

AAC SolarTrac™



The ultimate

window

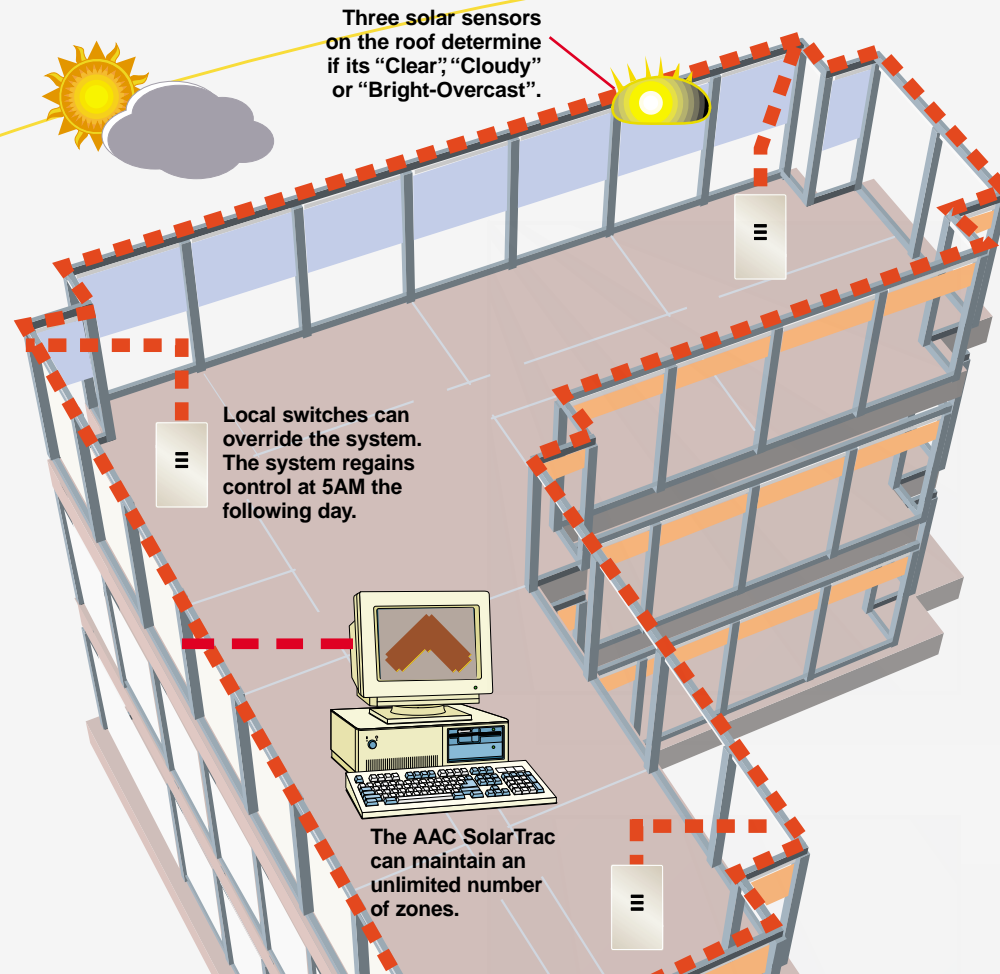
management

system

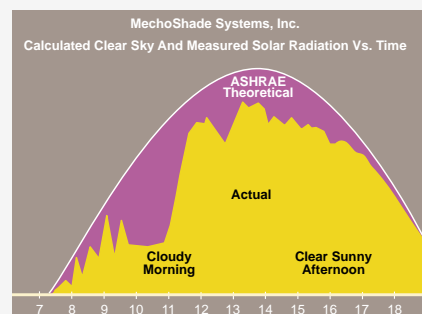


The AAC SolarTrac™ computerized solar tracking system for superior window management and shade alignment.

The AAC SolarTrac™ Window Management System is designed to automatically adjust the position of the shades incrementally throughout the building to maximize view and daylighting while protecting people and work surfaces from direct sun when and where needed, using a PC-based program. SolarTrac's intelligent multi-level command accounts for "Clear", "Cloudy" or "Bright-Overcast" sky conditions in accordance with established criteria for vertical, horizontal or sloping windows. In addition, it factors in the sun's angle of incidence, solar heat-gain (in BTUs or W/M²), allowable solar penetration, plus brightness and glare control.

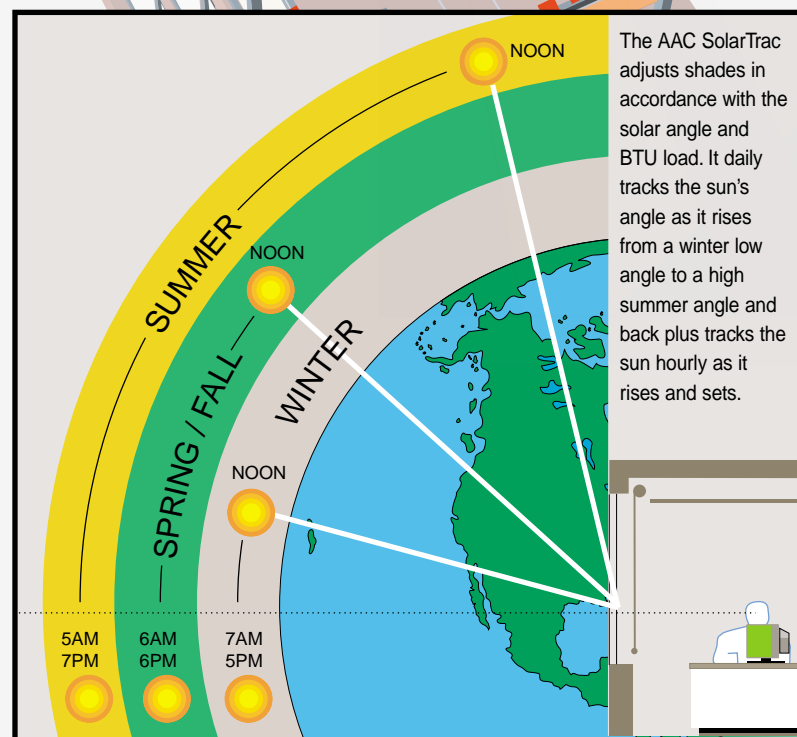


Microclimate Control

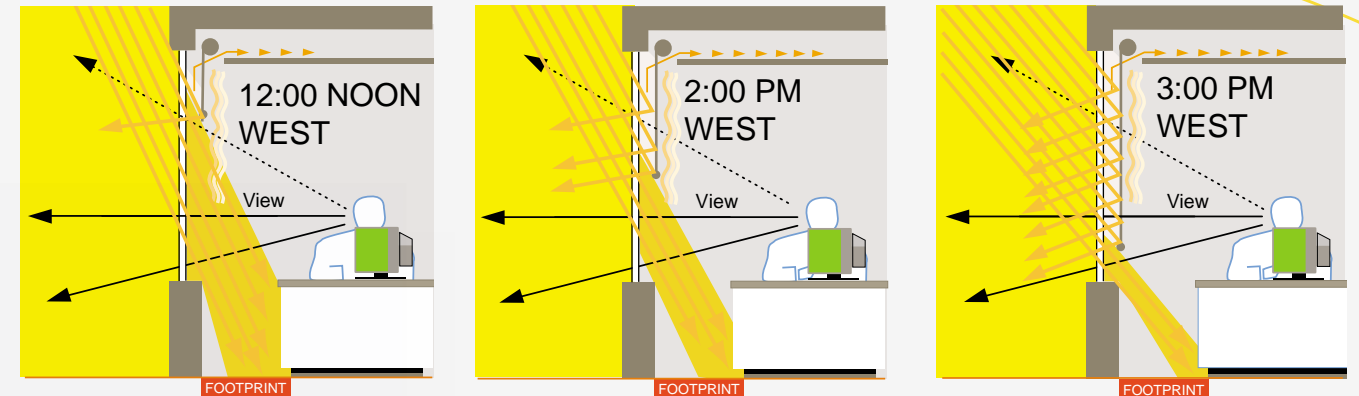


BTU graph plotting measured solar radiation (sunshine) vs theoretical. The AAC SolarTrac uses this data daily to determine "Clear", "Cloudy" or "Bright-Overcast" sky conditions and operate accordingly.

This minute by minute evaluation of the Ashrae Theoretical Radiation Curve with Actual Solar Radiation registered on the building by the sensors determines the operation of the program.



Controlled solar penetration while assuring view and brightness management.



The AAC SolarTrac™ Window Management System also provides users with energy savings by optimizing the solar optical properties of ThermoVeil® ShadeCloths, which when used in recommended densities and colors, provide a significant reduction in solar heat-gain and greater comfort from the radiant component of sunshine, while maintaining those important outdoor views so beneficial to employee well being, and providing greater use of natural light recommended by healthcare professionals.

The AAC SolarTrac™ Window Management System is a multi-zone controller that:

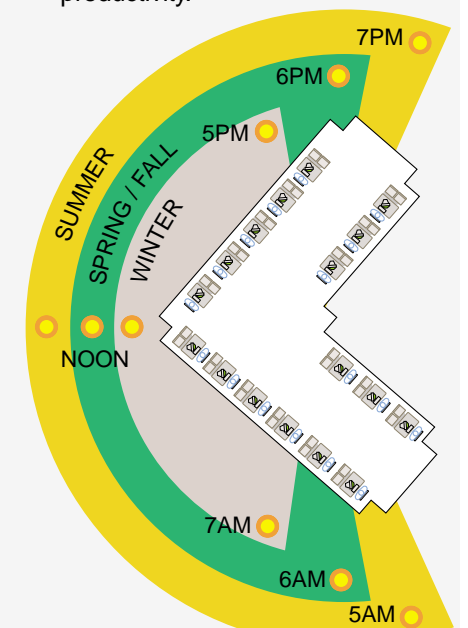
- On a daily schedule, automatically positions the shade to meet varying sun angles.
- Using 3 radiometers, it determines the momentary microclimatic conditions such as sunny, cloudy or bright-overcast sky conditions.
- Maximizes the amount of natural light and view thru the window by keeping the shade as high up as possible while not allowing the sun to penetrate beyond a user defined point within the space (footprint — see art above)
- Incorporates user defined internal time delays, for intermittent clouds and sun/no sun sky conditions and cycles the shades on a programmed basis.
- During nighttime winter conditions it lowers the shades to provide additional insulation if desired.
- During nighttime summer conditions it raises the shades to assist in nighttime cooling.

- Includes manual override capability by zone for executive offices, conference rooms and training facilities.
- MechoShade Systems, Inc. can monitor, perform system diagnostics and make adjustments via modem anywhere in the world.
- Integrates with building-management systems. (Optional)

- Improves productivity by:
 1. Improving personal comfort.
 2. Reducing the time employees spend adjusting shades.
 3. Regulating brightness and glare on CRT screens to reduce eye strain and improve productivity.

AAC SolarTrac™ Window Management System benefits include:

- Window shade alignment.
- Uniform building appearance by elevation.
- Optimizes use of natural light and views to the outside.
- Provides HVAC engineers with the flexibility to downsize air conditioning or to operate at a higher temperature set point.



Description of Operation

The multi-zone, multi-position, PC-based AAC SolarTrac™ Window Management System was developed exclusively for the operation of ElectroShades®.

The system is an intelligent multi-level command program which automatically adjust the position of shades incrementally, in accordance with the sun's angle of incidence, solar heat-gain factors in BTUs, and allowable solar penetration.

The system allows for brightness and glare control by adjusting the shades to "clear-sky", "cloudy-sky", or "bright-overcast-sky" conditions. The AAC-SolarTrac system incorporates these elements in accordance with an established computer program for vertical, horizontal, or sloping windows.

The AAC SolarTrac System is a multi-zone controller that:

- On a 365-1/4 day solar analysis, AAC SolarTrac automatically positions the shades to meet varying sun angles. This is accomplished utilizing ASHRAE clear day radiation as compared micro-climatic conditions at the site provided through three redundant solar meters via analog inputs into the system.
- Using solar meters, determines the momentary micro-climatic conditions (clear, cloudy, or bright-overcast).
- Incorporates user adjustable internal time delays, which adjust for intermittent clouds.
- During nighttime winter conditions, lowers the shades to provide additional insulation; during nighttime summer conditions, raises the shades.

Almost unlimited programming options are available to the end user such as lowering shades, at night and winter to reduce heat loss and/or reduce internal illumination transmitted out of the building.

- Includes manual override capability by zone.
- Incorporates on-site-adjustments to operating standards, either by user or remotely via modem by MechoShade.

Master Specifications

A. Hardware

1. The AAC SolarTrac Window Management System shall be equipped with a standard desktop PC or compatible computer with all the necessary interfacing, hardware and software to accept the following:
 - a. Analog inputs for solar meters (solar-level detection).
 - b. Analog inputs for optional temperature sensors.
 - c. Digital inputs for building-computer priority commands.
 - d. Inputs for fire alarm and additional non-designated ports.

2. The AAC SolarTrac software is compatible with: ElectroShade motorized solar sun screens utilizing Motor Logic Controllers (MLCs), IQ/MLCs, Smart Submasters. using standard asynchronous motors.

ElectroShade motorized solar sun screens utilizing Intelligent Motor Control (IMC) System

B. Software

1. Each zone on each floor in each building (or building module) shall be independently addressable.
2. For raising and lowering shades, each zone shall have typically 3 default intermediate aligned stop positions (25, 50 and 75% down) plus full up and full down. As an option additional programming can provide up to 16 incremental positions. Increment "0" represents the fully raised position. If five increments are selected for a particular zone of a floor of a building, the "0" setting indicates all the way up while "4" indicates fully down, with each increment one fourth of the total travel height.
3. Each zone on each floor in each building (or building module) shall have a set of tables which corresponds to a user-defined range of dates, times, and shade positions. The user can access these tables via the key board and through menu-driven screens.
4. Each table shall have a user-definable set of solar-level conditions. These levels shall define "clear-day", "overcast-glare", and "bright overcast sky" conditions. For the "clear-day" mode, the shades shall follow the programmed positions. The other two modes represent special conditions when the shades move to a specified position.
5. Each zone shall have user-defined delays for cloud and sun conditions to prevent intermittent clouds or sun from triggering the above special modes.
6. Each zone shall have user-defined priority-command positions to accommodate alarm-signal indicators which are relayed from the building computer.
7. Designated zones may have user-defined time-of-day accessibility. The locally accessed Submaster and Local controls shall be returned to the automatic (AAC SolarTrac) master-computer unit at a user-defined time or period.
8. During normal operation, the status of all zones on each floor in each building shall be displayed. Solar-intensity levels shall be displayed and indoor and outdoor temperature readings can be displayed as an available option.
9. Operation of the shade motors throughout the system shall be staggered so that peak electrical-loading conditions are prevented.
10. Remote access software shall also be provided to enable monitoring the performance of the system from a remote location via a dedicated analog telephone line provided by the end user.

