

AXIS Communications Academy Webinar Series

Audio Conference Details

Conference Telephone Number: 1-212-444-0108

Participant Code: 7766324731

Participant audio will be muted until Q & A session following the presentation

This is Axis

- > Founded in 1984
- > IT company driving the shift towards digital video surveillance products
- > Global partnerships through distributors, resellers and system integrators
- > Offering the market's broadest portfolio of network video products
- > Focused on Network Video Solutions (99%)
- > Worldwide presence in more than 20 countries, over 1300 employees
- > Listed on NASDAQ OMX, under the ticker AXIS



Low Light/No Light Surveillance

Axis' products for low and no light scenes



www.axis.com

Lightfinder technology

Combination of many factors

- > Latest generation of light sensitive sensor
- > Optimized megapixel lens
- > Axis' in-house chip technology
- > Increased image processing power

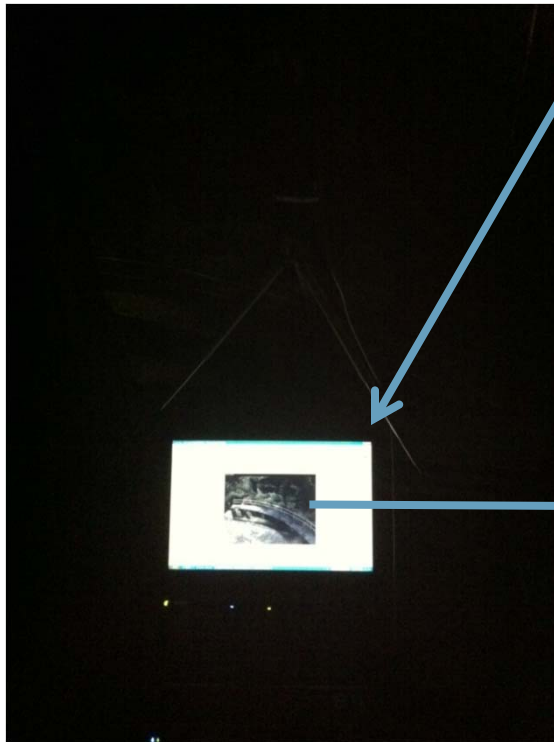


Lightfinder technology

- > The noise reduction is beneficial for
 - Less bandwidth
 - Fewer storage costs
- > AXIS Q1602/-E first network cameras incorporating Lightfinder technology
- > White papers available on [Axis website](#)
- > Watch video
www.axis.com/products/cam_q1602/video/



Axis' unique Lightfinder technology



The live view from AXIS Q1602 is bright, while the surroundings appear dark to human eyes and to a digital camera



AXIS Q16 Series Network Cameras



Outstanding image performance in demanding lighting conditions

- > Allows the cameras to "see" in the dark – even colors - Unique Lightfinder technology from Axis
- > Outstanding image performance in high variation of lighting conditions - WDR-dynamic capture capability

AXIS Q16 Series – for demanding lighting conditions

Low light/darkness

AXIS Q1602

D1 resolution
Day/night
Lightfinder



AXIS Q1602-E

D1 resolution
Day/night
Lightfinder
IP66



Intense light/backlight

AXIS Q1604

1MP or HDTV 720p
Day/night
WDR Dynamic capture



AXIS Q1604-E

1MP or HDTV 720p
Day/night
WDR Dynamic capture
IP66



AXIS Q1602/-E – Outstanding light sensitive cameras

- > Incorporate Axis' Lightfinder technology
- > Varifocal 2.8 - 8 mm, IR corrected, CS-mount lens
- > D1 resolution (720x576)
- > Focus assistant, remote back focus, pixel counter
- > Day&Night functionality
- > Two-way audio support



Axis' Lightfinder technology
AXIS Camera Application Platform

AXIS Q1604/-E – Outstanding Axis' WDR dynamic capture

- > Handles blinding light and provides superb images in intense light
- > WDR up to 120 dB (0.4 – 400,000 lux) depending on scene
- > Varifocal 2.8 - 8 mm, IR corrected, CS-mount lens
- > 1 MP or HDTV 720p resolution
 - Up to 1280 x 960 pixels
- > Focus assistant, remote back focus, pixel counter
- > Day&Night functionality
- > Two-way audio support



ONVIF

Wide Dynamic Range – dynamic capture
AXIS Camera Application Platform

AXIS Q16xx -E – Outdoor ready models

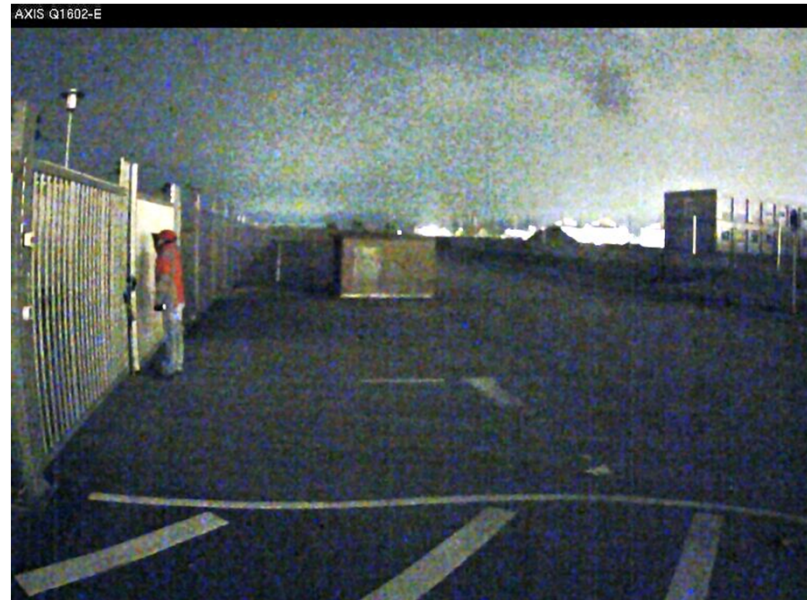
- > Built-in heater, fan and removable sunshield
- > Temperature ranging from -30 °C to 50 °C (-22 °F to 122 °F) with standard PoE (IEEE 802.3af), down to -40 °C (-40 °F) using High PoE midspan
- > Arctic Temperature Control
- > For demanding outdoor conditions
 - IP66- and NEMA 4X-rated
 - IK10-rated for protection against impact and vandalism
- > Out-of-the-box ready
 - Includes wall mount bracket, sunshield; midspan not included



Wide Dynamic Range – dynamic capture
AXIS Camera Application Platform

AXIS Q1602-E – Colors to identify people and objects

Comparison with the 'leading' best low light analog camera on the market



Perimeter surveillance with no street illumination during night time (10:40 p.m.) and approximately 0.1 lux.

www.axis.com

AXIS
COMMUNICATIONS

AXIS Q1602 – Maintaining color definition and sharpness

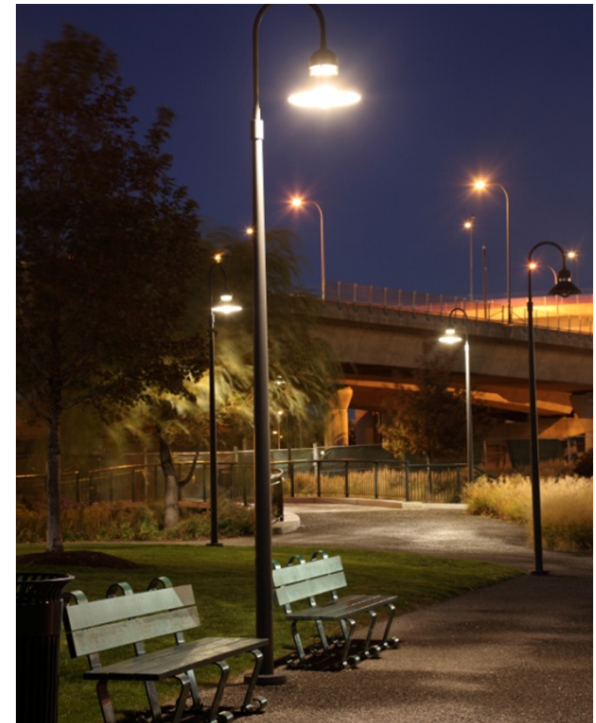
Comparison with the 'leading' best low light analog camera on the market



Indoor storeroom surveillance in poor light conditions and approximately 0.4 lux.

AXIS Q1602/-E comparison study

- > Outstanding image performance in low light conditions
- > Comparison study, AXIS Q1602/-E
www.axis.com/products/cam_q1602/video/
- > Watch Lightfinder technology presentation
www.axis.com/products/cam_q1602/interview/
- > [Partner Pages](#)

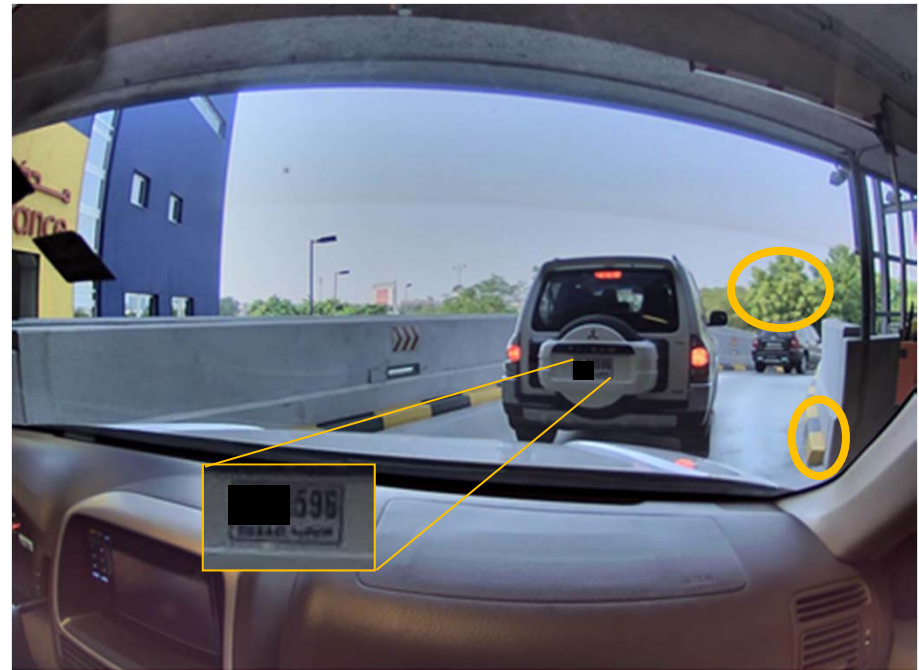


AXIS Q1604 – WDR-Dynamic capture

Surveillance onboard a car exiting a garage.

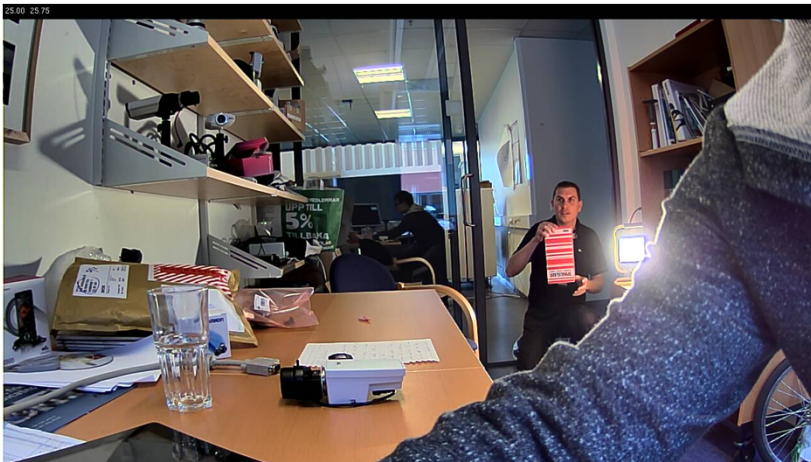


Reference picture "State-of-the-art" camera



AXIS Q1604 with WDR-Dynamic capture

AXIS Q1604 – WDR Dynamic capture



AXIS Q1604 viewing a halogen work light

AXIS Q1604 viewing open doorway



AXIS P33 Network Camera Series



Fixed domes for any environment with remote focus and zoom

- > Discreet and robust design, with smart features for easy installation
- > Applications such as schools and universities, retail environments, railway stations, city surveillance, prisons

AXIS P33 Series – Fixed domes for any environment

AXIS P3343

SVGA



AXIS P3343

AXIS P3344

1 MP, HDTV 720p



AXIS P3344

AXIS P3346

3 MP, HDTV 1080p



AXIS P3346

AXIS P3367

Indoor models

Indoor models
Vandal resistant

Outdoor models
Vandal resistant



AXIS P3343-V



AXIS P3344-V



AXIS P3346-V



AXIS P3367-V



AXIS P3343-VE



AXIS P3344-VE



AXIS P3346-VE



AXIS P3367-VE

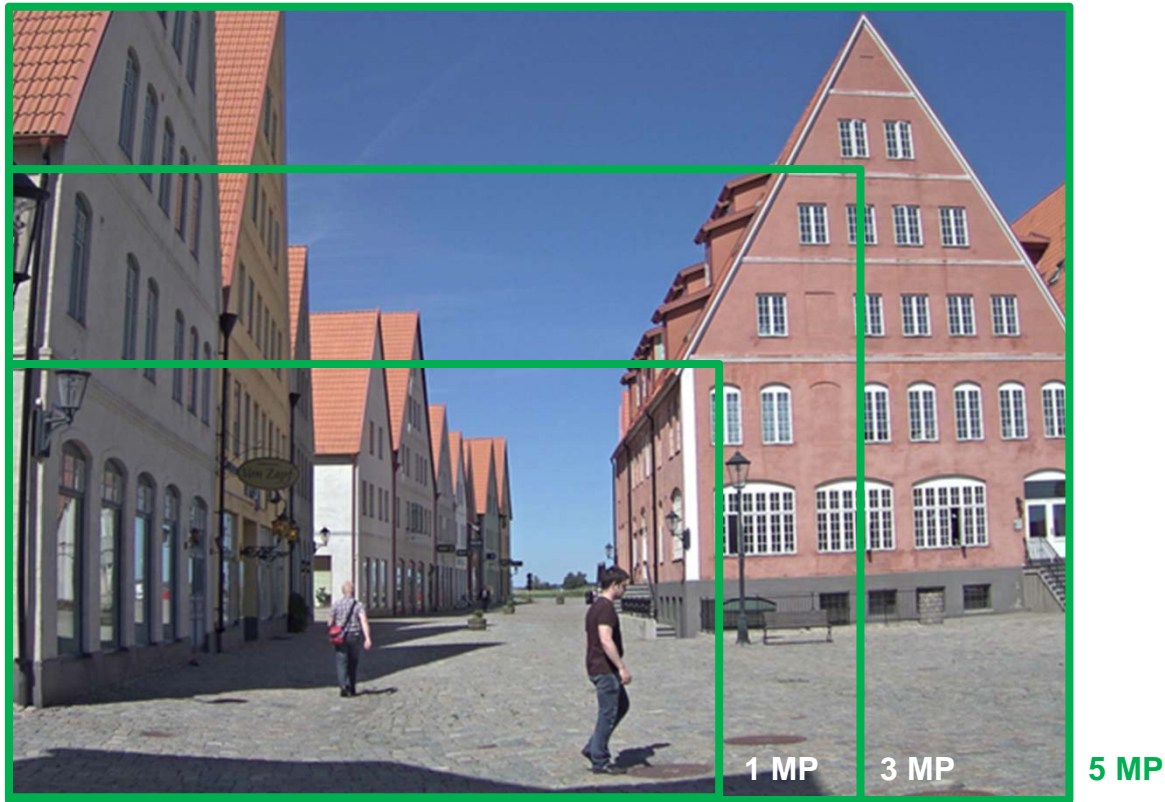
AXIS P3367 – 5 megapixel camera with lightfinder

- > AXIS P3367-V/VE : Market's most light sensitive 5 megapixel cameras
 - 12 fps in resolutions up to 5 MP
 - 20 fps in 3 MP
 - 30 fps in HDTV 1080p
- > P Iris control
 - Optimizes on image clarity and depth of field
- > Multi-view streaming
 - For minimized bandwidth and storage needs
- > Enhanced performance with AXIS P3367-V/-VE, including
 - Image processing
 - Compression enhanced with Main Profile H.264 option



AXIS Camera Application Platform

AXIS P3367-V/VE – Larger scenes



AXIS P3344 without Lightfinder



P3346 at approximately 1 lux

www.axis.com

AXIS P3367 with Lightfinder



P3367 at approximately 1 lux

AXIS Thermal Network Cameras



Reliable detection in dark and challenging conditions

- > Detection around the clock in complete darkness or difficult daylight conditions and in demanding weather conditions
- > Applications such as perimeter and area protection, security and emergency management

AXIS Q19 Thermal Camera Series

AXIS Q1910 30 fps*	AXIS Q1910-E 30 fps*	AXIS Q1921 30 fps*	AXIS Q1921-E 30 fps*	AXIS Q1922 30 fps*	AXIS Q1922-E 30 fps*
Image Sensor: 160 x 128 Lens: 13 mm	Image Sensor: 160 x 128 Lens: 13 mm	Image Sensor: 384 x 288 Lens: 10 and 19 mm	Image Sensor: 384 x 288 Lenses: 10, 19, 35, 60 mm	Image Sensor: (VGA) 640 x 480 Lenses: 10, 19 mm	Image Sensor: (VGA) 640 x 480 Lenses: 10, 19, 35, 60 mm
					
					

*30 fps available as standard within EU, Norway, Switzerland, USA, Canada, Japan, New Zealand, Australia

www.axis.com



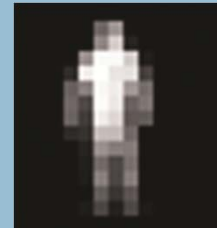
Detection according to Johnson

- > John Johnson, a US military scientist, measured the ability of observers to identify targets under various conditions with 50% accuracy
 - At least **1.5 pixels** are needed for **detection**
 - the observer can see that an object is present
 - At least **6 pixels** are needed for **recognition**
 - the observer can distinguish an object from another (i.e. animal or human)
 - At least **12 pixels** are needed for **identification**
 - the observer can distinguish a specific object
- > The detection range is often used to compare a camera's maximum performance

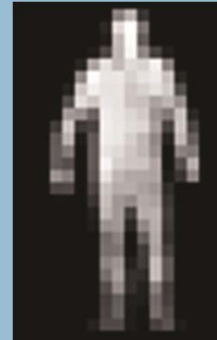
Detection
1.5 pixels
on target




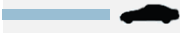

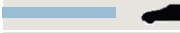

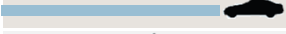

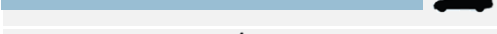










Recognition
6 pixels
on target



Identification
12 pixels
on target



Detection ranges – 1.5 pixels on target

	Focal length (mm)	Horizontal viewing angle	Detection range based on Johnson criteria -1.5 pixels on target	(m)	(yd.)
AXIS Q1910/-E	13	17°		200	220
			550	600	
AXIS Q1921/-E	10	51°		220	241
			660	722	
	19	28°		390	427
			1200	1312	
AXIS Q1921-E	35	16°		700	766
			2200	2405	
	60	9°		1200	1312
			3700	4046	
AXIS Q1922/-E	10	57°		320	350
			990	1083	
	19	32°		580	634
			1800	1970	
AXIS Q1922-E	35	18°		1050	1148
			3200	3500	
	60	10°		1800	1970
			5500	6015	

Recognition ranges – 6 pixels on target

	Focal length (mm)	Horizontal viewing angle	Recognition range based on Johnson criteria - 6 pixels on target	(m)	(yd.)
AXIS Q1910/-E	13	17°		65	71
			200	219	
AXIS Q1921/-E	10	51°		55	60
			170	186	
	19	28°		100	109
			300	328	
AXIS Q1921-E	35	16°		175	191
			550	601	
	60	9°		300	330
			920	1006	
AXIS Q1922/-E	10	57°		80	87
			250	273	
	19	32°		150	164
			440	481	
AXIS Q1922-E	35	18°		260	284
			800	875	
	60	10°		440	481
			1350	1476	

Understanding light



www.axis.com

Light and illumination?

- > Light is fundamental to the quality of an image.
 - If the amount of light is insufficient, the image will be noisy or dark.
 - The amount of light required to produce a good-quality image depends on the camera and how sensitive to light it is.
- > Minimum illumination is an assessment of a camera's light sensitivity.
 - The smallest amount of light needed for a camera to produce an image of useable quality.



Light and illumination?

White Light

- > White light is measured in lux, the SI unit of illuminance, which also takes into account the area the light is spread over.
- > 1 lux = 1 lumen per square meter.
- > The foot candle is still widely used as a unit of measurement: 10 lux \approx 1 foot candle.

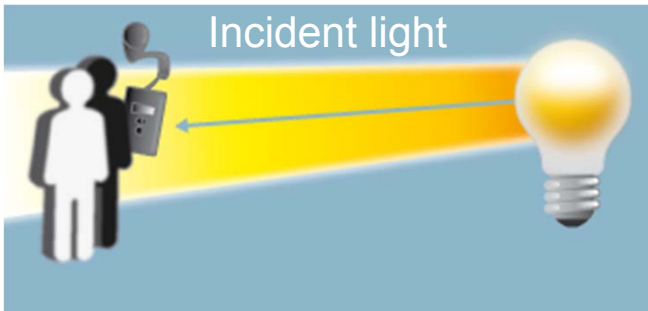
Infrared

- > As lux is a measurement of visible light, and infrared produces invisible light, lux cannot be used to measure infrared power.
- > The most common form of measurement for infrared light is mW per square meter, a simple statement of energy output from a light source over a given area.

Lux meters vs. cameras

Lux meters collect incident light.

- > The amount of visible light that hits, or illuminates, a given area.
- > All objects and surfaces are equally illuminated.



Cameras collect reflected light.

- > The amount of light reflected from the objects in the covered area.
- > White objects reflect more light than black objects; glossy objects reflect more light than dull objects.



Illumination in the real world



Bright sunny day =
10,000 - 100,000 lux



Overcast day =
1,000 - 10,000 lux



Twilight =
1 - 100 lux



Street lighting =
5 lux



Full moon =
0.1 lux



Bright, clear starlight =
0.01 - 0.0001 lux

What influences a camera's light sensitivity?

- > Exposure time
- > F-stop
- > Quality of the sensor
- > Quality of the lens
- > Color temperature



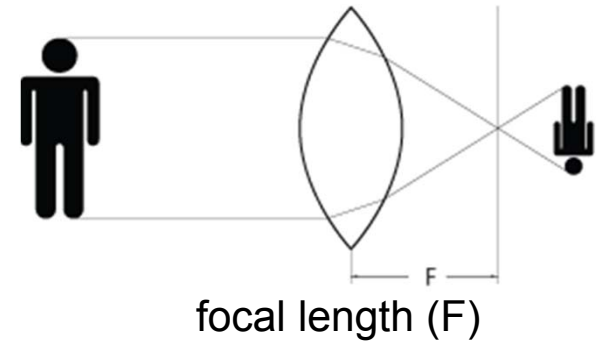
Exposure time

- > The length of time the image sensor is exposed to light.
- > The longer the exposure time, the more light an image sensor receives.
- > Increasing the exposure will improve image quality in poor lighting conditions.
- > Increasing the exposure will increase motion blur.
- > Increasing the exposure will lower the total frame rate since a longer time is required to expose each frame.



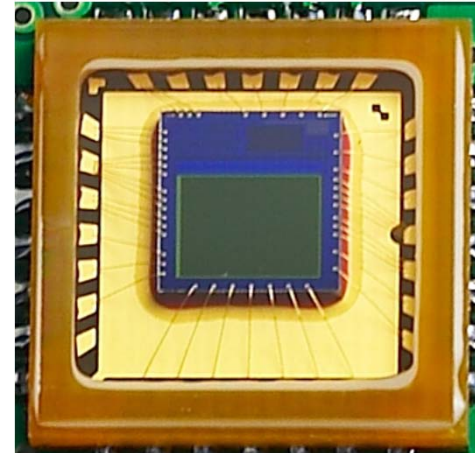
F-stop

- > A measure of the lens' light collecting capacity.
- > The smaller the f-number, the better is the lens' light collecting capacity.
- > Ratio between focal length (F) and aperture (x).
- > F4 means that the iris diameter is equal to the focal length divided by 4.



Quality of the sensor

- > The light that passes through the lens is focused on the camera's image sensor.
- > The pixels of the sensor convert the light into electrons (electrical signals).
- > The brighter the light, the more electrons.



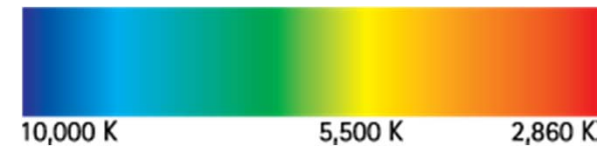
Quality of the lens

- > Influences the resolution.
- > Is subject to
 - Lens material
 - Lens assembly design
- > Lenses are manufactured to match the sensor.
- > Lenses must be suitable for the camera.



Color temperature

- > All heated objects radiate.
- > Color temperature is measured in degrees Kelvin (K).
- > The scale of visible light ranges from 2,860 K to 10,000 K, from red to blue.
- > Daylight color temperature shifts during the day.
- > Indoor light color temperature varies depending on light source type.



Gain

- > A measure of amplification of electrical signals.
- > Increasing the gain makes the image brighter at the cost of increasing the level of noise (graininess) in the image.
- > The signal-to-noise ratio indicates the relation between signal power and the noise power corrupting the signal.
- > Image sensors with larger pixels usually generate a larger maximum signal-to-noise ratio and images that are less noisy in highlights.



Gain effect

Low gain > dark image > less noise



High gain > bright image > more noise



Comparison 1: Fixed network cameras

AXIS P1346 Network Camera



Test image
0.5 lx Datasheet
0.6 lx (color)

Competitor product 1



Test image
0.5 lx Datasheet
0.3 lx (color)

Competitor product 2



Test image
0.1 lx Datasheet
0.2 lx (color)

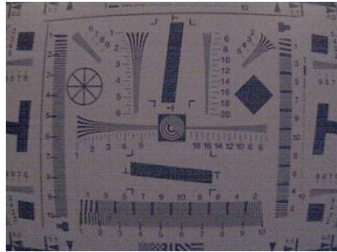
A technical note on *Measurement of Minimum Illumination (MMI) – The Axis Method* can be found at http://www.axis.com/corporate/corp/tech_papers.htm

Comparison 2: Fixed network cameras

AXIS M1031-W Network Camera

Competitor product 1

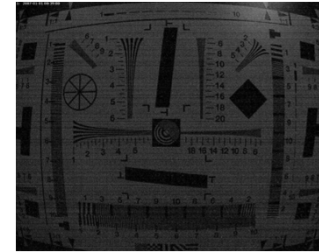
Competitor product 2



Test image Datasheet
1 lx 1 lx (color)



Test image Datasheet
1 lx 1 lx (color)



Test image Datasheet
1 lx 0.5 lx (color)

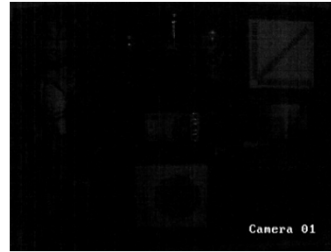
Comparison 3: Fixed dome network cameras

AXIS M3114-R Network Camera



Test image 1 lx
Datasheet 1 lx (color)

Competitor product 1



Test image 1 lx
Datasheet 1 lx (color)

Competitor product 2



Test image 1 lx
Datasheet 0.5 lx (color)

AXIS T90A IR LED illuminators

- > **High-performance illuminators for Axis fixed and PTZ network cameras**
 - AXIS T90A Illuminators are a series of high-performance white and infra-red LED illuminators,
 - Provide unique flexibility to alter the angle of on site illumination to suit specific security needs, and to match the network camera's field of view.
- > **Lower operational and maintenance costs**
 - AXIS T90A Illuminators are high-efficiency LED's for extremely low energy consumption.
 - They allow for huge savings in long-term operational and maintenance costs compared to traditional light bulbs.



AXIS T90A IR LED illuminators

- > **Night time video surveillance with outstanding reliability**
 - The illuminators provide additional light in applications where the surrounding lighting conditions may be insufficient for effective video surveillance.
 - The new surface-mount technology LED's have a life-cycle of up to 10 years.
 - No light bulbs need to be replaced.
 - AXIS T90A Illuminators also have IP66-rated vandal-resistant casings and polycarbonate lens protection for indoor and outdoor use.
 - Perfect for security installations that require high-performance and low-maintenance illumination.



AXIS T90A IR LED illuminators

> Applications:

- Low-light surveillance - 24 hours/day: where light conditions are less than optimal.
- Discreet surveillance: where the use of artificial light is restricted.
- Indoor and outdoor: IP66-rated vandal-resistant casings and polycarbonate lens protection for indoor and outdoor use
- Available in two versions:
 - AXIS T90C10 Fixed Dome IR-LED (supporting 18-56 V DC input)
 - AXIS T90C20 Fixed Dome IR-LED (supporting PoE, IEEE 802.3af)
- Outdoor ready
 - IP66 and NEMA 4X rated
 - Operating conditions: -40 °F to 131 °F



AXIS T90A Series LED illuminators

Model	Type / Usage	Angle	Range at narrow/wide angle	Example applications	Recommended models *
AXIS T90A01 <i>IR-LED</i> 50 DEG POE	850 nm IR semi-covert Indoor only	50° **	14m	Indoor IR illumination of smaller rooms, passageways, etc.	AXIS 221, AXIS 223M, AXIS 225FD, AXIS P13 Series, AXIS P33 Series, AXIS Q1755
AXIS T90A11 <i>IR-LED</i> 50 DEG	850 nm IR semi-covert Indoor or outdoor (IP66)	50° **	14 m	IR illumination of e.g. small rooms, passageways, etc.	AXIS 221, AXIS 223M, AXIS 225FD, AXIS P13 Series, AXIS P33 Series, AXIS Q1755
AXIS T90A16 <i>W-LED</i> 50 DEG	White light Indoor or outdoor (IP66)	50° **	14 m	White light illumination of small areas, e.g. small rooms, passageways, etc.	AXIS 221, AXIS 223M, AXIS 225FD, AXIS M11 Series, AXIS P13 Series, AXIS P33 Series, AXIS Q1755
AXIS T90A20 <i>IR-LED</i> 120-180 DEG	850 nm IR semi-covert Indoor or outdoor (IP66)	120-180°	16m/11m	IR illumination at short ranges and wide angles.	AXIS 232D+, AXIS 233D, AXIS P55 Series, AXIS Q60 Series



AXIS T90A Series LED illuminators

Model	Type / Usage	Angle	Range at narrow/wide angle	Example applications	Recommended models *
AXIS T90A21 <i>IR-LED</i> 50-100 DEG	850 nm IR semi-covert Indoor or outdoor (IP66)	50-100°	28m/18m	IR illumination at short ranges and medium angles. ▶ Watch video clip	AXIS 221, AXIS 223M, AXIS 225FD, AXIS P13 Series, AXIS P33 series, AXIS Q1755
AXIS T90A26 <i>W-LED</i> 50-100 DEG	White light Indoor or outdoor (IP66)	50-100°	20m/13m	For color video in low light conditions at short ranges and medium angles. Also for deterrent/safety effect.	AXIS 221, AXIS 223M, AXIS 225FD, AXIS M11 Series, AXIS P13 Series, AXIS P33 series, AXIS Q1755
AXIS T90A32 <i>IR-LED</i> 30-60 DEG	850 nm IR semi-covert Indoor or outdoor (IP66)	30-60°	80m/53m	IR illumination at medium ranges and narrow angles.	AXIS P13 Series, AXIS P33 Series with 6mm lens, AXIS Q1755
AXIS T90A33 <i>IR-LED</i> 10-20 DEG	850 nm IR semi-covert Indoor or outdoor (IP66)	10-20°	150m/100m	IR illumination at long ranges and very narrow angles.	AXIS P13 Series, AXIS P33 Series with 12mm lens, AXIS Q1755



AXIS T90A Series LED illuminators

Model	Type / Usage	Angle	Range at narrow/wide angle	Example applications	Recommended models *
AXIS T90A37 <i>W-LED</i> 30-60 DEG	White light Indoor or outdoor (IP66)	30-60°	42m/28m	For color video in low light conditions at medium ranges and narrow angles. Also for deterrent/safety effect.	AXIS 221, AXIS 223M, AXIS 225FD, AXIS M11 Series, AXIS P13 Series, AXIS P33 Series, AXIS Q1755
AXIS T90A40 <i>IR-LED</i> 120-180 DEG	850 nm IR semi-covert Indoor or outdoor (IP66)	120-180°	64m/42m	IR illumination at medium ranges and wide angles.	AXIS 232D+, AXIS 233D, AXIS P13 Series, AXIS P33 Series, AXIS P55 Series, AXIS Q60 Series
AXIS T90A42 <i>IR-LED</i> 30-60 DEG	850 nm IR semi-covert Indoor or outdoor (IP66)	30-60°	160m/106m	IR illumination at long ranges and narrow angles. Watch video clip	AXIS P13 Series, AXIS P33 Series with 12mm lens



AXIS T90C Fixed Dome IR-LED

- > Wall mount, vandal resistant IR illuminator for AXIS P33xx - VE Series
- > Available in two versions:
 - AXIS T90C10 Fixed Dome IR-LED (supporting 18-56 V DC input)
 - AXIS T90C20 Fixed Dome IR-LED (supporting PoE, IEEE 802.3af)
- > Outdoor ready
 - IP66 and NEMA 4X rated
 - Operating conditions: -40 °F to 131 °F



AXIS T90C Fixed Dome IR-LED

- > Eight SMT (Surface Mount Technology) LEDs
 - High power and reliability
 - Thermal management
- > Easy to install
 - 5 m pre mounted cables with gasket
- > Visible light sensor
- > Reliable
 - Low power consumption (less than 13W)
 - Long life performance
 - No maintenance required
 - 3 year warranty



Adding external light: IR vs. white light



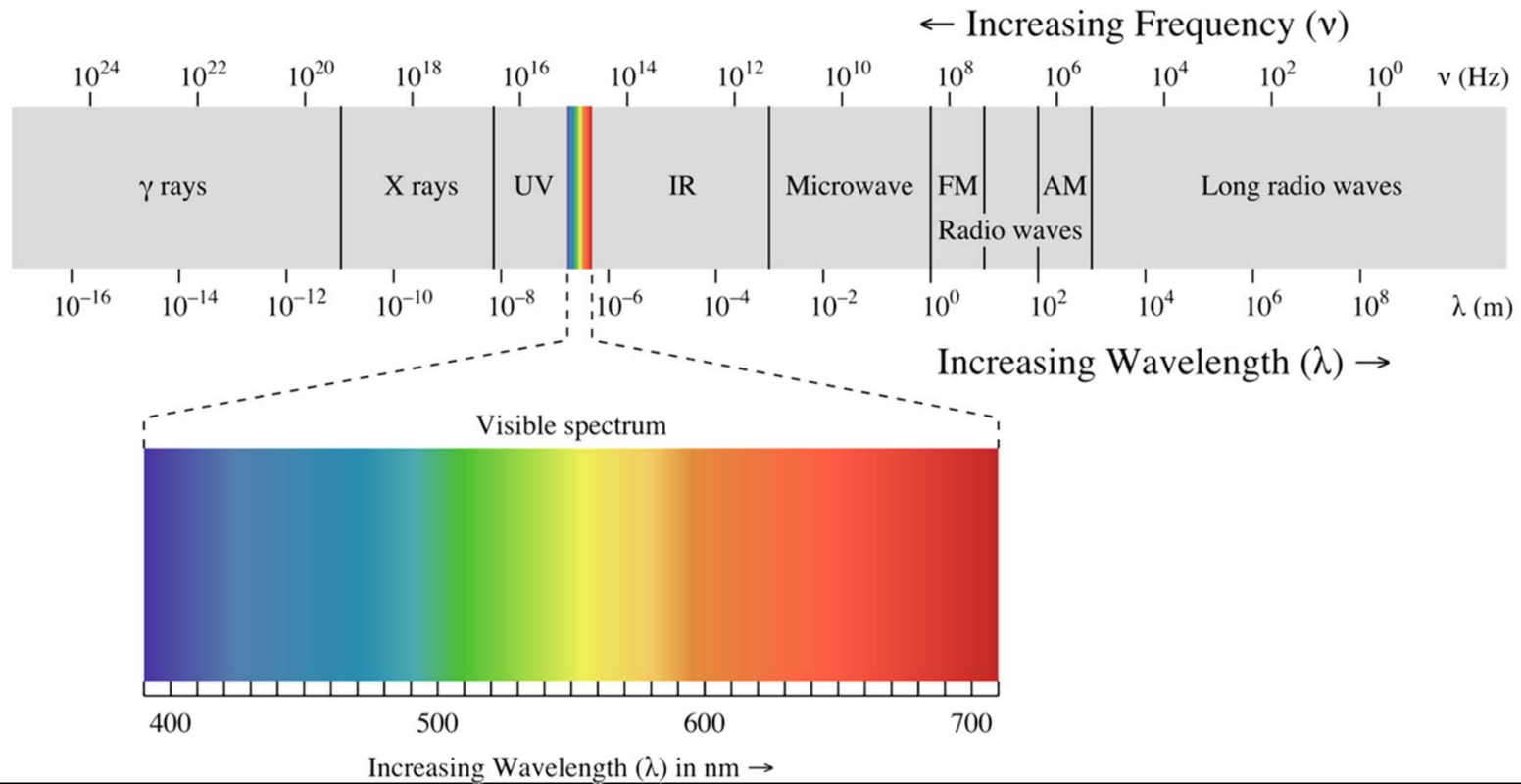
White-light



Infra-Red

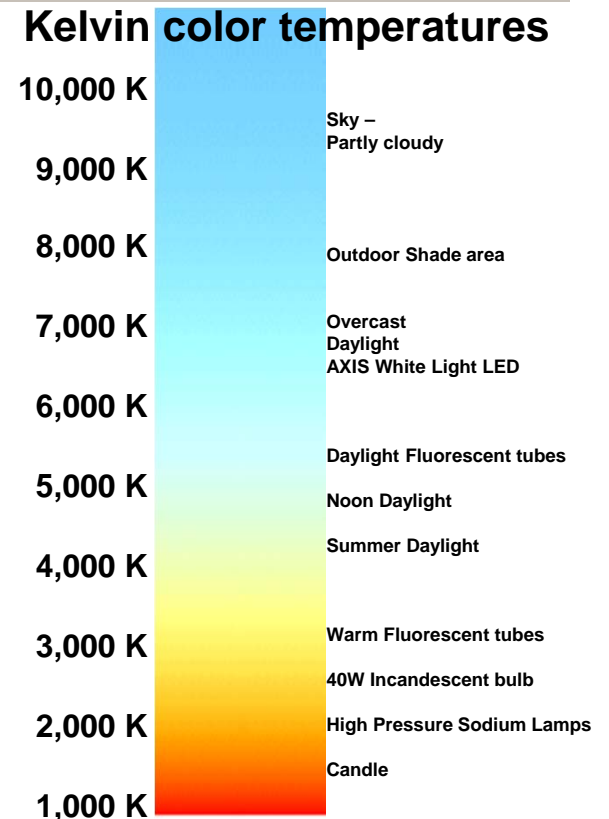
Advantages	Disadvantages
Visible deterrent	Light pollution
Quick start (LED)	Reduced distances
Full color rendition	
Easy set up	
Covert or Semi Covert	Limited deterrent
Longer distances	More difficult to set up
No light pollution	

Visible light



Color temperature

- > Color temperature is measured in degrees Kelvin (K) and visible light ranges from 1,500K to 10,000 K
- > Daylight color temperature shifts during the day
- > Indoor light color temperature depends on source
- > Human eyes
 - Will compensate for the differences in color
- > Cameras
 - Must be adjusted for illumination through white balance
 - Usually automatic modes that calculate the white balance automatically



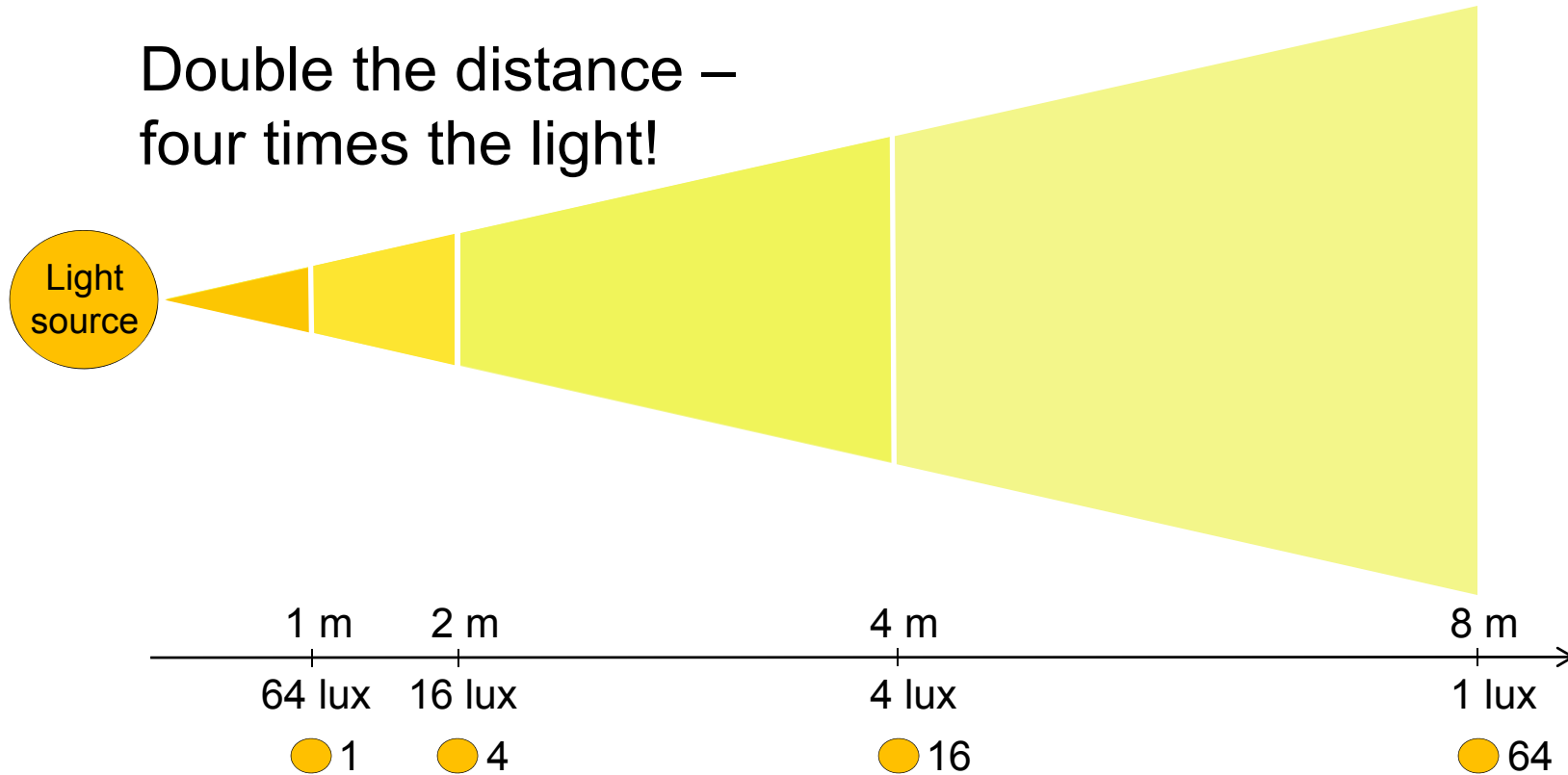
How much light does a surface reflect?

Surface	Reflection, %
Dark asphalt	5
Dark clothes	10
Grass	15
Gray colors	50
Yellow colors	60
Aluminum	70
Snow	80



The inverse square law of light

Double the distance –
four times the light!



The inverse square law of light



1 UNIT = 1 x DISTANCE



4 UNITS = 2 x DISTANCE



No. of Illuminators	Distance Multiplier
1	1
2	1.4
3	1.7
4	2
5	2.2
6	2.4
7	2.6
8	2.8
9	3

The inverse square law of light

TIP 1! It is not always necessary to use multiple illuminators to achieve increases in distance. Illuminators with narrower angles or more powerful illuminators may both provide the required additional increase in distance.

TIP 2! If you only need to illuminate a particular object at a particular distance, using e.g. a zoom lens, then there is also the option to place a small illuminator close to the object. An example of an application of this type is a gate or door at a site perimeter, relatively far from the site's buildings and other infrastructure.

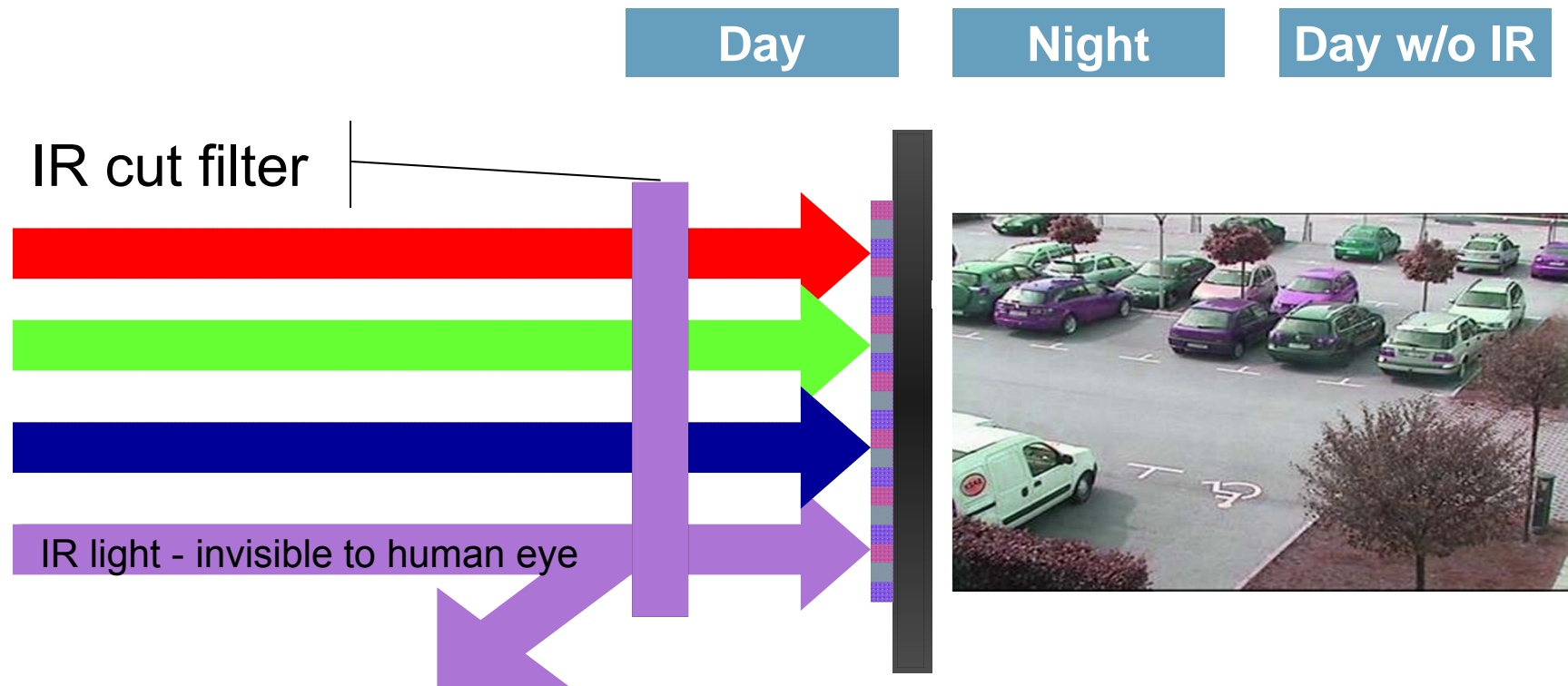
TIP 3! Doubling the illumination distance requires 4 x the power.

TIP 4! Doubling the number of illuminators provides a 1.4 x increase in distance.

IR Cut Filter Basics 101

- > **How does the day and night functionality or IR-cut filter work?**
 - A human eye can only register light between the blue and red spectrum, a color camera's image sensor can detect more.
 - The image sensor can sense long-wave infrared radiation and thus "see" infrared light.
 - Allowing infrared light to hit the image sensor during daylight will distort colors as humans see them.
 - Color cameras are equipped with an IR cut filter -- an optical piece of glass that is placed between the lens and the image sensor -- to remove IR light and to render color images that humans are used to.
 - As illumination is reduced and the image darkens, the IR cut filter can be removed automatically to enable the camera to use IR light so it can "see" in a very dark environment.
 - To avoid color distortions, the camera switches to BW mode and is able to generate high quality black and white images.
 - The IR cut filter in Axis' day & night cameras can also be removed manually via the cameras' Web interface.

The filters in a day and night network camera



Ambient low light outdoor

Color Mode



Black & White (IR Mode)

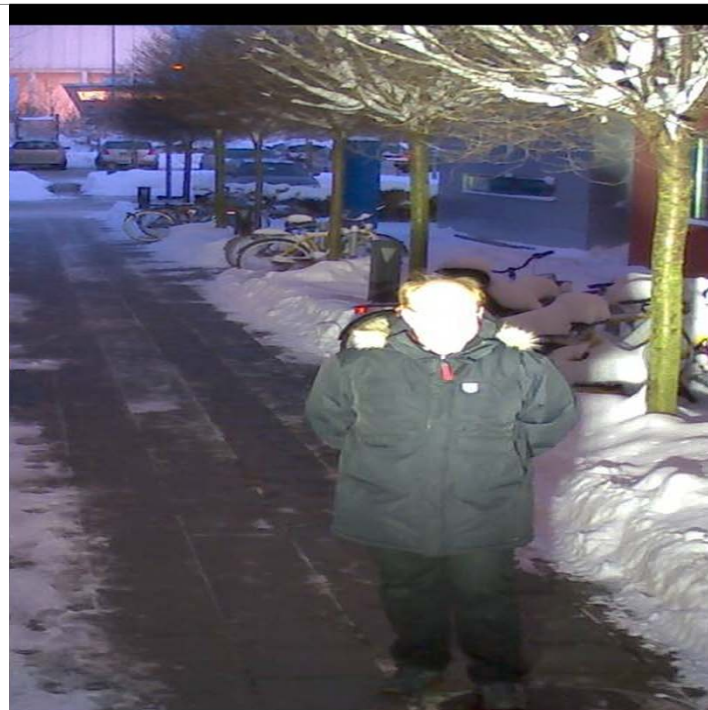


Auxiliary white LED light

White LED



White LED Over Exposed



Auxiliary infra red light

IR LED illuminators

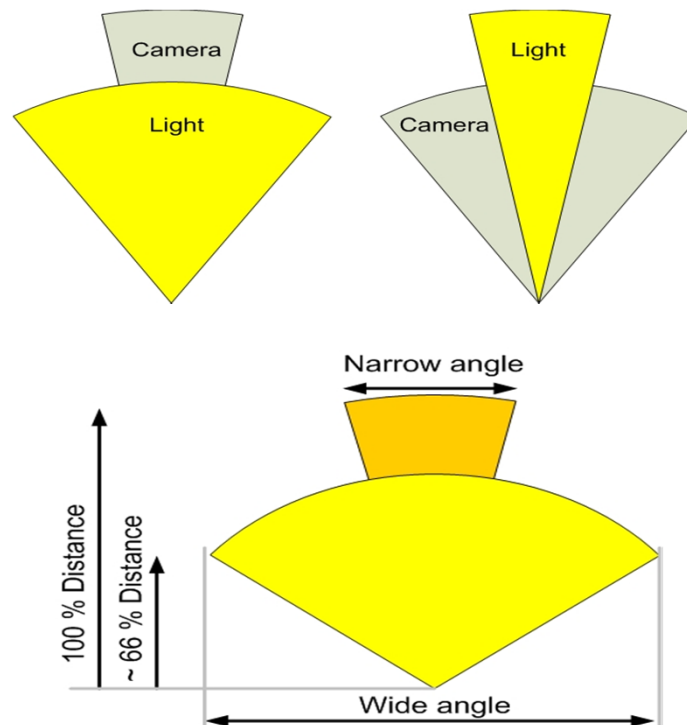


Over exposed IR LED illuminators



When adding light...

- > Match the angle of light to the angle of view provided by the camera
 - Too narrow will leave dark areas at each side
 - Too wide will leave areas in the distance too dark
- > Ensure a distance of at least 1 m / 3 feet between camera and light source to avoid problems with insects
- > For light with adjustable angle of coverage: Wide angle distance approximately 66 % of max distance



When adding light... Which wavelength?

> White light: A mixture of light at 400-700nm provides true white light.

Practical uses:

- Illuminate an area for the network video system
- Improve the overall level of illumination for personnel
- Provide a welcoming environment for authorized personnel
- Deter crime by illuminating a secure area upon intrusion
- Can be used with monochrome, color, and day/night cameras

When adding light... Which wavelength?

> Infrared:

- 715-730nm. Overt IR produces a red glow like a red traffic light.
- 815-850nm. Semi-covert IR with a faint red glow.
- 940-950nm. Covert IR - invisible to the human eye.

Practical uses of infrared:

- Provides discreet or covert illumination for network video
- Minimizes light pollution
- Provides very long distance illumination
- Can be used with monochrome or day/night cameras

Because the wavelengths of IR are longer than visible light, an IR corrected lens needs to be used in IR mode or the image may be slightly out of focus

IR correction



Additional resources

http://www.axis.com/files/whitepaper/wp_lighting_for_netvid_41222_en_1012_lo.pdf

http://www.axis.com/files/whitepaper/wp_wide_dynamic_range_46873_en_1203_lo.pdf

http://www.axis.com/files/whitepaper/wp_lightfinder_43131_en_1105_lo.pdf

http://www.axis.com/files/whitepaper/wp_light_sensitivity_41137_en_1011_lo.pdf

Additional Information & Instruction

- > *The Axis Communications' Academy provides a range of educational curricula to boost competence and confidence about Axis products and network video technology.*



▶ Classroom-based training



▶ Web-based training



▶ Webinars



▶ Guides and tutorials

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