Imperial College London

Intelligent Lighting System Using Presence Detection
ICALS

USER MANUAL

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1) WELCOME

Thank you for purchasing the ICALS intelligent lighting system control.

You have made an excellent choice: the ICALS is a presence detection system that ensures the light usage in your office or domestic environment is exactly what is needed.

This system targets specific behaviour of individuals in an office or domestic residence to ensure not only that power is not wasted on lighting after closing hours, but also that lights do not go off without warning during an extracurricular work session, when people are inside the area covered by the system.

The ICALS is also a compact, easy to install apparatus that works with both your lighting supply and the computer networks within the workspace.

2) OVERVIEW AND DIMENSIONS

- o Suitable for domestic or office lighting for areas of up to 100 m²
- o Ceiling Mounted max 3.3 m
- o Windows XP compatible
- o Supports Ethernet and WI-FI LAN networks
- o Movement detection (passive infrared)
- o PC monitoring unit (mouse and keyboard)
- o Mobile phone signal and SMS detection (GSM 900MHz and 1900MHz bands)
- o Bluetooth Detection (2.4GHz band)
- o User controllable operation of detectors
- o Motion detectors should not point towards sunlight. Do not mount near sunlight or any heat sources.
- o Indoor use only: avoid water, impact and extreme temperatures

3) INSTALLATION

The ICALS system comes with all necessary components for its installation; this includes the sensor case, screws and anchors for ceiling mounting. Extension cables for the input supply AC/DC adaptor (included with the system), serial port and mains are provided as well as a PCB mounted relay switch, together with software CDs for the PC monitoring unit.
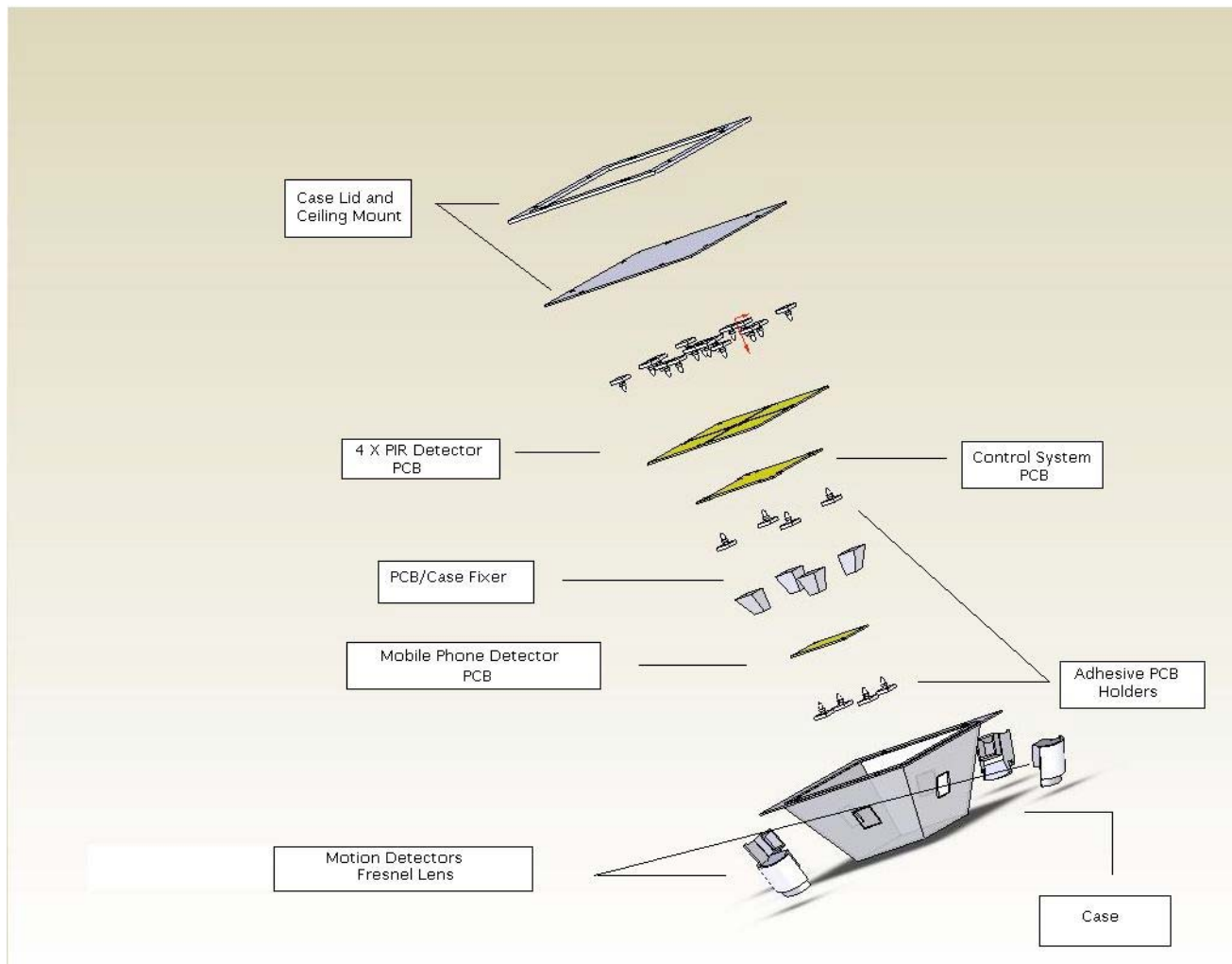

The ICALS system can be easily installed onto the ceiling of the room (up to 3.3 m) with the screws provided with the ceiling mount. The system should be connected from the control system output onto a relay switch to control the operation of the

lighting. For this it is necessary to disconnect the mains supply to the lights in the environment desired and connect the relay switch as shown:

RELAY OPERATION

Vcontrol

E

L

N

Vcontrol

N/C
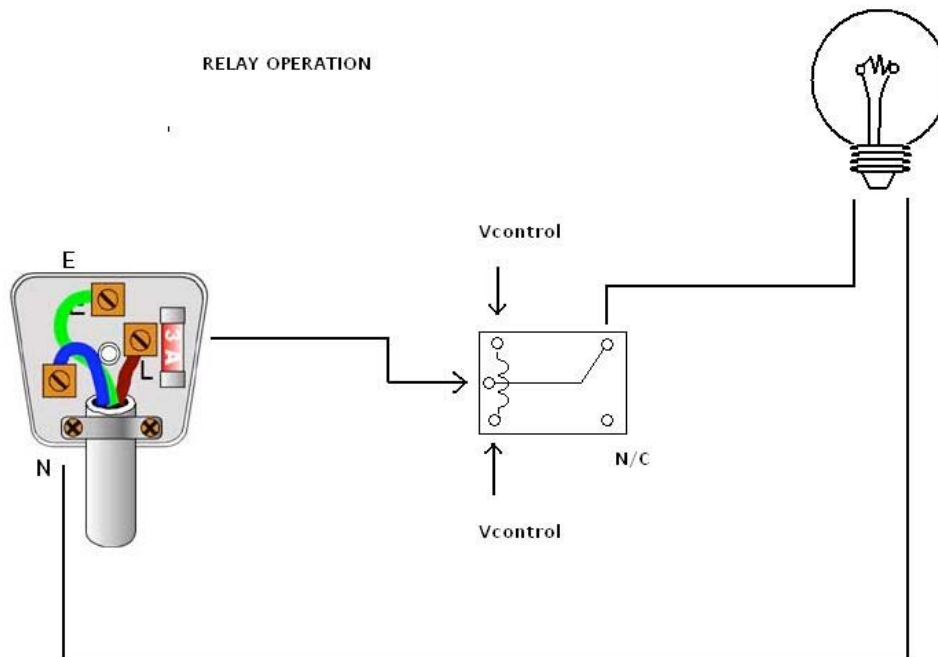
There are three cables connected to the box, namely the serial port for the computer software, the power supply input to the circuit and the relay output to the mains. These require installation preferably through the roof of the area in which the lights are controlled.

Software Installation

The ICALS system includes software CDs to be installed in all PCs within the network of interest. There are two variations of the program. One for the server and one for the computers in the LAN labelled "server" and "client". To install insert the corresponding CD into the computer and click the D drive in My PC. The following messages should appear on screen:
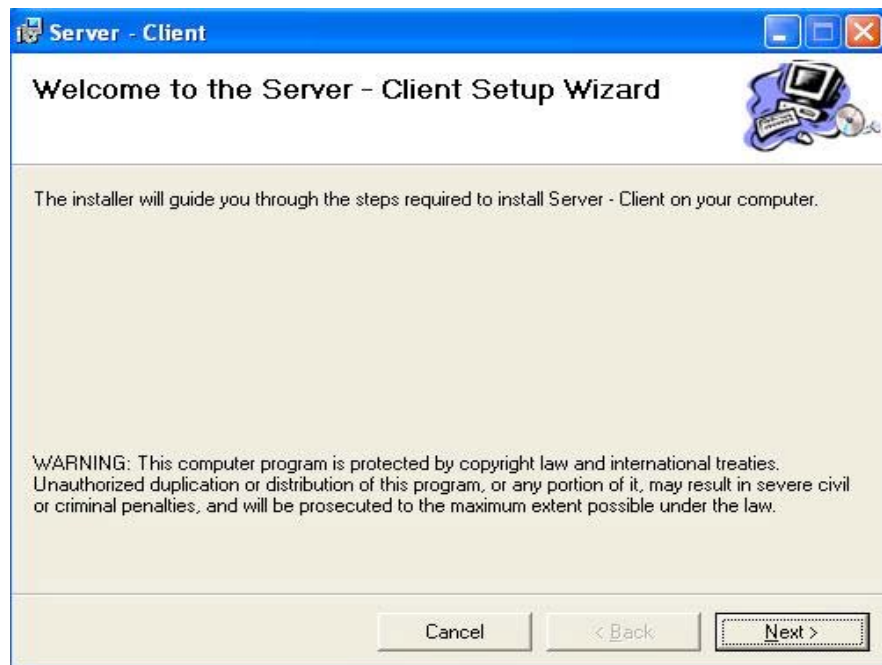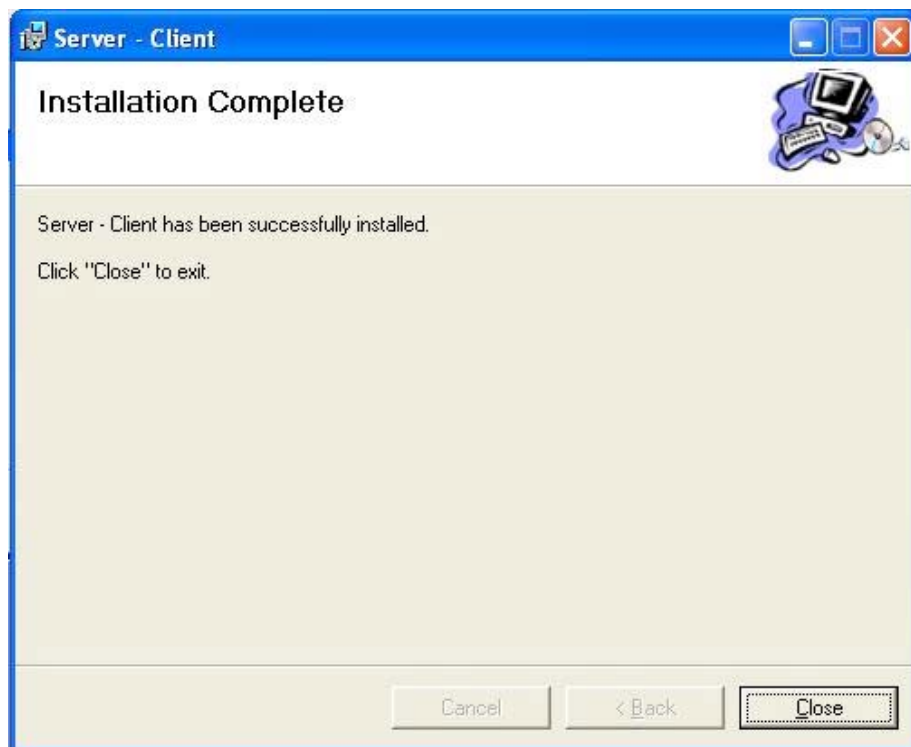

Follow the instructions through and install the program in the computer. Once it is installed it will automatically send or receive information about PC activity (both the server and client software are installed in the exact same way)
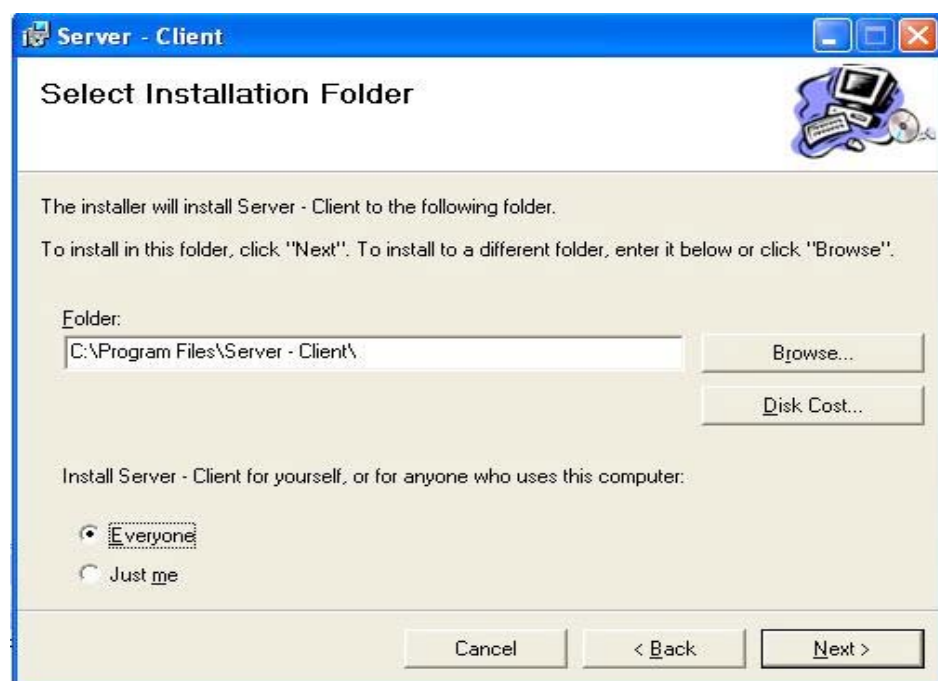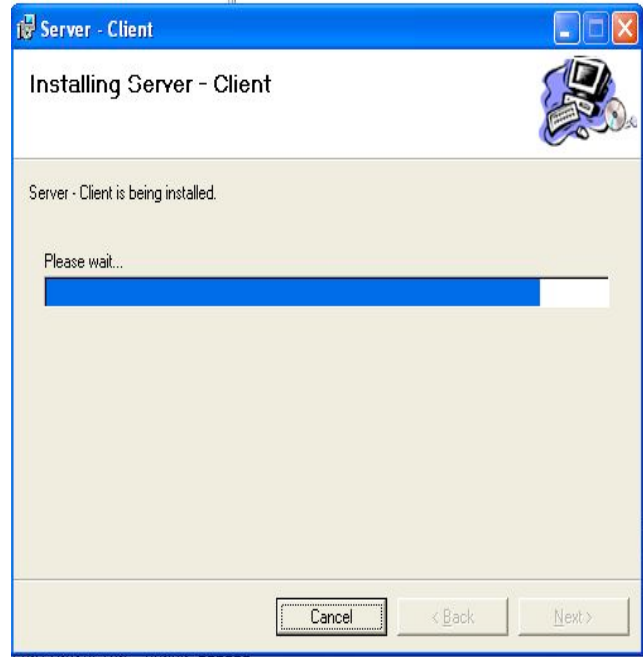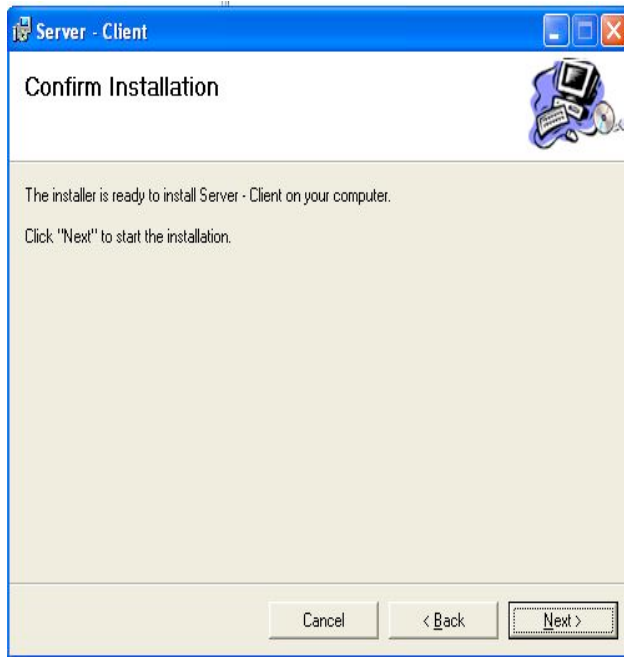
Choose the desired PC folder and wait for the process to complete; it should not take more than a couple of minutes.

4) CHOOSING THE CORRECT SETTING FOR YOUR ENVIRONMENT

In order to adapt to the specific needs of each customer, the ICALS system includes a user friendly control with personalised settings for your particular workspace. This consists of a turning knob located on the case with 7 possible configurations and 5 ON/OFF switches for each PIR sensor and for the whole system. The settings are as follows:

- *Mobile Phone Detection Only* (**knob position 1**): this setting will disable the remaining sensors and the system will detect only cell phone activity. The lights will remain on while a cell phone is in use and will turn off automatically 30 minutes after the last detection.

- *PIR Motion Only* (**position 2**): detects movement within the controlled area, all other sensors are disabled. Again, there is a 30 minute window since last detection.

- *PC Monitoring Only* (**position 3**): detect computer use within the local area network. Other sensors disabled. 30 minutes after last detection of mouse or keyboard use a prompt will appear on the screen.
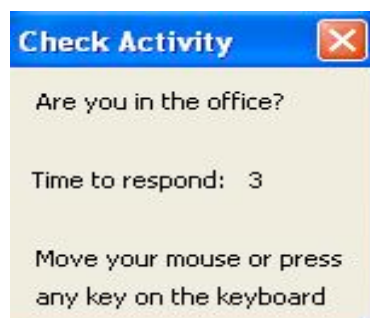
The user has 5 minutes to respond, if there is no response the lights go off.

- *Mobile and PIR Motion Detect* (**position 4**): detects both mobile phone signals and movement within the office. The PIR will override the mobile phone detector if there is no motion for 30 minutes.

- *Mobile and PC Monitoring* (**position 5**): detects mobile phone signals and use of PCs within the network. The detectors act separately and the lights will stay on while any of the two detectors senses activity.

- *PIR Motion and PC Monitoring* (**position 6**): detects separately both motion and use of PCs. Lights will stay on while any of the detectors sense activity.

- ***All Detection* (position 7):** full combination of mobile, movement and PC activity detection. The PIR will override the mobile phone detector after 30 minutes and will work separately with the PC monitoring unit. The lights will turn off only if there is no detection from both the PIR and the PC monitoring unit for 30 minutes.

- ***System ON/OFF:*** the case contains an on/off switch labelled "system enable". This will override the whole system if the user so desires and will pass the light control onto the wall switch for the mains.

- ***PIR ON/OFF:*** the case has four of these switches labelled (PIR ON/OFF) located each near its corresponding detector that will enable or disable said motion detector. This is useful for ignoring sensors that are close to a heat source or pointing at the sun as these will wrongly give a high output even if no movement occurs within the controlled area.

5) TECHNICAL INFORMATION

Detecting Systems	Specifications
Motion	- Passive infrared detection 2 separate sensing elements to reduce false alarms - White light and hot air turbulence rejection - High radio frequency interference immunity 12mA at 6Vdc standby-2mA detection - Operating temperature -20°C to 55°C - Range 10 m, 90° aperture
Mobile Phone	- GSM 900MHz and 1900MHz frequency band detection (bi-band) - SMS detection - Bluetooth detection 2.4GHz - Range 15 m - Supply 3Vdc 5mA standby, 50mA detection - Background noise elimination
PC Monitoring	- Mouse and keyboard activity detecting - Windows XP compatible - Supports Ethernet and WI-FI Local Area Network - Serial port connection - Server controlled, any workstation can act as a server - Controls work groups within the network
Control System	12Vdc input, output pulses 3Vdc 50mA nominal pull current - User defined settings as explained in part 4