Smart lighting and its usage in galleries
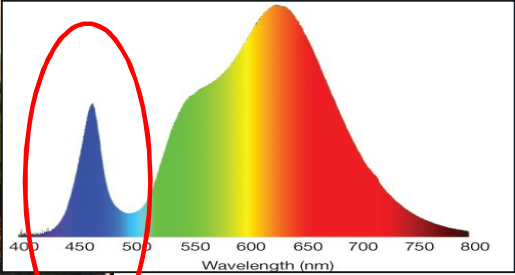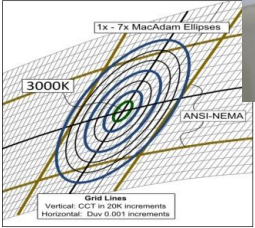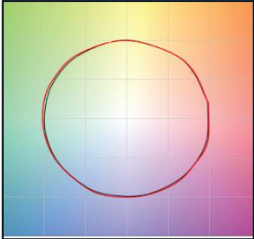
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What can smart lighting offer to galleries?

- A deeper, richer visitor experience
  - Light quality: sustained, accurate colour portrayal
  - Location-based information services
- A more sustainable operation
  - Maintenance savings
  - Energy savings
  - Conservation management
  - Easier (re) commissioning
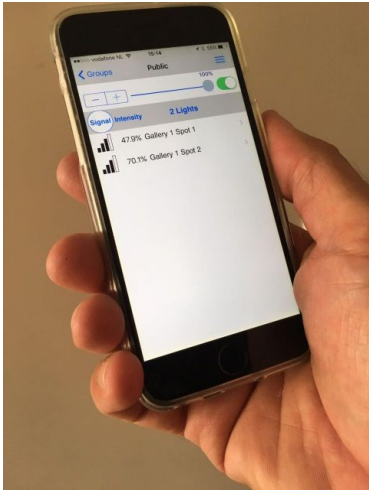
- Three fundamental questions

Van Gogh Museum, Amsterdam.
Lighting Design by Henk van der Geest
Luminaires by Mike Stoane Lighting

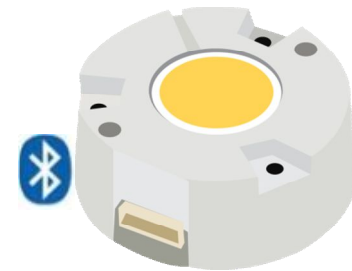**XICATO**®
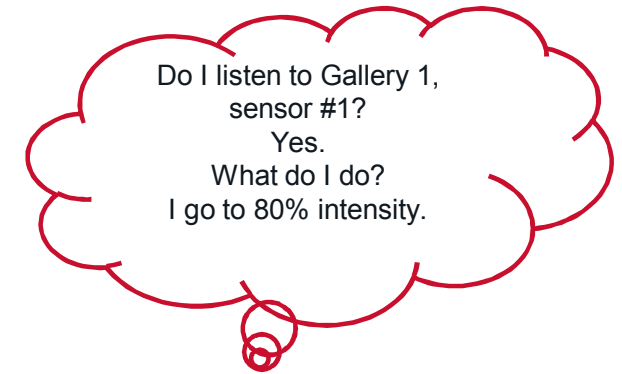
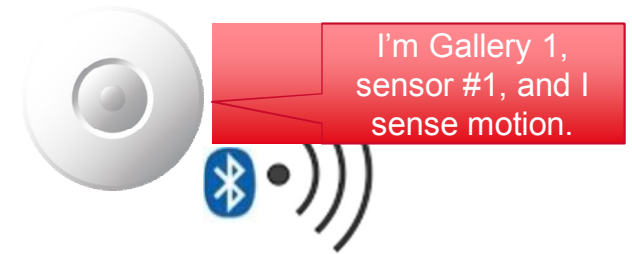# Light quality for architecture, artwork, people

XICATO®
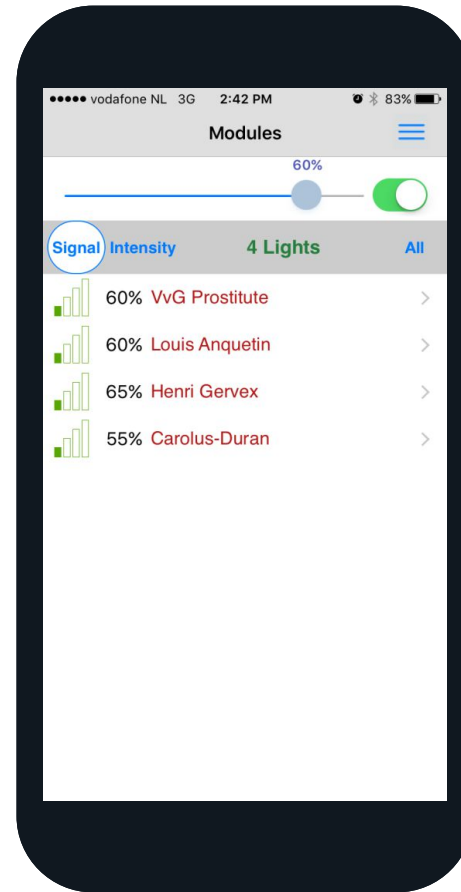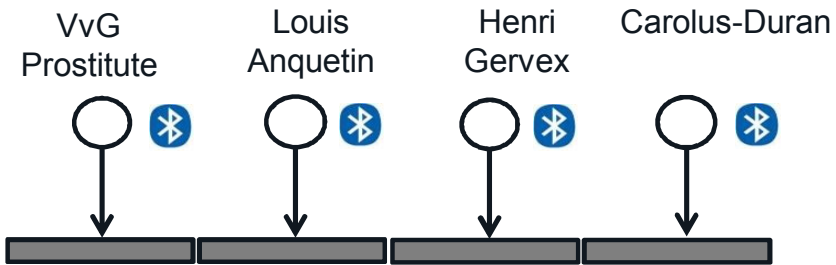
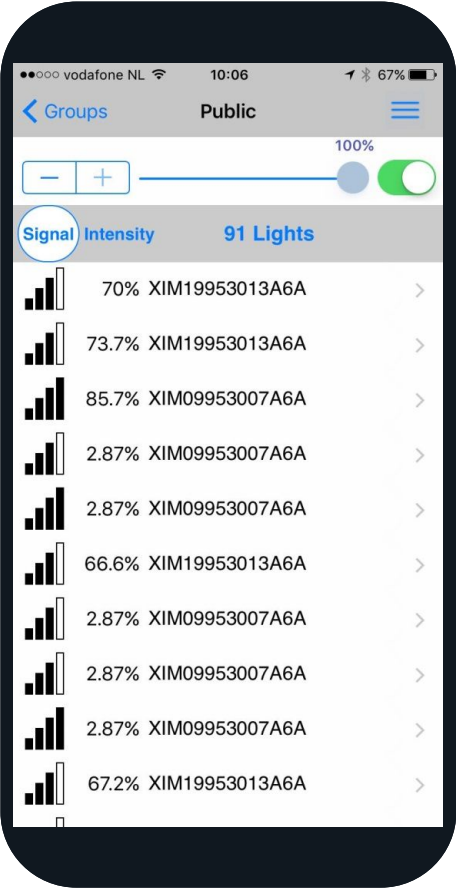# Peer to peer communication

No wires. No centralized controller.

Easier (re) commissioning

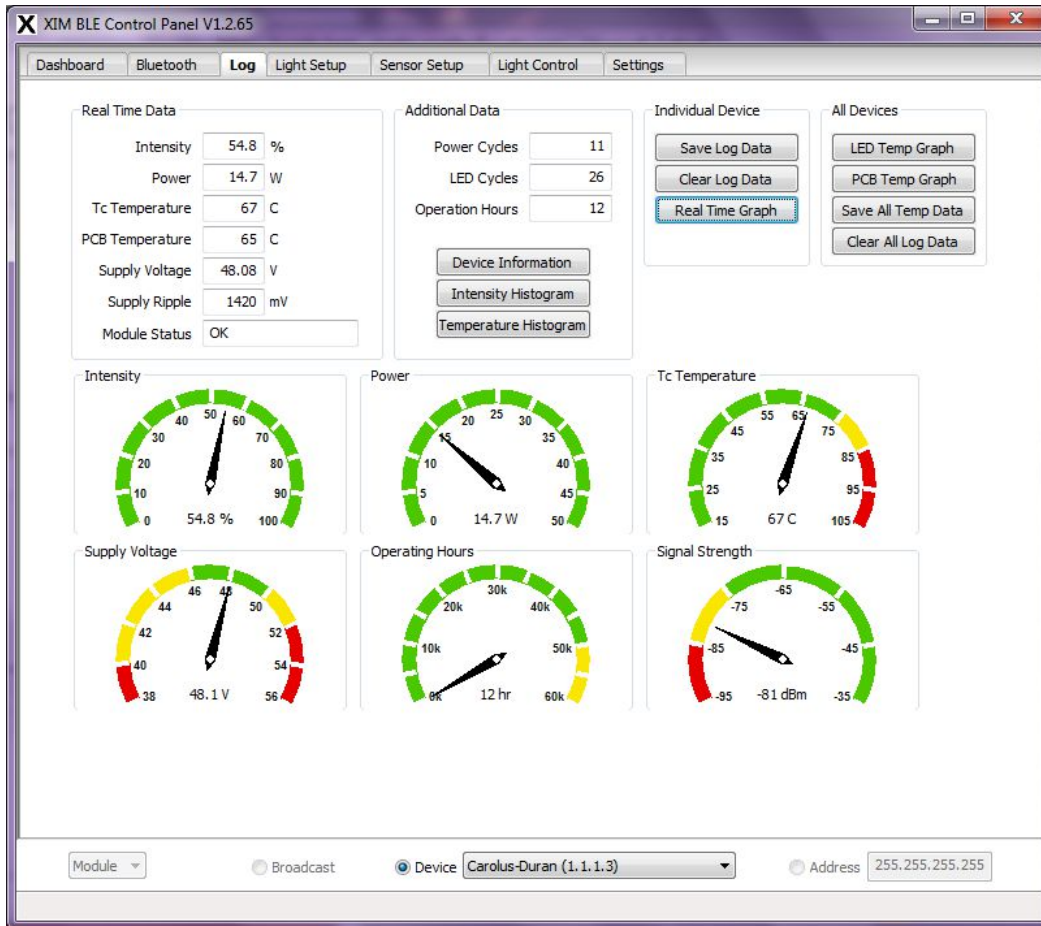Turn around and scalability

Commissioning at Museon, The Hague, 19th October 2016
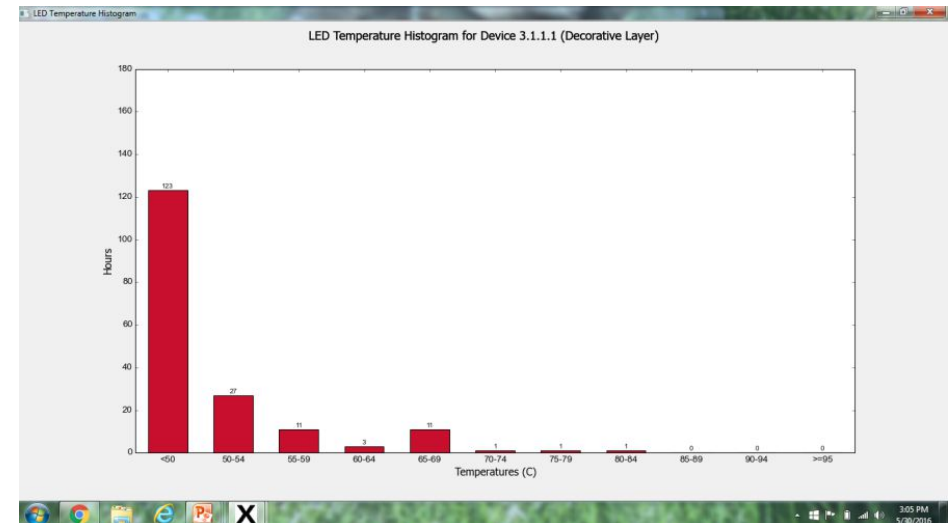

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Maintenance savings

Maintenance savings:
- Prolonged life through auto protection
- Real-time status and preventative maintenance
- Historical data
    - Payback claim verification

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Energy saving via SUBTLE use of sensors

- Natural light
- Movement

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New ways of communicating, 1
Using sensors

- Experience
- Revelation
- Not just enhancing characters in a play; lighting is a character itself

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Conservation management using sensors

Managing light exposure to minimise photochemical action

- Light dose (Lux-hours / year) is a function of:
  - The spectral sensitivity of the illuminated object
  - The spectral power distribution (SPD) of the light
  - The Preservation Target (years, decades, centuries, millennia)

- Methodologies
  - Limit when the art is shown (frequency or duration). Lighting is fixed during opening times
  - Above, plus vary lighting during open times according to a fixed schedule, eg for the Ardabil carpet at the Victoria & Albert museum
  - Above, with smart lighting linked to occupancy and ambient light sensors

| Category	LOAED	Preservation Targets		
		1000 yrs	100 yrs	10 yrs
High Sensitive ISO 1, 2, 3	ISO 2: 1.0 Mlx hr	50 lux for 20 hrs/yr	50 lux for 25 days/yr 500 lux for 25 hrs/yr	50 lux for 250 days/yr 500 lux for 25 days/yr
Medium Sensitivity ISO 4, 5, 6	ISO 4: 10 Mlx hr	50 lux for 25 days/yr 500 lux for 20 hrs/yr	50 lux for 250 days/yr 500 lux for 25 days/yr	340 lux for 365 days/yr 500 lux for 250 days/yr
Low Sensitive ISO 7, 8, above	ISO 7: 300 Mlx hr	100 lux for 365 days/yr 500 lux for 75 days/yr	1000 lux for 365 days/yr (500 lux/yr for target 200 yrs)	

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Conservation management using sensors
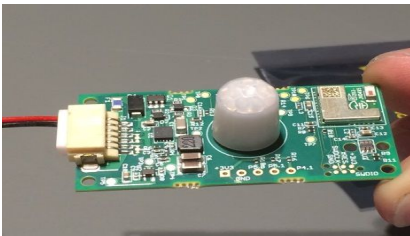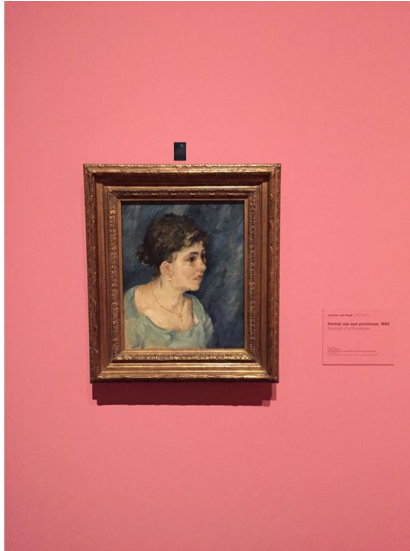
- Position sensors next to paintings and calibrate
- Set desired maximum light level on each painting
- Program exposure limit (lux hrs) into app for each painting
- App estimates display time at that level (hours per season)
- User tweaks parameters periodically to achieve actual desired display time
- User to set illumination level for painting when no presence is detected
- Database tracks and displays occupancy, lux levels and lux hours for each painting, with advice
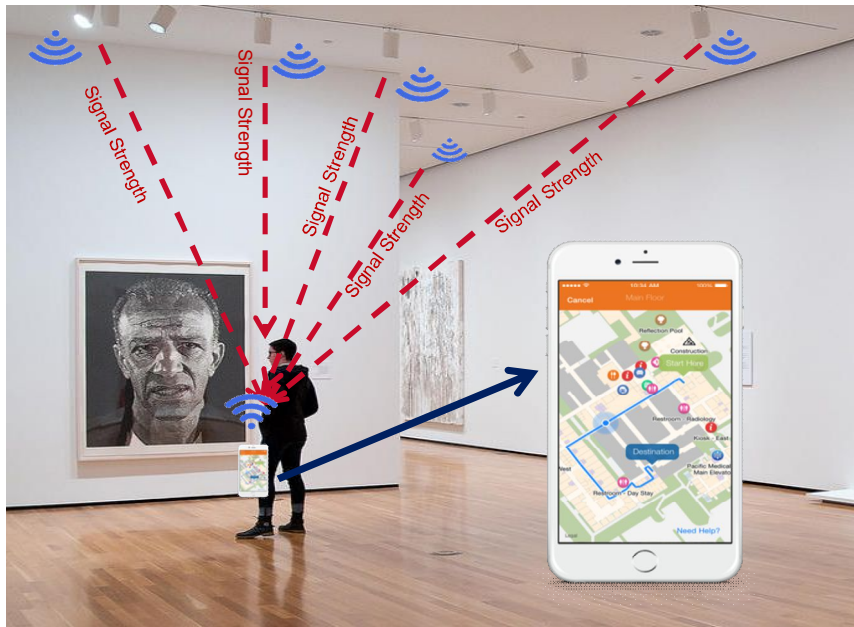- Alarm function

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‘Spider Sense’
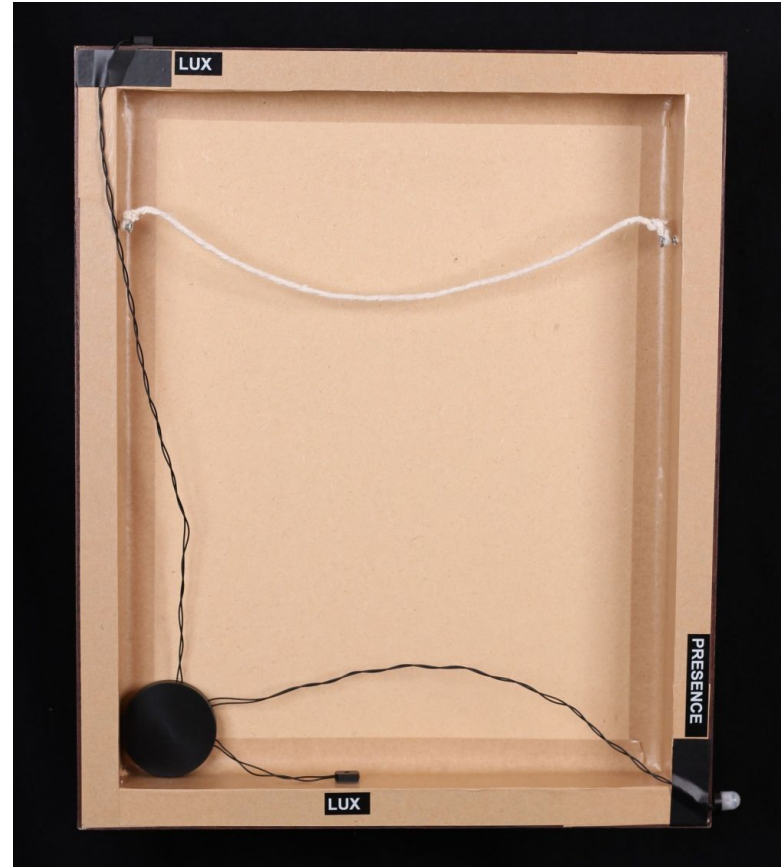
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New ways of communicating, 2
Indoor positioning
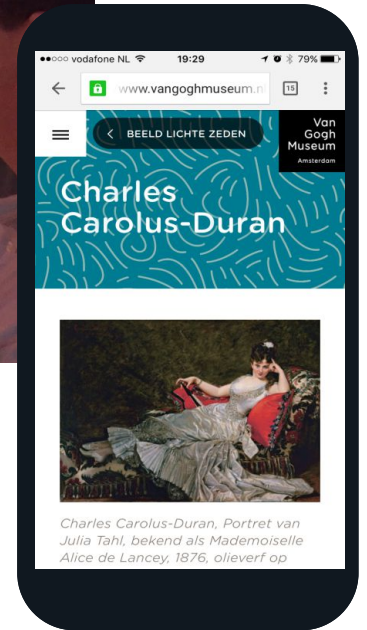
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Hypothetical application

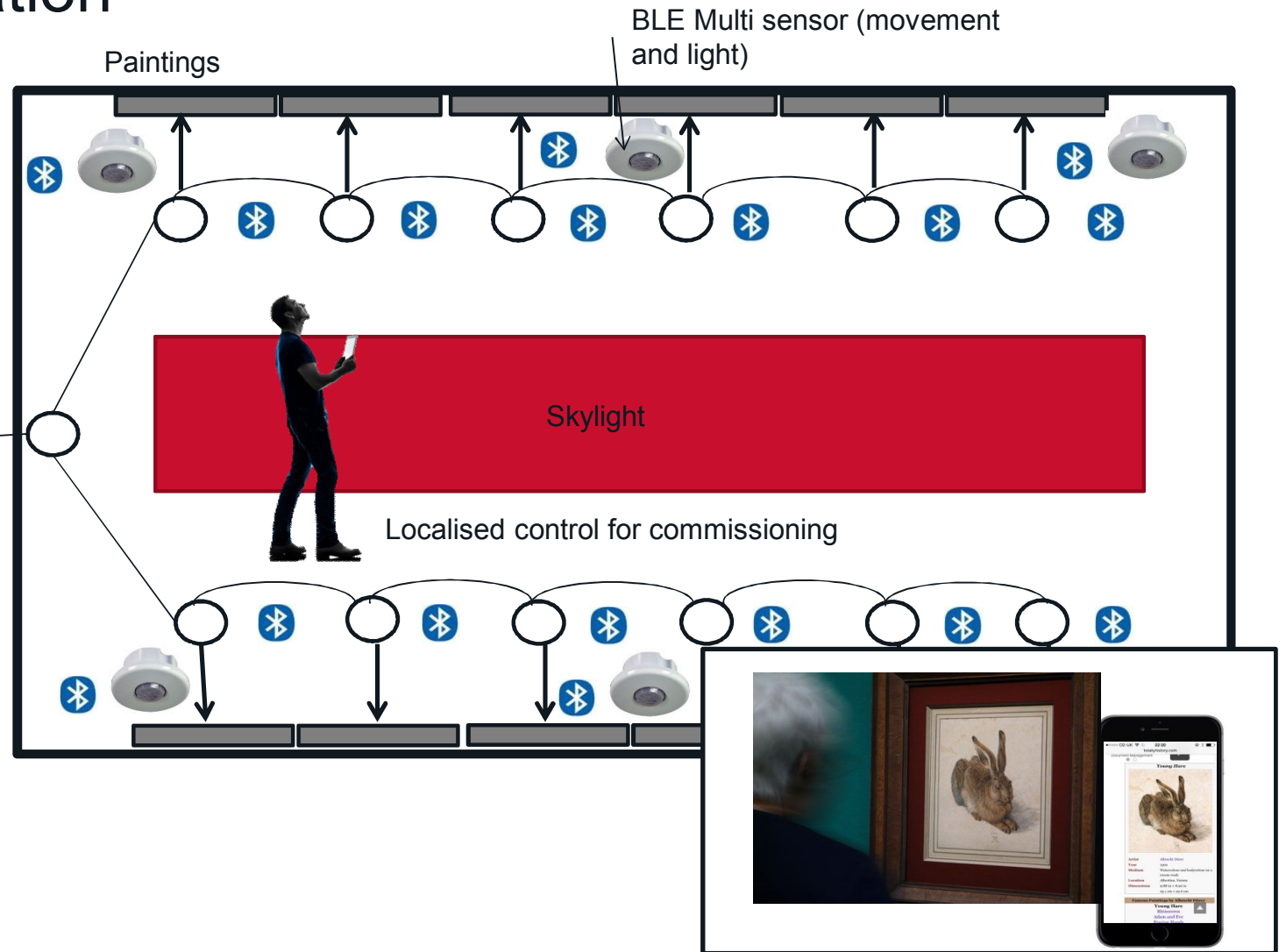BLE Multi sensor (movement and light)

Paintings

Wallace Collection, London
Lighting Design: SVA
Luminaires: MSL

Administration & Database

BMS / CMS

- Overall power management
- Energy data
- Maintenance alerts

Skylight

Localised control for commissioning

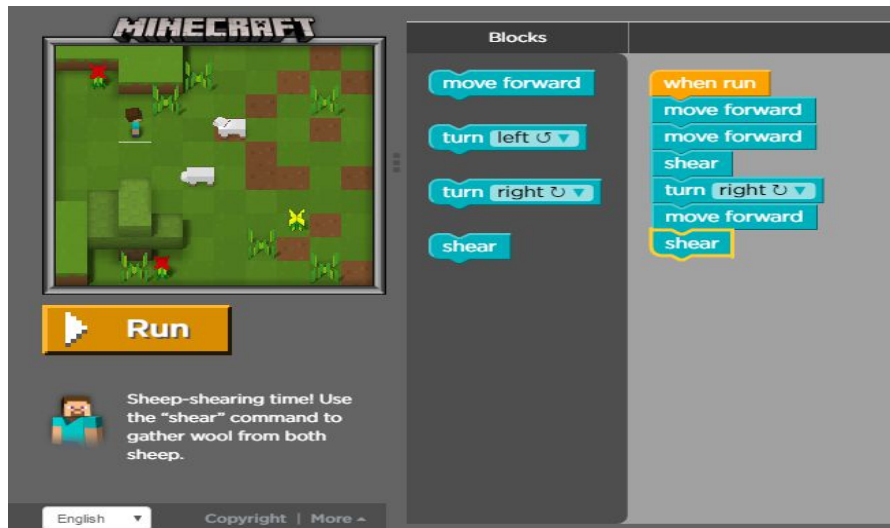**XICATO**®

Three fundamental questions

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Affordable?

- Reduced system costs c/w traditional
    - Dimming driver integrated into module
    - No control wires and no hub
    - Use existing smartphone and/or tablet for commissioning and usage
    - Free software

- Design and installation
    - No communication wiring to be installed
    - Modules preconfigured with position data linked to lighting plan
    - One and not two people to install control plan
    - All upgrades are OTA
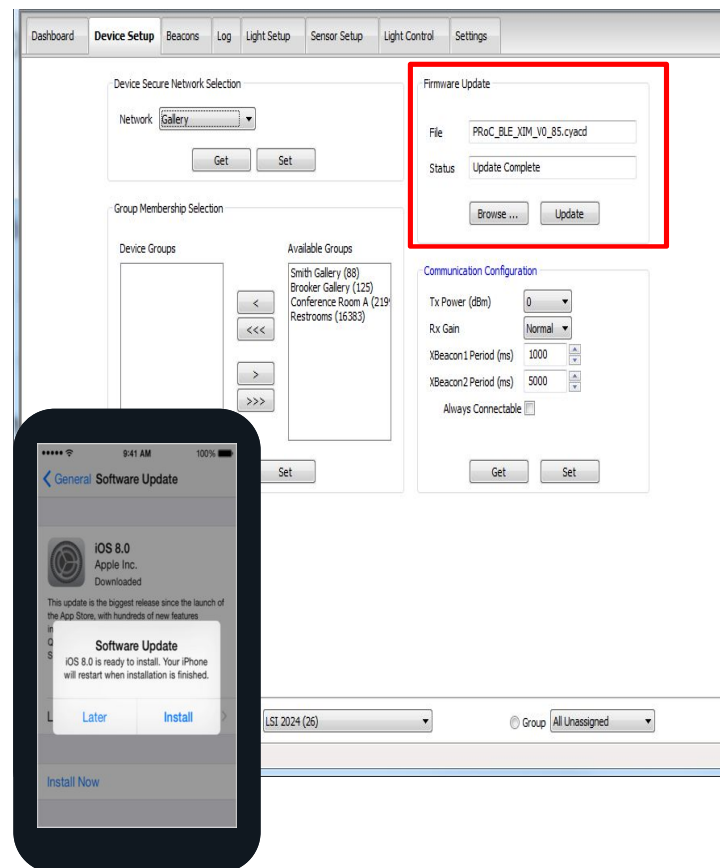
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Intuitive to use?
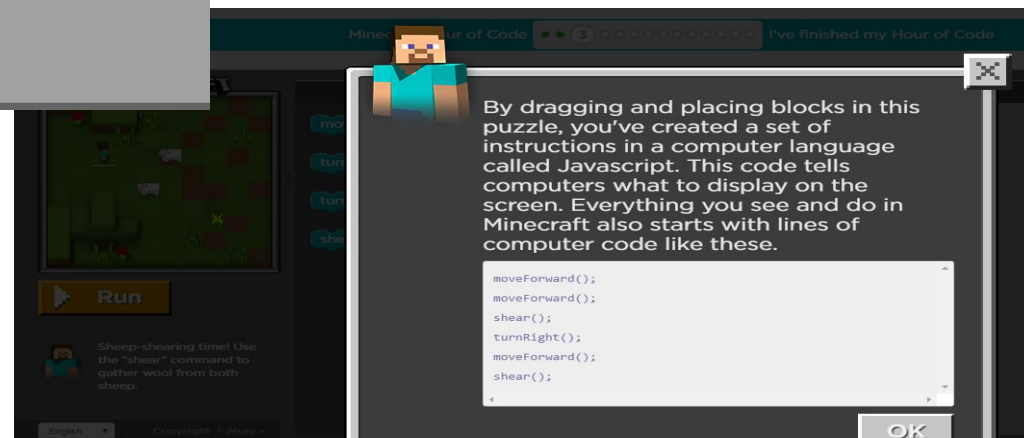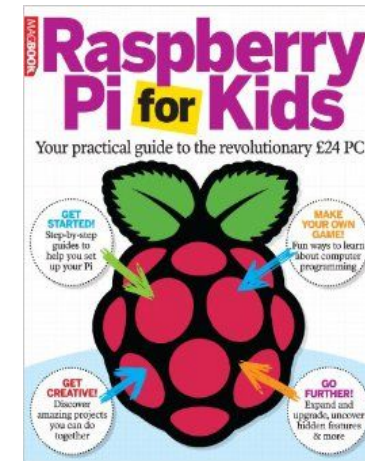
Usage of apps demystifies controls and bring usage from the elite to the all

Interoperable?