Most suitable network camera
for Wide area surveillance

with Best Cost Performance

360° High Resolution Clear View Camera

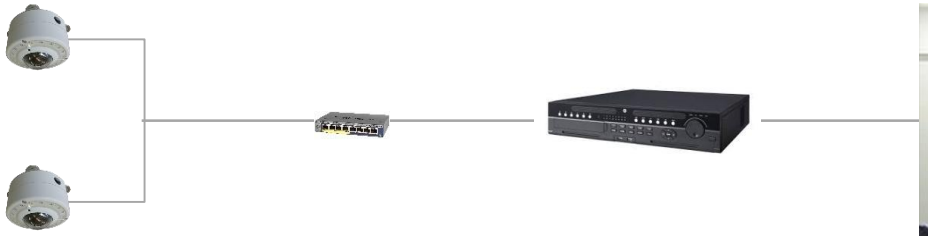
Model: NUD360-F

Comparison with other types

	our NUD360-F			
Reference product				
Type	360° camera High resolution	Fish-eye camera	Optical PTZ camera	One-directionality normal view angle
Clear View Range	View angle: 180° Horisontal: 360° Radius: 50 m	View angle: 130° Horizontal: 360° Radius: 10 m	View angle: 50～110° Rotating angle: 130～360° Distance: 10～100 m	View angle: 50～130° Distance: 10 m
	◎ Clear view area is very wide (all direction)	all around view but in shrt distance	× Blind spots except where the camera is now facing.	× Many blind spots by limited view angle.
Installation	◎ Easy installation with no angle and focus adjustment		Large and heavy hard handling	Complicated works for angle and focus adjustment. ×
Size	Big, for outdoor	midle size	Extra large and heavy	small～middle
Price Range (US$)	2500～3500	800～2900	× 3000～6000	200～800
	◎ cost performance is high in a wide area surveillance			unit price is cheap
Life	75,000 hours (8.5 years)		5,000 hours (6.5 months)	75,000 hours
	◎ excelent durability without no PTZ mechanism		× very short life	
Remarks	◎ ・wide area surveillance with fewest units. ・minimize the installation cost. ・minimize the number recorders and monitors and load of monitoring. ・easy tracking in a wide view range.	possible to reduce the number of cameras (better than the one-directionality camera, but worse than NUD360-F)	◎ Possible to precisely enlarge one point by the optical zoom.	◎ Because of its low price, suitable for a narrow area surveillance. Good cost performance in a few camera use.

Cost performance study

in case of NUD360-F



Camera: 2　　HUB etc…　　Recorder

Monitoring system

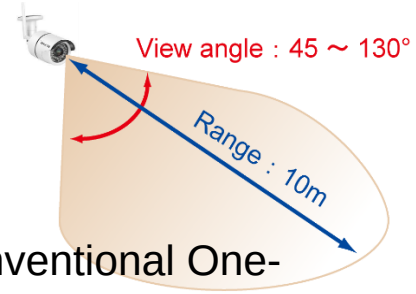
Load of monitoring
- personnel
- monitor

It is stupid to compare only the product price !

		Camera	Recorder	Construction	Monitor	
	Q'ty		300,000円	300,000円	100,000円	Sum Cost
General camera	50	@30,000円	4 unit	50 set	4 set	
		1,500,000円	1,200,000円	15,000,000円	400,000円	18,100,000円
Competitors	15	@240,000円	2 unit	15 set	1 set	
fisheye		3,600,000円	600,000円	4,500,000円	100,000円	8,800,000円
NUD360-F	2	@350,000円	1 unit	2 set	1 set	
		700,000円	300,000円	600,000円	100,000円	1,700,000円

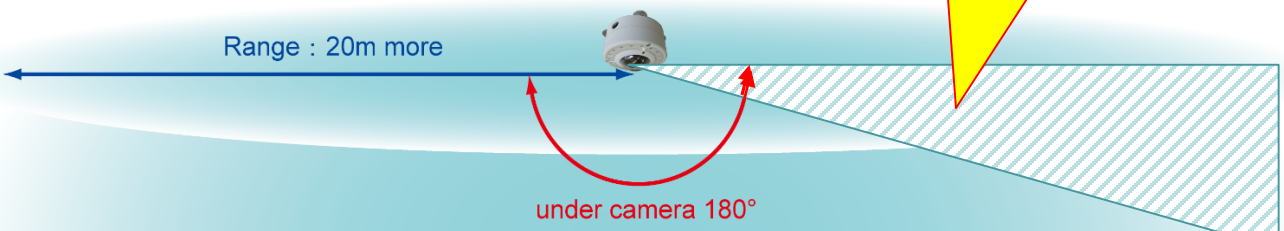
Reduced Under 1/10

Very Wide High Resolution Advantage

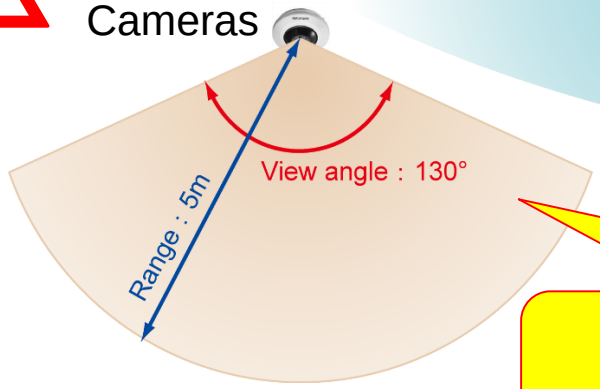


✕ Conventional One-direction Cameras

High resolution at the lens fringe area is very important for a 360° long distance surveillance.



△ Typical Hemispheric Cameras

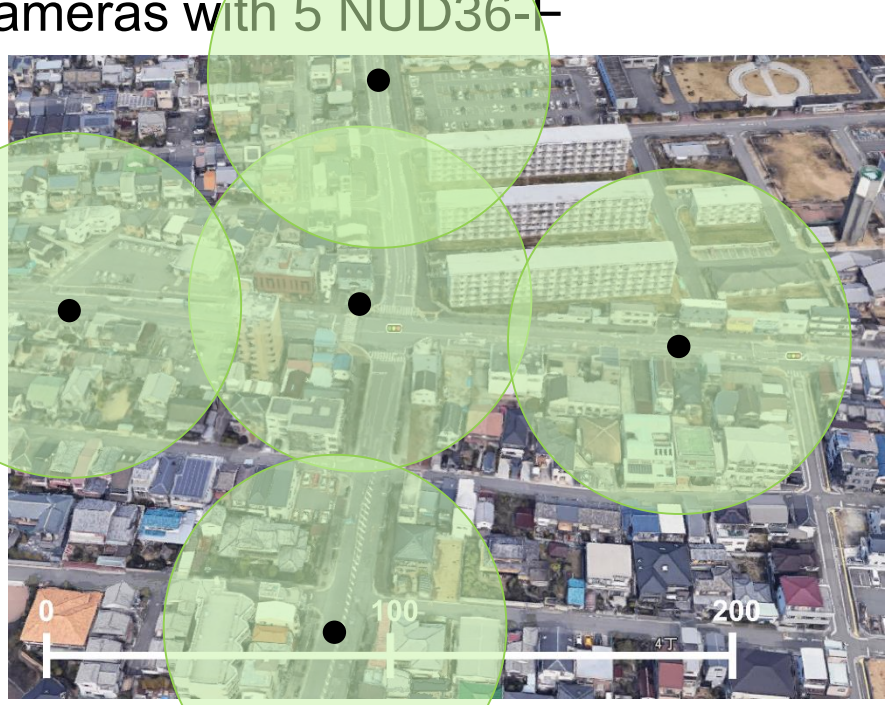


◎ Our NUD360-F
- Wide angle
- High edge resolution
- FRIP lens

Because of poor resolution at the lens fringe area, the acceptable range is narrow, ~130° even though the original view angle is 180°.

Urban Surveillance

Replace 56 competitor's cameras with 5 NUD36-F



✕ Using conventional cameras with directivity or mechanical PTZ, due to blind spots, the number of cameras and the cost increases, and the management of a picture is difficult.

✕ Connection of many camera pictures is necessary for viewing of a moving object.

Viewing area of a camera with directivity (assuming about 15m)

◎ Installing NUD360-F at every radius 50-100m makes it possible to use a small number of cameras with few system connections – easing the management of images.

◎ Observing in a wide range, it becomes straightforward to find the direction of moving subject and follow it.

Viewing area of our NUD360-F.
（assuming about 50m radius）

Suitable camera for Wide area surveillance

Example of NUD360-F usage

- Airport（Runway, Terminal）
- Port and harbor
- Urban area
- Railway（Station, along a railway line）
- Factory, delivery center
- Highway
- Border security　etc…

Our camera can greatly contribute to reducing overall costs in places where a large number of general cameras must be installed.

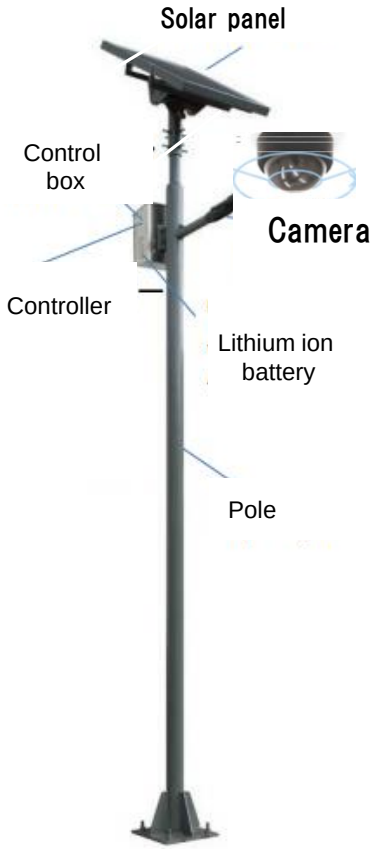
Example of use ～ Border Guard

【 Border Guard Security 】

*** between the states with international dispute**
*** Watch of illegal violation of the border**
*** The sea coastal guard**

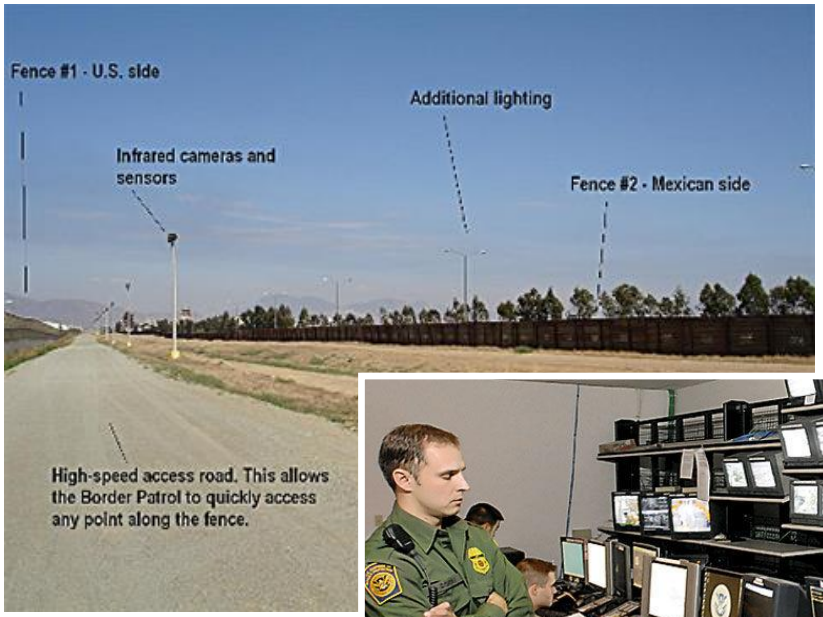
【 Assumed Demand 】 (placing every 100 m)

Country	Boarder Line	Distance (Km)	Q'ty (unit)
Vietnam	China	1,281	12,810
	Laos	2,130	21,300
	Cambodia	1,228	12,280
South Korea	North Korea	248	2,480
USA	Mexico	3,141	31,410
Iran	Iraq	1,458	14,580
	Afghanistan	936	9,360
	Total		104,220



◎ Comparison with border monitoring system in other countries

USA attempted to build a fence at the border with Mexico but abandoned at 85 Km.
(Approximately 1 billion yen per 1 km development cost, but did not work much because of malfunctions .)



Very expensive PTZ swing cameras were set every 30 to 40 meters.
Expenses and management costs of cameras and equipment of 25 to 30 units / Km are enormous.

PTZ swing camera is very short in life（5,000 H）

In Saudi Arabia,
it is planed to introduce an American type system at the Iraq border at 5 billion USD.
(Apprx. 610 million USD per 1 km of development cost)

An all-around camera is installed every 100 m. Reduce cost of equipment and half the installation cost**. Total cost is 1/4 or less** by saving video management cost (monitor, monitoring staff, data processing system, labor).
A long life (75,000 hours) because there are no moving parts,

◎ Cameras equipped with fisheye lense have the following advantages over general cameras:

(1) All around view by one camera

→ **no blind spot**

→ **can reduce the number of cameras**

→ **can reduce the construction cost**

→ **can reduce the load of monitoring**

View 360° entire direction around the optical axis.

(2) Because of the electronic PTZ

→ a **long life** with no moving mechanism

× conventional camera with mechanical PTZ: 5,000 hours

◎ 360° camera with fish-eye lens: 75,000 hours

(3) No need of the focus adjustment

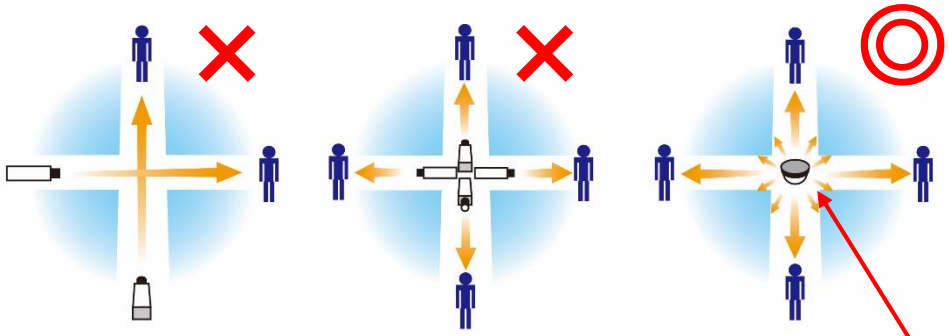
As the fisheye lens features focus free from the lens surface to the infinity, the focus adjustment is not required.

→ Easy installation

◎ Fisheye camera can reduce the number of cameras

(General theory)

【at a crossroad】

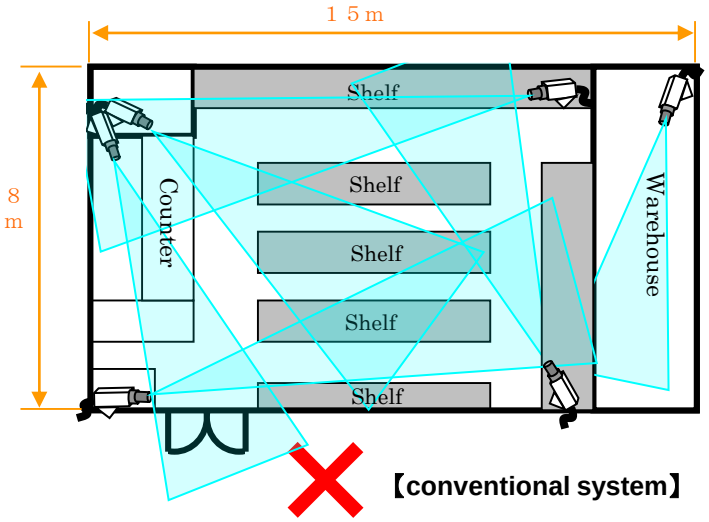


Multiple number of conventional cameras are required.

Only one fisheye camera is enough

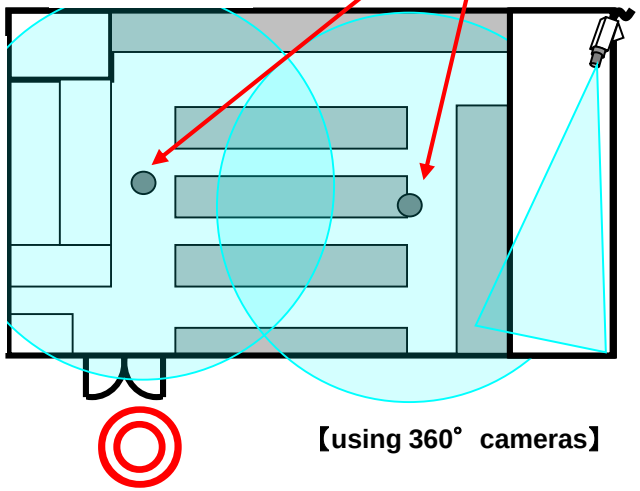
Fisheye camera

【 in a small size store 】



【conventional system】

Many cameras are required.



【using 360° cameras】

A few camera can see whole.

Fisheye camera is such a useful device, however

(General theory)

✕ Conventional fisheye lens is with

- distorted image and low resolution especially at the lens fringe area
- unsuitable for viewing a far place more than 10m.

The distance not look clear

By competitors' 12M fisheye camera (USA, Taiwan, China)

Let's enlarge the image at the lens fringe area.

40m ahead

80m ahead

Resolution is poor and image height is low at the lens fringe area.

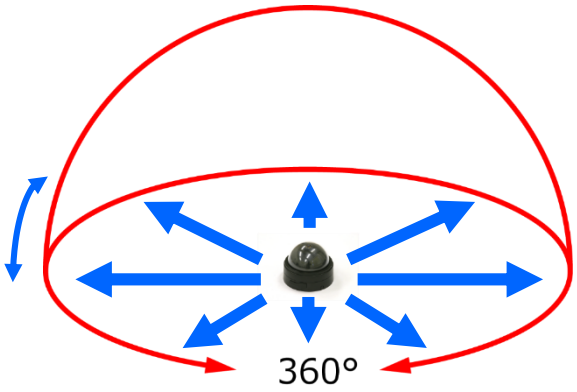
As the resolution of the original image is low, it is not clear even with the image processing.

Advanced Lens Technology

Then, we created the best lens for **360 °** entire circumference viewing with **high resolution** and high recognition even at 100m.

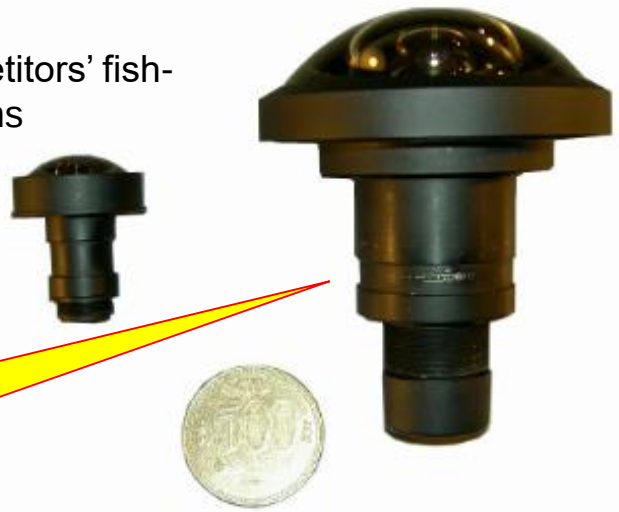
Newly developed lens
Clear fringe area ＝360° camera

Large and high view here at the lens fringe area.



Our ultra high resolution fish-eye lens

Competitors' fish-eye lens

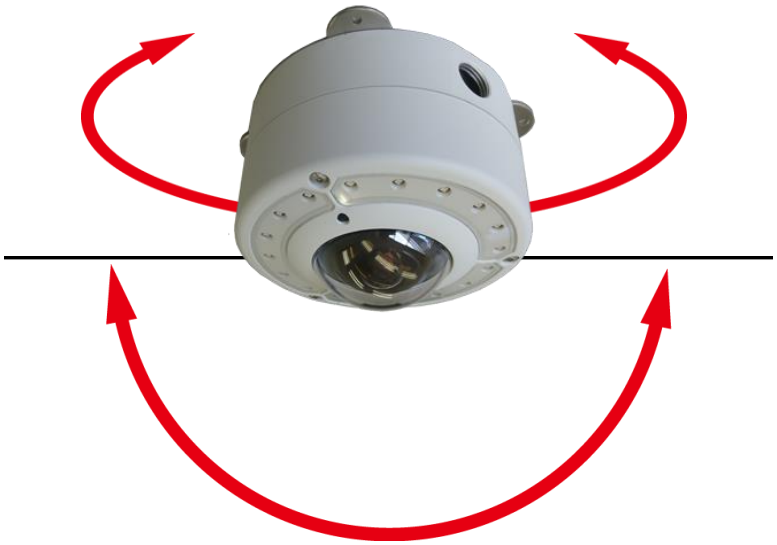


500 yen coin

Sophisticated glass lens system
This lens is difficult to design and manufacture and can not be copied by overseas manufacturers

Only the camera that gives clear View in all directions around the optical axis is 360 ° camera.

360° around the optical axis



View angle 180°

Real 360° camera is NUD360-F only.

Comparison with other fish eye cameras

360° fringe area image clarity test

Our NUD360-F

◎

USA, Taiwan, China

×

Japan competitor's

△

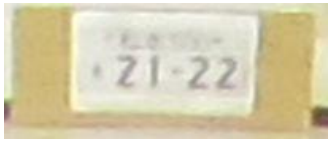
Let's compare the image at the 360° lens fringe area.

12M cameras' images in the fringe area

	Our NUD360-F	USA, Taiwan, China Competitors'	Japan Competitor's
5m			
10m			
15m			

When viewing at the lens outmost edge area, the image is very distorted with low lens resolution and low image height.

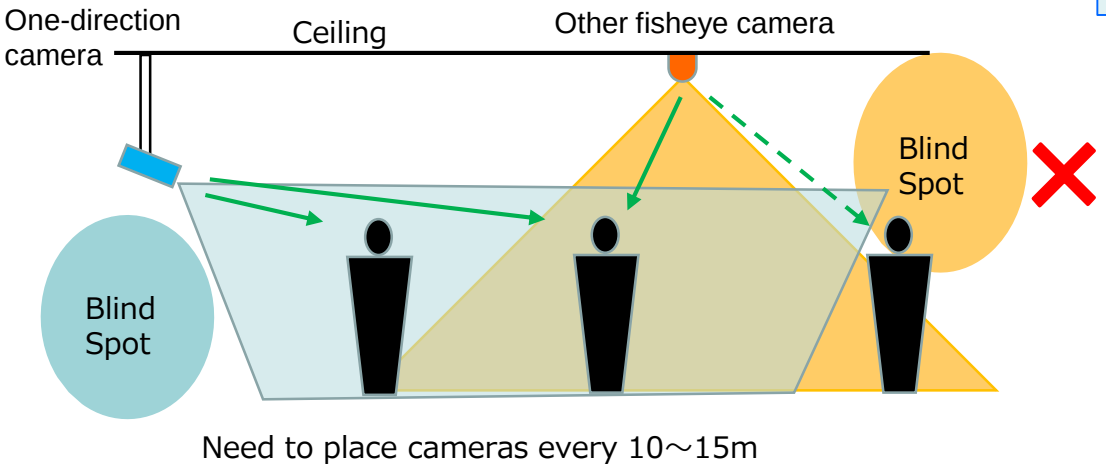
Image resolution comparison with the same sensor

	5m ahead	7.5m ahead	10m ahead
◎ Ours			
△ Other Japan			
✕ USA, Taiwan, China			

When viewing at the lens outmost edge area, the image is very distorted with low lens resolution and low image height.

Merit of High Resolution Lens Edge

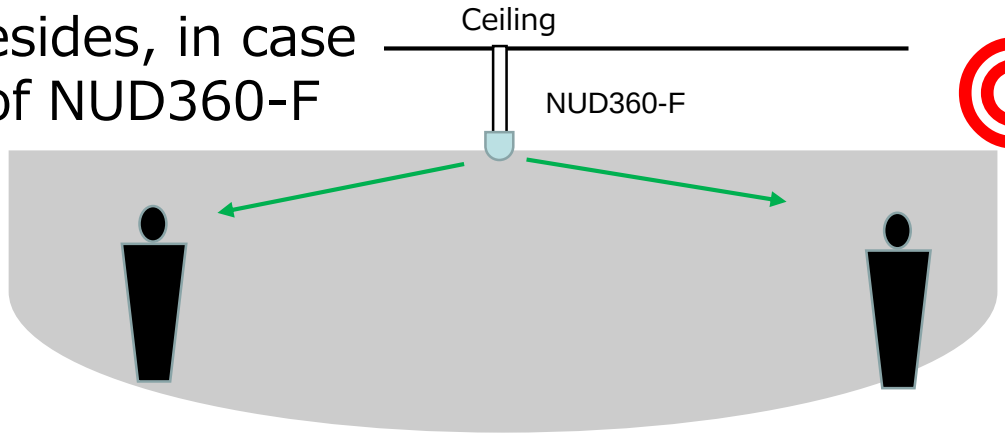
Ex. a place with a low ceiling



Need to place cameras every 10～15m

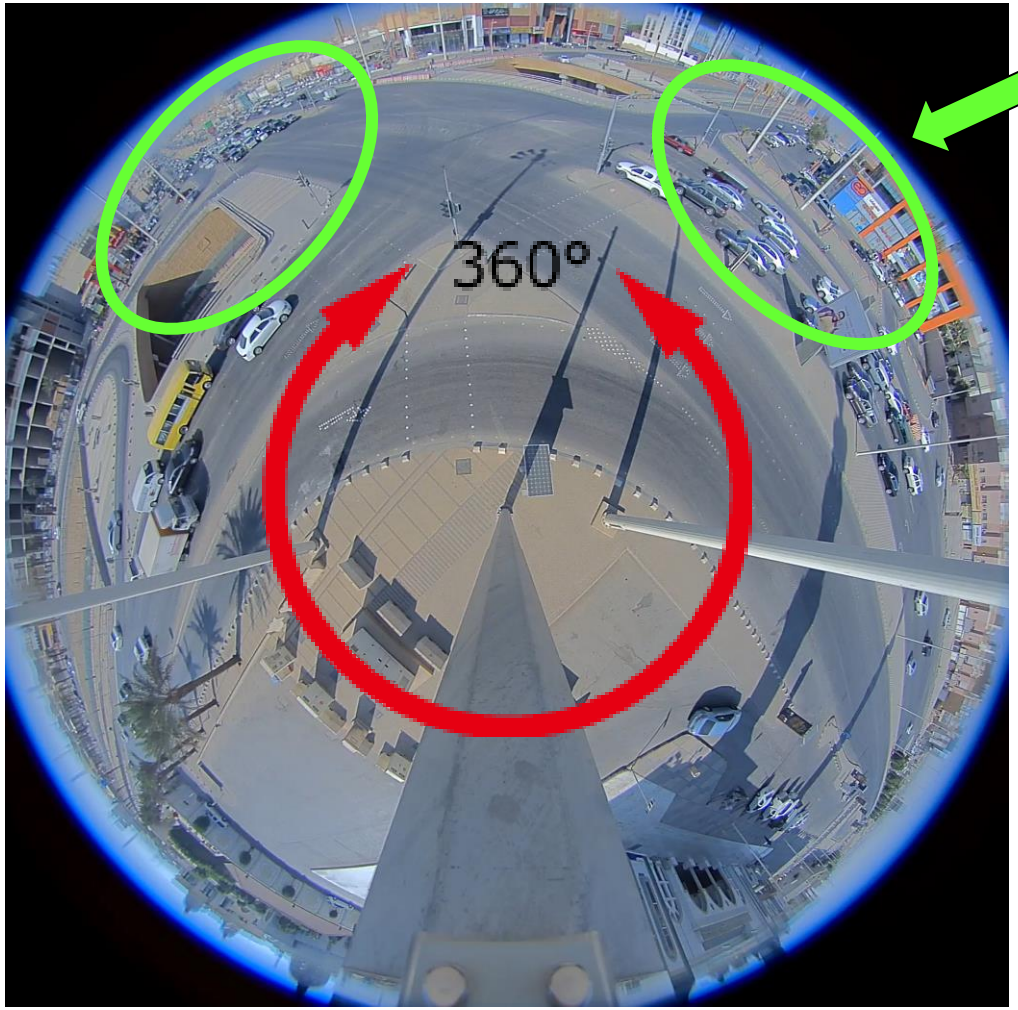
Because of the narrow viewing angle, it is necessary to set this camera in a high position in order to capture a wide area. This makes it impossible to see the person's face.

Besides, in case of NUD360-F



Setting NUD360-F at a low position, the whole area becomes an acceptable viewing range. **Because the resolution at the lens fringe area is very high, a person's face can be seen clearly even if the camera is set at a low height.**

Actual view ～Road intersection～



360° clear view in the distance.

The camera is installed on a pole of 12 m high facing downward.

Installing the camera on the 12m high pole at the corner of the intersection of 4 lines of 55m wide and 96m diagonal.
(Saudi Arabia)

Let's see a movie for a while.

Features of NUD360-F

1. **360° entire directional surveillance**
   - ① can reduce the number of cameras
   - ② can reduce the construction cost
   - ③ can minimize the surveillance system
     - number of monitor
     - volume of recording capacity
     - number of persons to monitor

2. **With the 3 steams video outputs,**
   surveillance is possible according to the communication environment, recording condition, searching condition etc.
   High resolution/low speed ～ low resolution/high speed

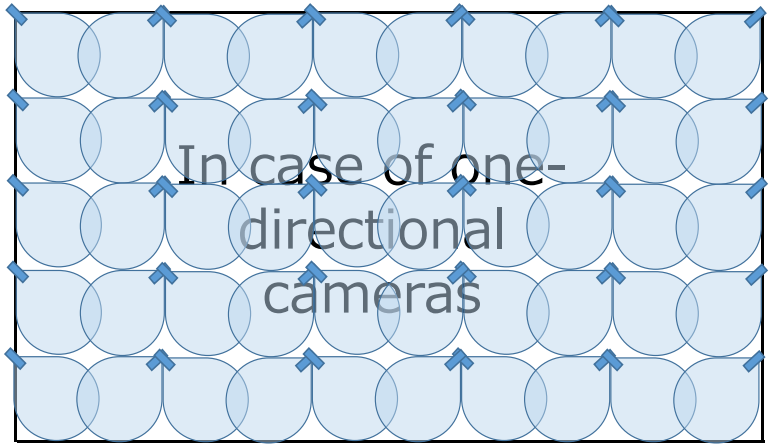
3. **User friendly application software**
   Recording by the fisheye round image viewing a whole area, and watch a spot enlarged area at the same time.

4. **Clear view in the distance at the 360° entire direction**
   compare with other fisheye cameras
   - ① can reduce the number of cameras
   - ② can reduce the construction cost
   - ③ can minimize the surveillance system

5. **Good cost performance**

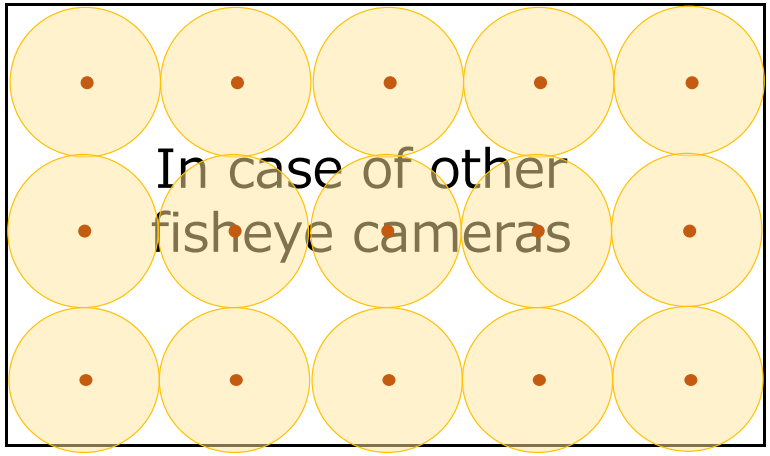
Cost Performance

▼ General narrow angle cameras (View angle: 110°, Range: 10m)



50 cameras are necessary if monitoring a whole area.

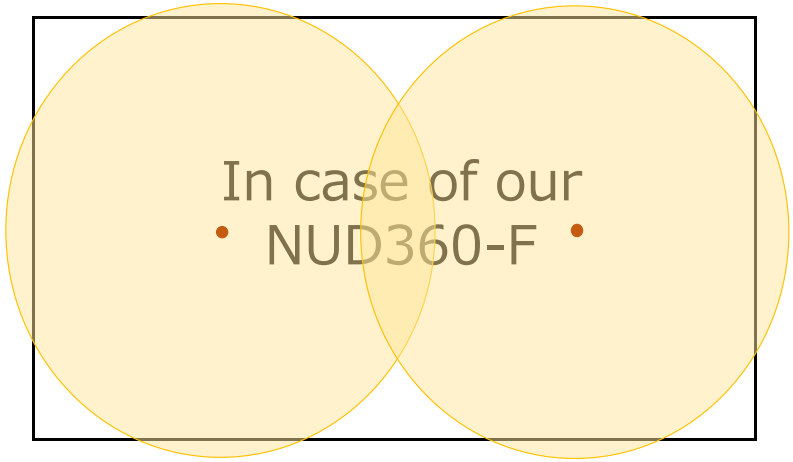
▼ other competitor's fish-eye cameras (View angle 360°, Range: R=10m)



15 cameras are necessary if monitoring a whole area.
※ In fact, in order to capture the blind spots of obstacles, use multiple narrow viewing angle cameras together.

Effective in wide area surveillance

▼ NUD360-F (View angle: 360°, Range: R= 3 0m)

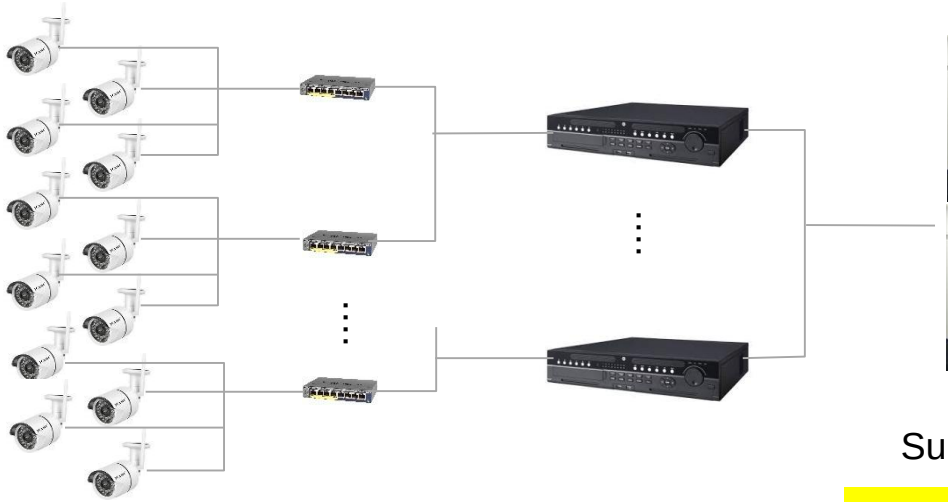


As so, we can dramatically reduce the number of cameras.

1．General one-direction camera

Cost Performance

Based on the number of cameras in the former page.



50 cameras　HUB etc.　Recorder

Surveillance system

Monitoring so many images needs a large number of monitors.

Load of monitoring
・persons
・monitors

	Camera	Recorder	Construction	Monitor	
Unit cost	@30,000円	@300,000円	@300,000円	@100,000円	Sum Cost
General	50 unit	4 unit	50 set	4 set	
cameras	1,500,000円	1,200,000円	15,000,000円	400,000円	18,100,000円

Needs many cameras and many corresponding devices.

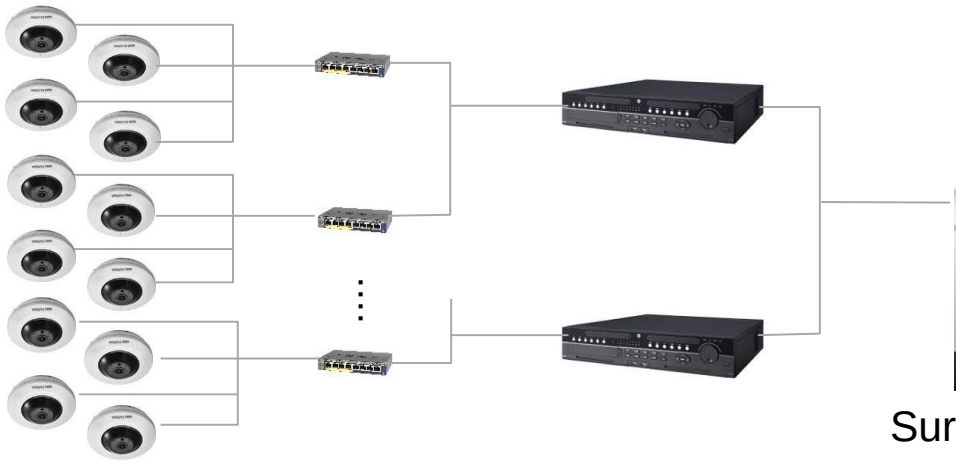
Needs construction cost according to the number of cameras.

※ Competitor's fisheye camera: depending on the mode ...able.

※ In addition to the above, material costs of connector, wires, etc. are generated according to the number of units.

2．Other Fisheye Cameras

Cost Performance



15 cameras　HUB etc.　Recorder

Surveillance system

Monitoring many images needs many monitors.

Load of monitoring
- persons
- monitors

	Camera		Recorder		Construction		Monitor			
Unit Cost	@240,000	円	@300,000	円	@300,000	円	@100,000	円	Sum cost	
Competitors'	15	unit	2	unit	15	set	1	set		
fisheye	3,600,000	円	600,000	円	4,500,000	円	100,000	円	8,800,000	円

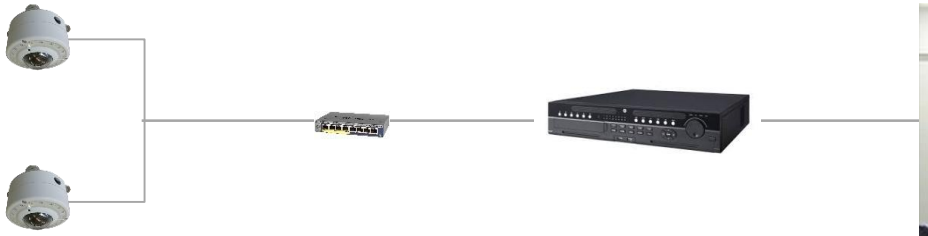
Needs many cameras

Needs construction cost according to the number of cameras.

※ [illegible] place such as wiring
※ [illegible] ssumed. Prices fluctu
※ Monitor: Including wires and others. 16 division displ
※ General cameras: Specifications and prices vary acco
※ Competitor's fisheye camera: depending on the model, only wall installation (viewing angle 180 °) is suitable.
※ In addition to the above, material costs of connector, wires, etc. are generated according to the number of units.

Cost Performance

3． In case of our NUD360-F



2 cameras　　HUB etc.　　Recorder

Surveillance system

Load of monitoring
・persons
・monitor

Minimized number of camera can reduce the load of system

Never compare the camera unit price only !

the load of surveillance (number of monitor and person).

		Camera	Recorder	Construction	Monitor	
	Q'ty		300,000円	300,000円	100,000円	Sum Cost
General camera	50	@30,000円	4 unit	50 set	4 set	
		1,500,000円	1,200,000円	15,000,000円	400,000円	18,100,000円
Competitors	15	@240,000円	2 unit	15 set	1 set	
fisheye		3,600,000円	600,000円	4,500,000円	100,000円	8,800,000円
NUD360-F	2	@350,000円	1 unit	2 set	1 set	
		700,000円	300,0		100,000円	1,700,000円

Reduced Under 1/10

As explained, NUD360-F provides very clear 360° view in the distance so that it is the best camera for the purpose of a wide area surveillance.

NUD360-F is a network camera with excellent cost performance by reducing the construction cost and load of system.

Thank you !