

MechoLux®

Lighting Strategies for High-Performance Buildings



MechoLux® System

MechoSystems Energy-Management Program: Shades up, lights down.

For high-performance buildings

MechoLux is the new member of the Energy-Management Program, which includes SolarTrac® and SunDialer®.

The cost-effective MechoLux Daylighting System makes it possible:

- To take advantage of the largest untapped opportunities for improving building-energy performance.
- To enhance occupants' relationship to the environment.
- To acquire greater access to natural light and to outside views without occupant discomfort.

High-performance buildings with MechoLux and SolarTrac benefit from:

- Lower lighting and HVAC costs.
- More access to sunlight and outside views.
- Greater comfort from glare and solar heat gain.
- Increased productivity overall due to the symbiosis of the two systems.

In a high-performance building using MechoLux and SolarTrac, lighting fixtures and roller shades both adjust automatically to deliver the optimum amount of daylight. Shades raise and lower in

response to sun and sky conditions, while lights dim themselves. These adjustments occur automatically, optimizing daylight and energy use, with no human intervention necessary.

As Energy-Management partners:

- SolarTrac is the state-of-the-art, automated-shading system that maximizes the use of natural sunlight by programming shades to move up and down incrementally and automatically throughout the day.
- SunDialer, the economical lighting-control system, serves more modest projects, such as small and retrofitted commercial spaces.

The benefits are clear:

Human factor: At MechoSystems, we're keenly aware that the quality of light matters as much as the quantity of light. Daylight and outdoor views have long been shown to benefit building occupants. Workers are happier and more productive; students perform better and learn more, and patients have better outcomes.

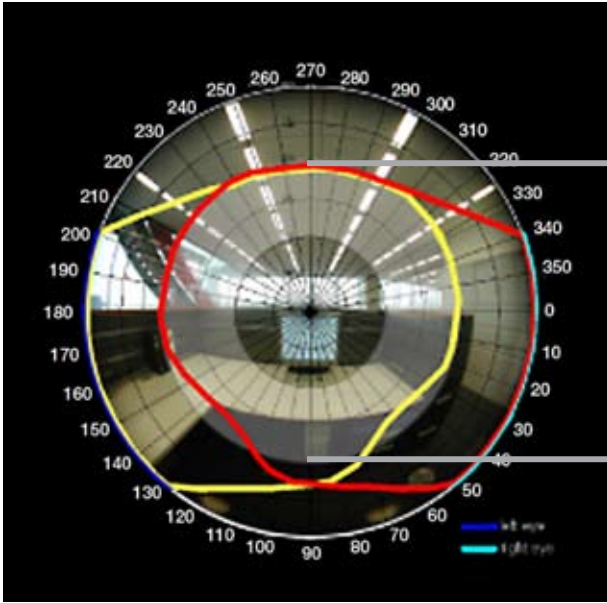
Cost saving: At the same time, MechoLux's common Ethernet backbone and open architecture makes it cost-effective to set up and reconfigure.

Sustainability: MechoLux and SolarTrac allow for the use of daylighting and electric lighting strategies that will deliver energy savings.



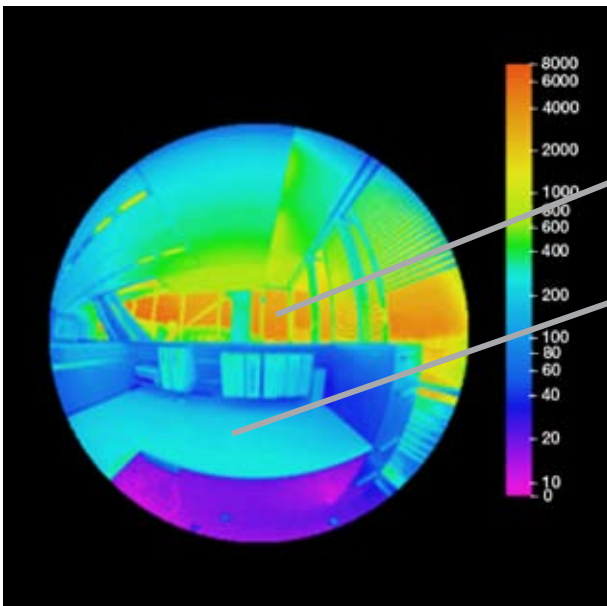
Shades raise and lower in response to sun and sky conditions, while, in tandem, the lights are dimmed by MechoLux. These adjustments occur automatically, optimizing daylight and energy use, with no human intervention necessary.

Contrast Ratio



30–60°
cone

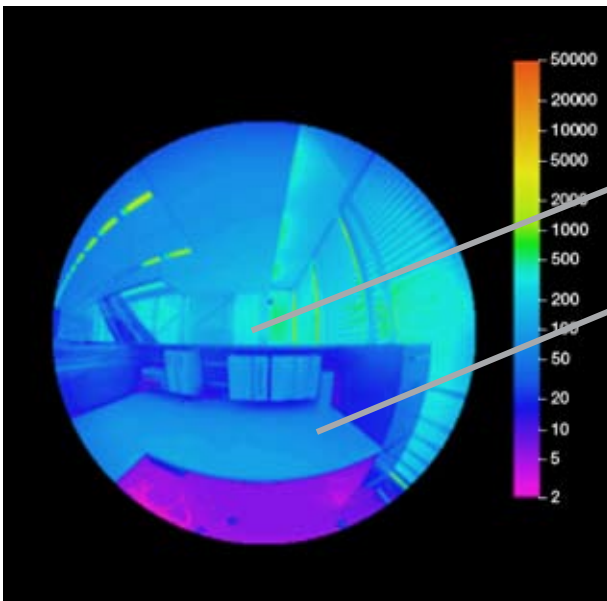
After reviewing several displays, The New York Times decided its standard would be a product with a screen brightness of 200cd/m² (candelas per square meter). Following IES recommendations for contrast ratio, The New York Times and its consultants specified a design intent that the luminance between a remote surface and a task surface (30–60 degree cone) would not exceed a 10:1 ratio.



8,000cd/m²

100cd/m²

Hence, unshaded glazing in the background has a luminance value of 8,000cd/m² and approximately 100cd/m² at the task (or work) surface, which results in an unacceptable contrast ratio of 80:1.



200cd/m²

50cd/m²

Lighting fixtures dim down to their minimum target levels when the automated shades lower (to override the brightness allowable by the lighting/shade control systems), which trends to an acceptable contrast ratio.

Strategies

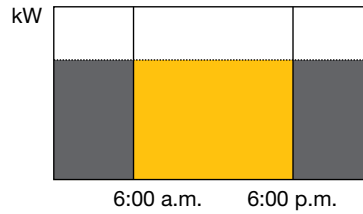
Energy savings

■ Energy saved
■ Energy lost

If you don't control both lights and shades, you're only getting half the benefit.

Smart-Time Scheduling

10-50%



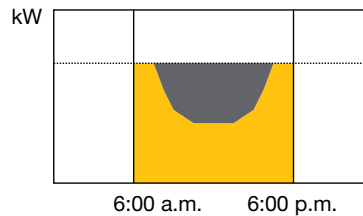
Lighting fixtures and roller shades are interdependent concerning daylighting and lighting-energy costs.

The amount of daylight penetrating a building affects the amount of artificial light needed. Lighting and lighting costs aren't being fully managed if you don't control the shades.

The savings MechoLux delivers are measurable. Its powerful software-reporting tools and energy-saving capabilities allow building managers to see exactly how much energy the system conserves.

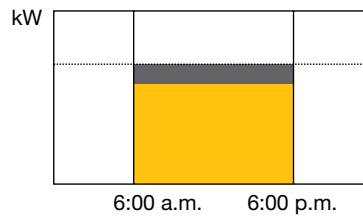
Daylight Harvesting

17%



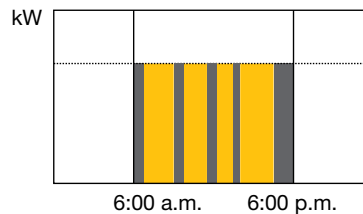
Task Tuning

28%



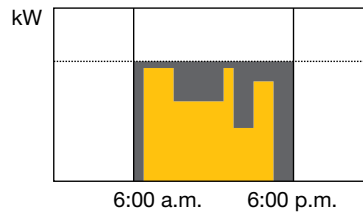
Occupancy Control

35%



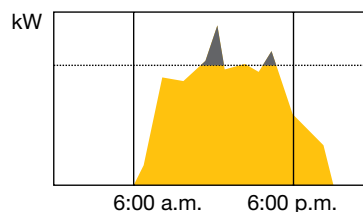
Personal Control

38%



Variable-Load Shedding

10%



**New design. Open architecture.
Easy configuration.**

MechoLux's cost-effective and flexible features are the product of its having been written from the ground up as a software-based, digitally controlled system. As a result, it is device-independent. Other companies' systems—absent of open architecture—add software to their expensive, proprietary, analog devices. Because the MechoLux systems do not shackle you to proprietary devices, costs are lowered, and options opened.

The systems' features BACNet and other communication capabilities in order to integrate with Building Management Systems (BMS) or other systems. Demand-response functionality can also be embedded in the systems.

MechoLux and SolarTrac communicate via the same Ethernet backbone and are controlled through the same desktop computer. In fact, all of MechoLux's devices are plug-and-play and can be addressed and assigned from a desktop or the head-end unit.

The system's open architecture allows the use of virtually any industry-standard (3rd-party) components, such as:

- Dimmable ballasts.
- Occupancy sensors.
- Lighting sensors.
- Other types of devices as technology expands.

MechoLux uses click-and-go Cat-5 network cable and universal input/output modules that can be daisy-chained back to the Energy Control Unit (ECU). The ECU collects and processes the information it receives from the system's sensors, and then distributes commands to dimmable ballasts and other devices. The ECU communicates over the building's existing local-area networks (LANs), and the system is installed independently of existing electrical lighting circuits, further keeping costs down.

MechoLux and SolarTrac are sustainable-design strategies that integrate daylighting and lighting-control systems. The bundling enables the individual components and systems to operate effectively and to optimize energy performance and efficiency.

The partnering of the two systems:

- Provides a significant amount of actionable data.
- Enables real-time performance reporting.
- Enhances compliance with LEED® under Energy and Atmosphere (EA), Indoor Environmental Quality (IEQ), and Innovation in Design (ID) categories.
- Functions with nonstop communication to ensure that a building's systems are operating optimally.
- Goes beyond monitoring, due to continuous communication, to adjust the system's controls and further reduce energy consumption.



Seven smart strategies



SolarTrac

Automatically adjusts roller shades in response to sun and sky conditions.



Smart Time Scheduling

In areas where occupancy sensors are not needed, time-scheduled switching or the dimming of lights can be used for zones as small as an individual light fixture.



Daylight Harvesting

Light levels are automatically adjusted to take advantage of natural sunlight. Sensors report light levels back to the control unit, and artificial lighting is dimmed when appropriate.



Task Tuning

Default light levels are set to suit a particular task or workspace to eliminate excessively bright lighting.



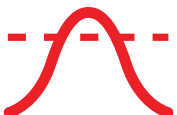
Occupancy Control

Occupancy sensors send data to the control unit to automatically turn off fixtures when they're not needed.



Personal Control

Users can control light levels at their desktops or work areas (if permitted by the system) through the Personal Control Software or a browser-based interface.



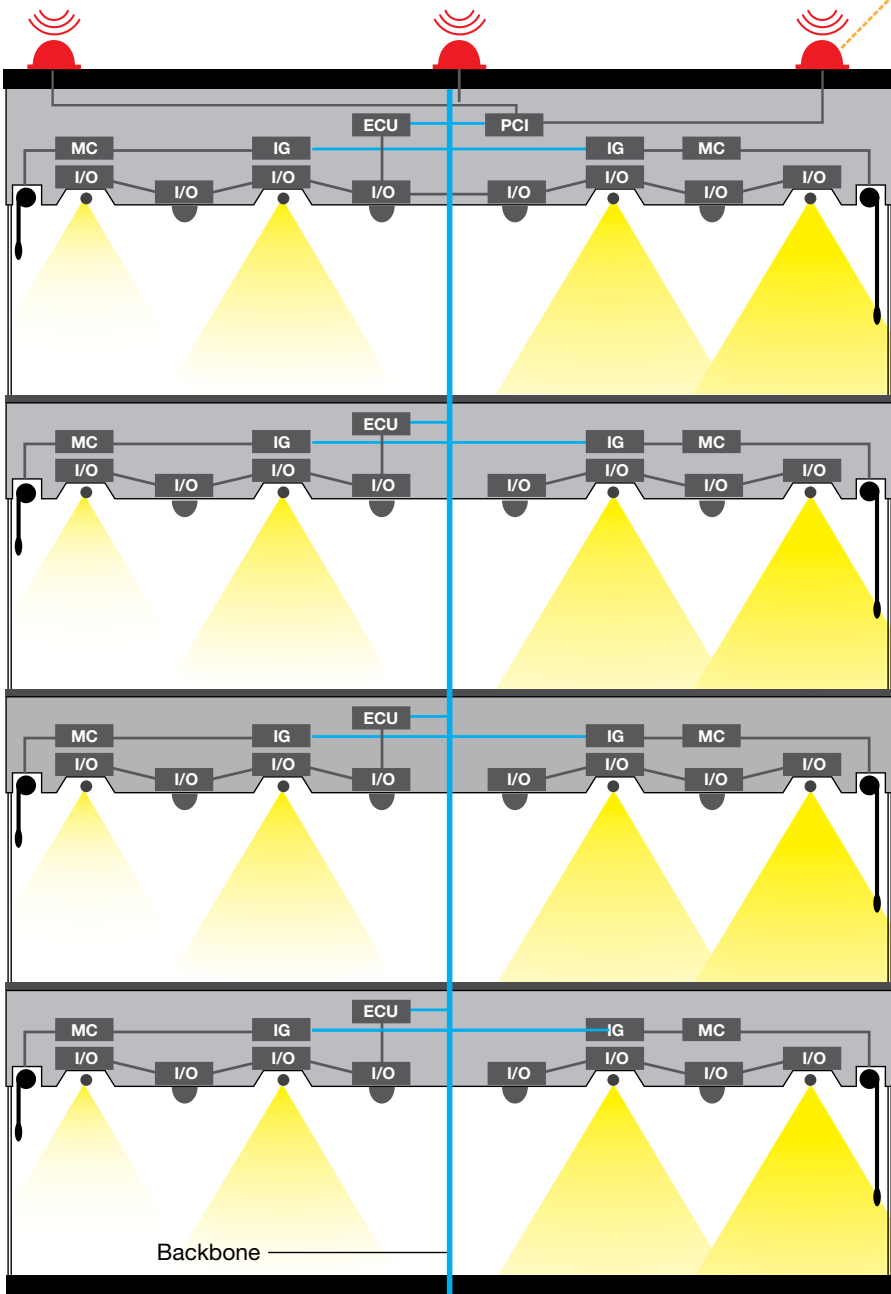
Variable Load Shedding

MechoLux can automatically shed lighting loads through dimming or switching to trim peak demand or respond to a utility price or demand-response signal. Load shedding can be done selectively with lowest-priority areas first.

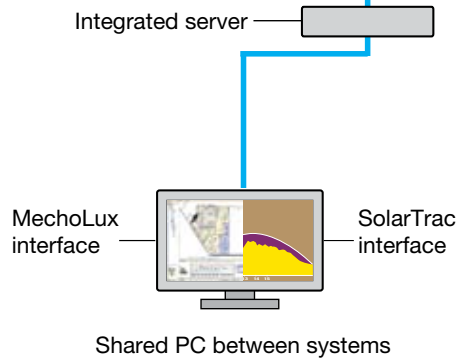


The SolarTrac® System has been implemented in The New York Times Headquarters.

MechoLux® and SolarTrac® systems

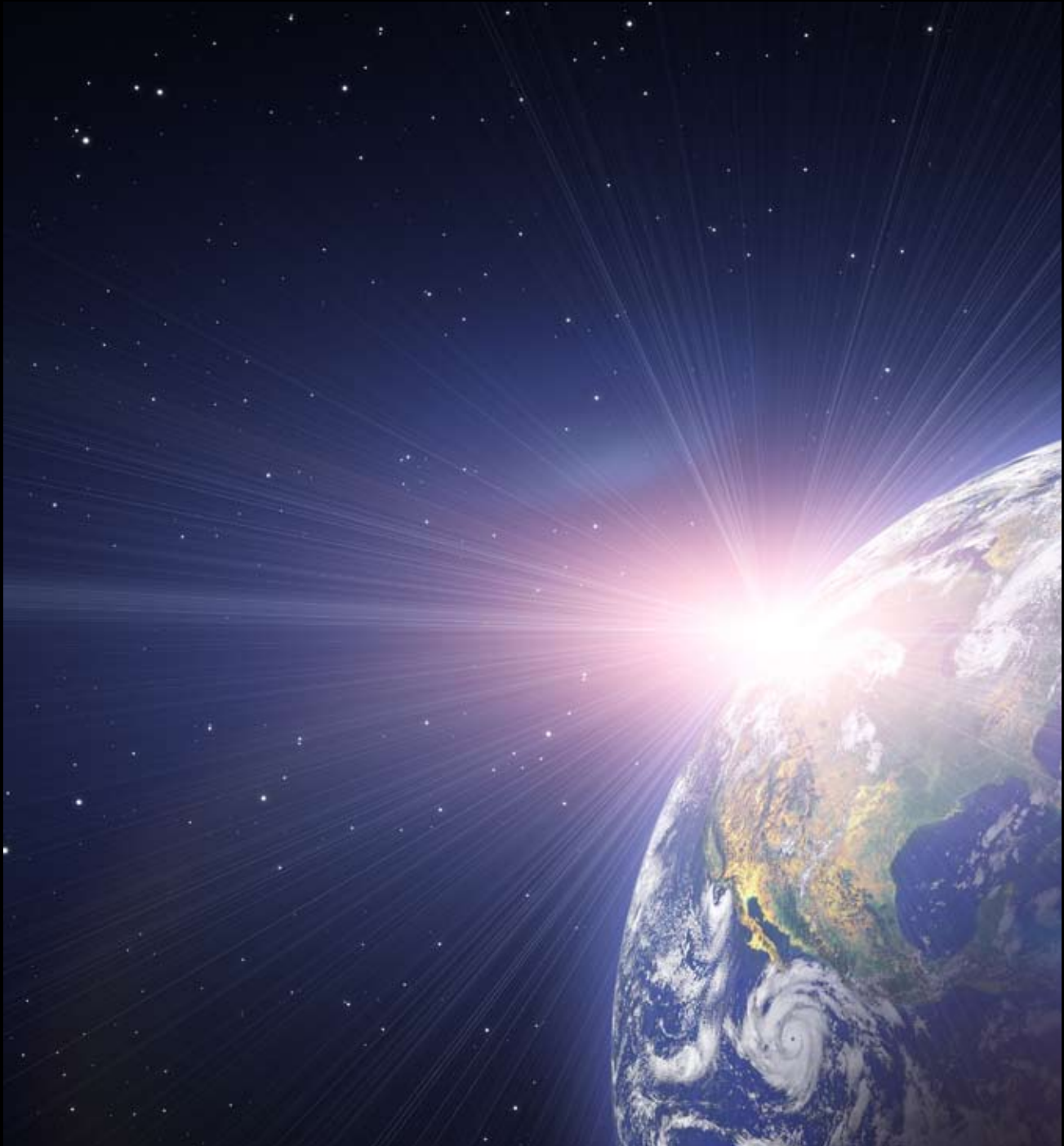


- Roof-mounted radiometers measure the total solar energy present (not just visible light) in the skydome over the building in real time.
- Via an Ethernet backbone (see the center-vertical blue line), SolarTrac uses the information collected by the radiometers to discretely position the shades to meet the occupant's expectations of visual and thermal comfort.
- Through the same backbone, SolarTrac also shares the data collected by the radiometers with the Energy Control Unit (ECU) and merges it with inputs from sensors, zone and scene controllers and—also—personal control software.
- This information is then distributed through a bus line to input/output devices (I/O) that address each lighting fixture, informing the fixtures to dim down or top off the amount of light admitted by the shades, achieving light levels assigned to each zone.



Legend			
	Backbone		Motor controller
	Central controller		PC interface
	I-Con Gateway		Radiometer
	Input/output module		Solar shade
	Lighting fixture with dimming ballast		Visual light sensor

Light. Energy. Managed.



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