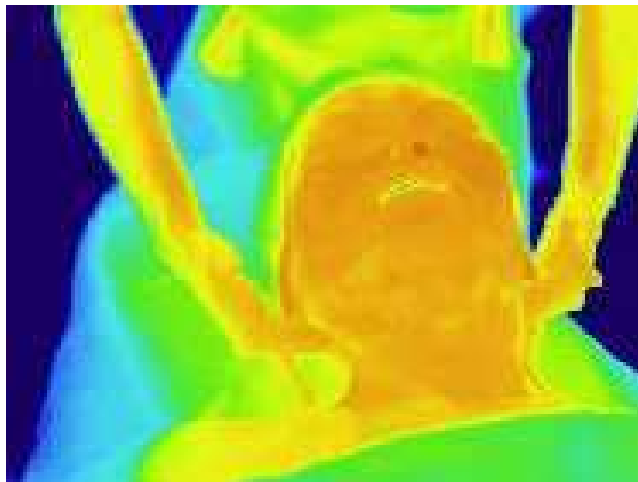


New Targeting Market (Cosmetic & Health)

Acupuncture and moxa treatment



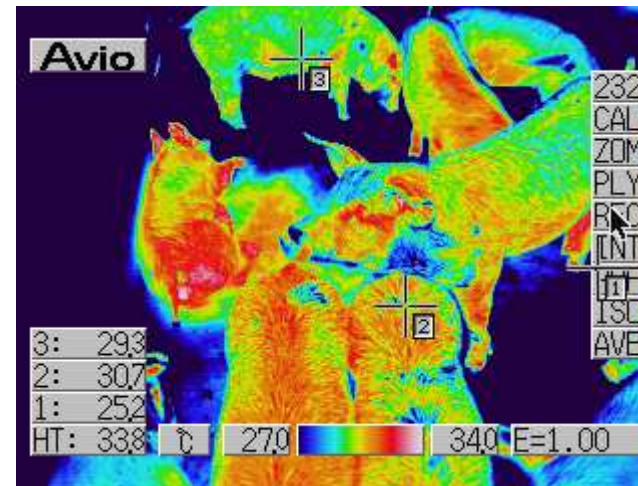
Beauty salon treatments



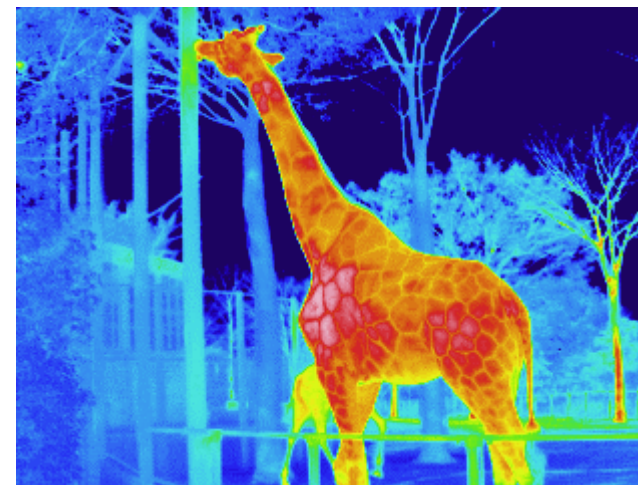


New Targeting Market (Livestock, Zoo, Pet Shop)

Pig Farm



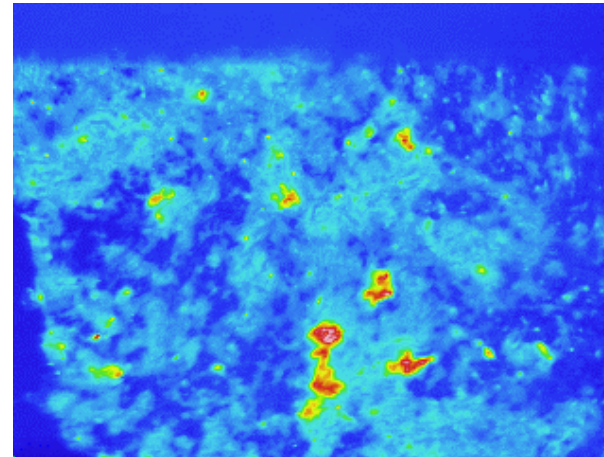
Zoo



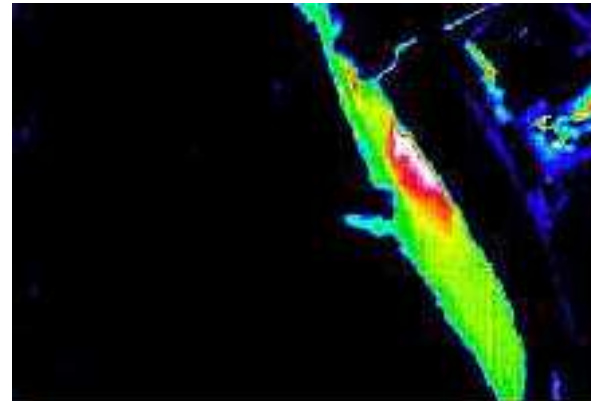


New Targeting Market (Environmental Problem)

Industrial waste



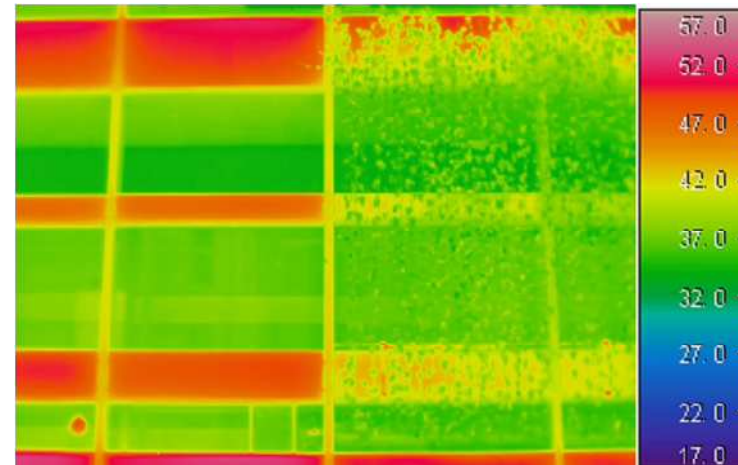
River pollution



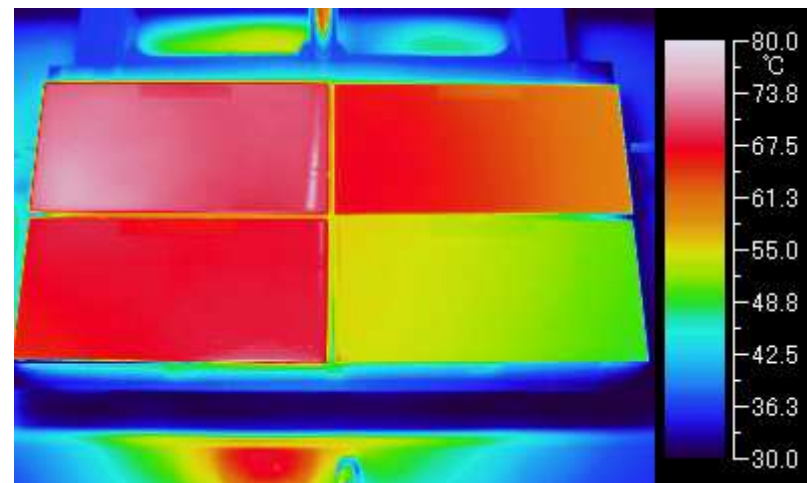


New Targeting Market (Heat Island)

Rooftop & wall greening



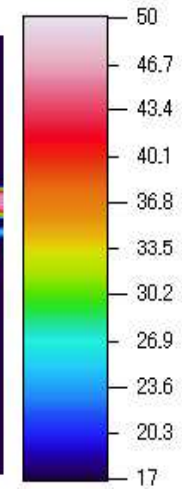
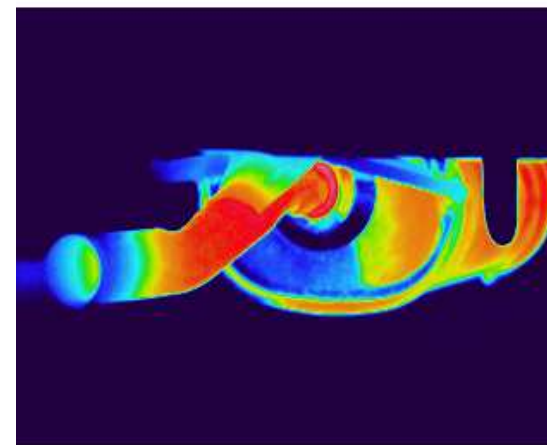
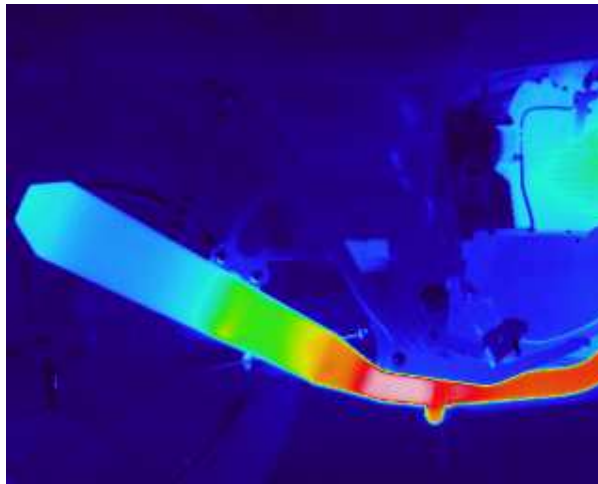
Evaluation of heat reflection material



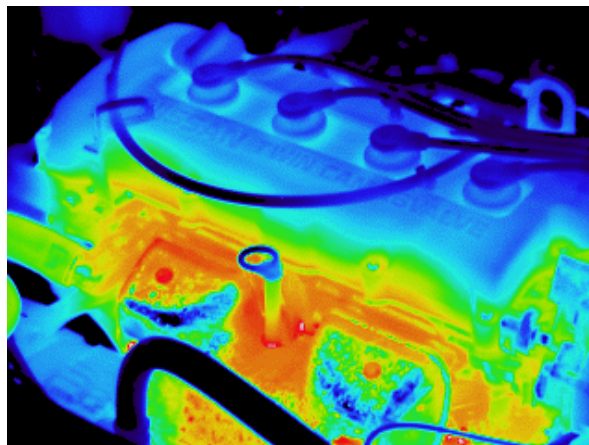


New Targeting Market (Automobile)

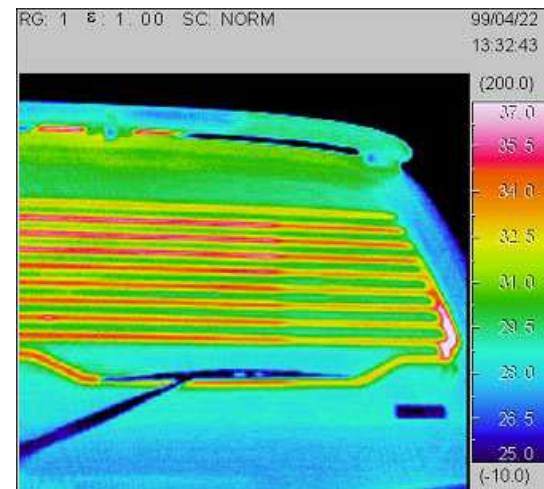
Muffler



Engine



Defroster





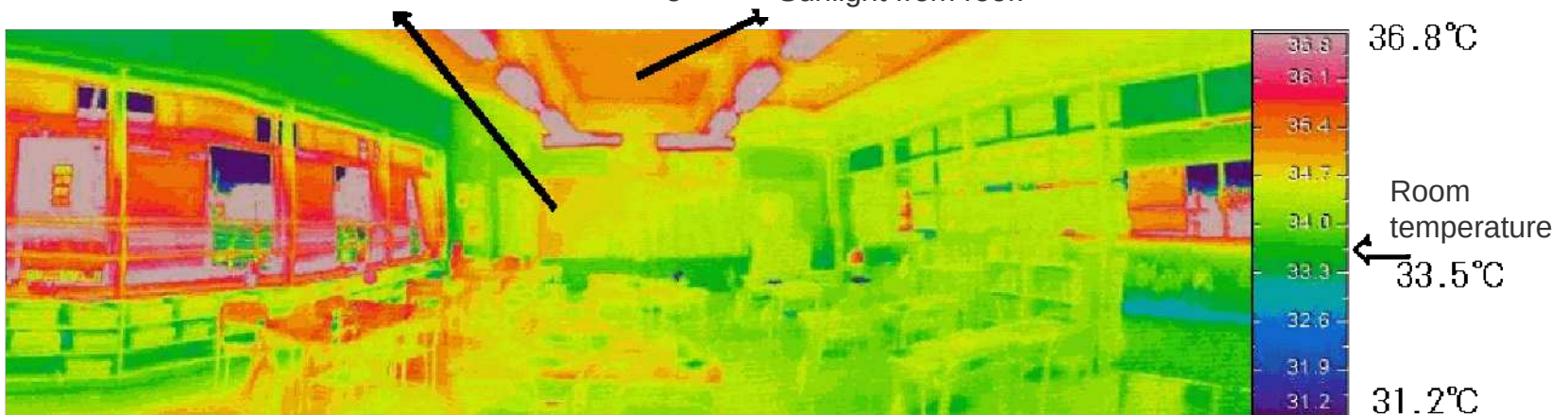
New Targeting Market (Education)

Thermal image of classroom



Sunlight on the blackboard makes it difficult to see writings.

Sunlight from roof.

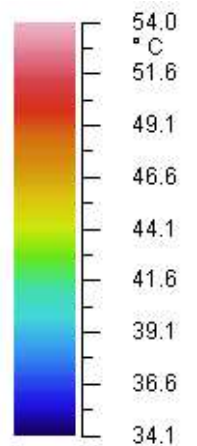
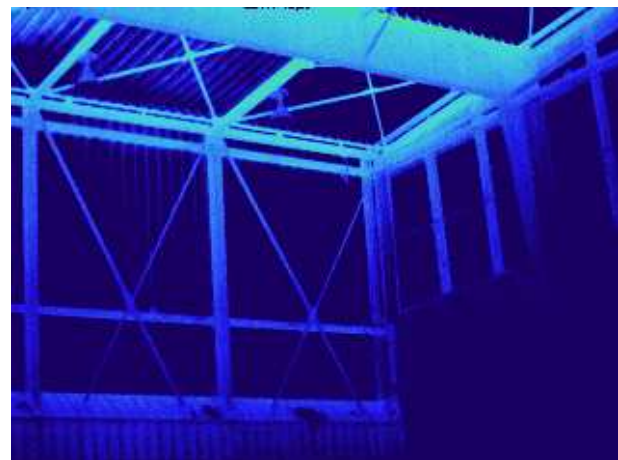
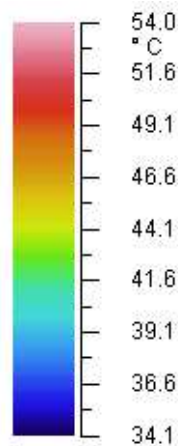
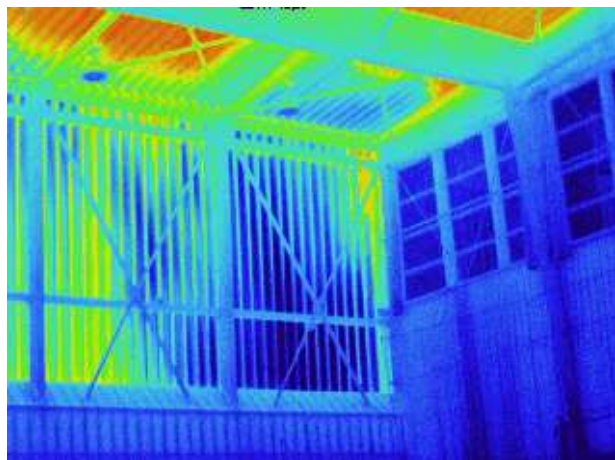
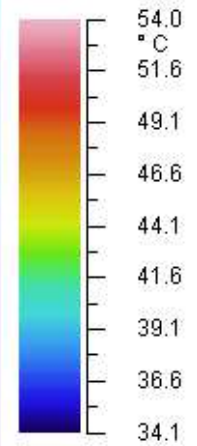
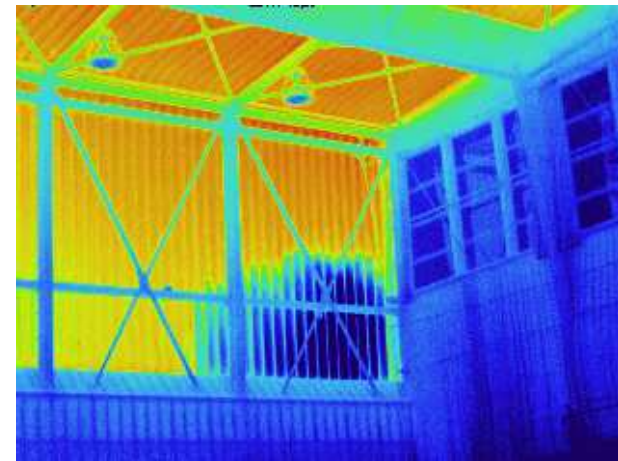
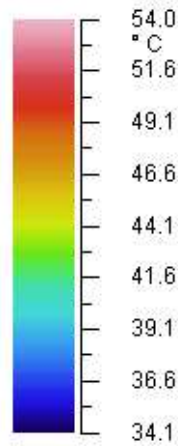
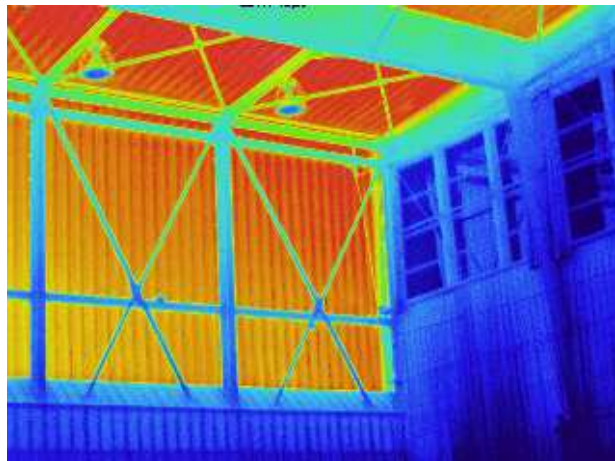


Surface temperature is 2-3°C higher than room temperature due to incoming sunlight.



New Targeting Market (Education)

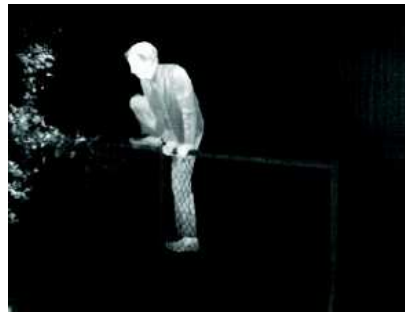
Discharge water to gymnastic hall & prevention from heat stroke





New Targeting Market (Safe & Security)

Crime prevention & Security



Night time image



Lifesaving





Thank you !

