

## Daylighting Models

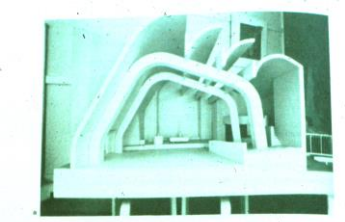






Fig. 1. The three-dimensional model used by Kevin Hurley for the design of the Holy Church in the Holy Sepulchre, Jerusalem. The model has been used to study daylighting in the church and to study the effect of the different types of skylight on the interior of the church.



## You need three things:

<b>Model</b> “light-tight and big enough”	
<b>Sky</b> “clear or cloudy... real or not”	
<b>Sensor</b> “eye, camera, or meter”	

## Real Skies...

The real sky...best when perfectly cloudy or perfectly clear...



Eden Project  
Grimshaw


## Artificial Skies...



Figure 9. Schematic of 34-ft diameter sky simulator with model on platform. (XBL 8412-5124)



**Hemispheric Skies**  
ECS Lab  
UC Berkeley



Requirements:  
 A wide range of realistic conditions of the model and lighting conditions can be created using the sky simulator. The simulator can be used to study the effect of the sky on the model. The simulator can be used to study the effect of the sky on the model. The simulator can be used to study the effect of the sky on the model.

↑ University of Michigan  
 Cardiff University →


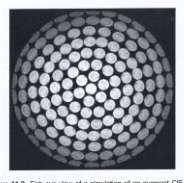



Figure 11.8 Fish-eye view of a simulation of an overcast CIE sky model (Moon and Spencer's model). (LESO-PB/ITB/EPL)

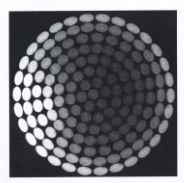
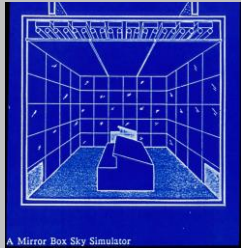


Figure 11.9 Fish-eye view of a simulation of a clear CIE sky model (Giller's model, country, sun altitude = 30°). (LESO-PB/ITB/EPL)

## Mirror Box Skies



A Mirror Box Sky Simulator



Seattle Lighting Design Lab



## Daylighted Artificial Sky

Funding: 1 July 2012 - 31 July 2014.

SketchUp model

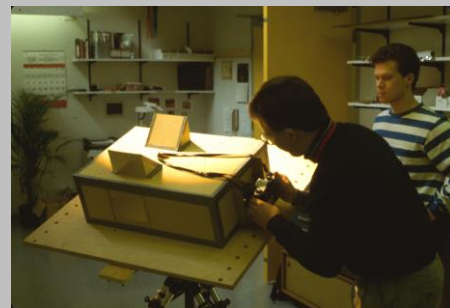


Solatube installation



Spring term construction sequence

## Sun Simulator...heliostats



Seattle Lighting Design Lab

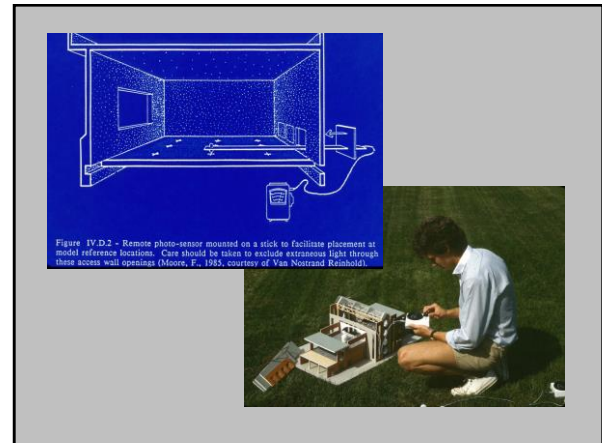
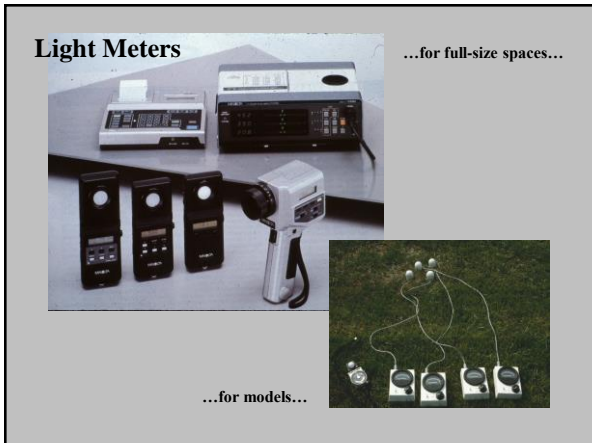


### Sensors...

...your eyes...



...a camera...



**NSF Daylighting Model Data Record Sheet**

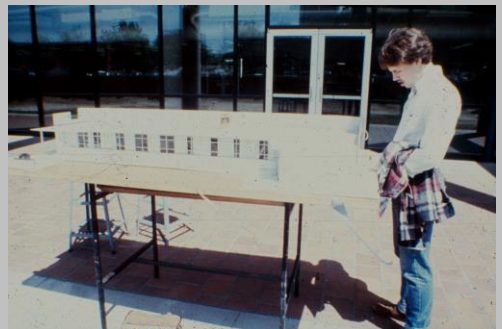
Notes: Maximum illuminance, General, Section, Plan.

EXTERIOR	INTERIOR DAYLIGHT (SP)						
	1	2	3	4	5	6	7
1. 1000	1000	1000	1000	1000	1000	1000	1000
2. 1000	1000	1000	1000	1000	1000	1000	1000
3. 1000	1000	1000	1000	1000	1000	1000	1000
4. 1000	1000	1000	1000	1000	1000	1000	1000
5. 1000	1000	1000	1000	1000	1000	1000	1000
6. 1000	1000	1000	1000	1000	1000	1000	1000
7. 1000	1000	1000	1000	1000	1000	1000	1000

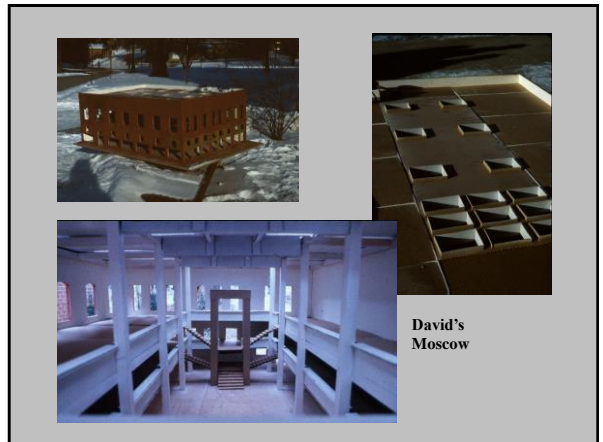
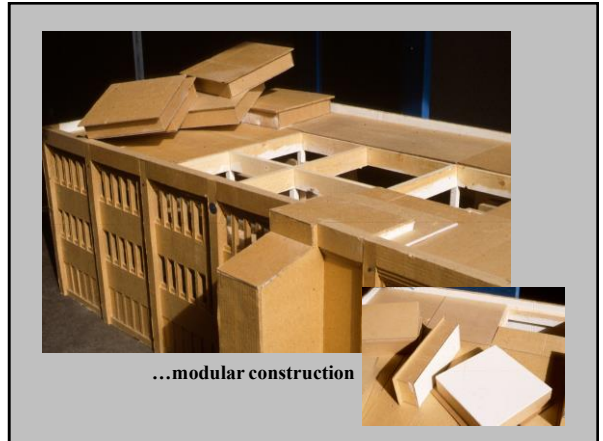
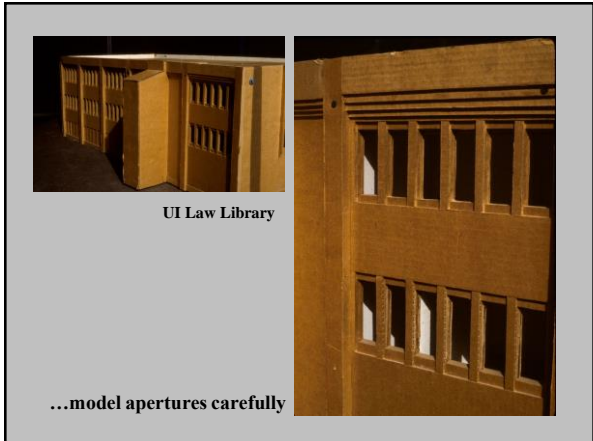
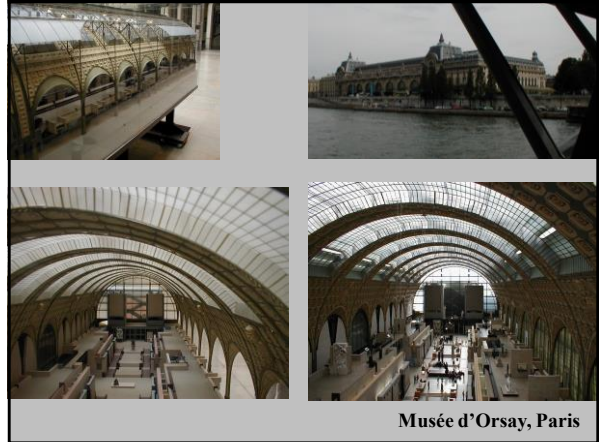
Figure IV.E.1 - A "visual lab" set up (w/ units from Michigan center)

- Video monitor (Panasonic CT-1930)
- Battery and power supply (Panasonic NY-BSE)
- Step driver (Panasonic NY-BSE)
- Video camera (Panasonic WV-200)
- Color camera (Hitachi HV-0017)
- Video recorder (Sony EV-1900 Beta)
- Video monitor (Sony EV-1311CR)
- Video recorder (Sony VHS)
- Video monitor (MCA VHS)
- Video camera (MCA VHS)
- Computer terminal (Microdot)
- Computer terminal (Microdot)
- Computer terminal (IBM/XT)
- Acoustic tape recorder

### Physical Models...



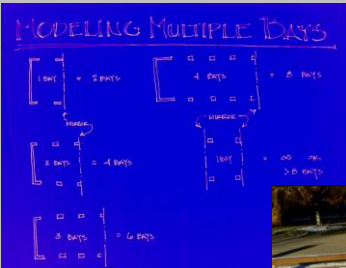
...ugly on the outside!



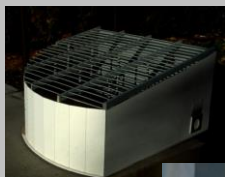
...model surface reflectance



UI SUB Ballroom



...mirror multiple bays or symmetry



...no translucent material

...ports for sensors



MOMA SF  
Botta

