



Energy saving and comfort



Lighting control around the clock

**Leif Petersen**  
**Head of Business Development**  
**Servodan A/S**



# Agenda

## Temadag –Smarte Sensorer - Teknologisk Institut

- Virksomheden Servodan
- Vision
- Smart Sensor DT-A
- Bringe dagslys ind i rummet
- Luxstat LED wireless konceptet



Servodan A/S is the leading company in Denmark within intelligent installation- and lighting control systems. With perspective development, we will make best possible use of nature's resources and keep the comfort high.

- Established 1958  
family owned until 2008  
Member of the NIKO group



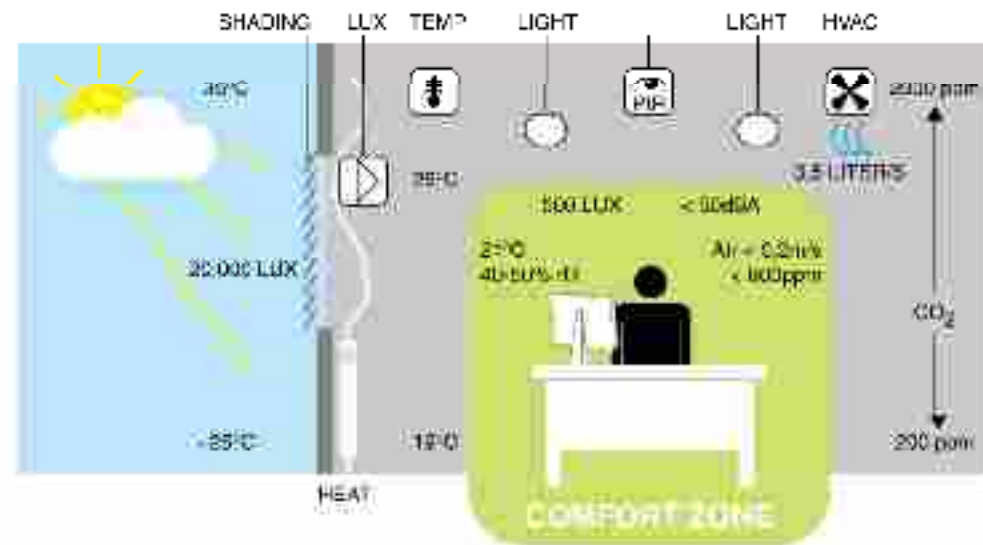
- Activities
  - Research, development and design
  - Production
  - Agencies
- 50 employees
- Export world wide



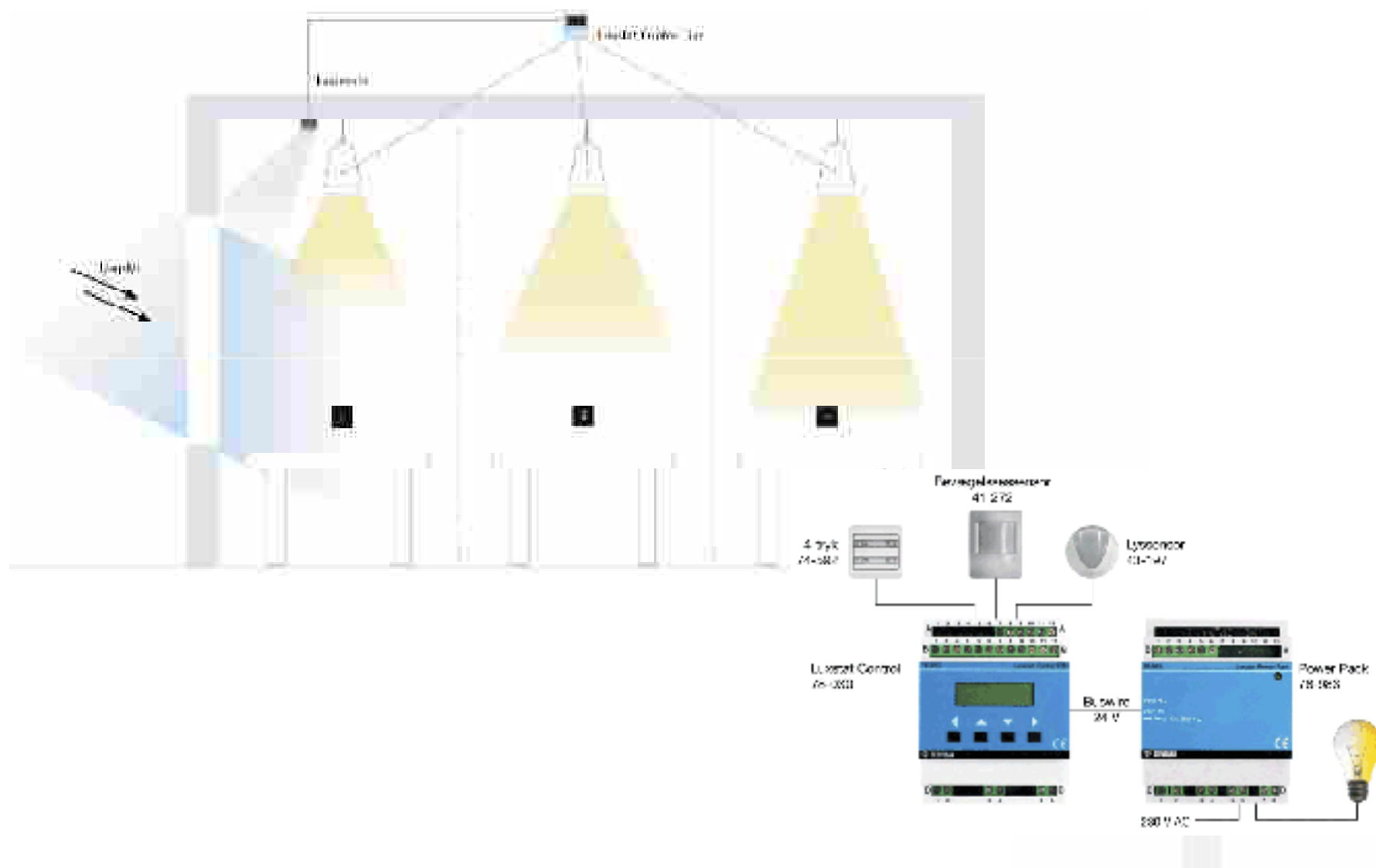
# Vision

***Our aim is to create an integrated, intelligent comfort- and energy control system, focused on the need of a person in a room, as the basic, to be controlled.***

- ☉ Artificial light
- ☉ Daylight
- ☉ Sun radiated heat
- ☉ Heat
- ☉ Air-condition
- ☉ Ventilation



## ALSION > 300 lokaler med Luxstat dagslysregulering



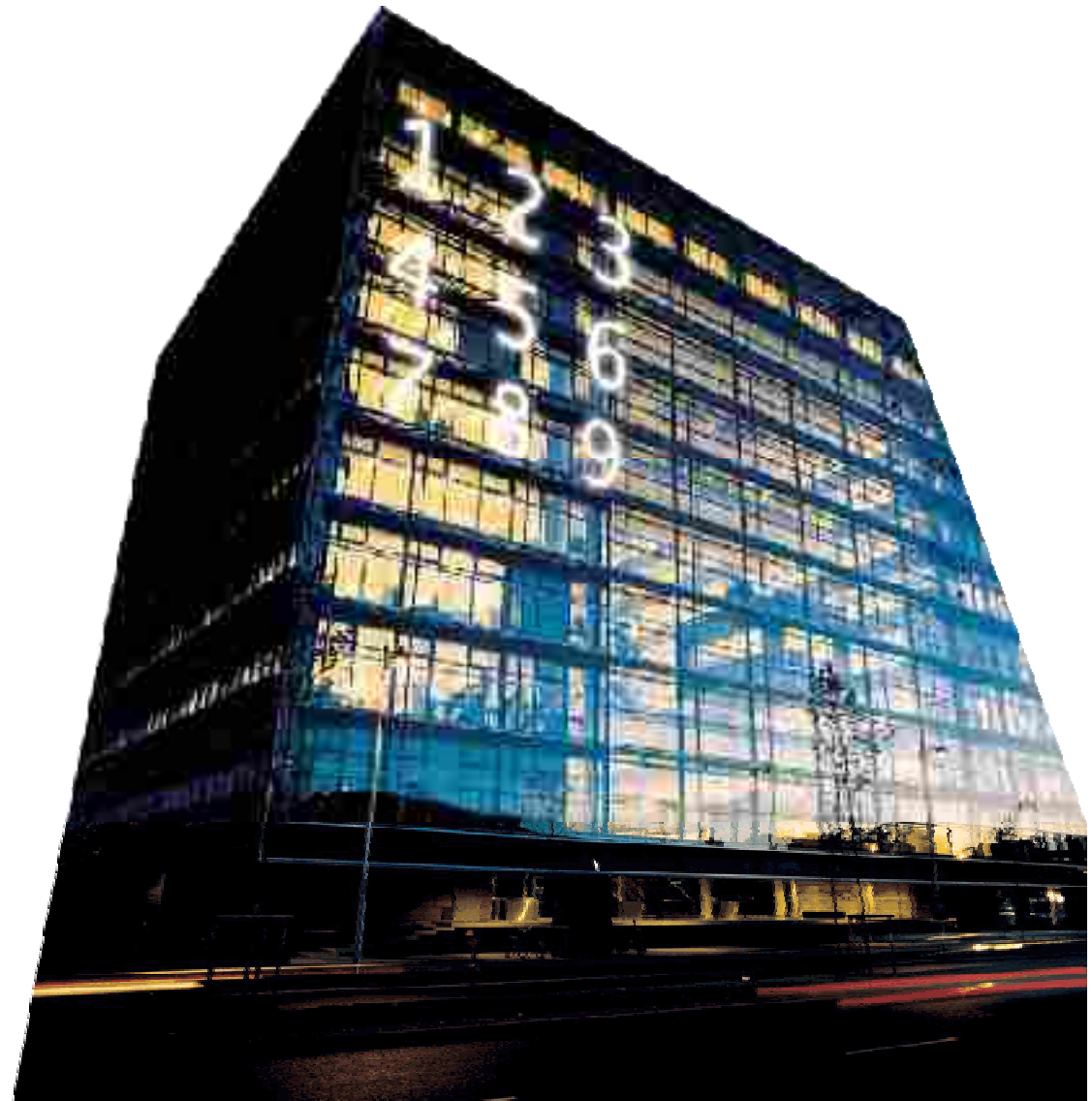
# Indoor and outdoor lighting control





## Support Concept

- Project planning
- Programming software
- Commissioning
- Technical assistance





# Marketing



- Catalogues
- Product data
- Project planning
- Sensor placement
- Quick Guides
- 3D Video films
- Detailed website



# References

Karup Military base



Nykredit (Financial Bank)



Billund Airport



Nokia HQ Denmark



Danfoss



Utterslev School



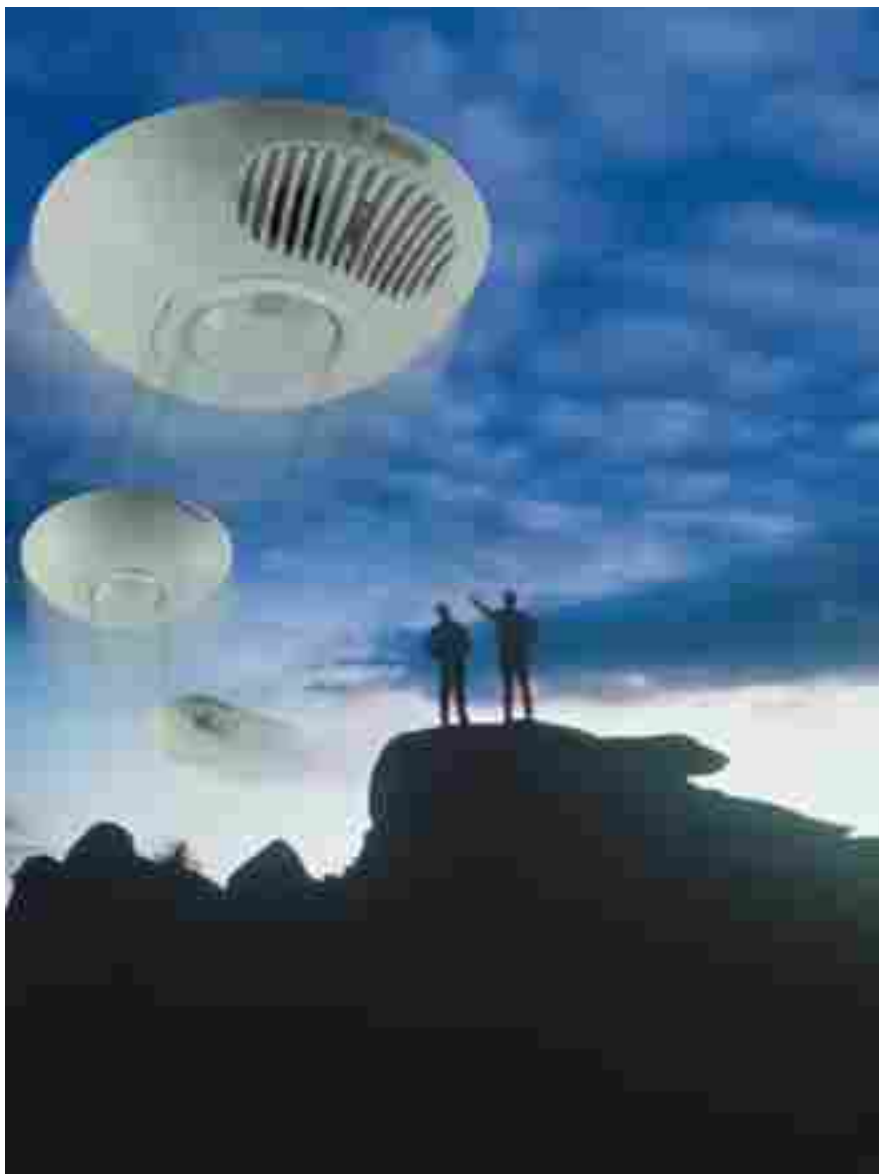
Wyeth Ireland

# www.servodan.com



- Product documentation
- Project solutions
- Price list
- Installation instructions
- Marketing material
- News
- Mailing list





## Minilux Sensor -A





## Minilux Sensor -A

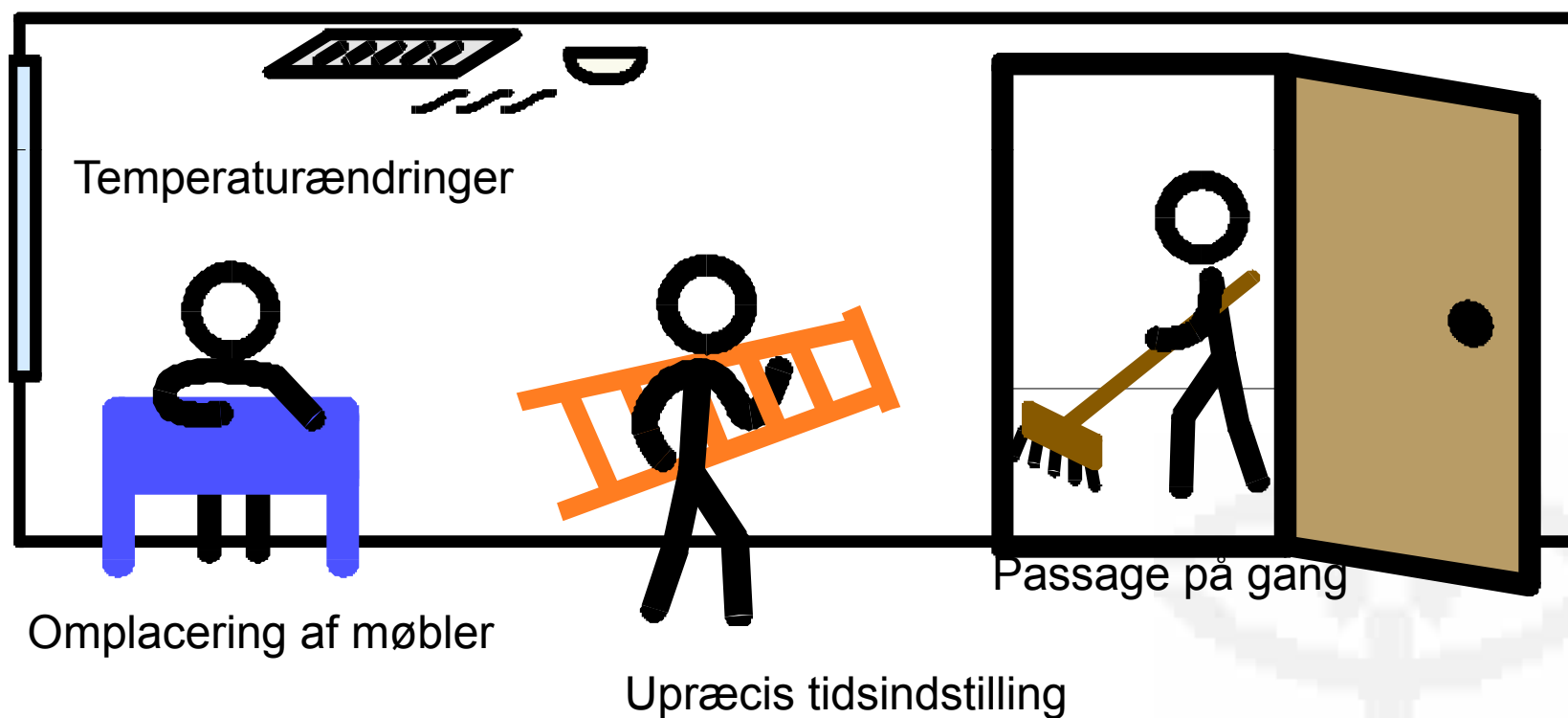
**En ny serie intelligente  
tilstedeværelsessensorer  
som er nemme at installere  
og nemme at bruge**



# Minilux Sensor -A

Forhold som  
påvirker tilstede-  
værelsessensorer

Luftstrømme fra Air conditioning anlæg



Infrarød stråling



Kropsvarme

Ultralyd



Reflekeret lyd

**Minilux**  
**Sensor -A**  
Hvad detekteres af sensorerne?







Set ovenfra

## Minilux Sensor -A Hvad detekteres af sensorerne?

**PIR** sensorer  
detekterer bedst ved  
bevægelse  
**vinkelret** på  
fanerne.



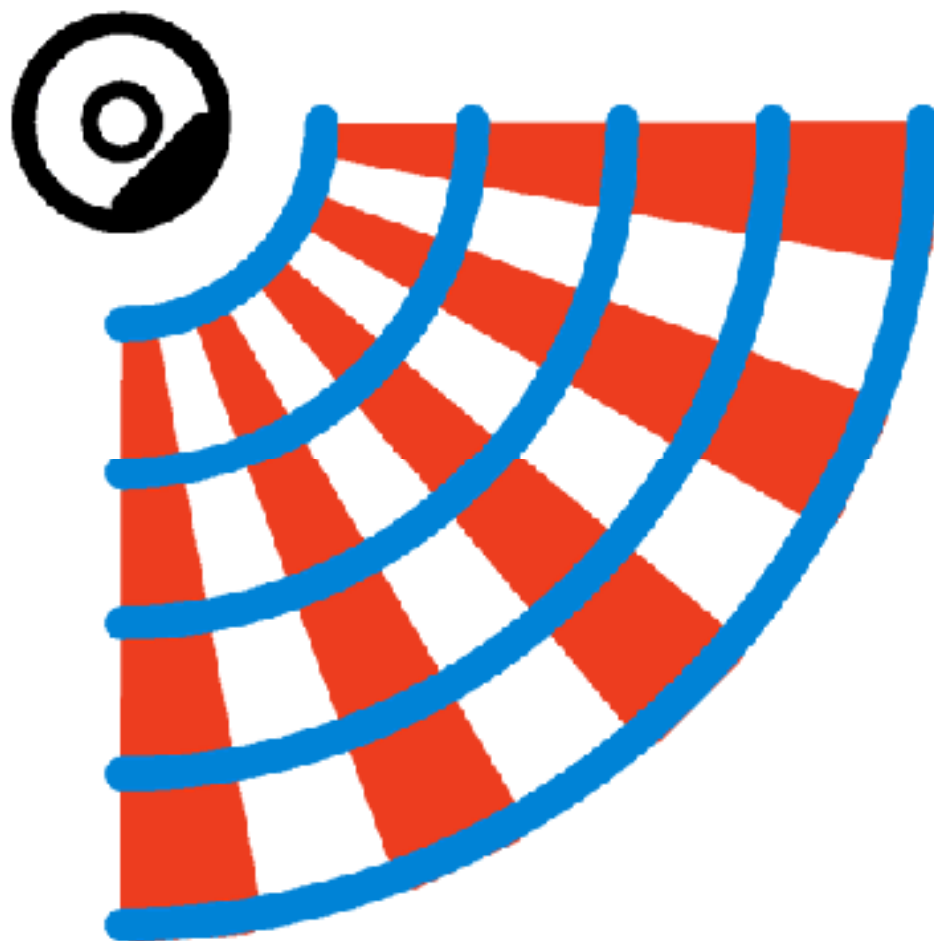


Set ovenfra

**Minilux  
Sensor -A**  
Hvad detekteres af  
sensorerne?

**Ultralyds** sensorer  
detekterer bedst ved  
bevægelse **imod**  
fanerne.





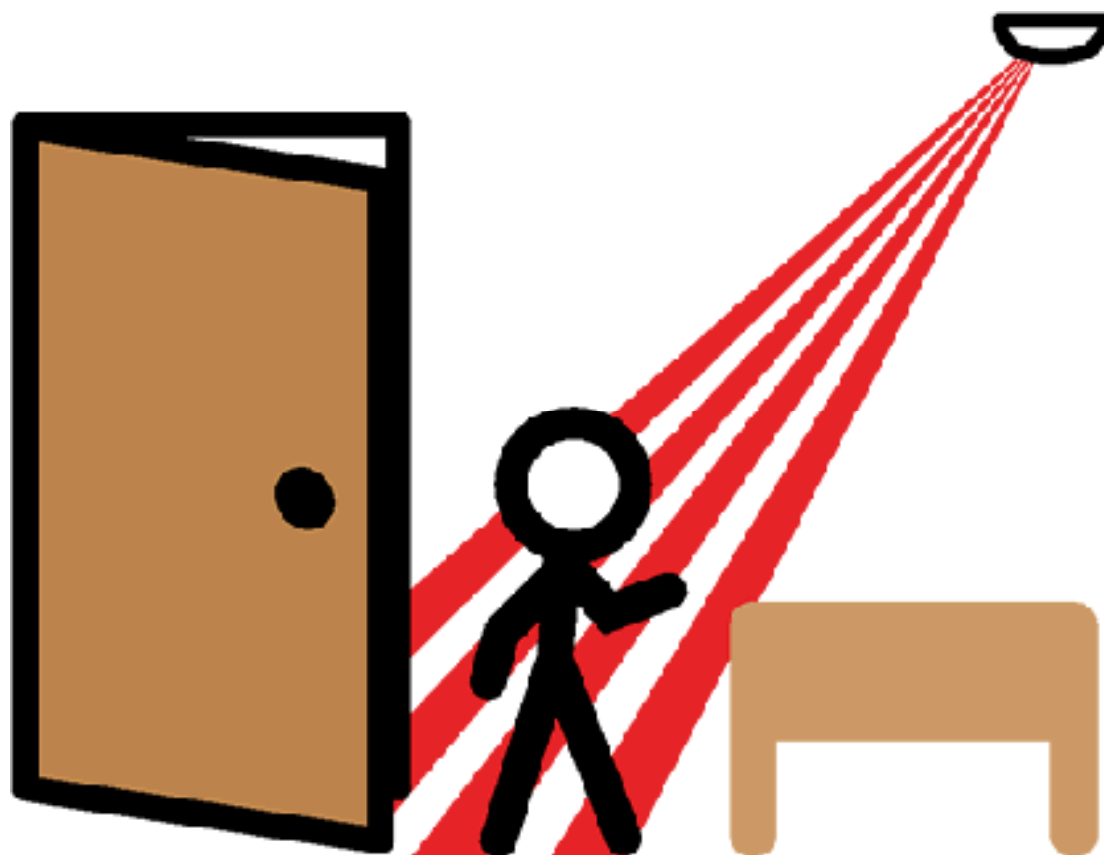
Set ovenfra

**Minilux  
Sensor -A**  
Hvad detekteres af  
sensorerne?

**Dual teknologi**  
kombinerer det  
bedste fra PIR og  
Ultralyd



## PIR sensor



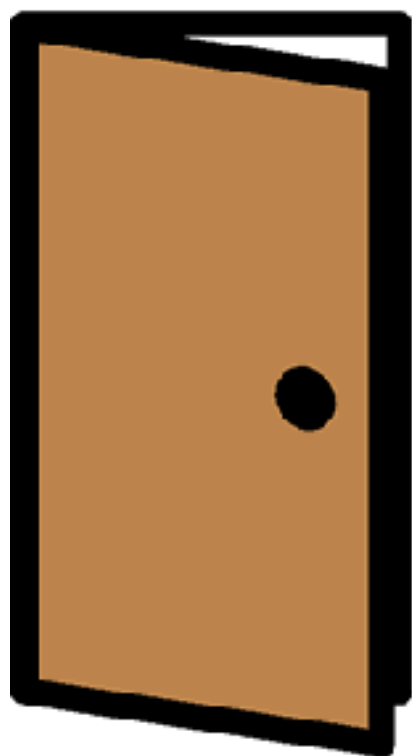
## Minilux Sensor -A Forskellige sensor typer

### PIR

Har ikke bedste  
immunitet overfor  
støjsignaler som  
f.eks. luftstrømme



## Ultralyd sensor



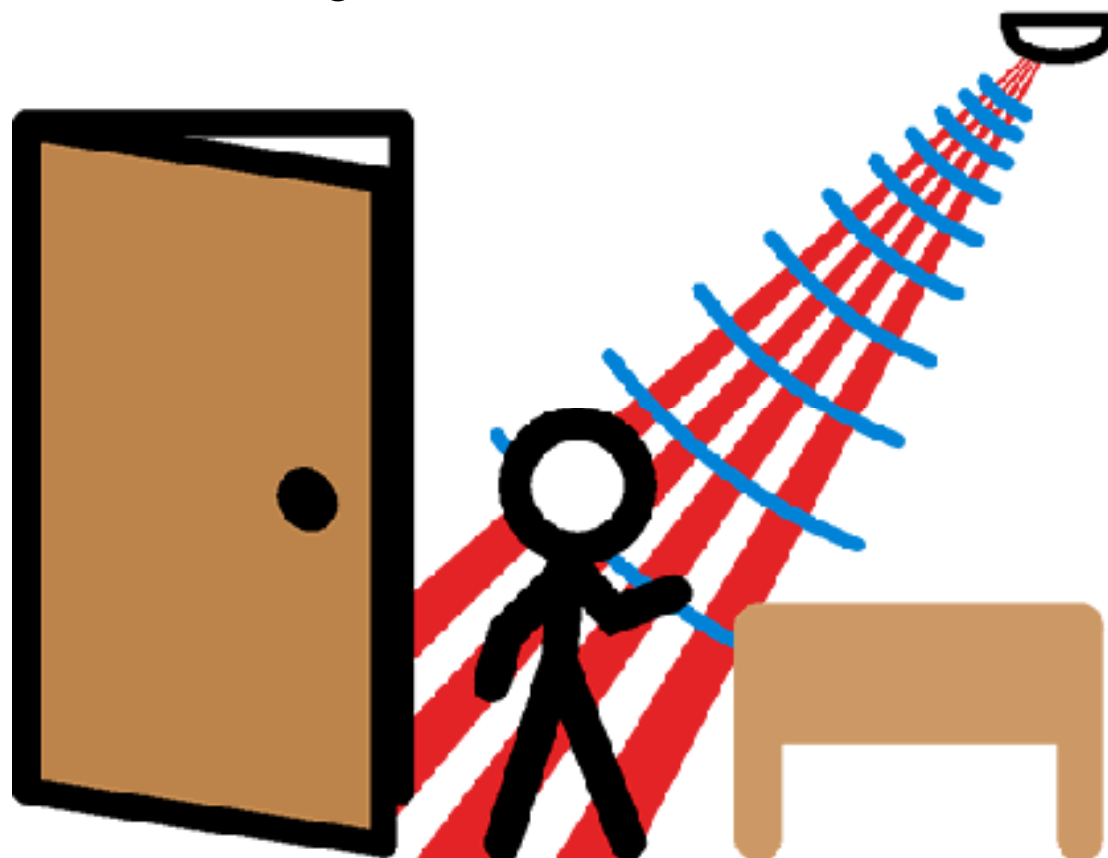
## Minilux Sensor -A Forskellige sensor typer

### Ultralyd fordele

Har bedste  
immunitet overfor  
støjsignaler som  
f.eks. luftstrømme



## Dual Teknologi



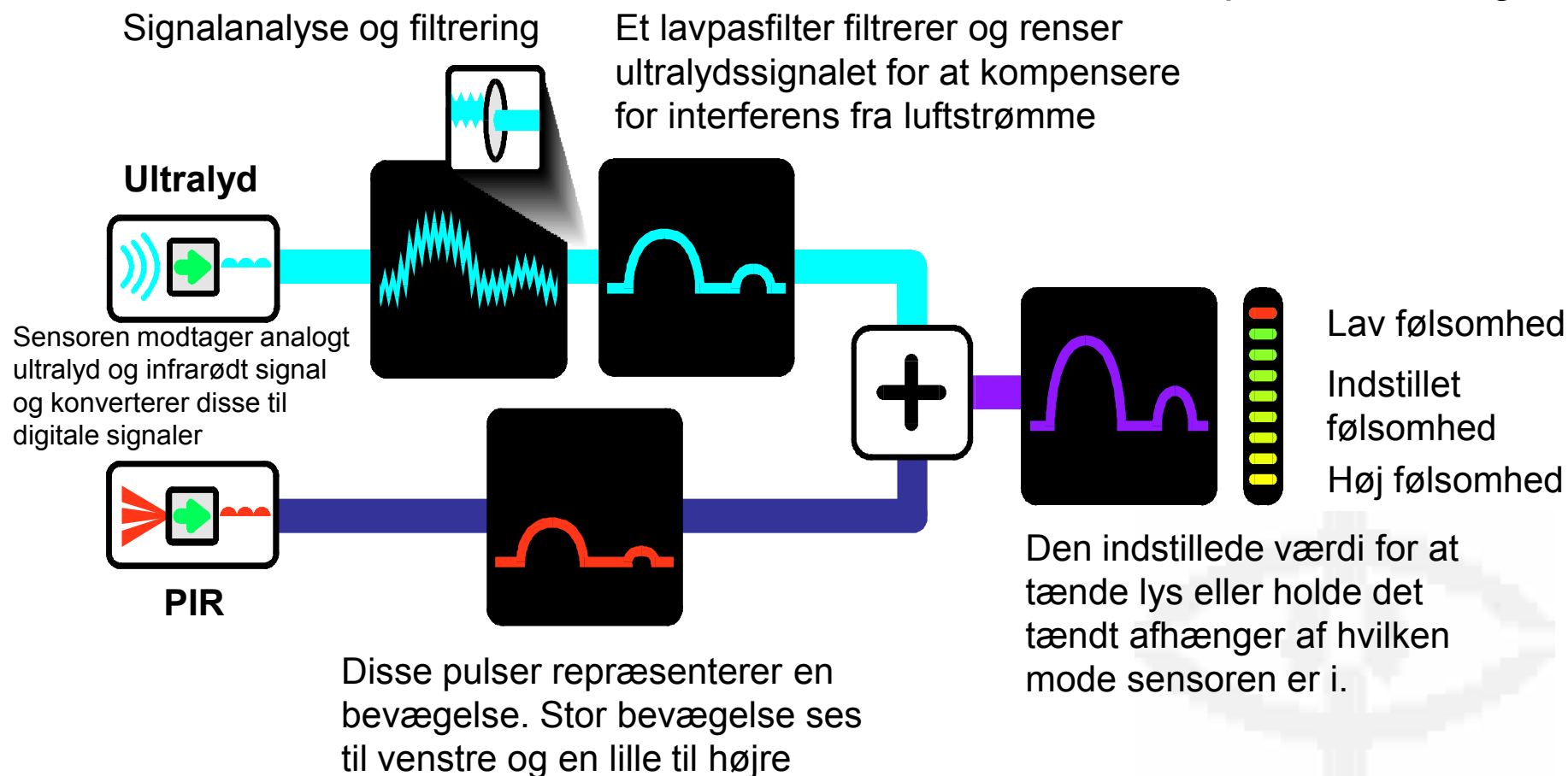
**Minilux  
Sensor -A**  
Forskellige sensor  
typer

**Dual teknologi**  
Det bedste fra  
begge typer!

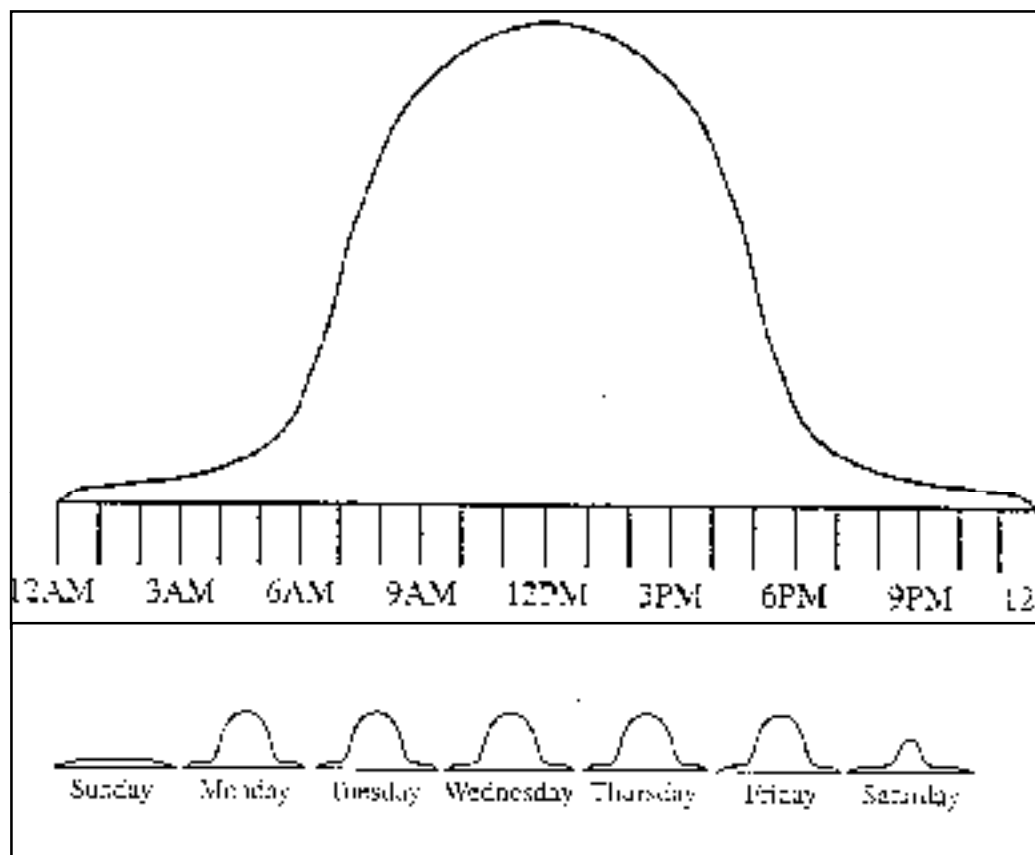


# Minilux Sensor -A

Dual-tech princippet  
Composite sensing







## Minilux Sensor -A

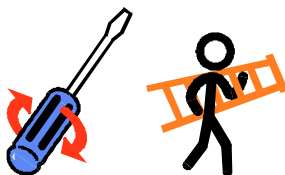
Døgn- og uge-  
kalender



# Minilux Sensor -A Den adaptive proces

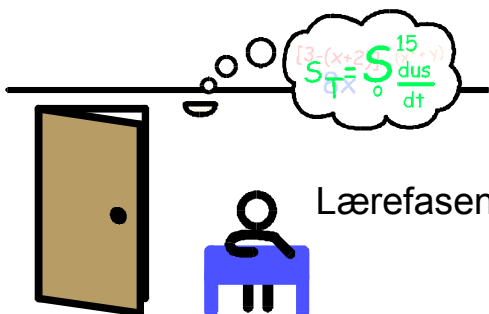
## Umiddelbart efter installation

Automatisk indstilling



Efterlades sensoren efter installering i "test", vil sensoren automatisk efter 1 time skifte til automatisk drift

## De første 4 uger



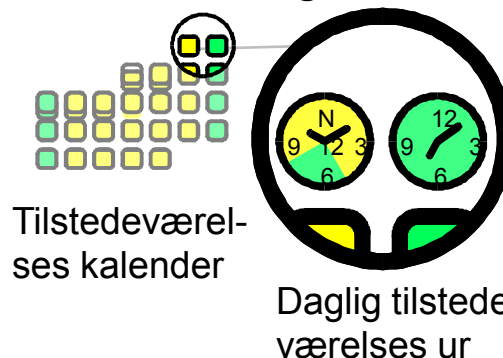
Lærefasen

Automatisk sensor indstilling

- Ultralyd område
- PIR område
- Timer
- Optimering af indstillet følsomhed

Korrektion af fejl:  
Falsk tænd, falsk sluk, støjsignal fra luftstrømme

## Efter 4 uger



Tilstedeværelses kalender

Daglig tilstedeværelses ur

Tilstedeværelsesmønster etableres. Timer hvor personer er tilstede, medfører tændt lys og høj følsomhed. Ingen personer tilstede medfører slukket lys og lav følsomhed

Ændringer i tilstedeværelsesmønsteret medfører at sensor skifter til ny selvlærende fase



## People needs daylight

Daylight – brought to you by LED technology

- Provides an indoor daylight environment
- System dims light source to level of comfort
- Daylight provides greater efficiency
- Cleantech and energy saving



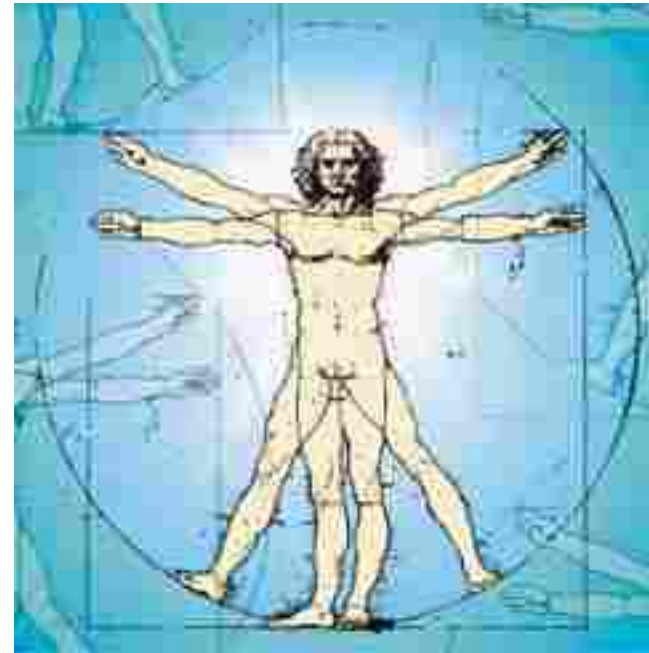
## The New Dimension of Light

- Bringing the quality of daylight into the room
- Dynamic light
- Wireless installation
- Self configuring system
- Artificial window
- Energy saving
- The system for luminaries manufactures
- Preprogrammed applications.



# The implications of daylight

- Body chemistry is affected - Sleeping vs. awake
- Research on the body's vitamin D content
- Reduction of hospitalization time
- Work, in an extended period of time, in underground facilities (e.g. the Armed Forces)
- Night work, the internal clock
- Psychological light impact - the psychological balance
- Insecurity in enclosed spaces
- Energy saving & comfort



# Luxstat LED wireless daylight control - 1-10V luminaires

**Luxstat LED  
Control**  
79-050



**Push-button**  
i.e. 76-926



**Luxstat LED  
Cut-off Control**  
79-210



**Light sensor**  
i.e. 43-197



**PIR sensor**  
i.e. 41-580

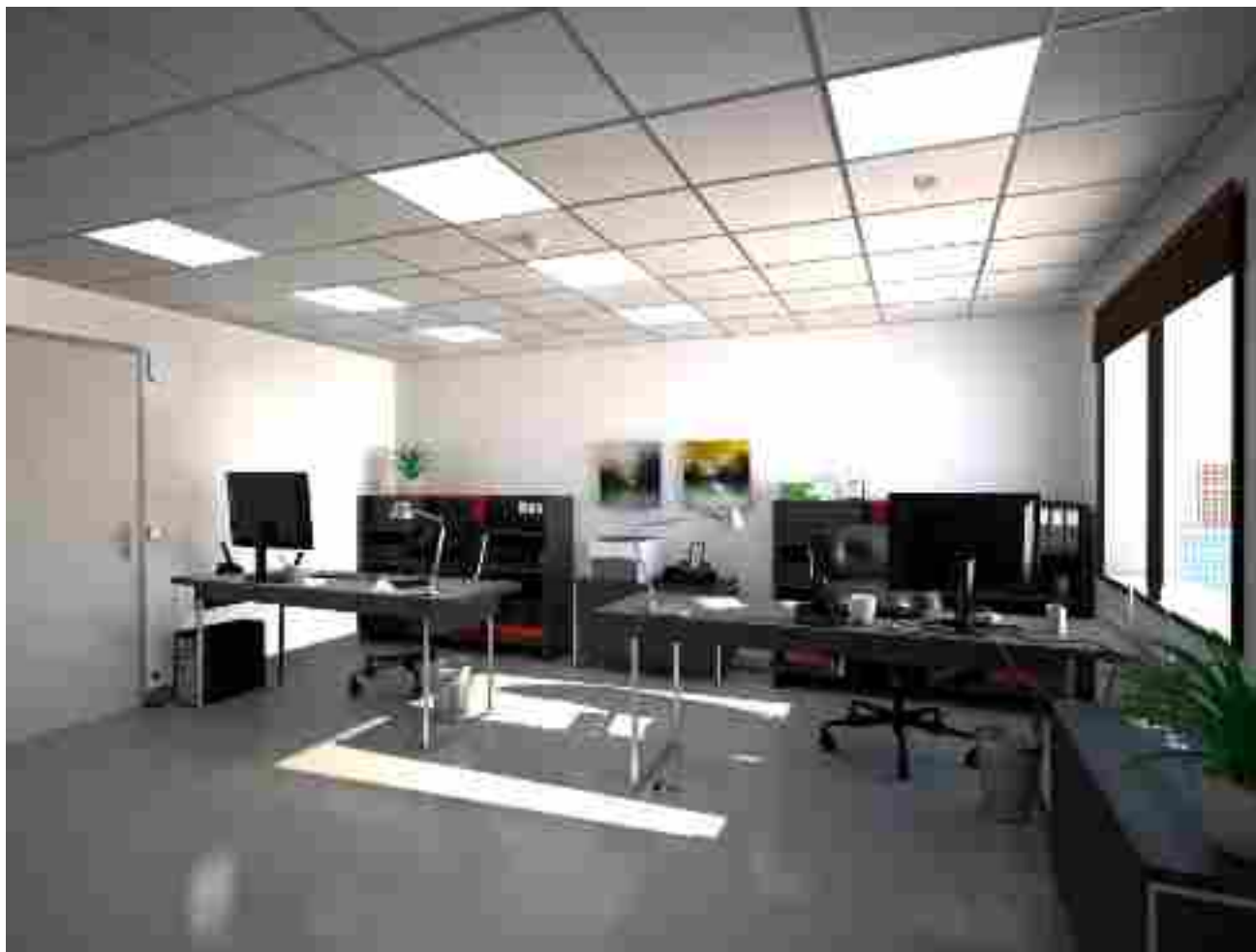


# Luxstat LED wireless daylight control - static LED light (1 colour - Pure white)

**Luxstat LED  
Control**  
79-050



**Push-buttons**  
i.e. 76-926



**Light sensor**  
i.e.. 43-380



**PIR sensor**  
i.e. 41-580



**LED luminaire  
(Pure white)**  
25-200





# Luxstat LED wireless daylight control - dynamic LED daylight (4 colour)

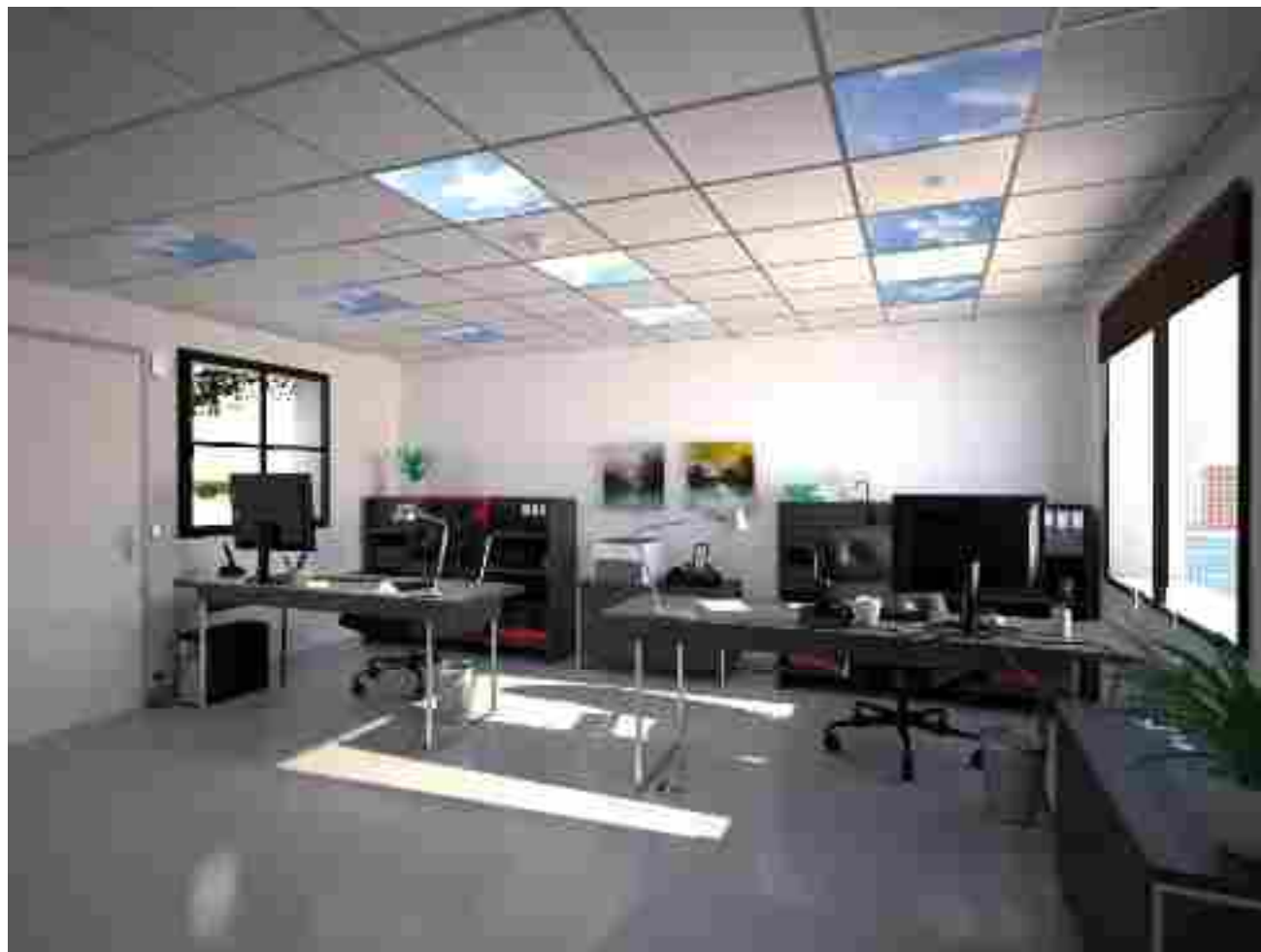
**Luxstat LED  
Control**  
79-050



**Push-button**  
i.e. 76-926



**LED daylight  
window**  
25-500



**Light sensor**  
i.e. 43-380



**PIR sensor**  
i.e. 41-580

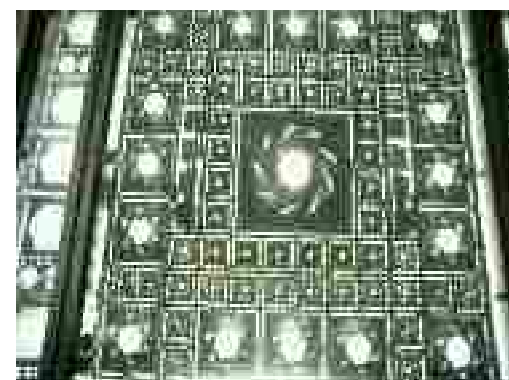
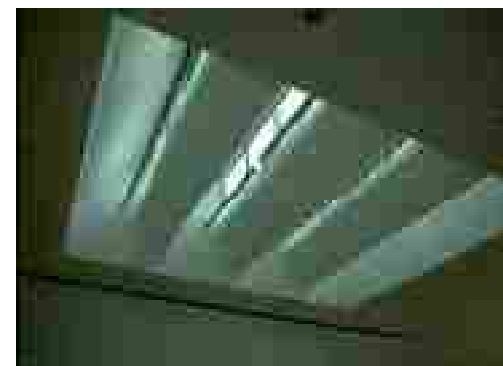


**LED daylight  
luminaire  
(Blue Sky)**  
25-800

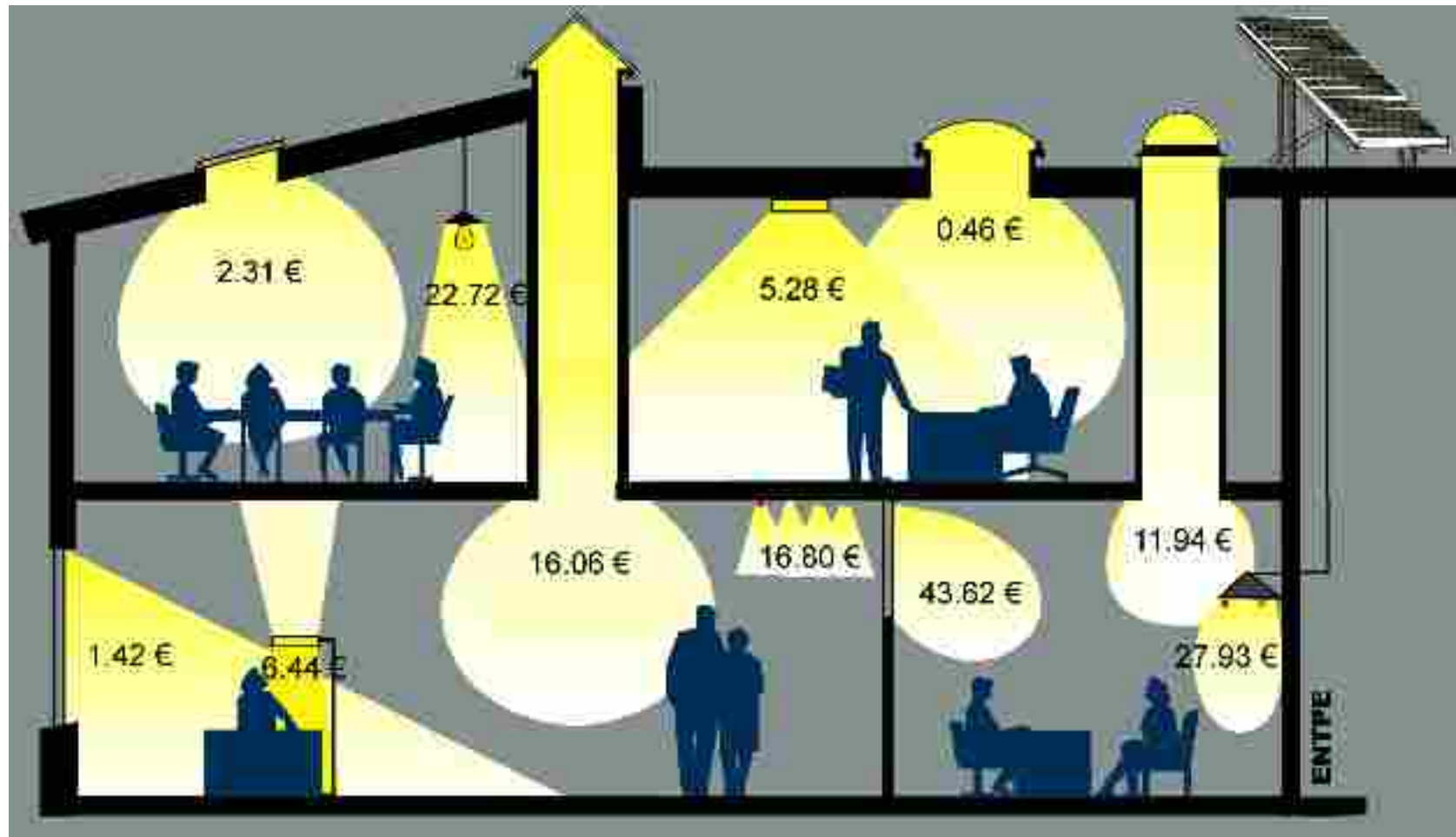




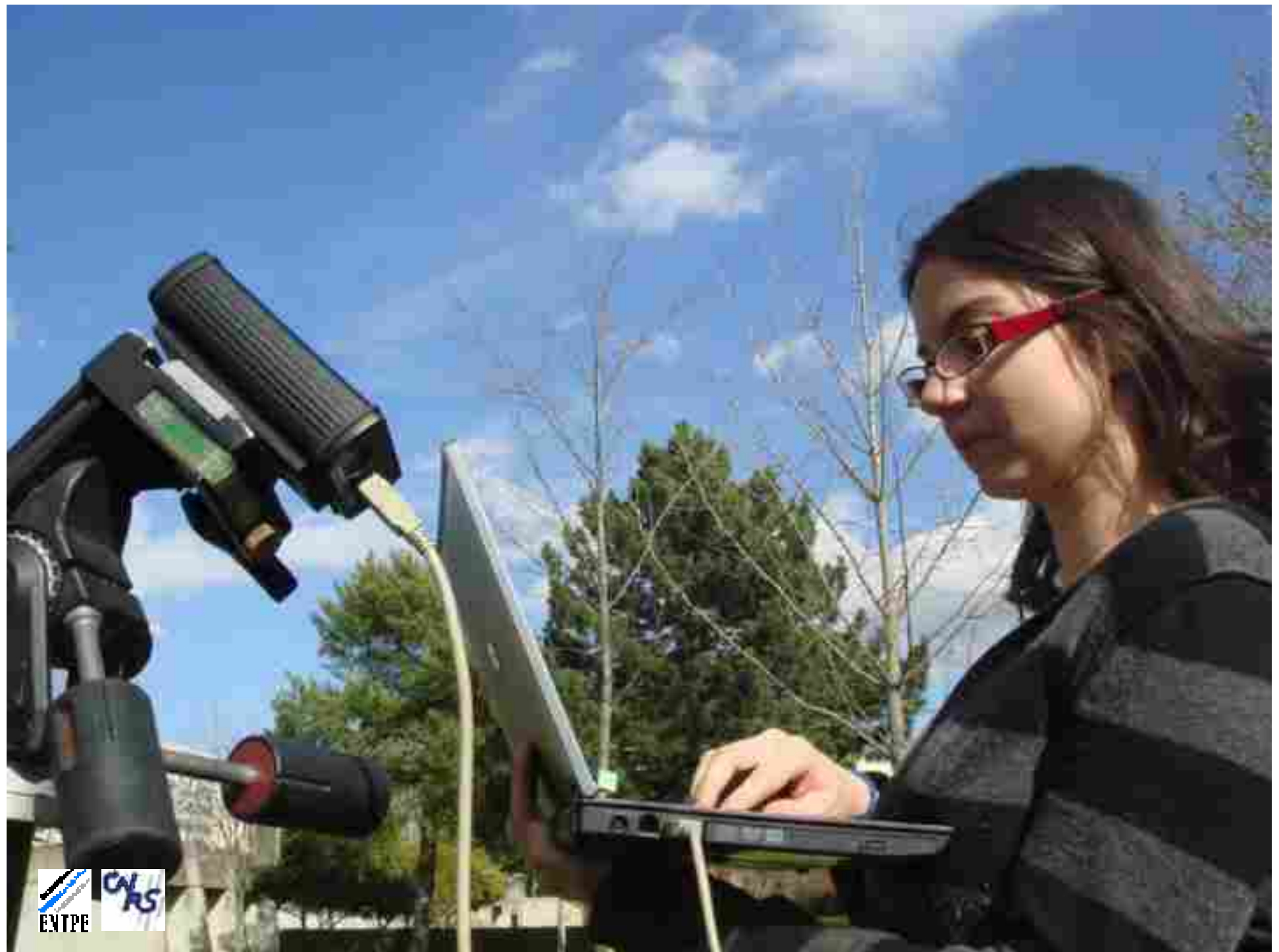
Technique d'éclairage naturel: un potentiel illimité pour la création artistique, la



es



Annual amortized cost of illumination delivered as a function of the lighting scenario (units :  $\bar{U}$  / Mm.hr per year) for various daylighting and electric lighting options

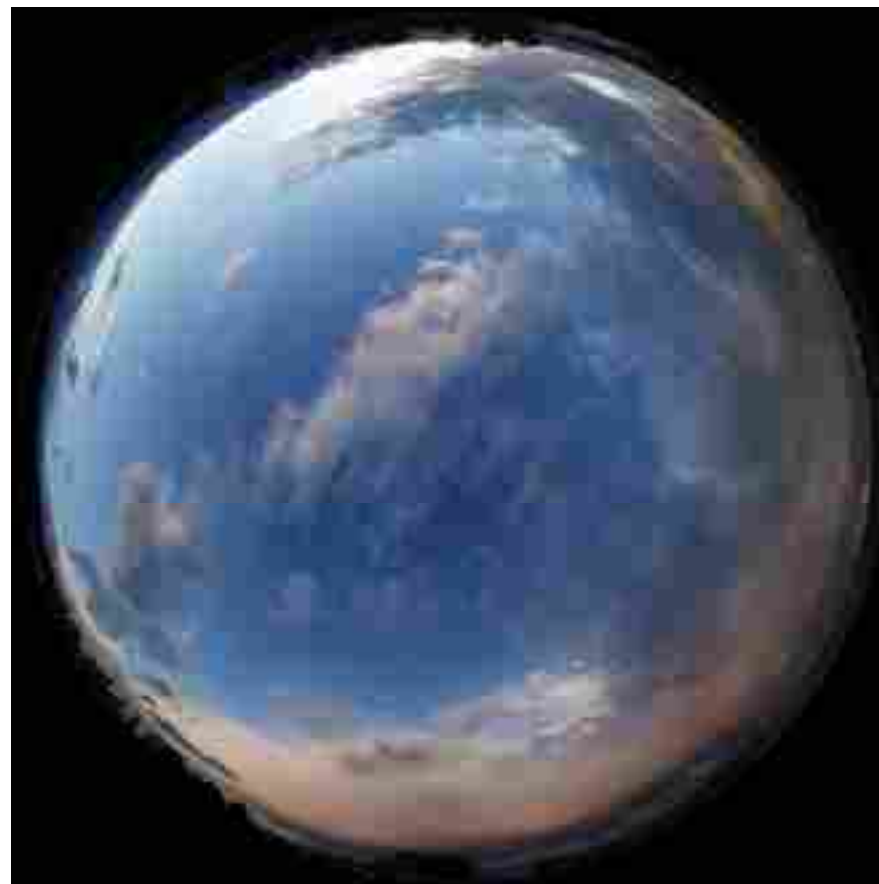


ENTPE

CALRS









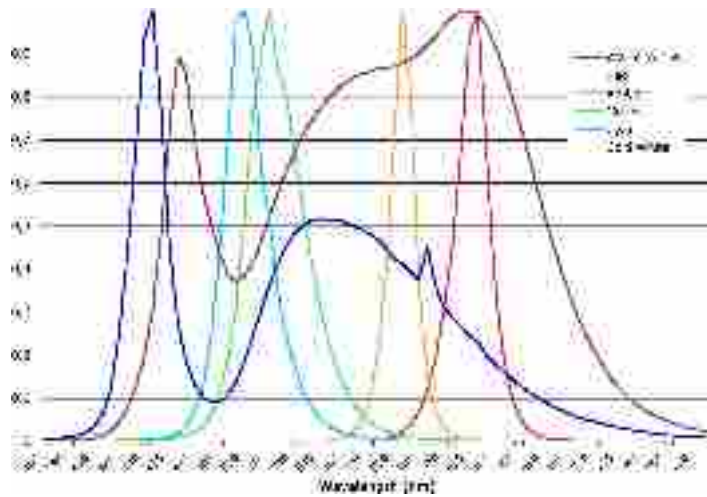






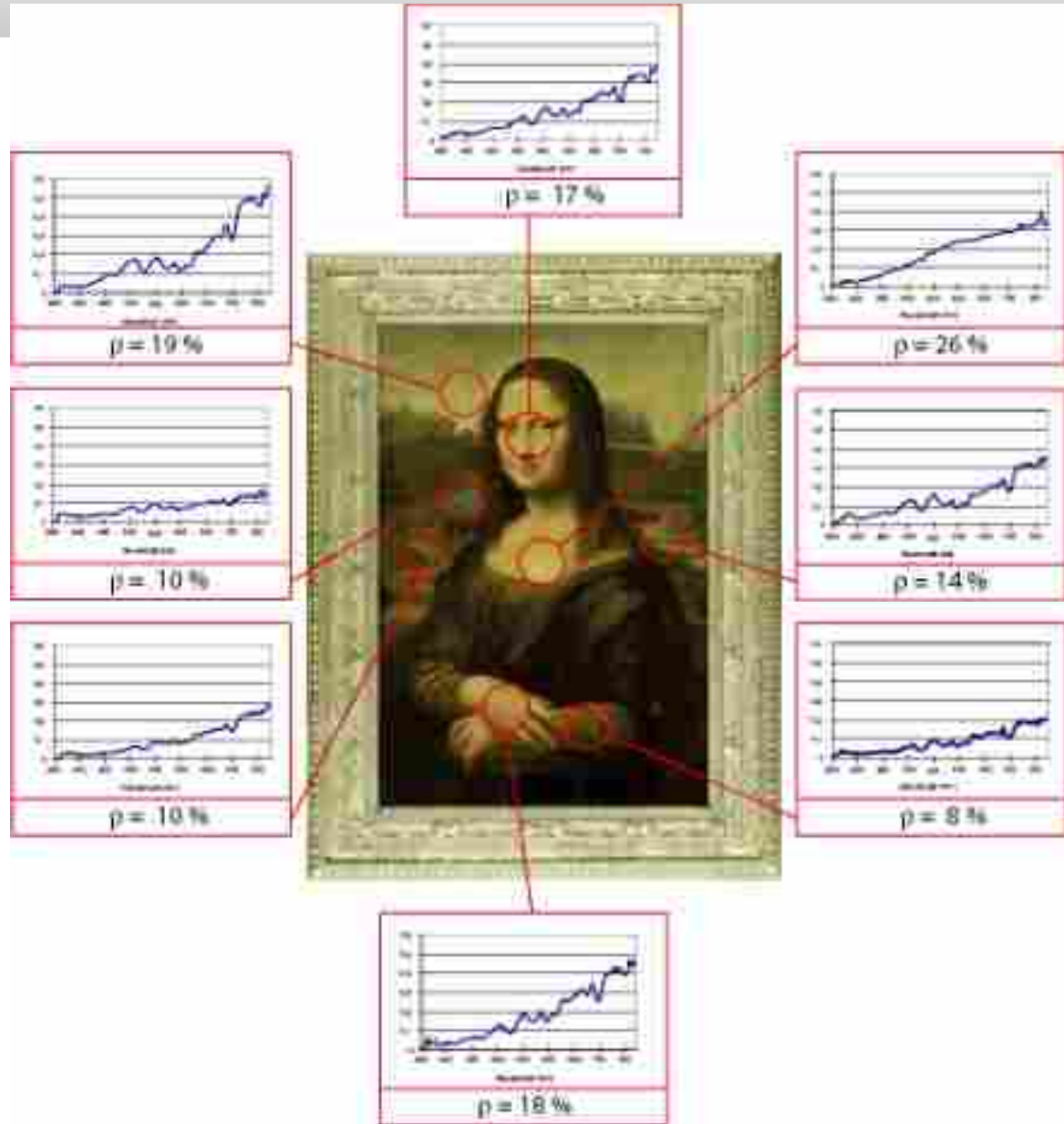
# Space for experimentation and demonstration of LED Lighting and Colour , 200 m2, ENTPE , Lyon, France





**PHILIPS**









## « *Monna Lisa* » Led Spotlight



Monna Lisa Led Spotlight, Design, Marc Fontoynt-ENTPE and SKLAER Lighting, Germany,  
Assistance Fraen (Italy), ENTPE (France), Russian Automotive University (Russia), Optileds (USA)











QuickTime™ et un décompresseur TIFF (LZW) sont requis pour visionner cette image.



QuickTime™ et un  
décompresseur TIFF (LZW)  
sont requis pour visionner cette image.



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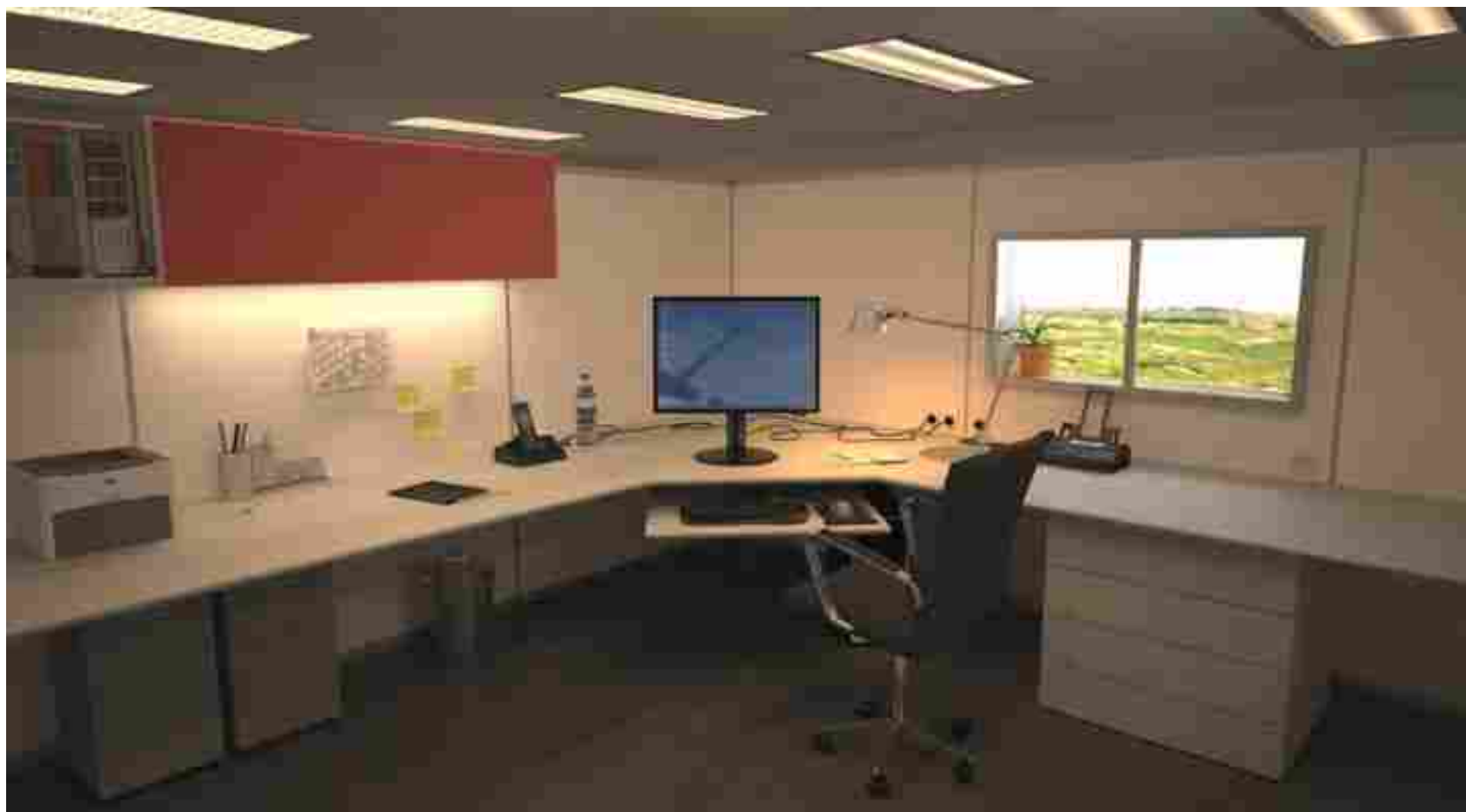
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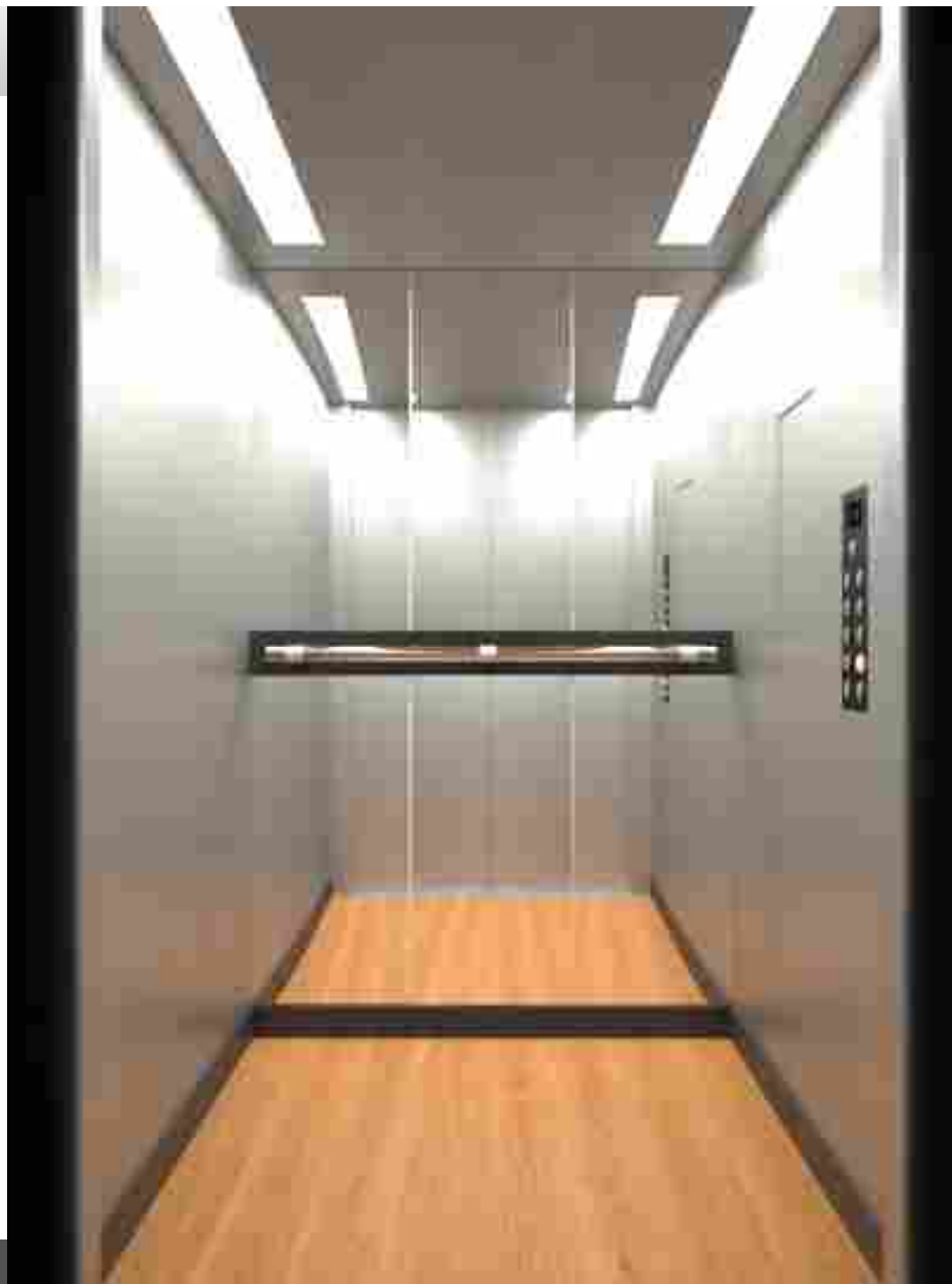
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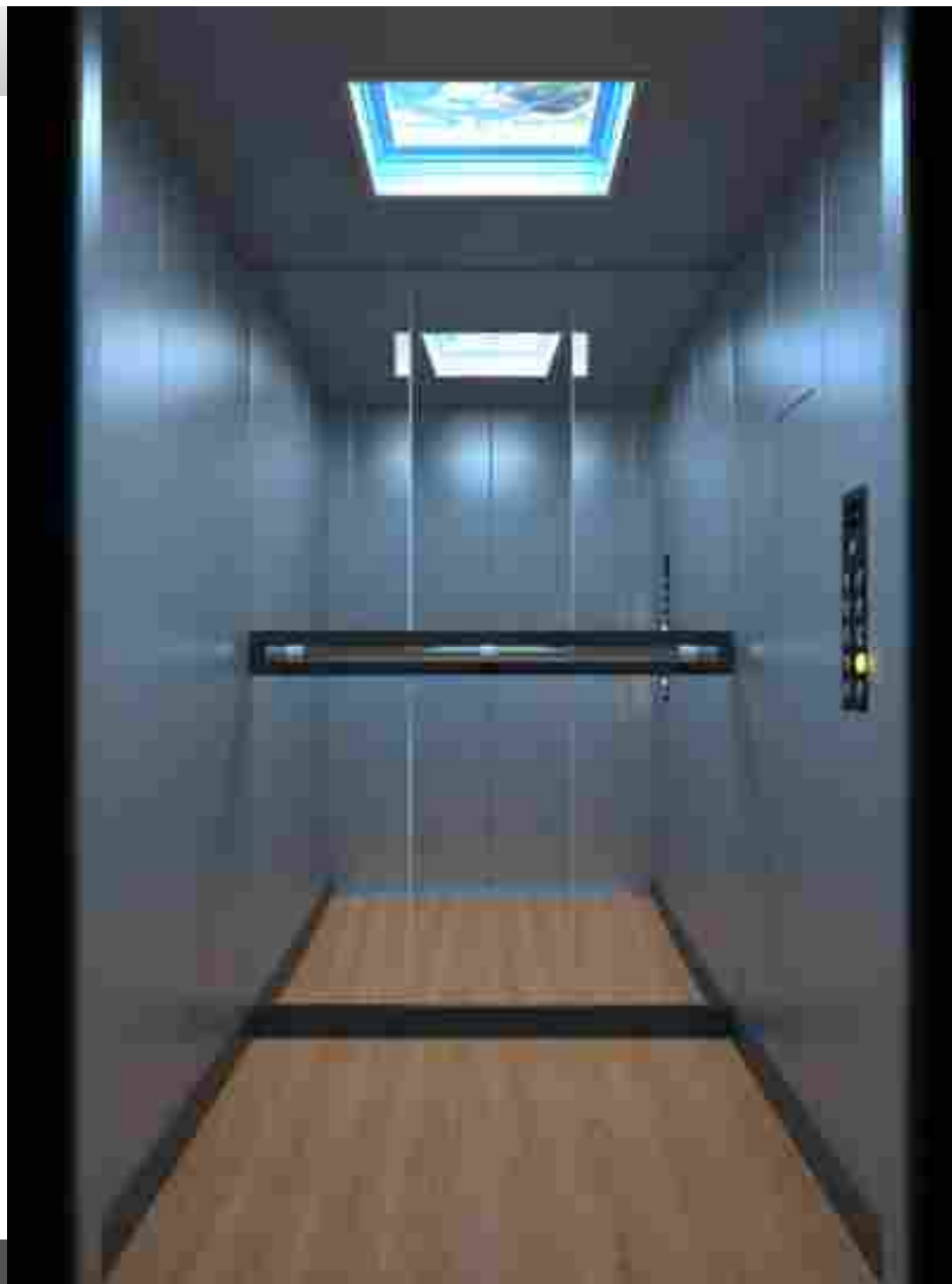
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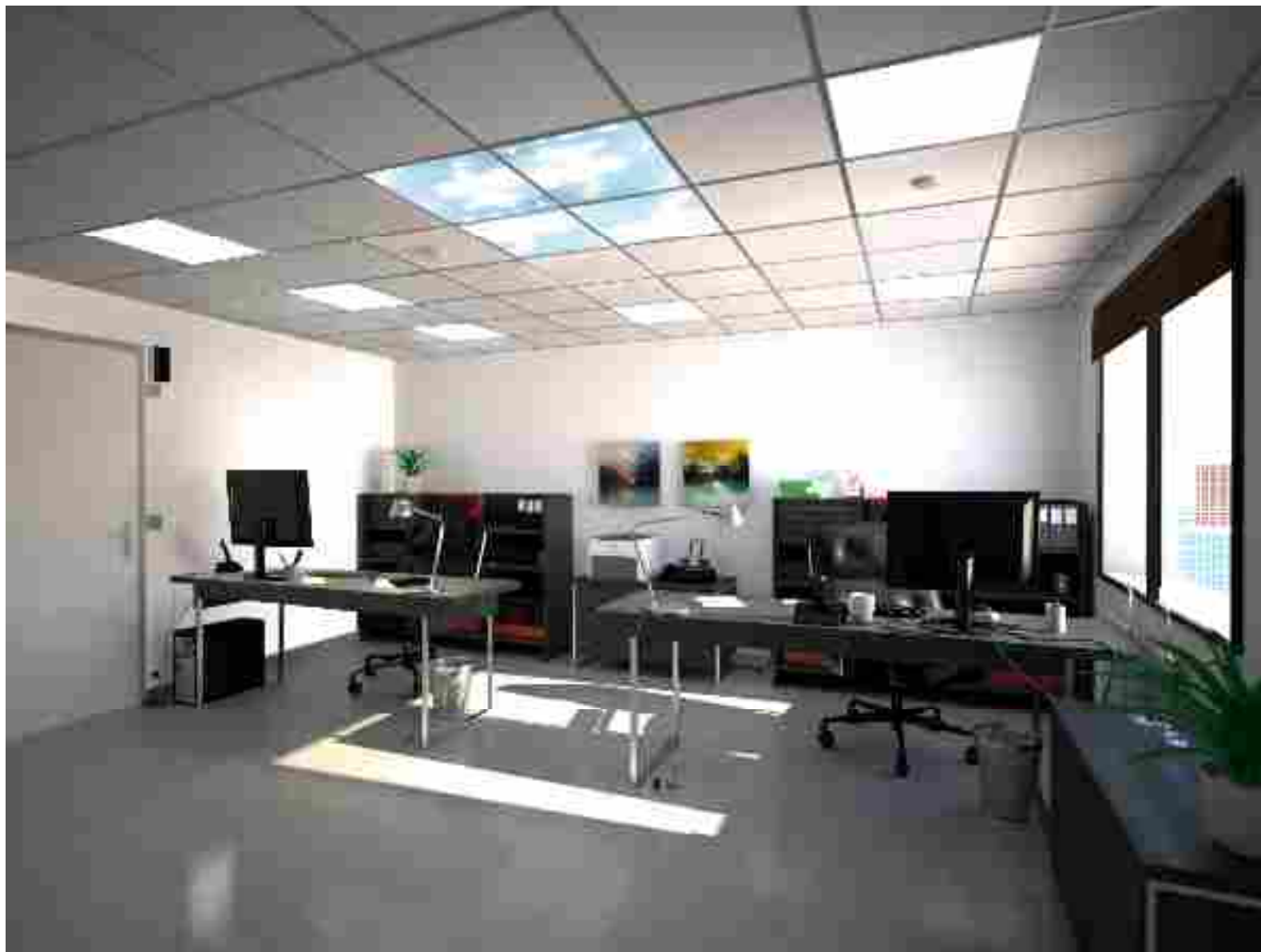
QuickTime™ et un décompresseur TIFF (LZW) sont requis pour visionner cette image.



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décompresseur TIFF (LZW)  
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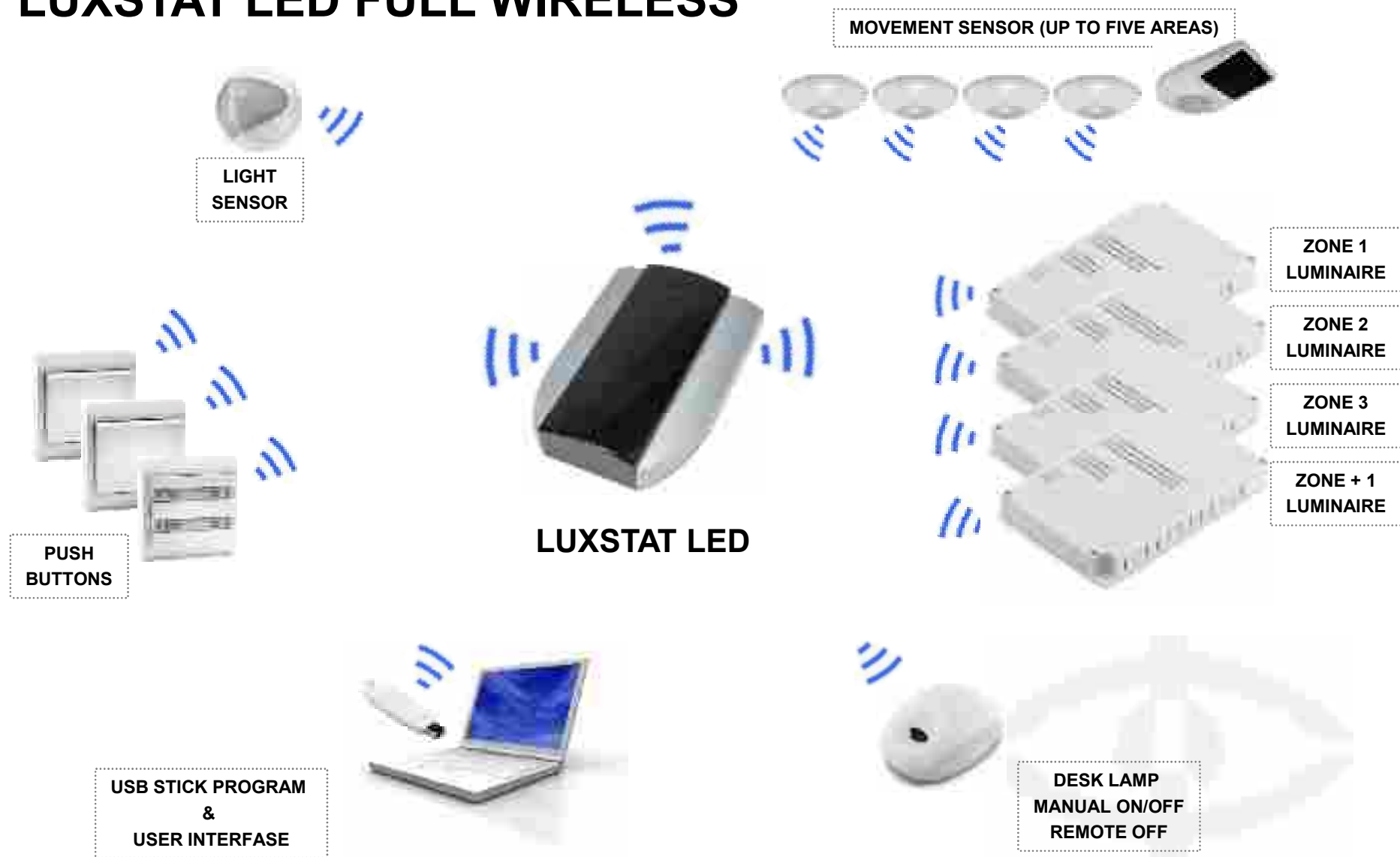
QuickTime™ et un  
décompresseur TIFF (LZW)  
sont requis pour visionner cette image.








# LUXSTAT LED FULL WIRELESS



**Luxstat LED Installation** [?] [-] [X]



Welcome to the Luxstat LED installation wizard.


This wizard will take you through the easy steps for setting up your Luxstat LED system.

Please enter the Project Data to the left.

Make sure that you have turned on the power to the Luxstat LED system.

You can control this by verifying that the luminaries in the room are turned on.

Press Next > to continue.



Project Name


Room Identifier


Technicians Name

26-02-2008 13:42

Press Next to continue

Luxstat LED Installation
? -





To configure the office do the following

- Select the room layout
- Select the number zones to control
- Select the layout of areas
- Control that # of elements is correct

Default configuration is an office with 3-zone control

- 2 artificial windows
- 18 luminaires
- 2 Door switches
- 1 Light sensor
- 3 Occupancy sensors
- 3 Luxstat Remote Controls

Office Layout

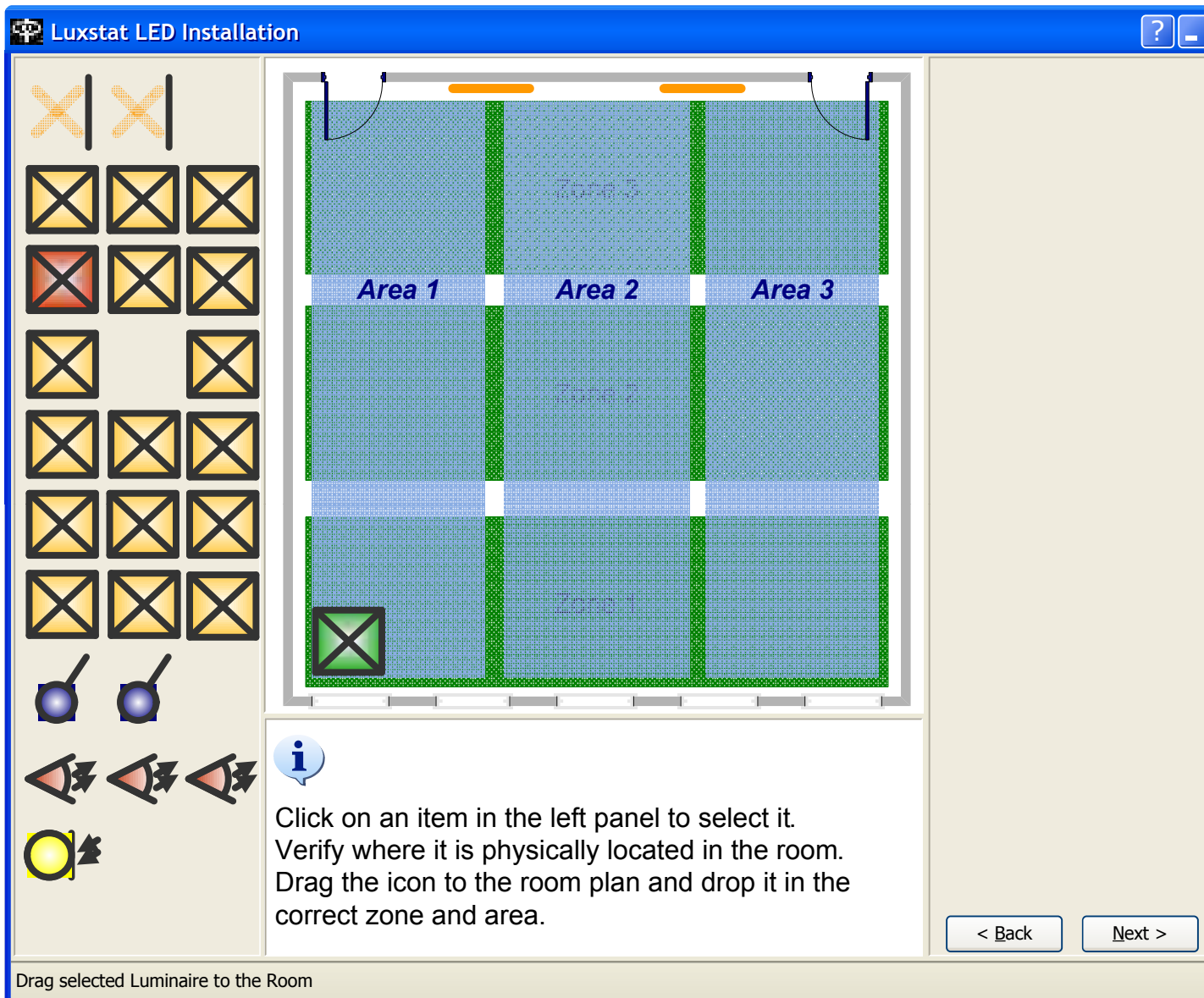
- 1 window side, 2 zones
- 1 window side, 3 zones
- 2 window sides, 2 zones
- 2 window sides, 3 zones

Artificial Windows	2
Luminaires	18
Light Sensors	1
Occupancy Sensors	3
PIR Sensors	0
Door Switches	2
Dimmer Switches	0
4-push Bottons	0
Remote Controls	3

< Back
Next >

Select room details from drop-down menus

**Luxstat LED Installation**




Click on an item in the left panel to select it.  
Verify where it is physically located in the room.  
Drag the icon to the room plan and drop it in the correct zone and area.

< Back    Next >

Drag selected Luminaire to the Room

**Luxstat Installation** [?] [-] [X]



The Installation Wizard has completed successfully


Enter the Project Data and press Print Report.

A copy of the report will automatically be save on your computer for later reference and an e-mail containing the installation set-up will be send to Servodan.

If your computer is offline the e-mail will be send when you go online next time.

Press Finish to end the Installation Wizard.

Project 1  
Office 201  
John Smith  
26-02-2008 14:27



Print Report Finish

Press Finish to end Installation Wizard

**Luxstat LED - Service and Maintenance**

File Edit Tools Help

Project 1

- Offices
  - Office 100
  - Office 101
  - Office 102
  - Office 200
  - Office 201
  - Office 202
- Project 2

General Setting Adjustment **Status** Scenario Player

Channel 1		Channel 2		Channel 3	
Current Setting	ON	Current Setting	ON	Current Setting	ON
V <sub>out</sub>	1.6 V	V <sub>out</sub>	3.3 V	V <sub>out</sub>	5.9 V
Daylight Factor	44.4%	Daylight Factor	35.5%	Daylight Factor	22.2%

Terminal Data

PIR Occupied	No	Dim Up	Low	Time	Low
Light Sensor	1500	Dim Down	Low	Loadshed	Low
Auto	Low	Door	Low	Auto LED	On
Manual	Low	Whiteboard	Low	Manual LED	Off

Event Log

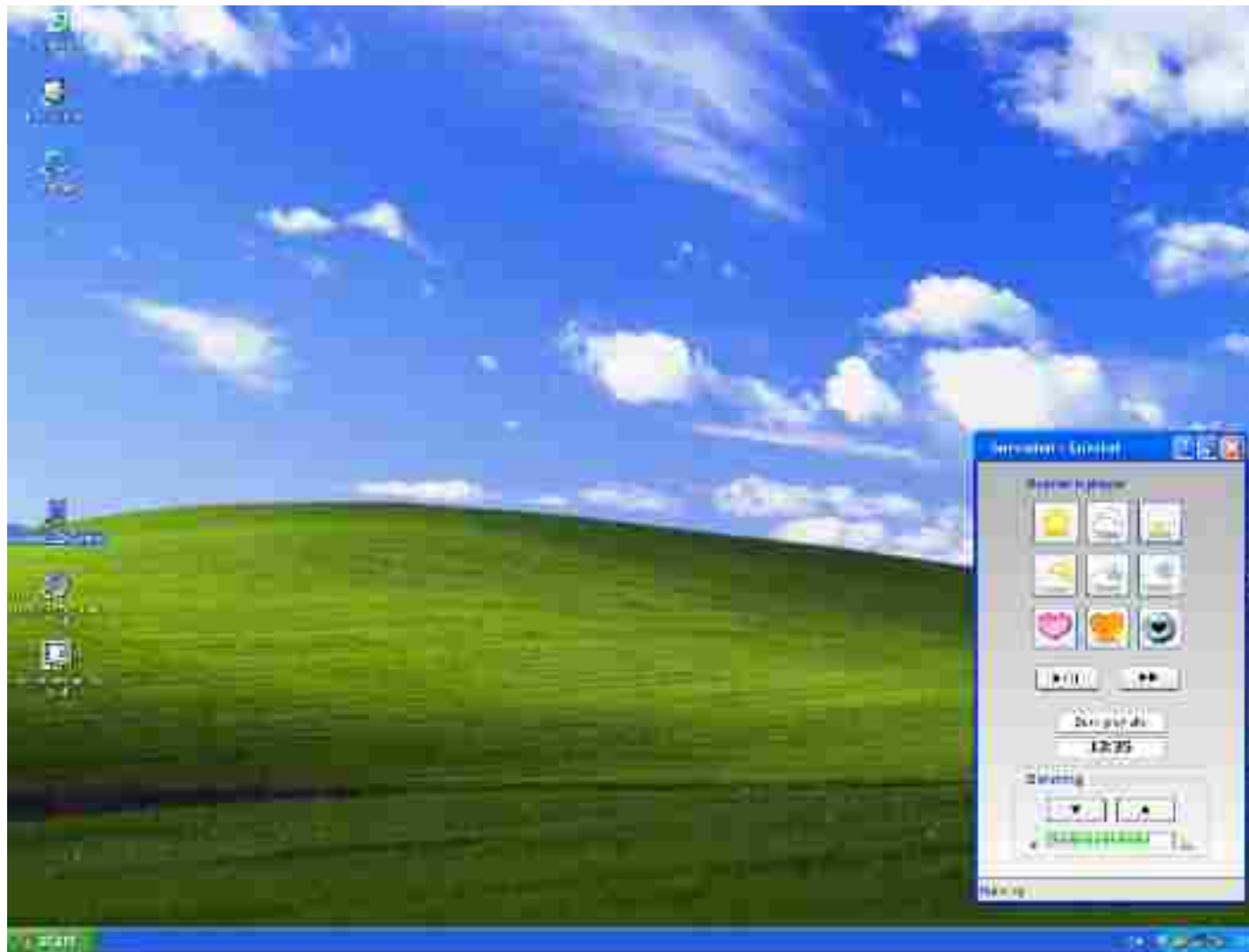
PIR 1 occupied = YES Light Sensor = 1000 Channel 1 = OFF Channel 2 = ON Channel 3 = ON PIR 1 occupied = No PIR 1 Time Delay = Running PIR 1 Time Delay = Expired Channel 1 = OFF Channel 2 = OFF	Channel 3 = OFF Dim Up = High Light Sensor = 2000 Channel 1 = ON Channel 2 = ON Channel 3 = ON Dimming Level = 80% Dim Up = Low Dimming Level = 100% Door = High	Channel 1 = OFF Channel 2 = OFF Channel 3 = OFF Door = Low PIR 2 occupied = YES Light Sensor = 2000 Channel 1 = OFF Channel 2 = ON Channel 3 = ON
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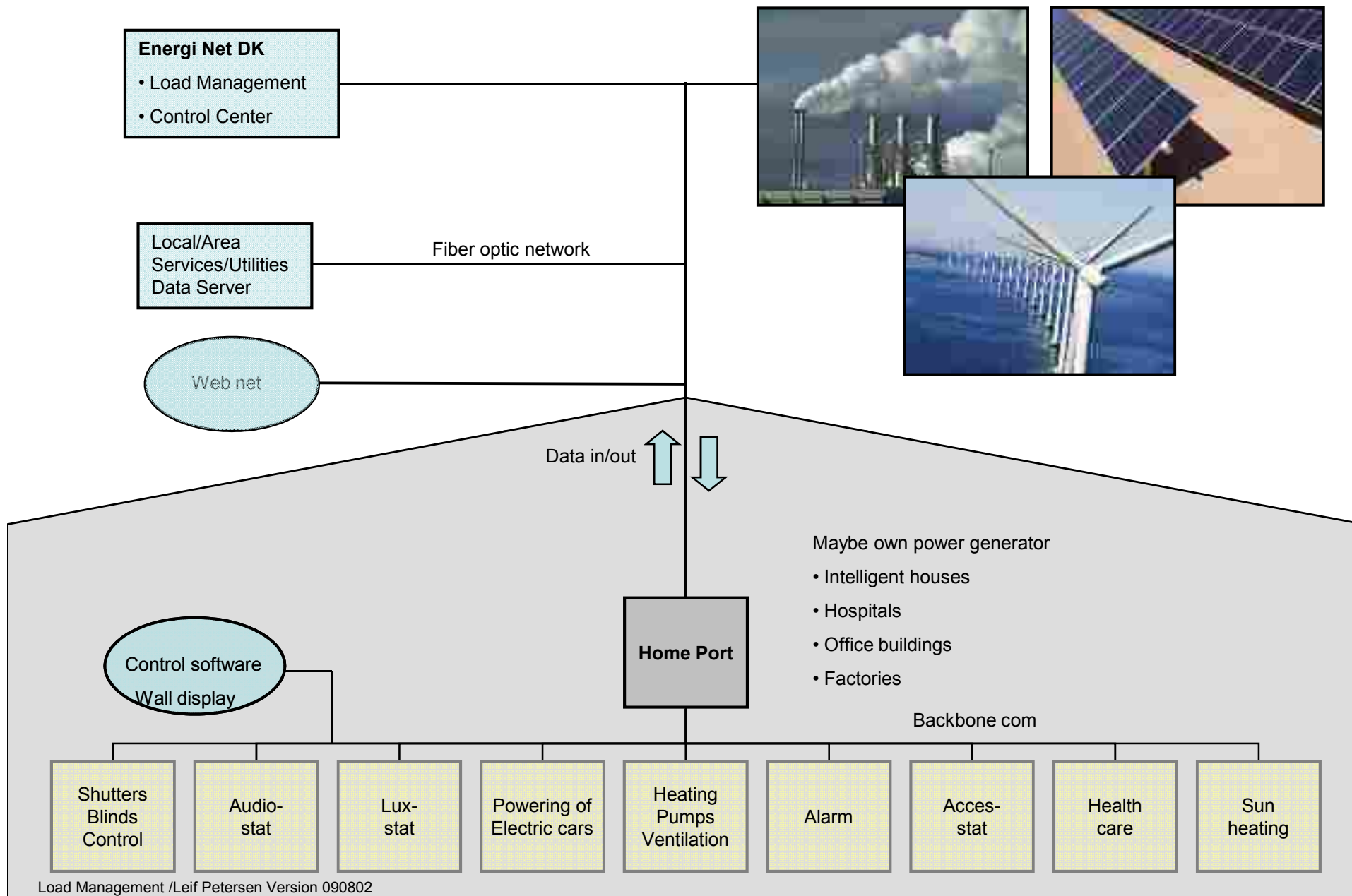
Save Reset

Project 1 - Office 201



# User Control











## **Danish Design Center, Copenhagen Exhibition: "See the Light"**



## Danish Design Center, Copenhagen Exhibition: "See the Light"





## Servodan product sale 2006



- Customer savings for about 93 mill. kWh
- Environmental savings about 50 mill. kg. CO<sub>2</sub>
- Equals 25 thousand CO<sub>2</sub> neutral Danish homes,  
or if 78% of the houses in Sønderborg Community became CO<sub>2</sub> neutral

## 50 years of energy-saving

### From 1960 to 2008

- 2.1 mill. lighting control components sold
- 1.4 bn. kWh saved for our costumers
- 902,000 ton CO<sub>2</sub> saved for the environment
  - Corresponding to 250,000 CO<sub>2</sub> neutral Danish homes, or
  - 200,000 CO<sub>2</sub> neutral cars



## Sevodan and climate management

### Visible actions

- Climate strategy
- 5 year objectives for CO<sub>2</sub> reductions compared with 2008
- Climate effort is registered in Carbon Disclosure Project
- Operational climate action plan
- Members of:



**Thank you for your  
attention!**

