

Museums, Videowalls, Shopping Malls and other buildings: applications of Radiance in lighting design

INSEAD - Smoothed human 3D models Radiance simulation in video conference facility lighting design.

Mandalay-Luxor Retail Complex, Las Vegas - “huge” models, daylighting simulation

Constellation Productions - Cinema projection screen design

Penn Station Redevelopment - Videowall Design

Austin Museum of Art - Daylighting design in Art Galleries

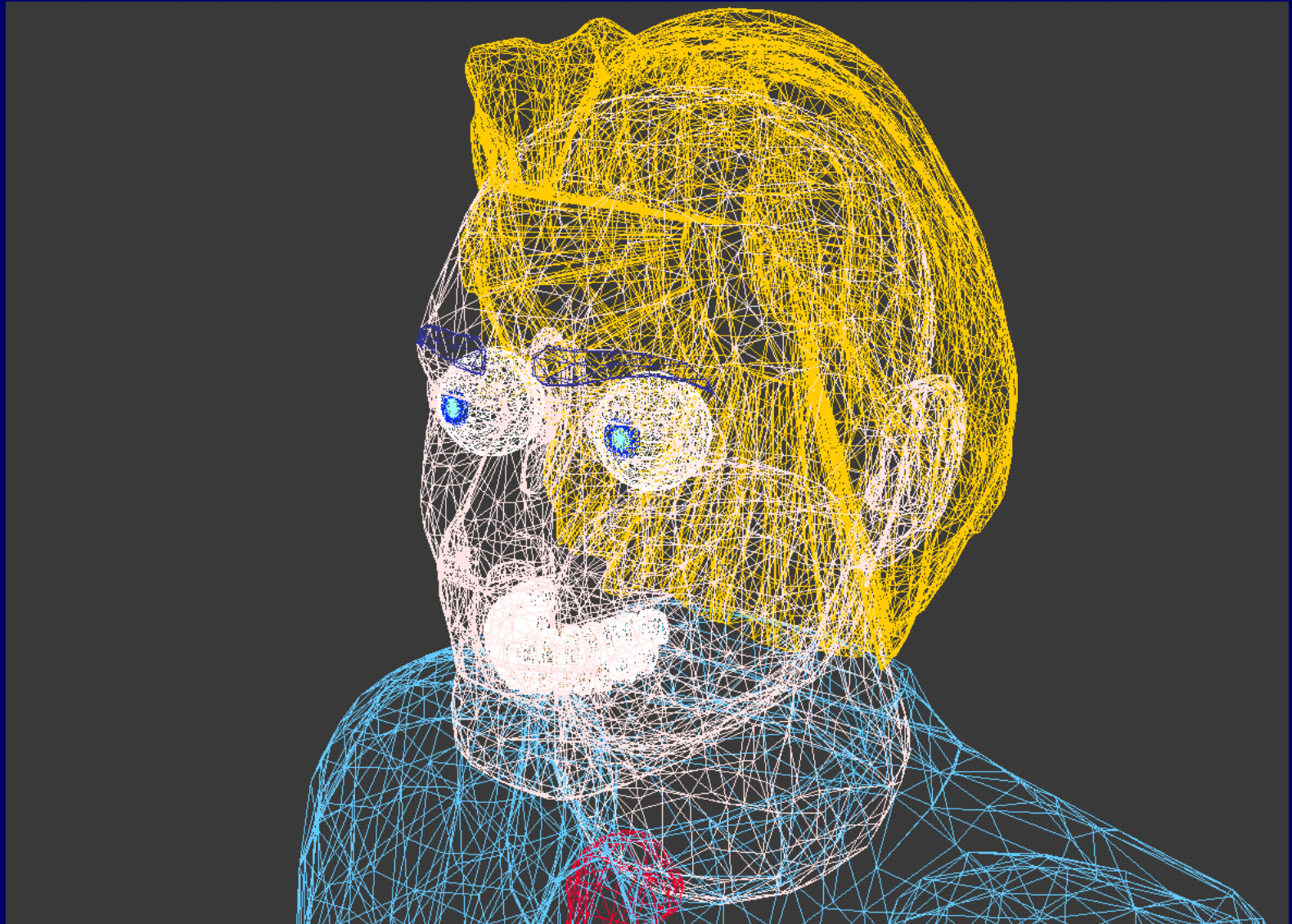
INSEAD



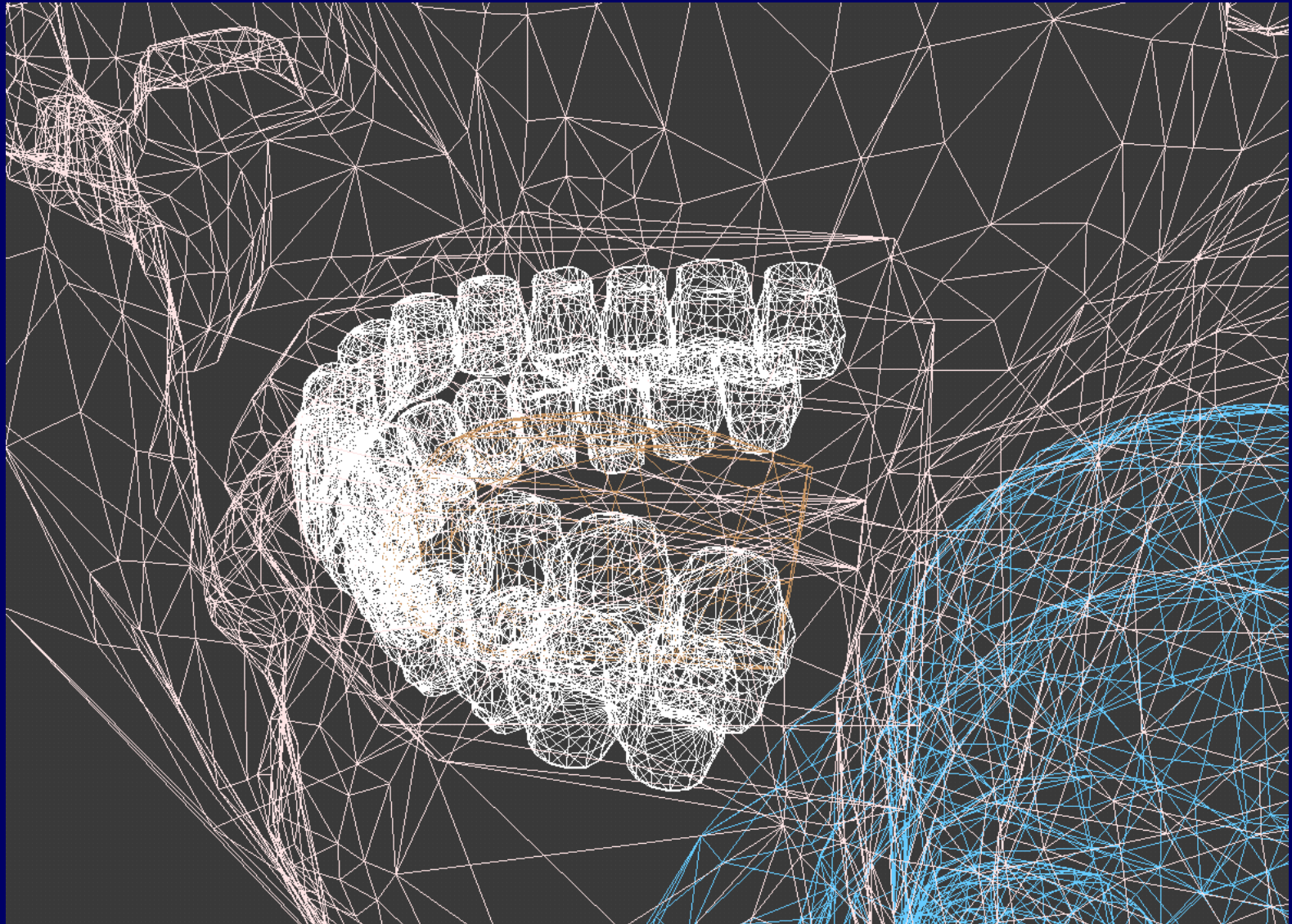
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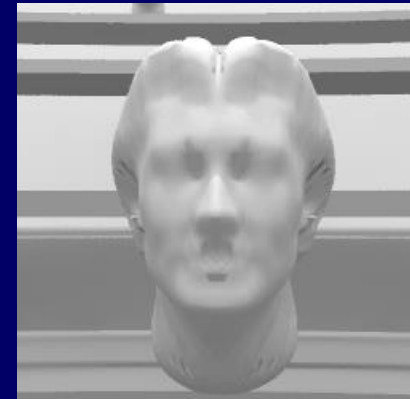
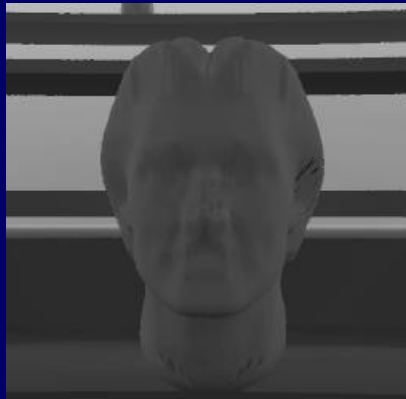
INSEAD



INSEAD



INSEAD

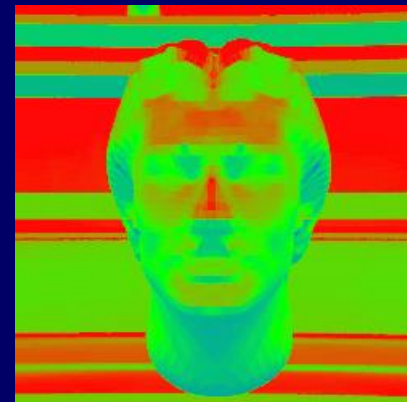


lux
750
650
550
450
350
250
150
50

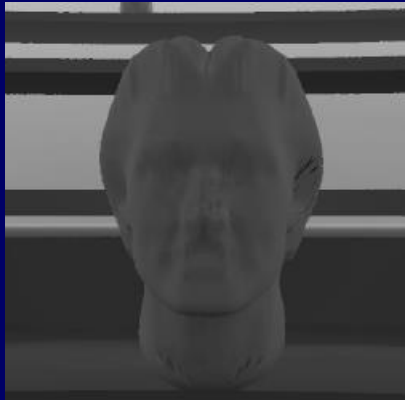
Mirel (wall wash)

Vision

Vision + Mirel



INSEAD

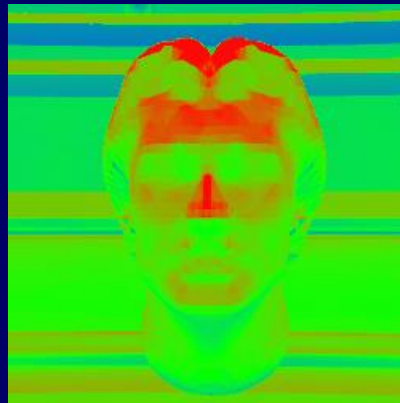


lux
750
650
550
450
350
250
150
50

Mirel (wall wash)

Wila (ring and center)

Wila + Mirel



Mandalay-Luxor Retail Complex



Precedent Studies:
BCE Place Galleria, Toronto



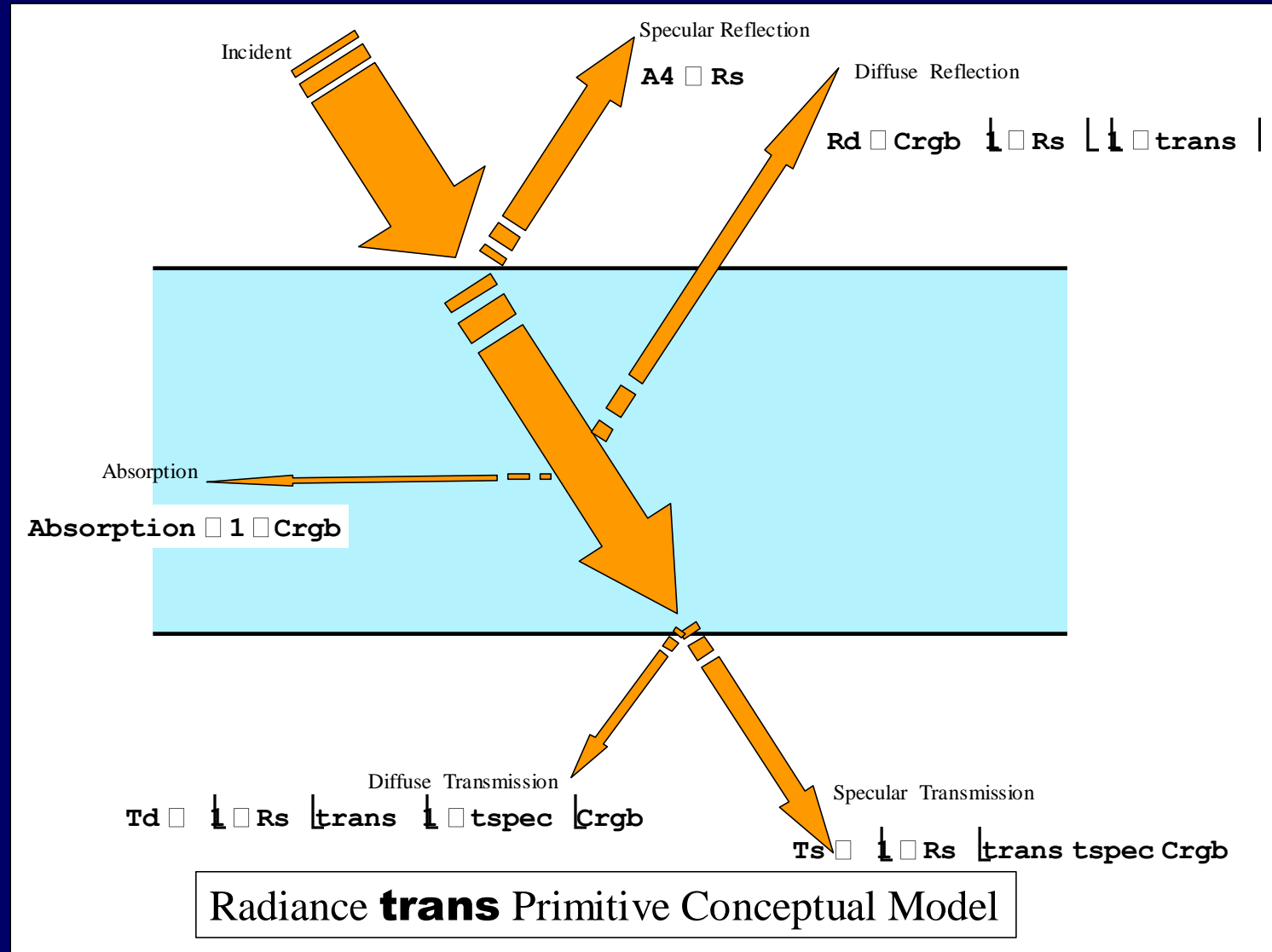
Mandalay-Luxor Retail Complex



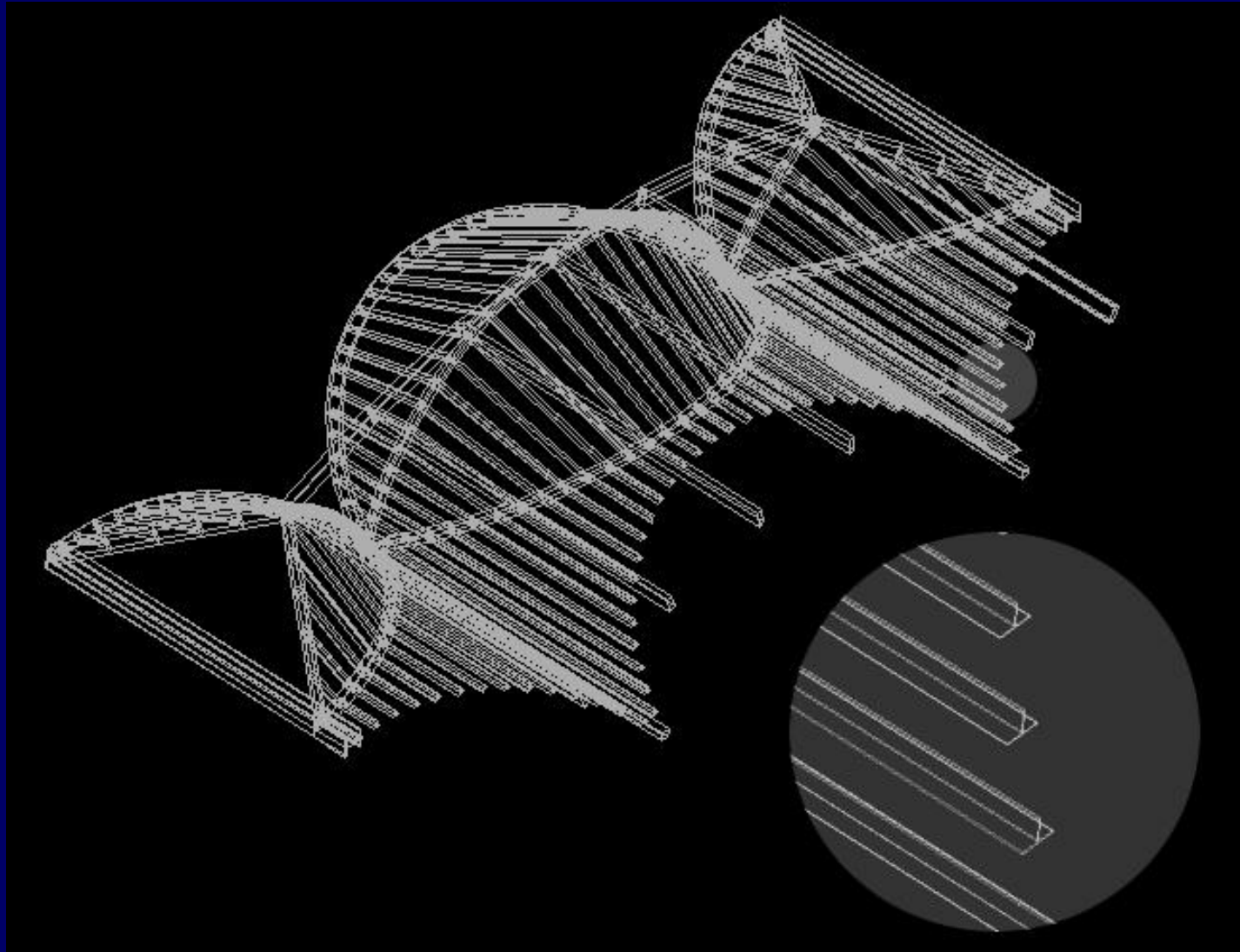
Precedent Studies:
Bellagio, Las Vegas



Mandalay-Luxor Retail Complex



Mandalay-Luxor Retail Complex



Mandalay-Luxor Retail Complex



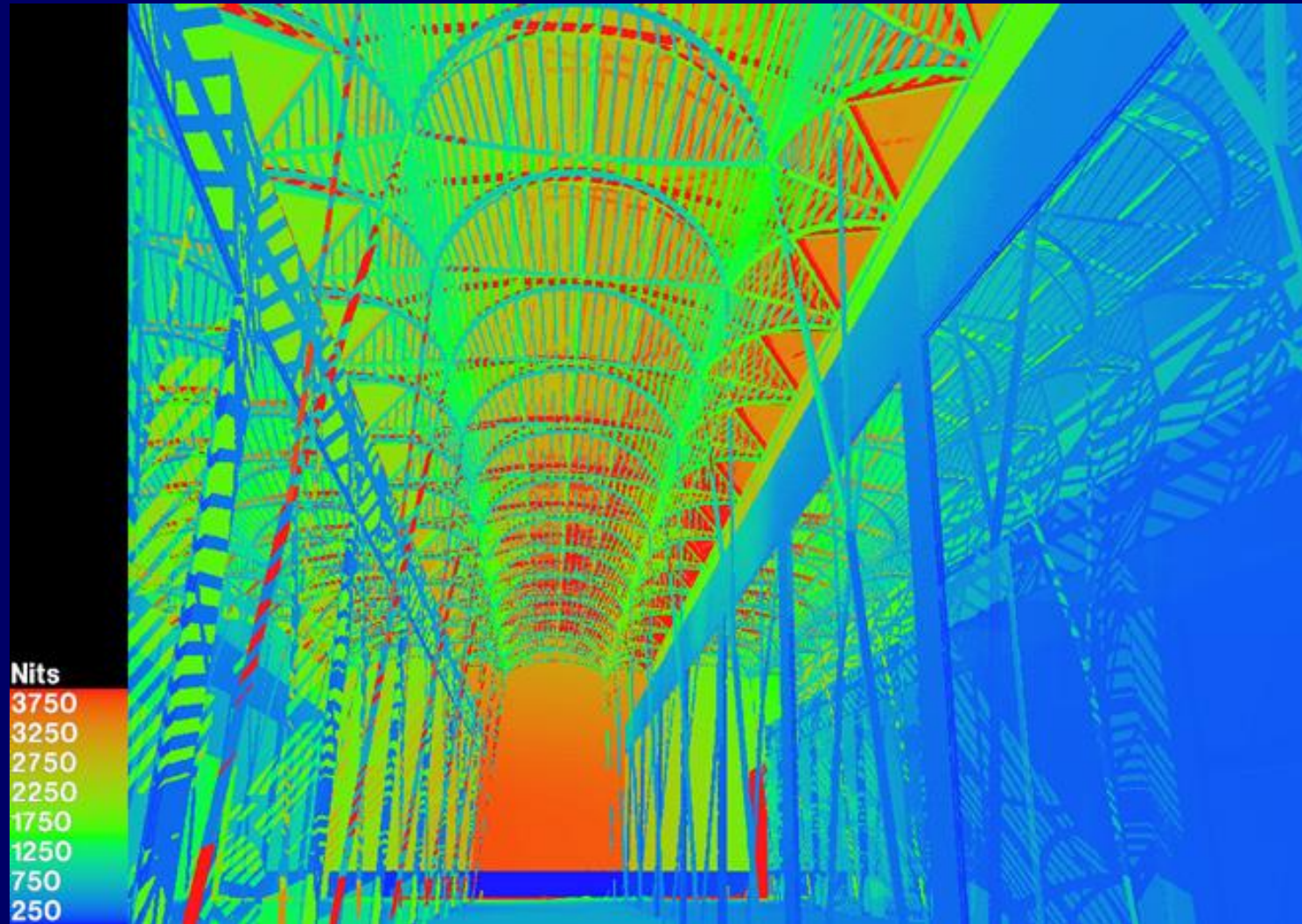
50% Frit

Mandalay-Luxor Retail Complex



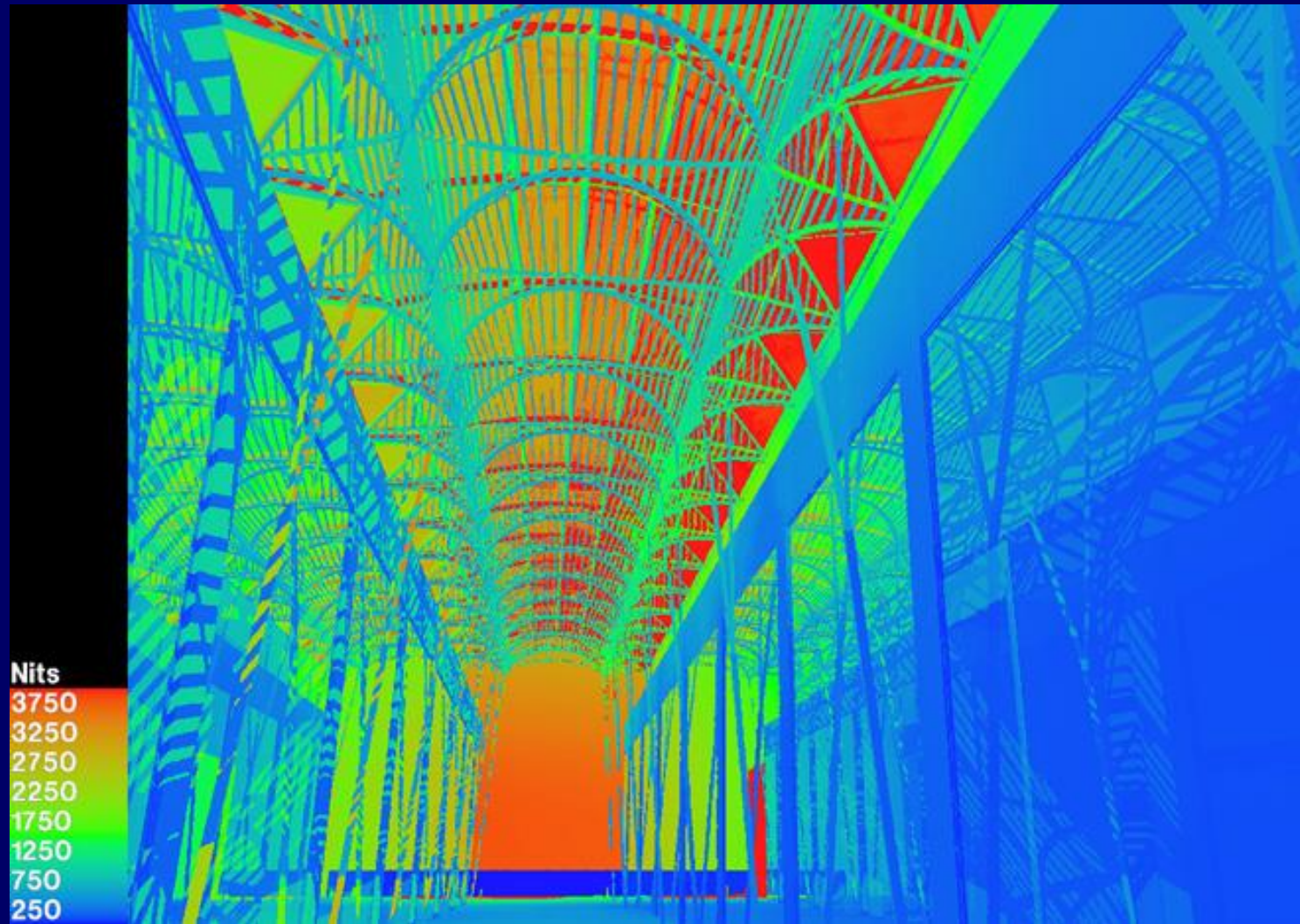
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Mandalay-Luxor Retail Complex



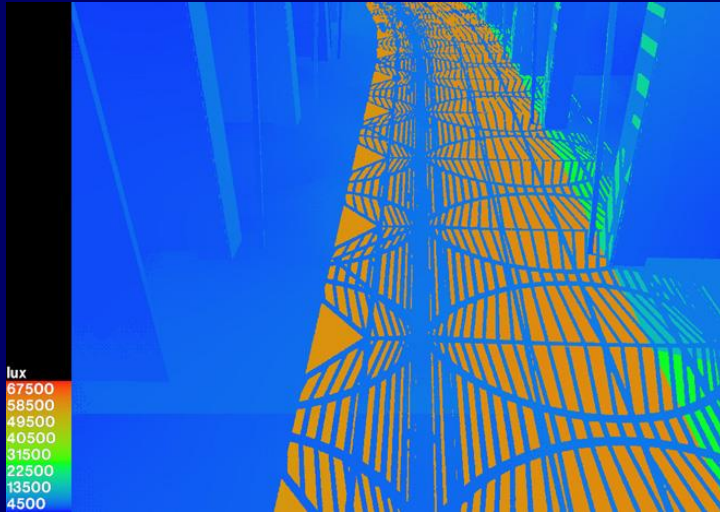
50% Frit

Mandalay-Luxor Retail Complex

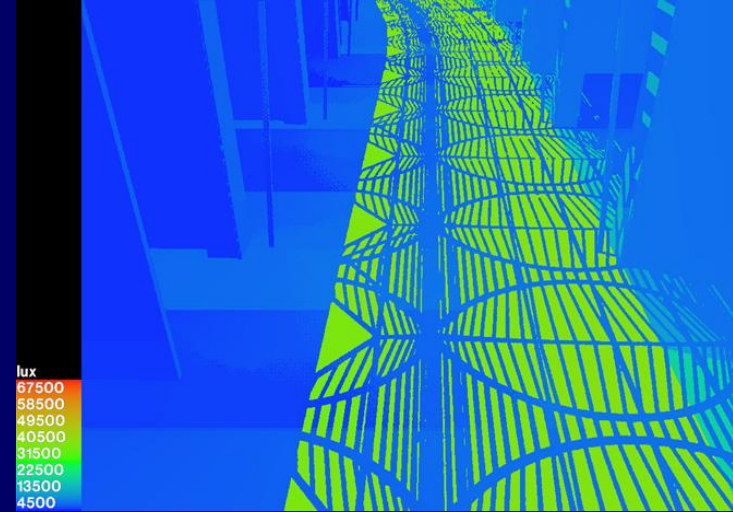


75% Frit

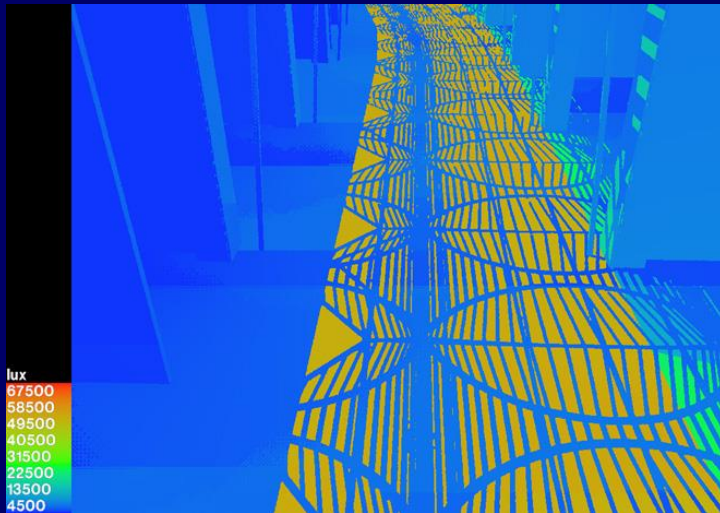
Mandalay-Luxor Retail Complex



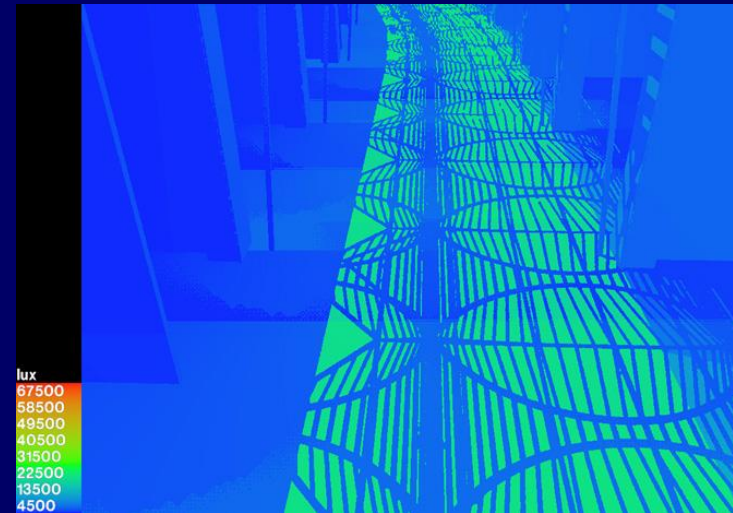
0% Frit



50% Frit

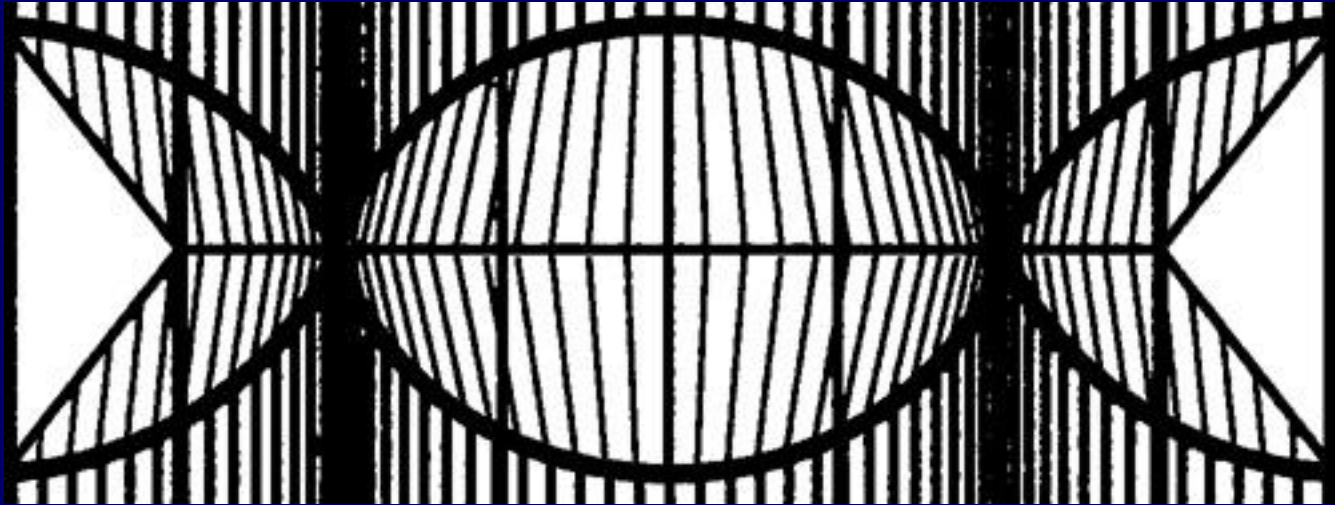


25% Frit



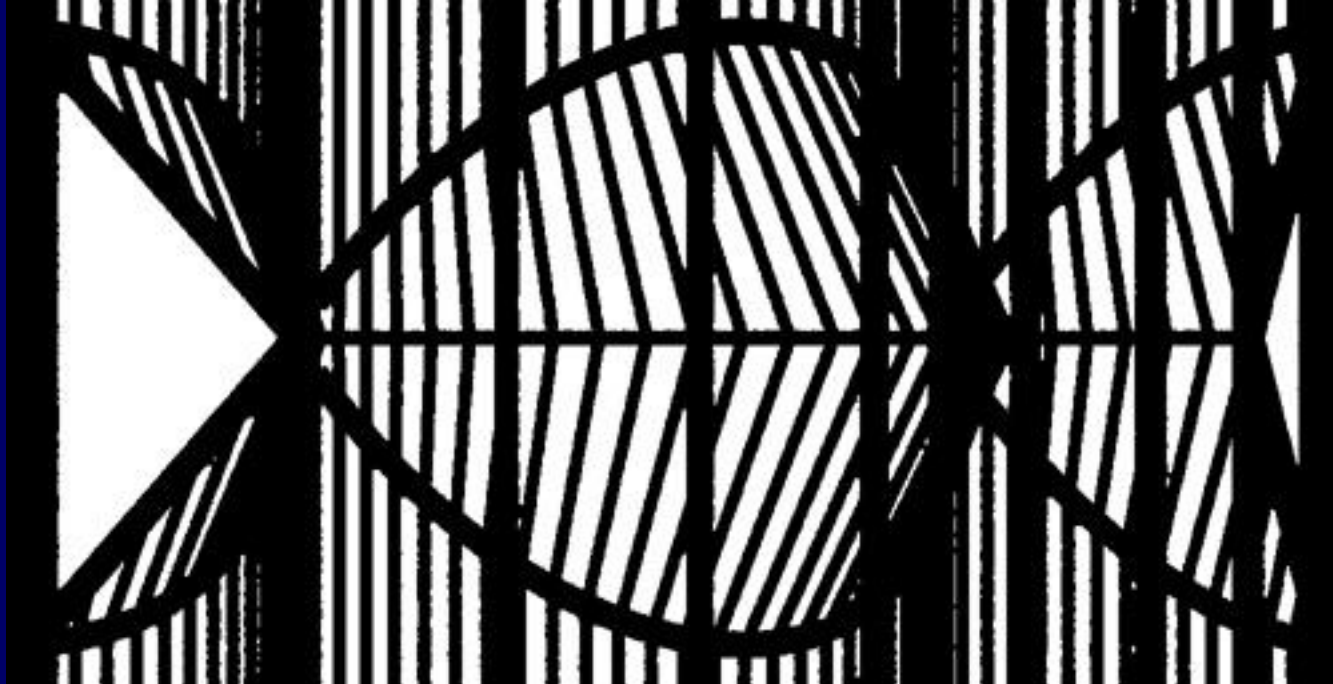
75% Frit

Mandalay-Luxor Retail Complex



*Percentage open: **

Mandalay-Luxor Retail Complex



*Percentage open: **

Mandalay-Luxor Retail Complex



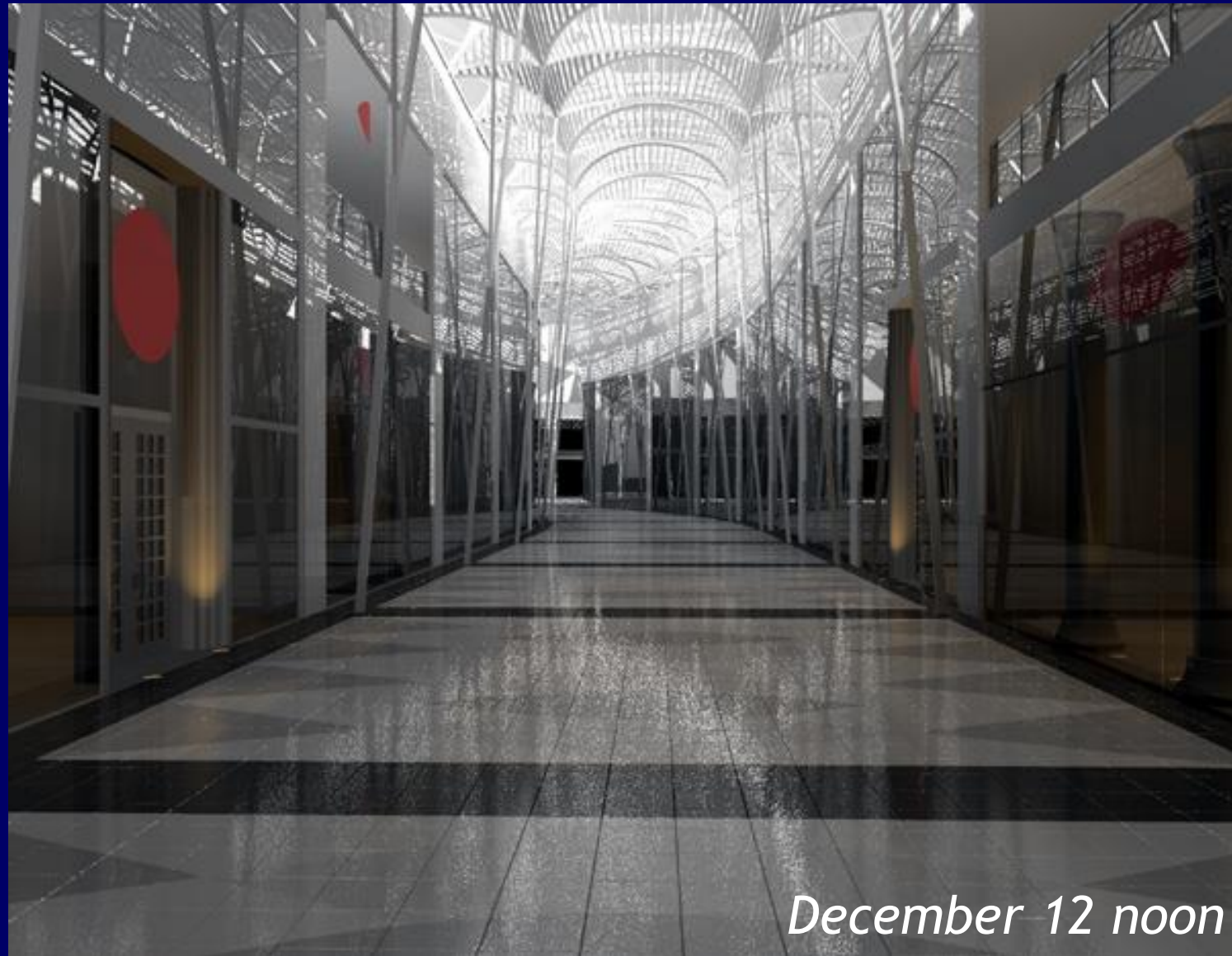
*Percentage open: **

Mandalay-Luxor Retail Complex

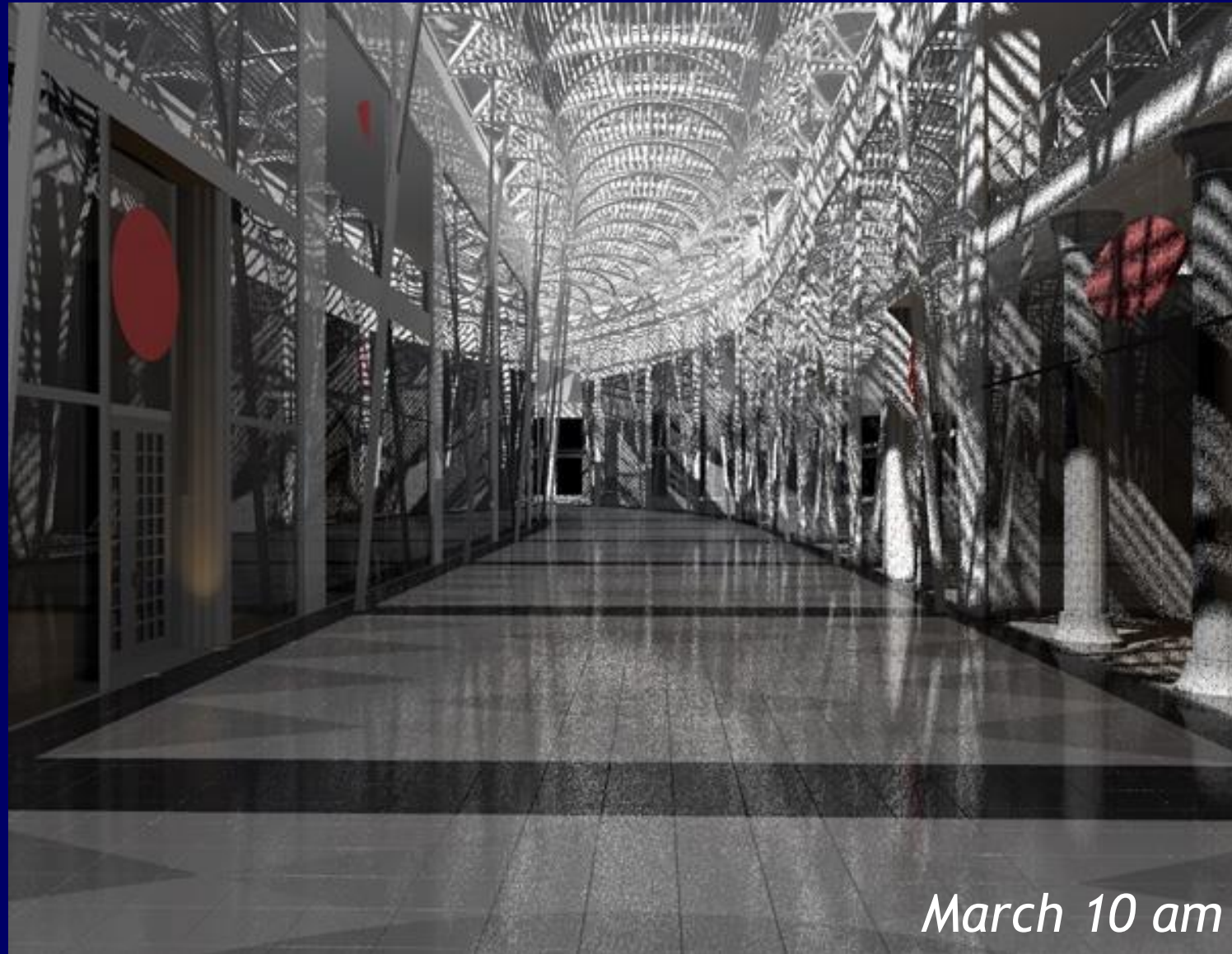


Electric Lighting Only

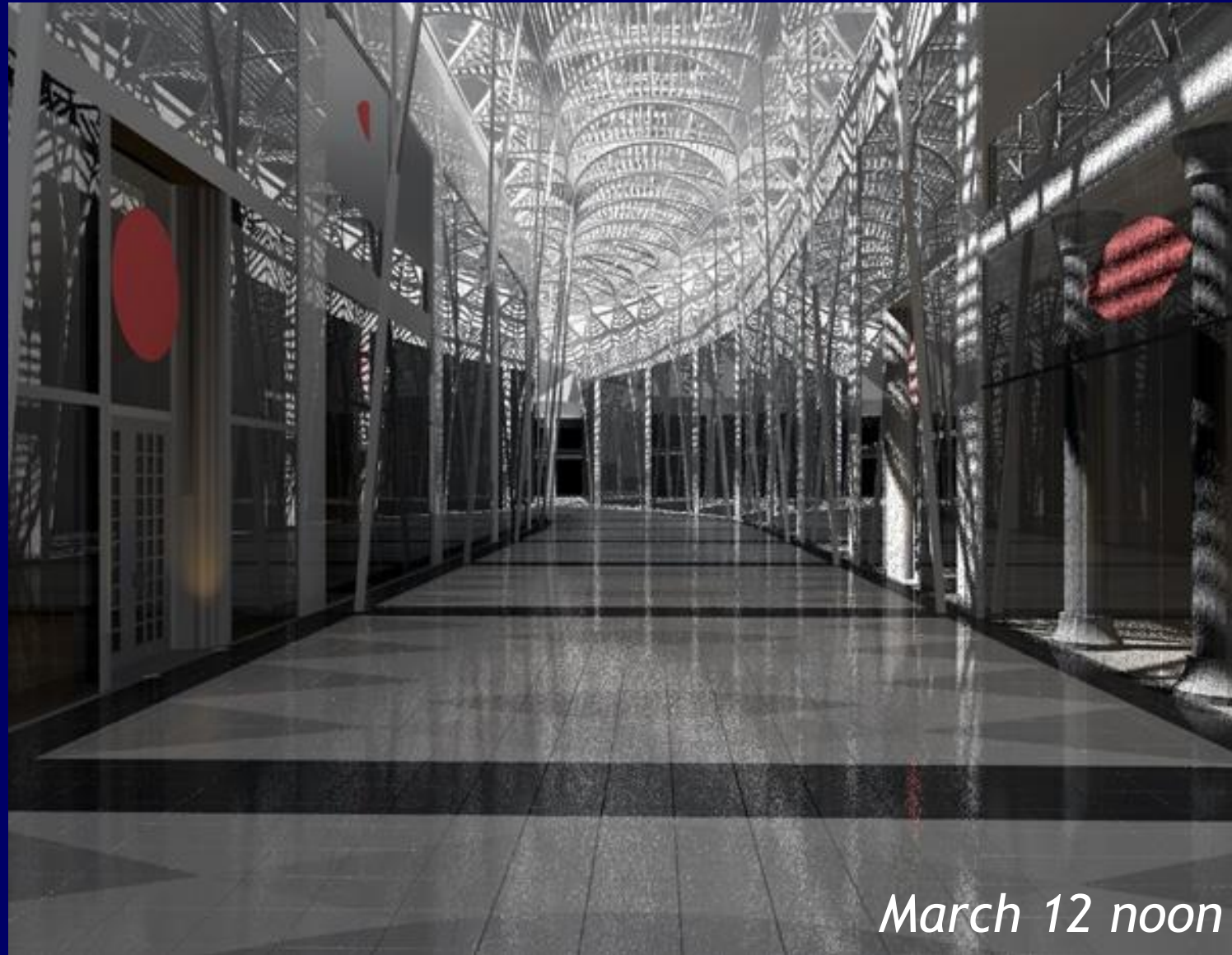
Mandalay-Luxor Retail Complex



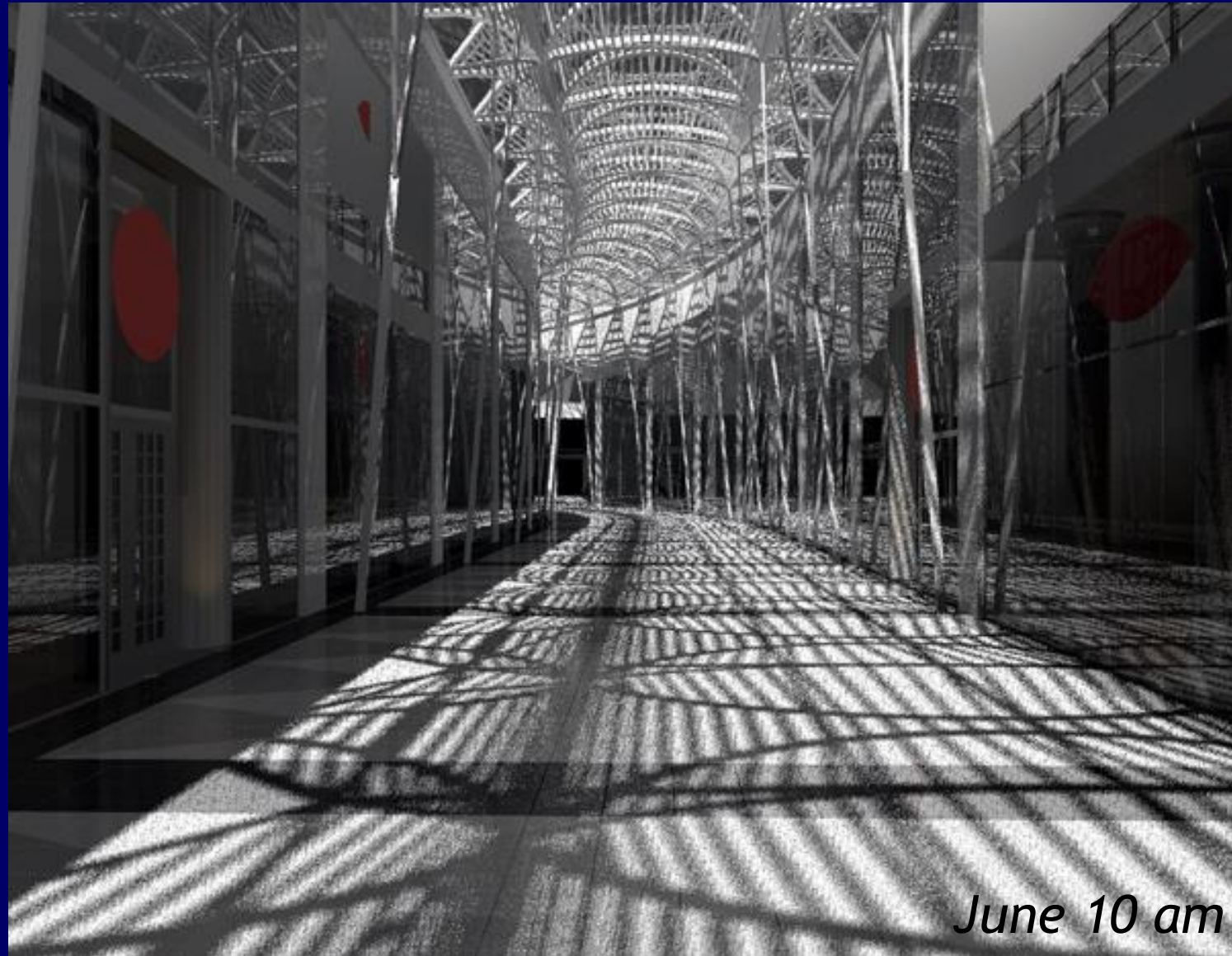
Mandalay-Luxor Retail Complex



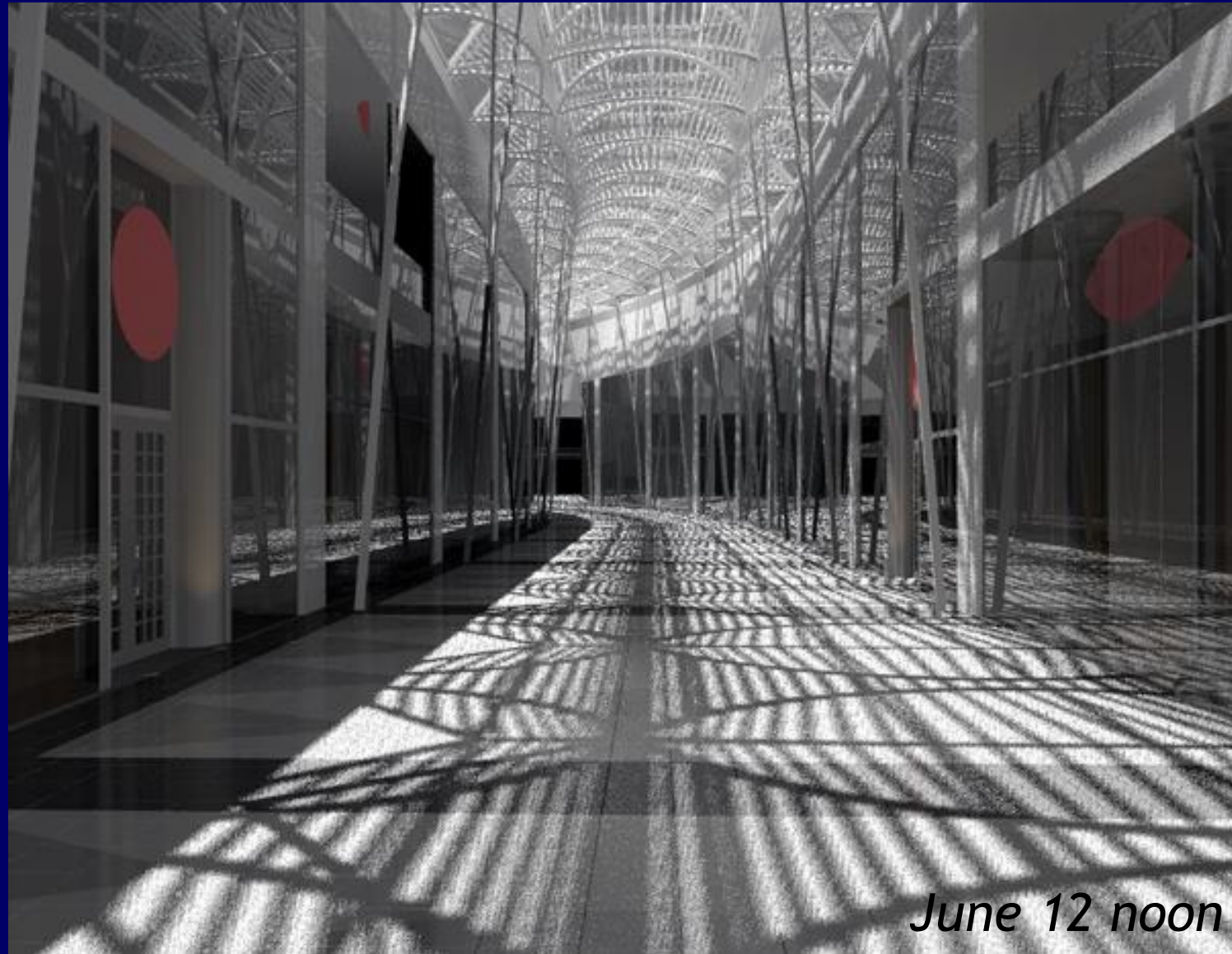
Mandalay-Luxor Retail Complex



Mandalay-Luxor Retail Complex

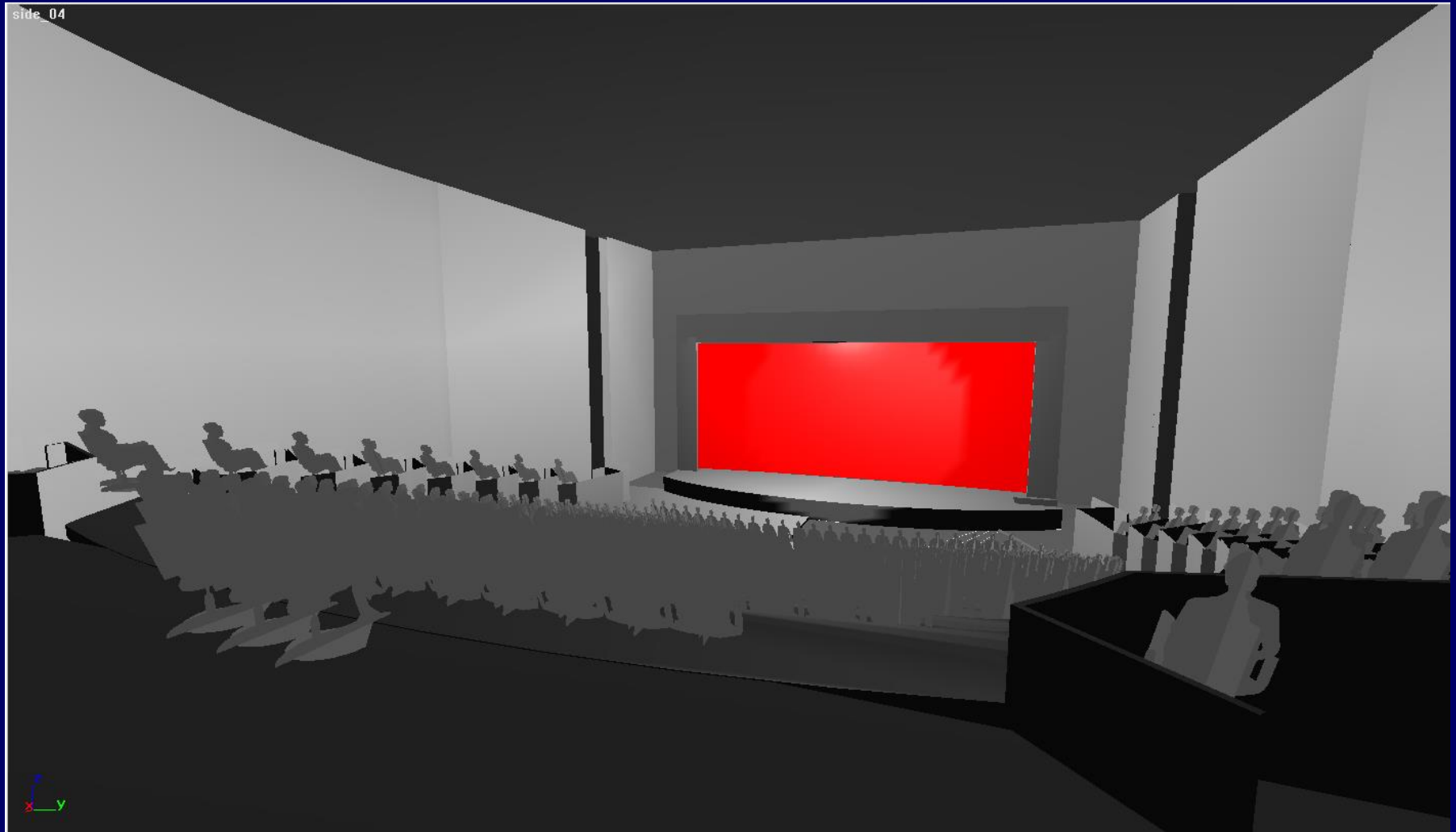


Mandalay-Luxor Retail Complex



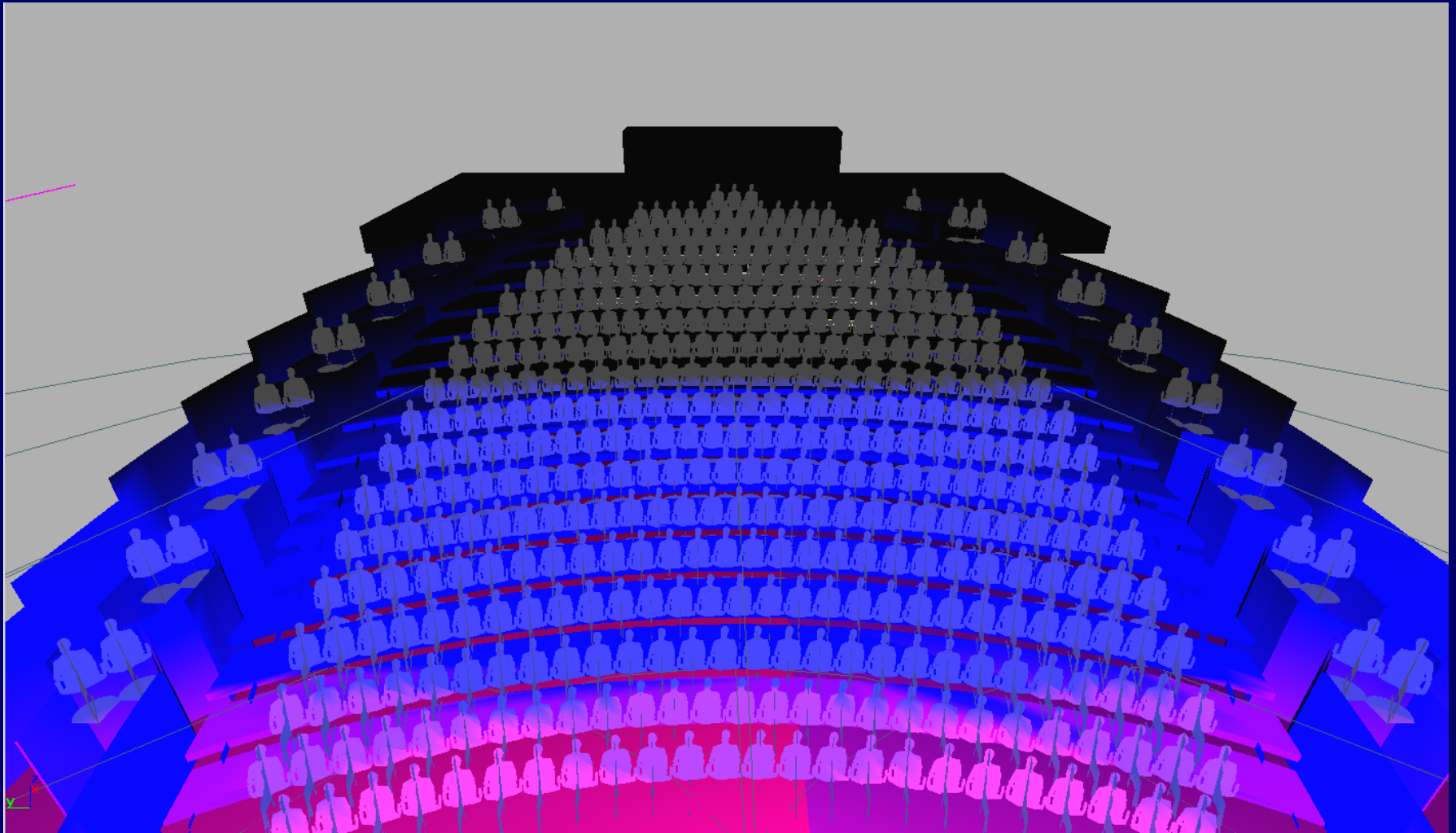
June 12 noon

Constellation Productions Cinema



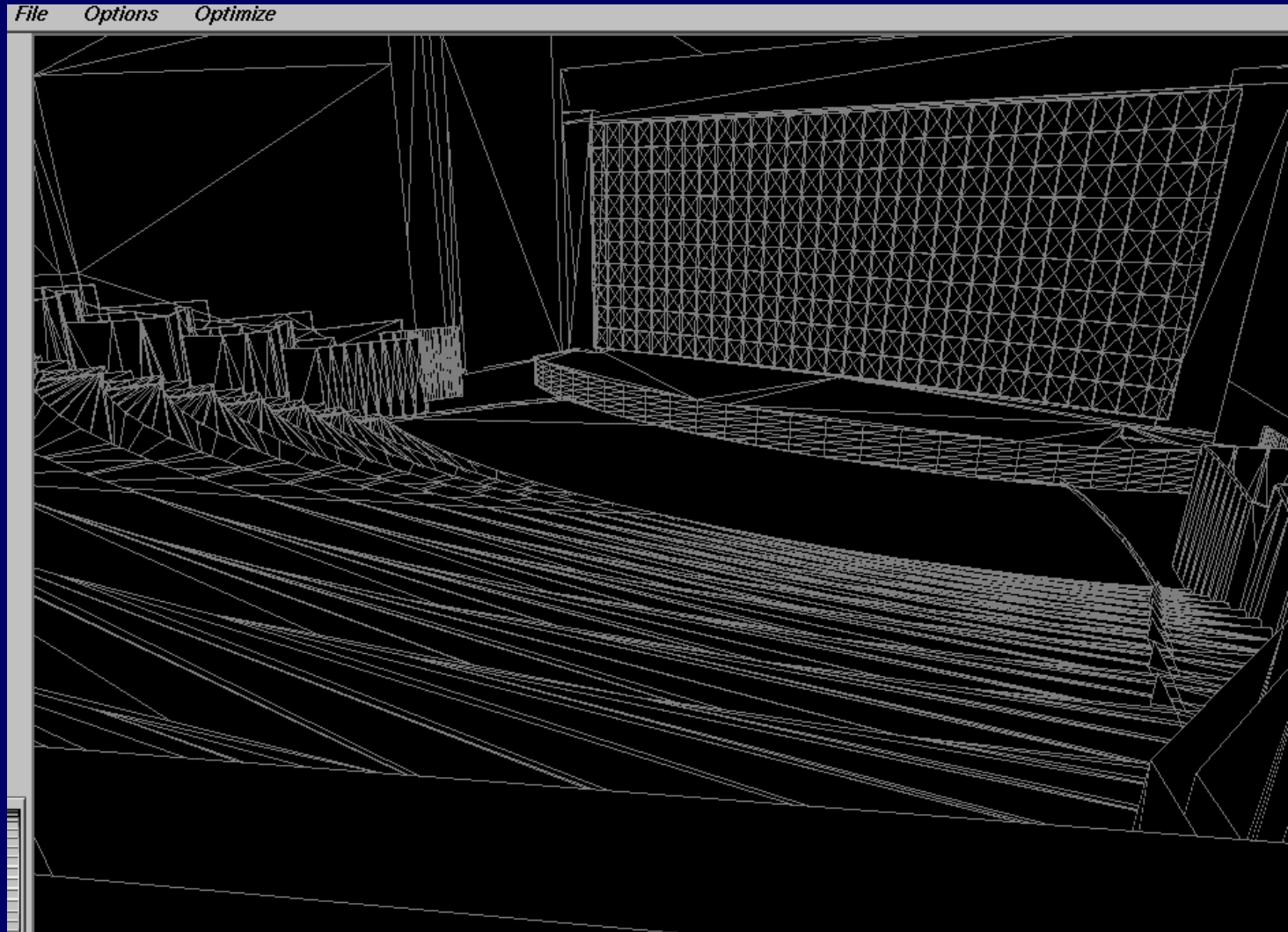
3D Model

Constellation Productions Cinema



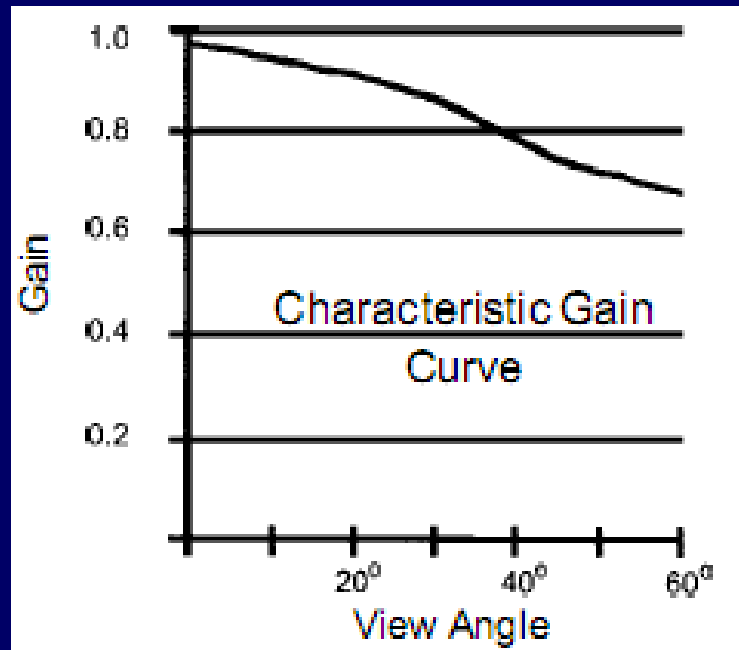
3D Model

Constellation Productions Cinema

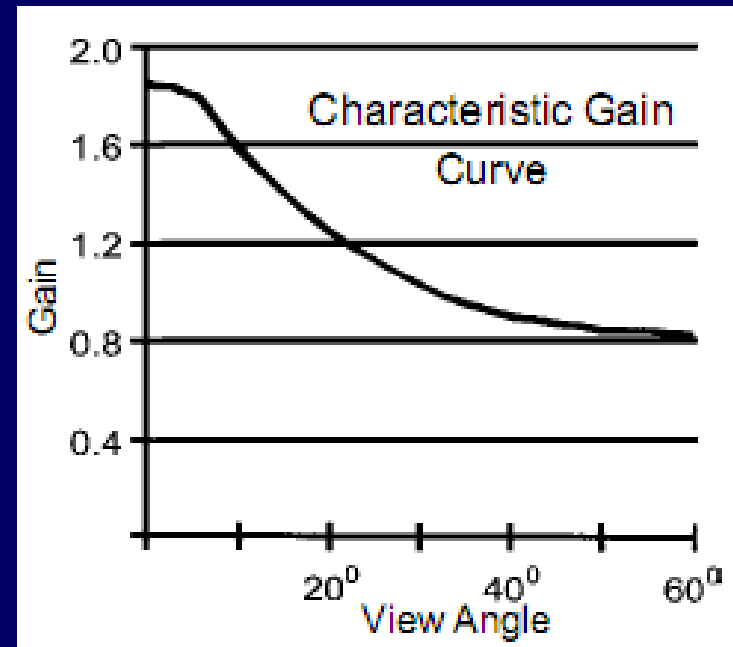


3D Model

Constellation Productions Cinema



Matt Screen



High Gain Screen

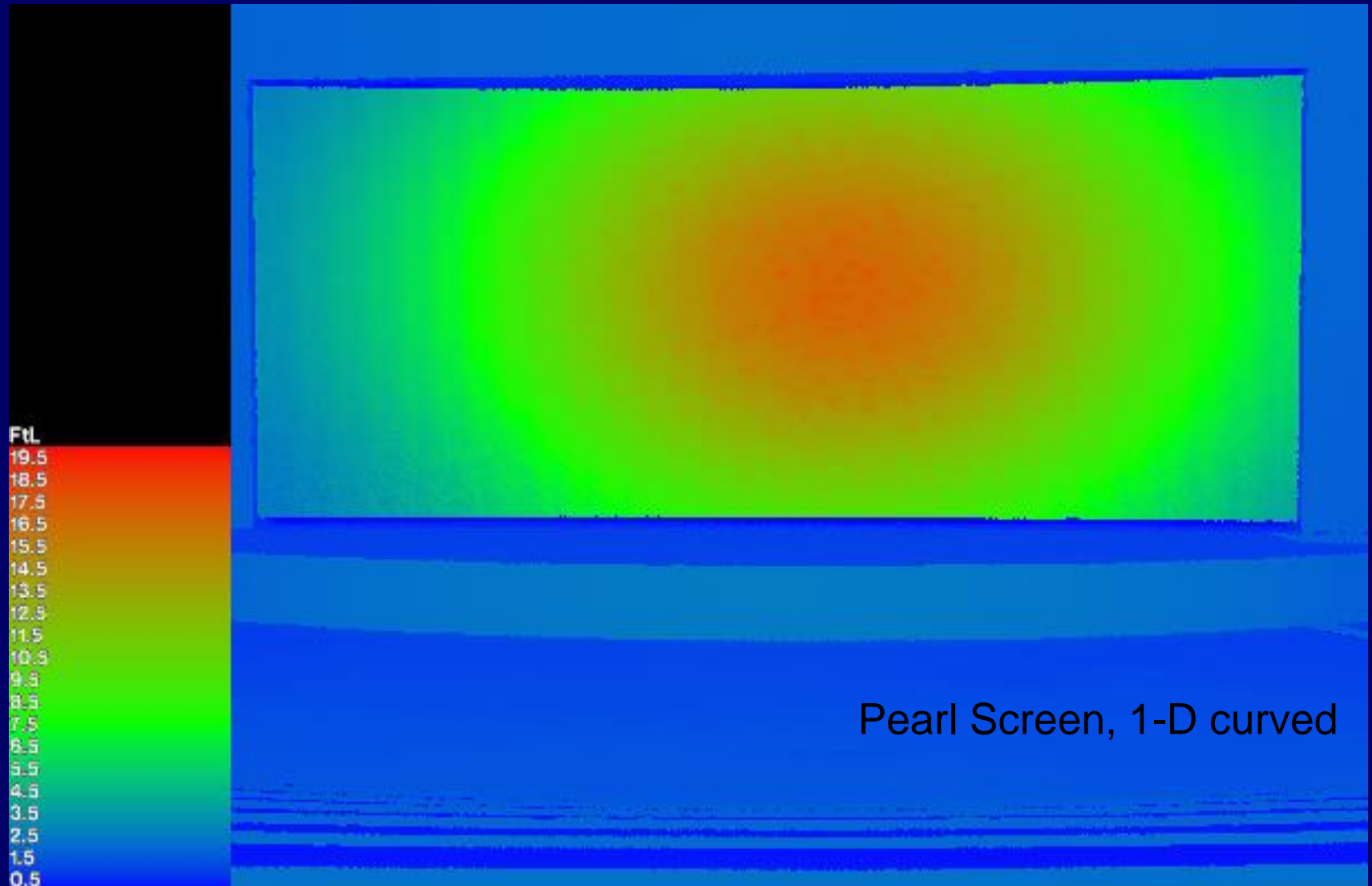
Typical Screen Reflectance Characteristics

Harkness Hall (Perlux)

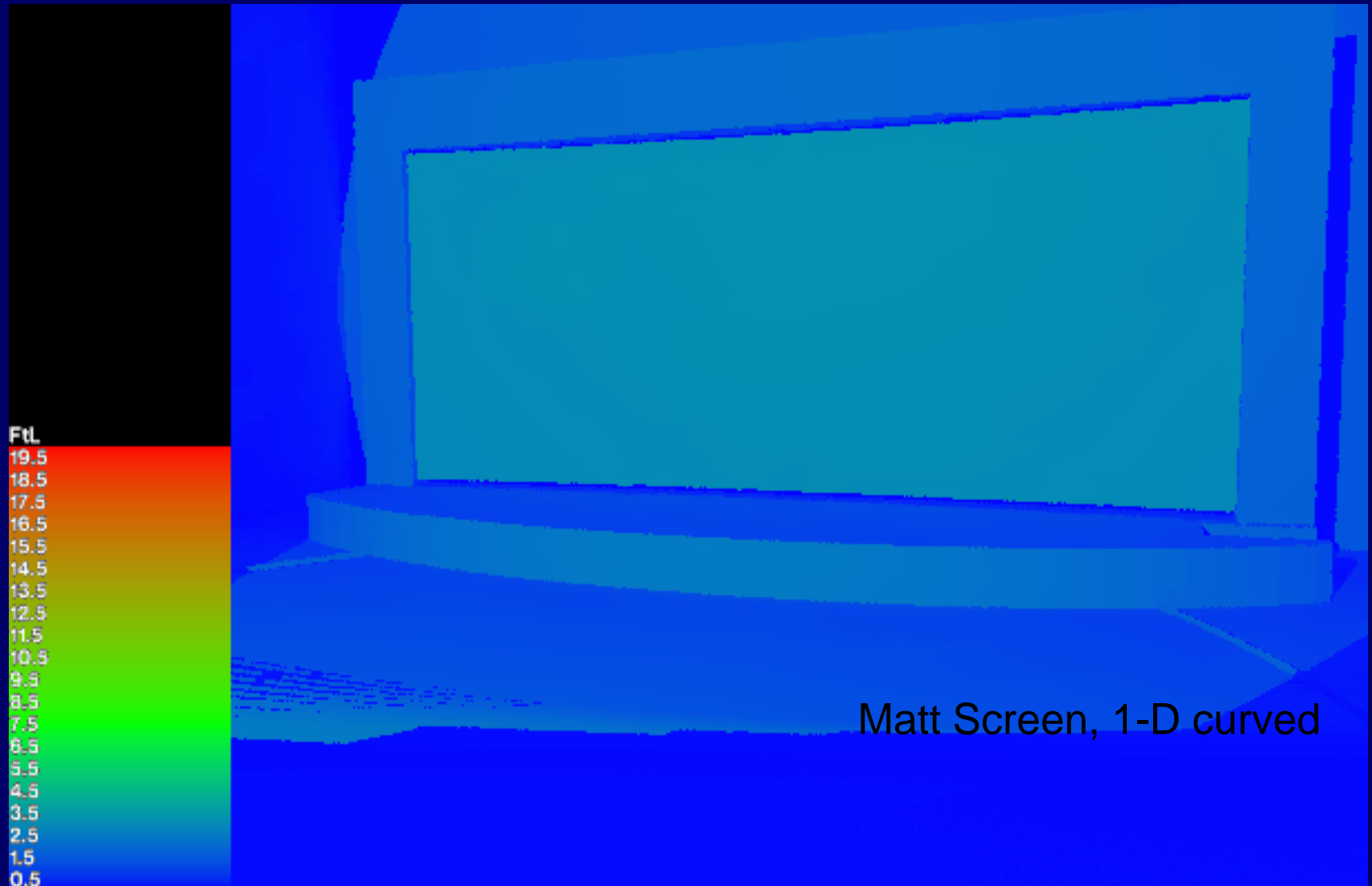
Constellation Productions Cinema



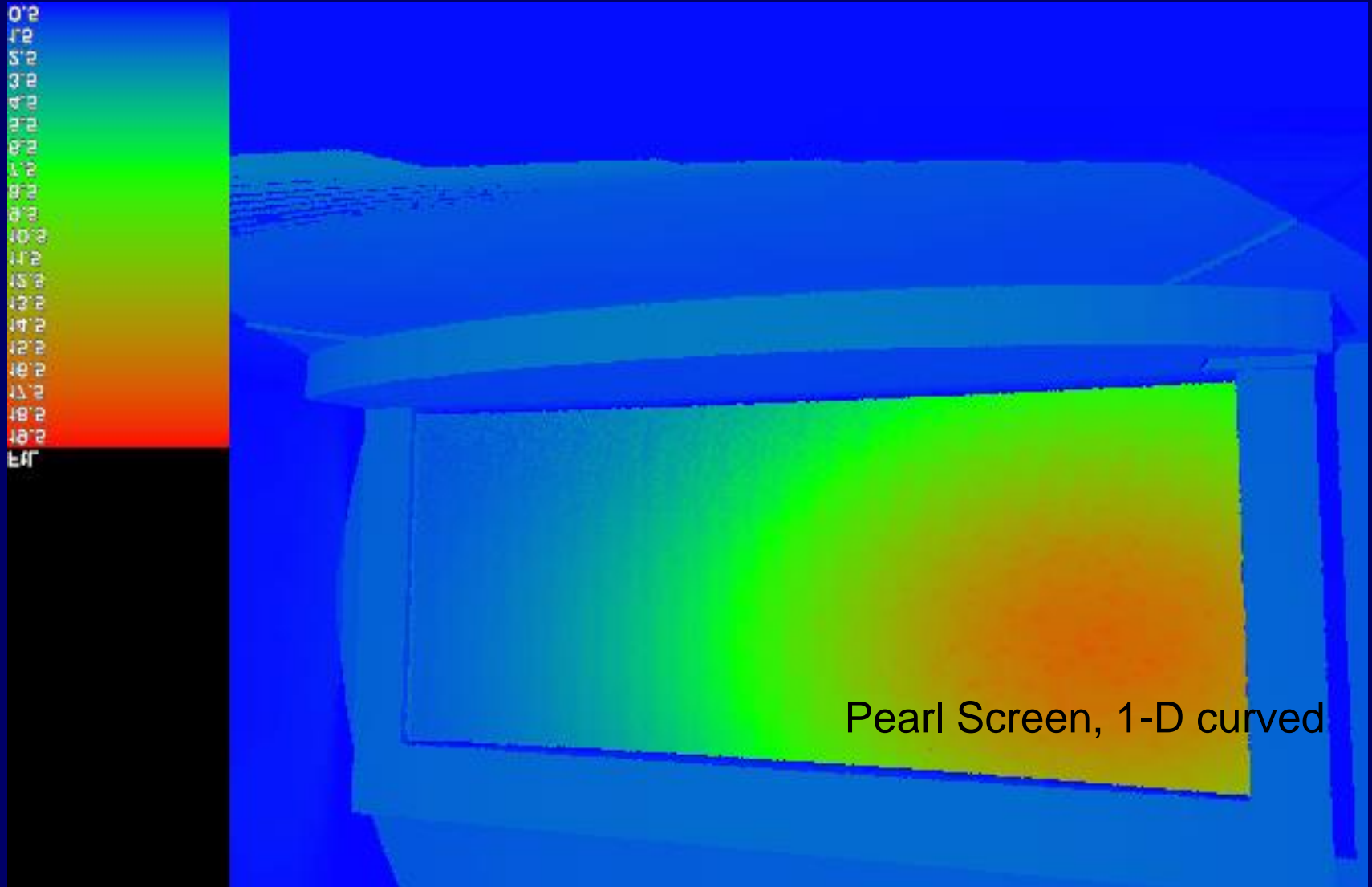
Constellation Productions Cinema



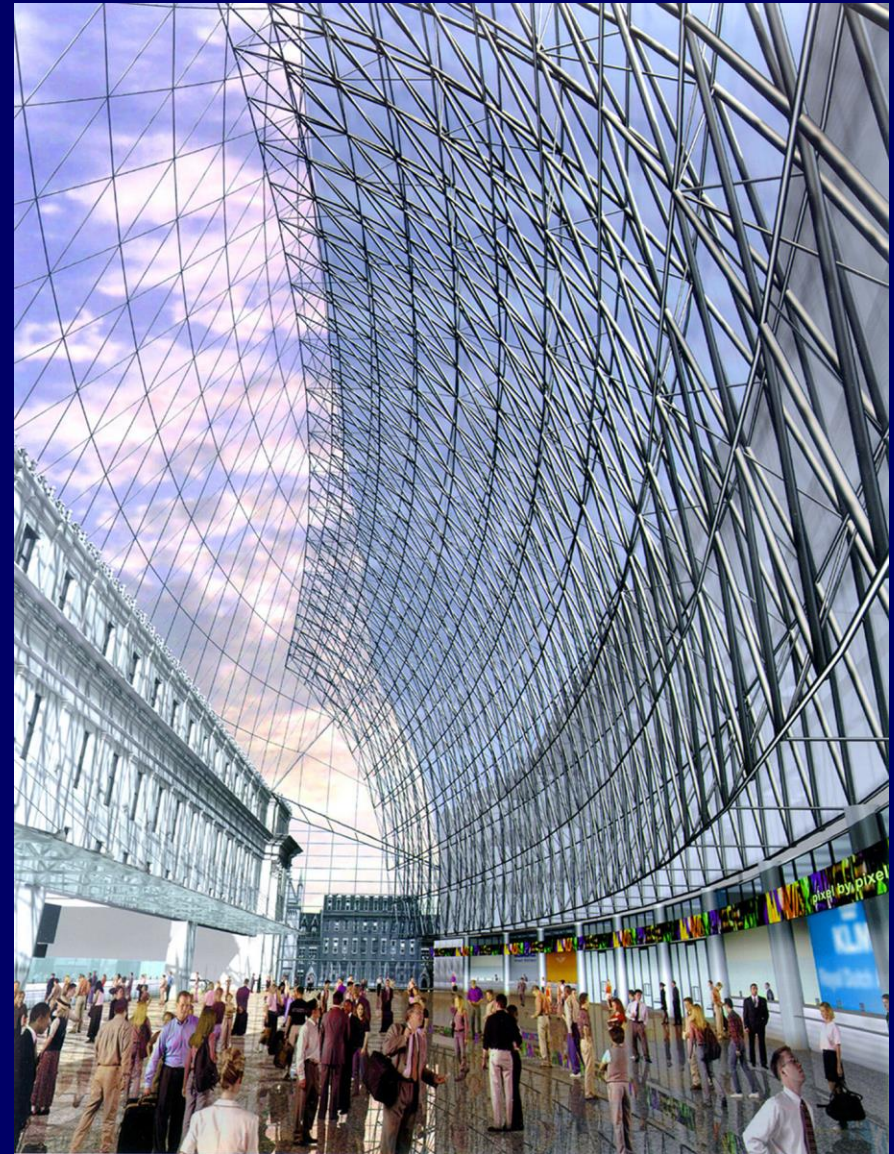
Constellation Productions Cinema



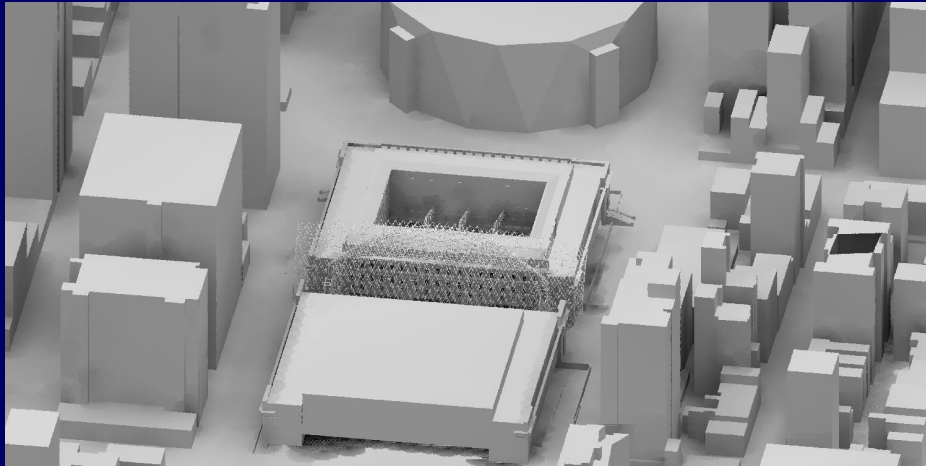
Constellation Productions Cinema



Penn Station Videowall

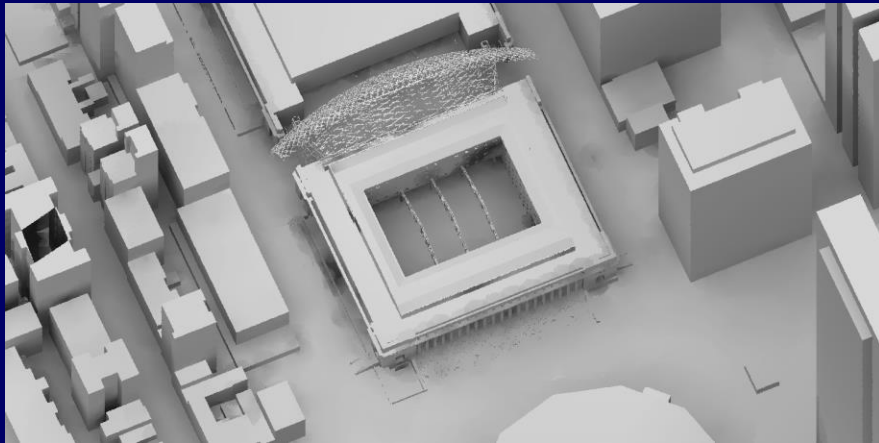


Penn Station Videowall

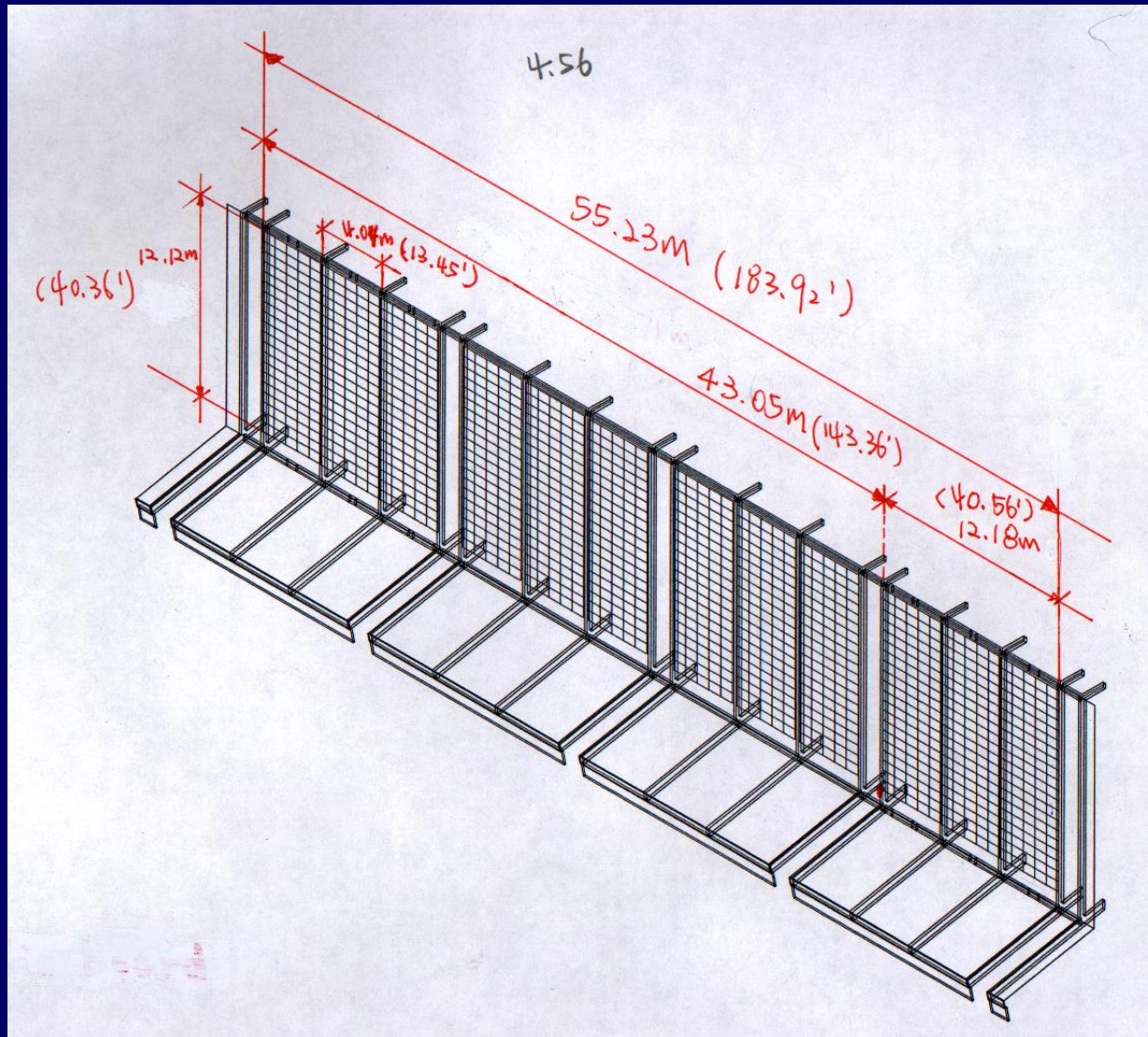


Views from east and west

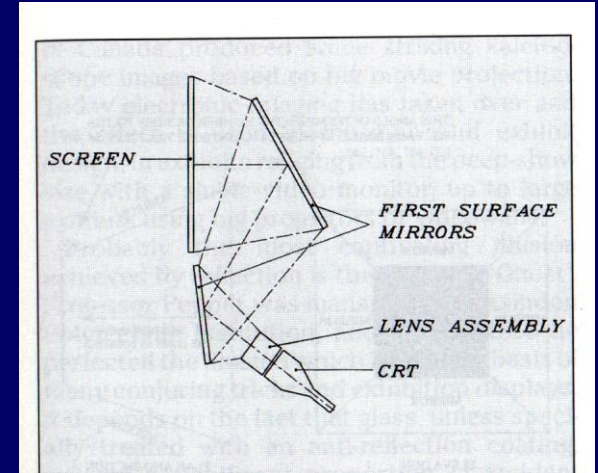
Train Hall



Penn Station Videowall



Penn Station Videowall



Videowall technology: Rear Projection

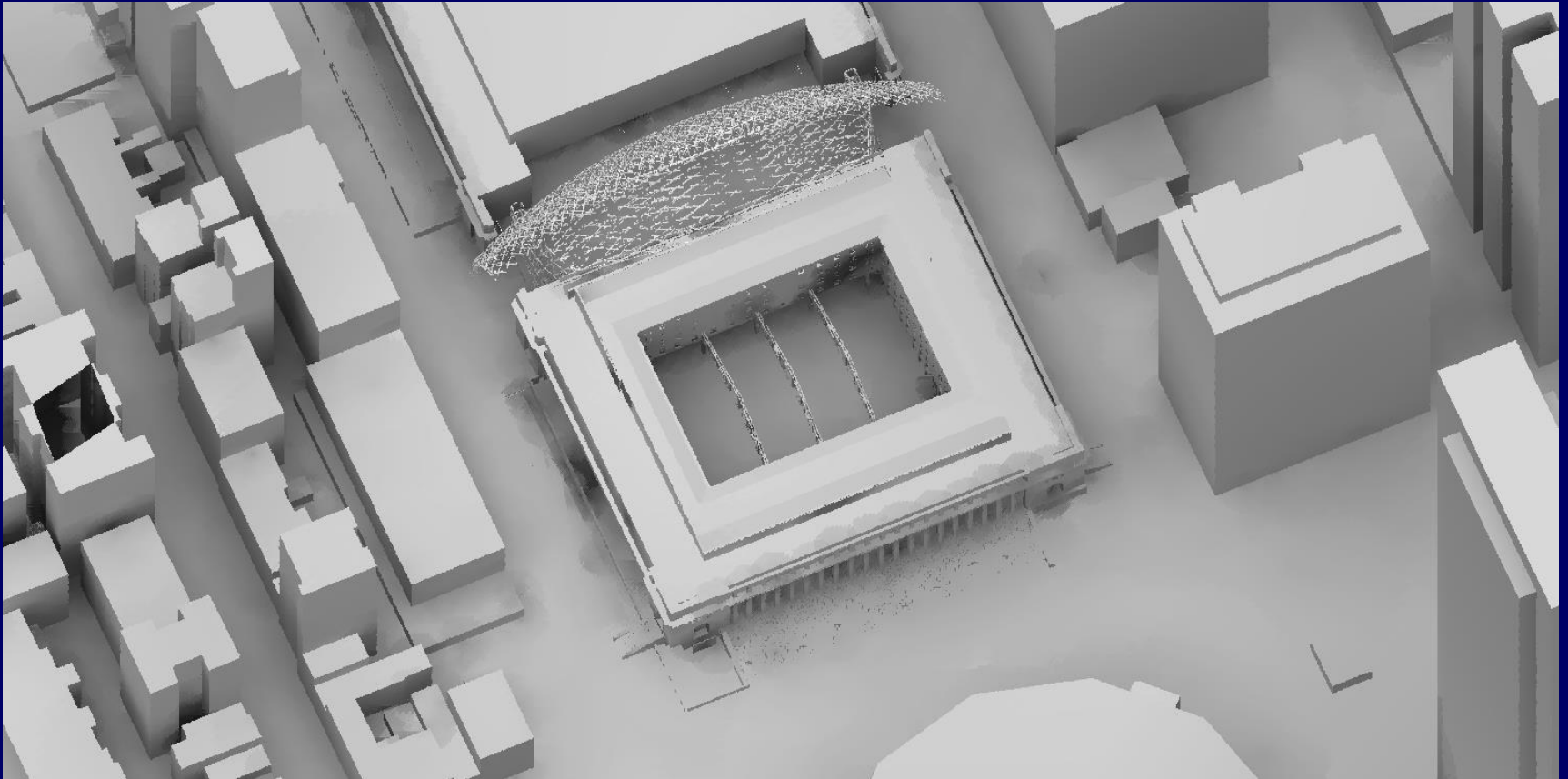
Penn Station Videowall

DLP Cube projectors

- 400 ANSI lumen output
- 50" screen diagonal dimension for each projector unit.
- Projection screen gain: 4
- Screen transmittance: 60%
- Screen reflectance: 5%
- Screen luminance: 110 FtL / 377 Cd/m²

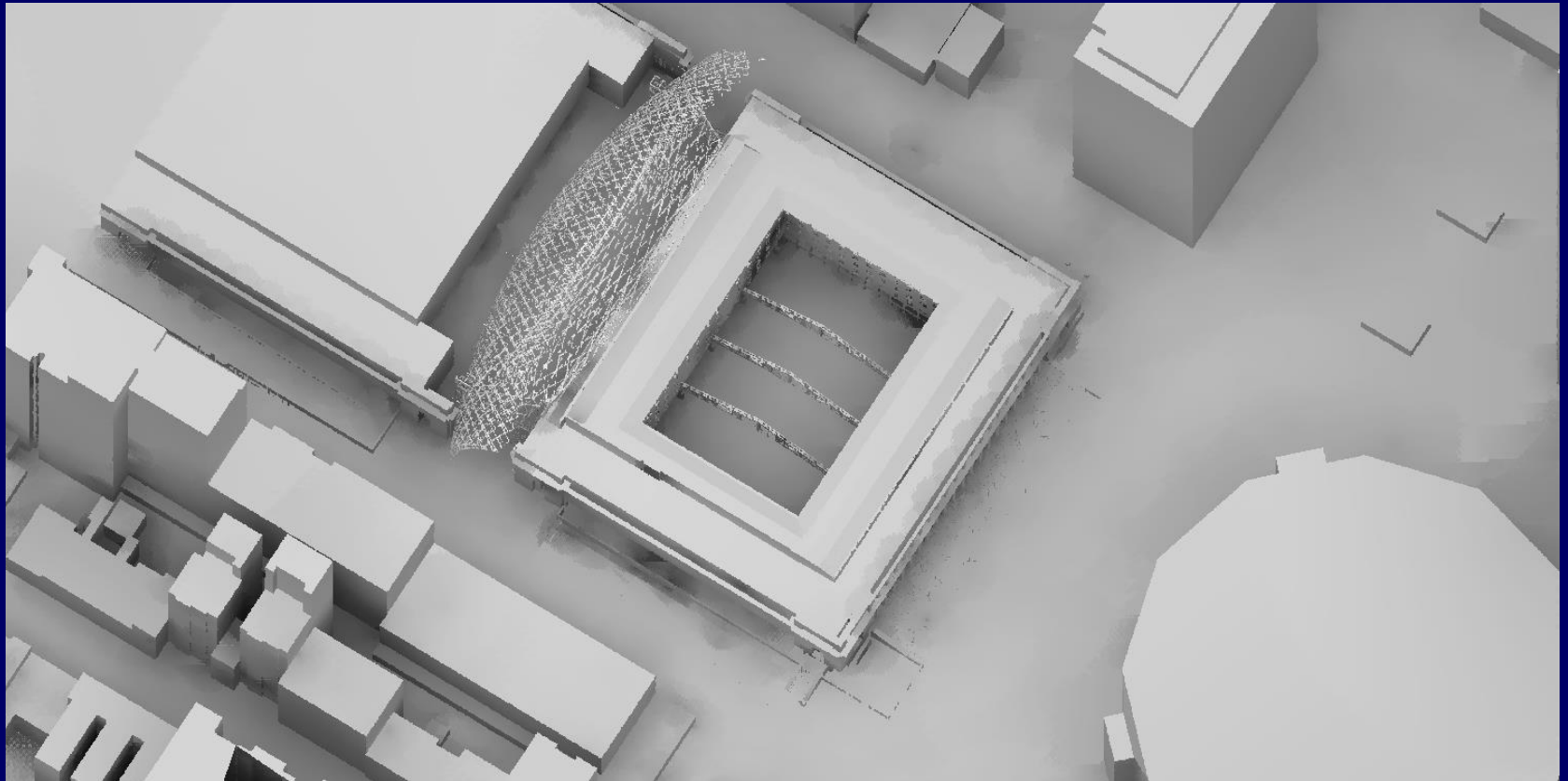
DLP Digital Light Processing, Texas Instruments proprietary device for image control. It is commonly used for this type of application.

Penn Station Videowall



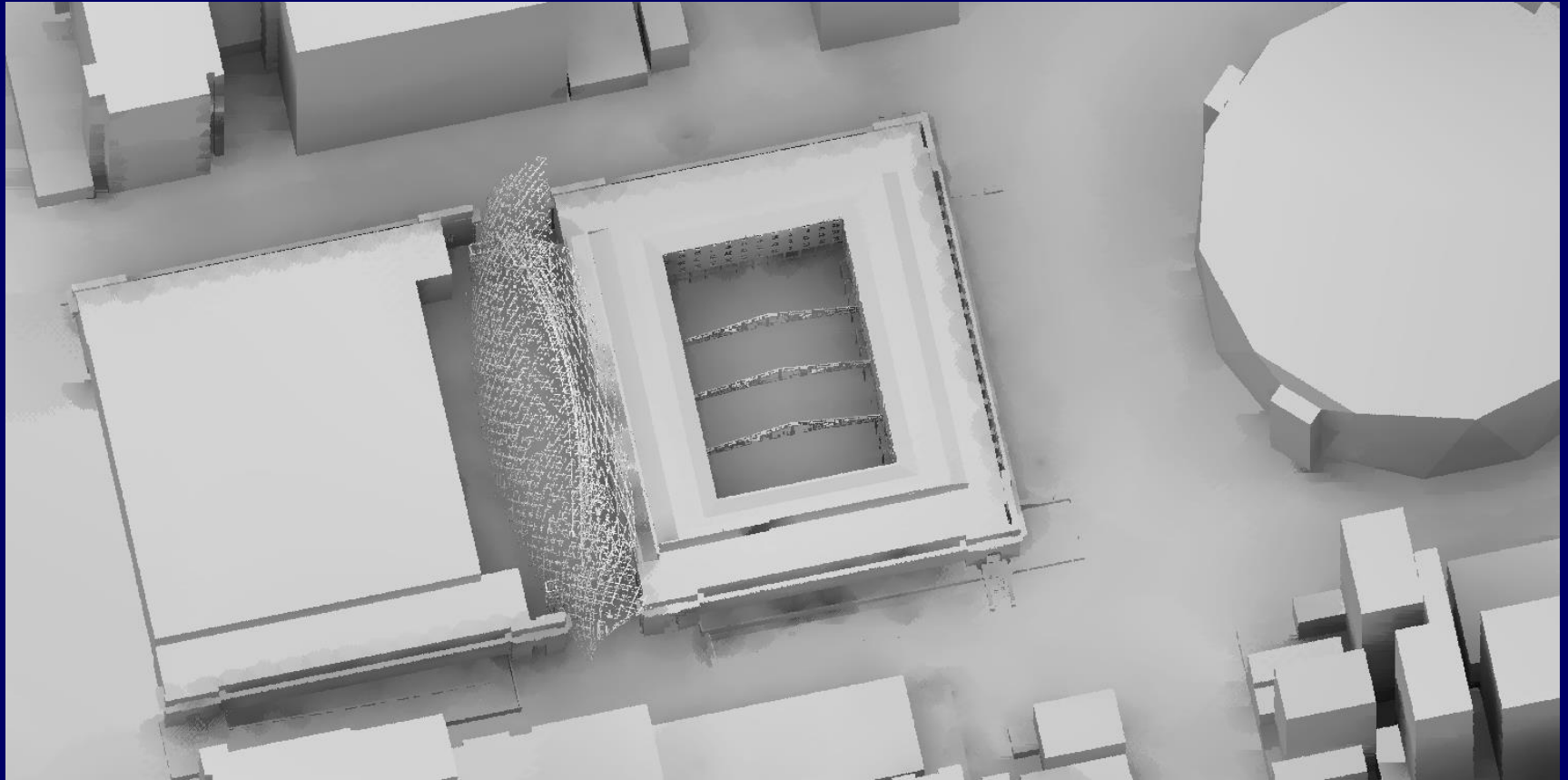
10:35am

Penn Station Videowall



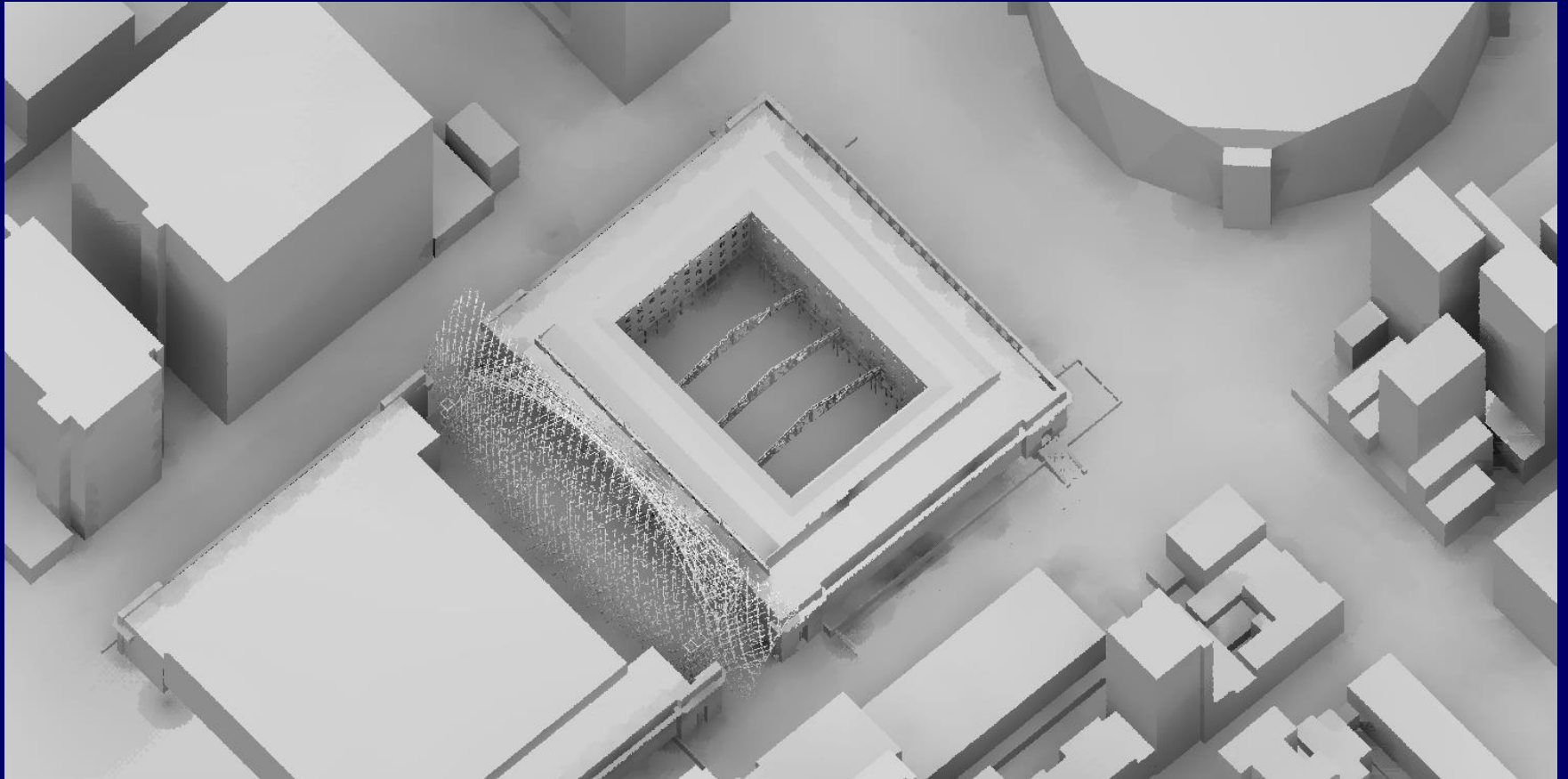
11:35am

Penn Station Videowall



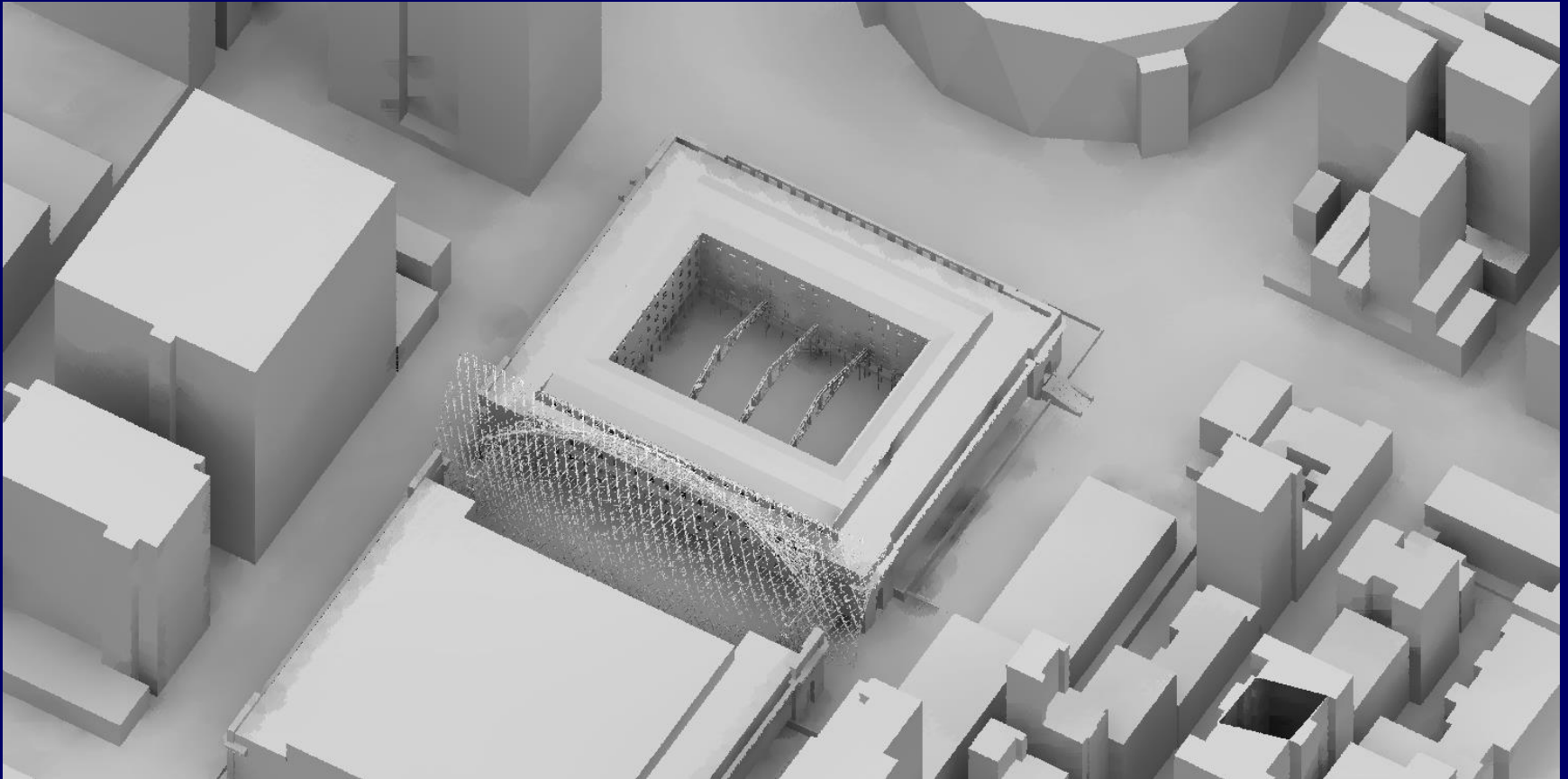
12:35pm

Penn Station Videowall



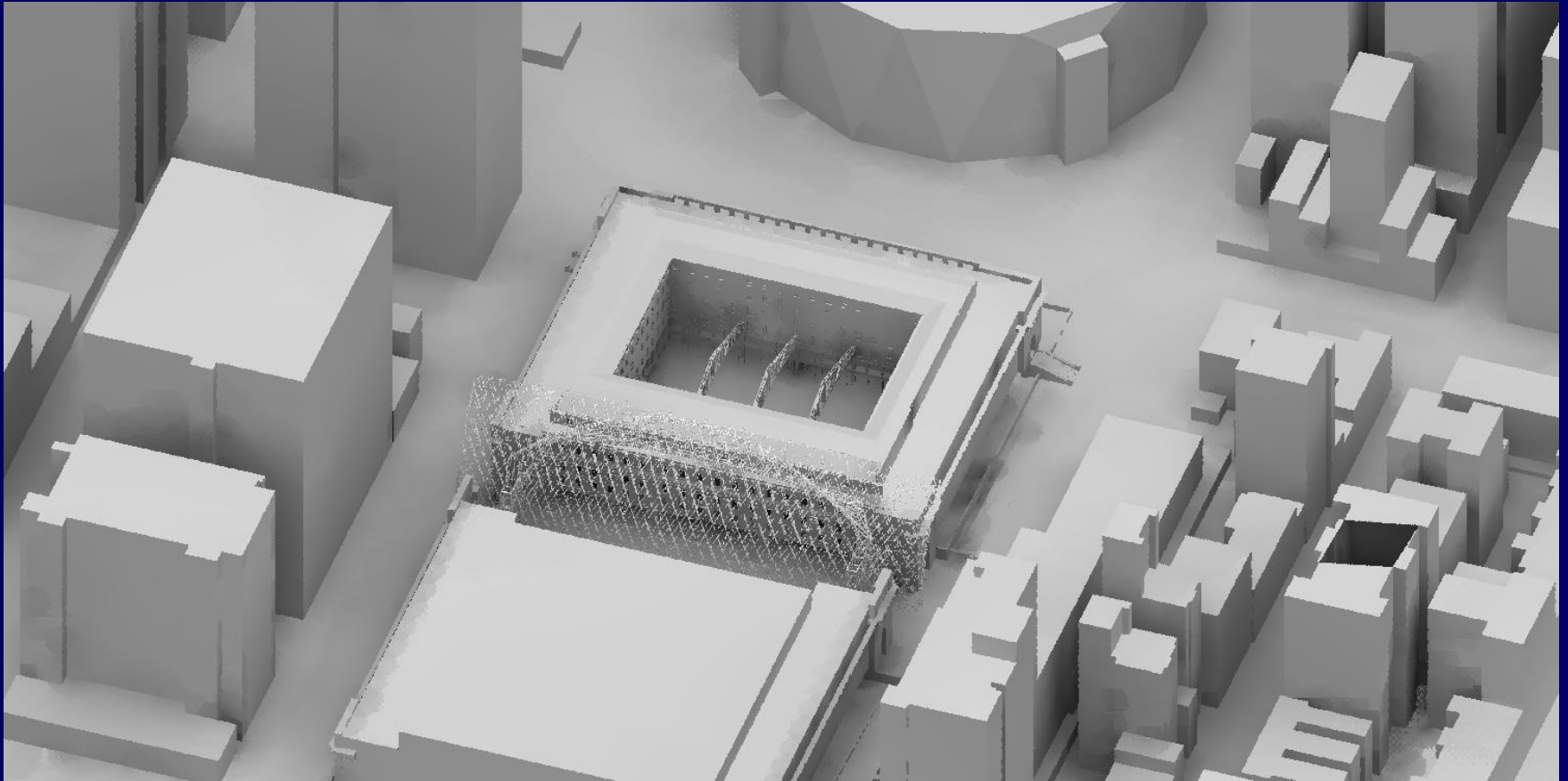
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Penn Station Videowall



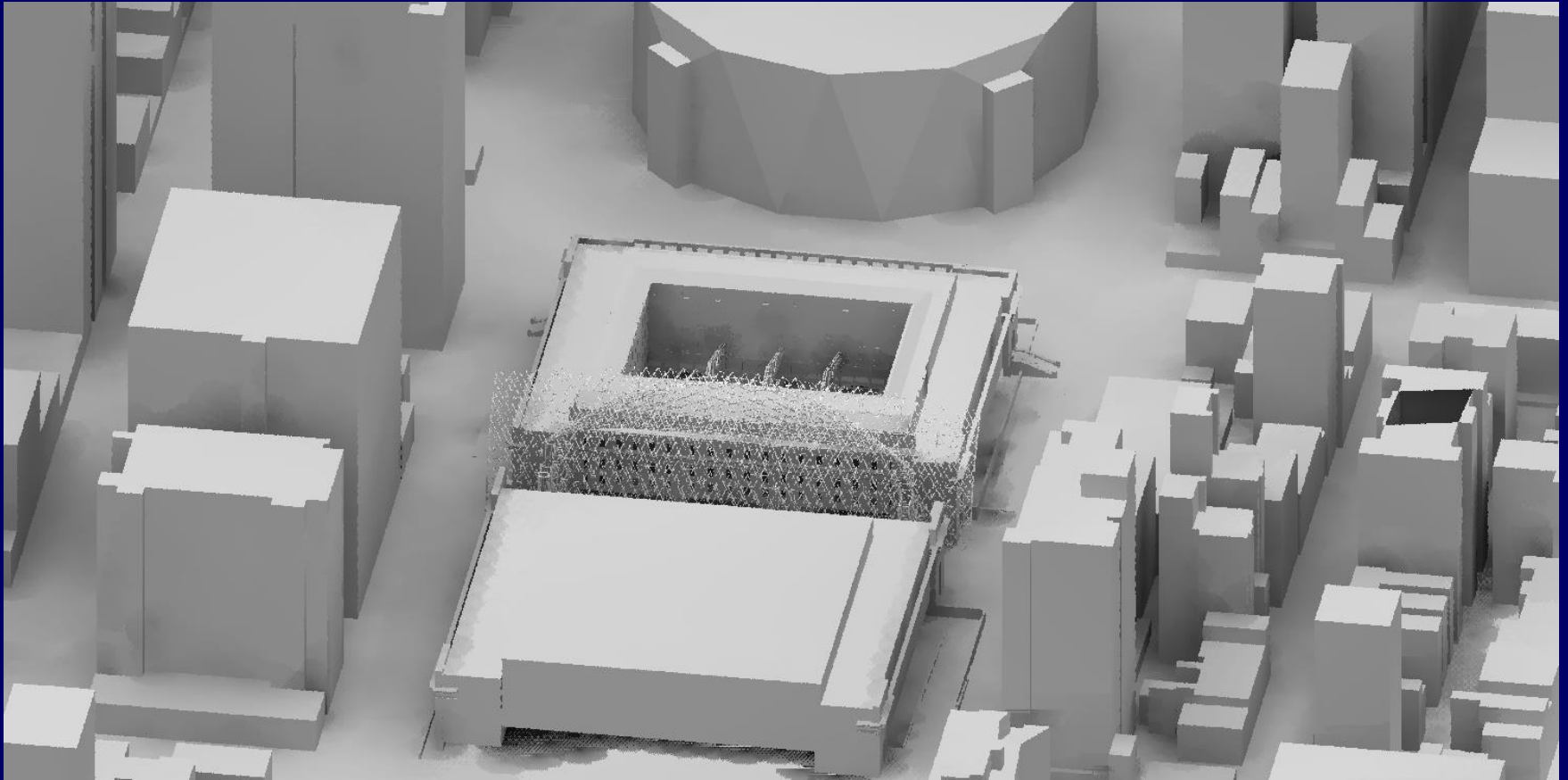
2:35pm

Penn Station Videowall



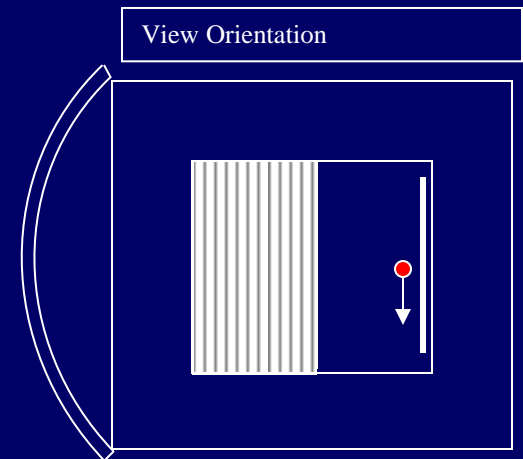
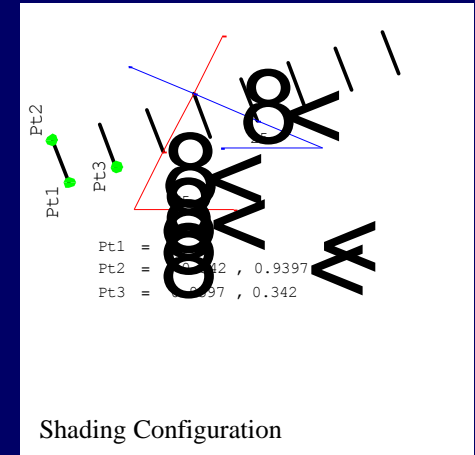
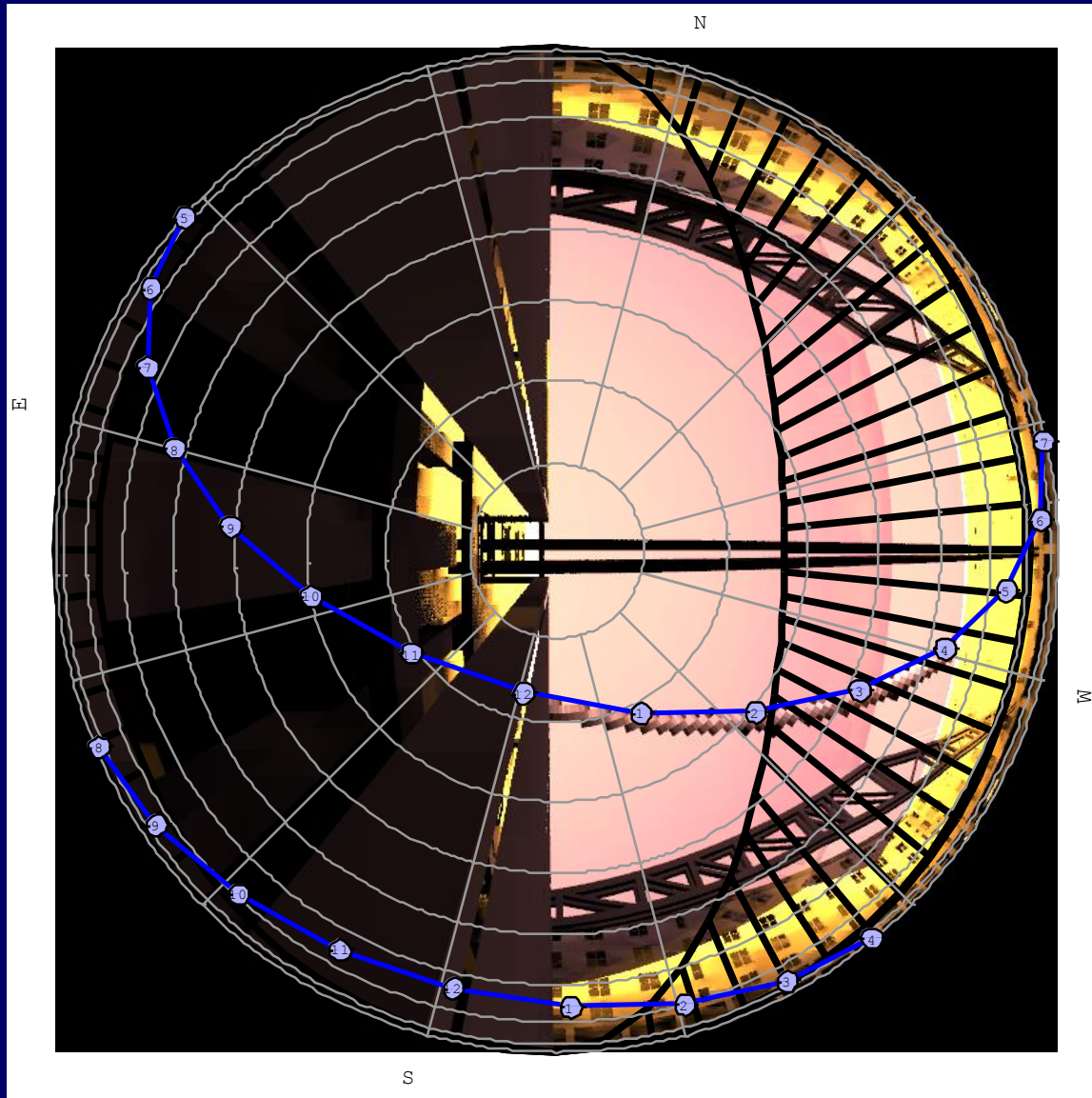
3:35pm

Penn Station Videowall

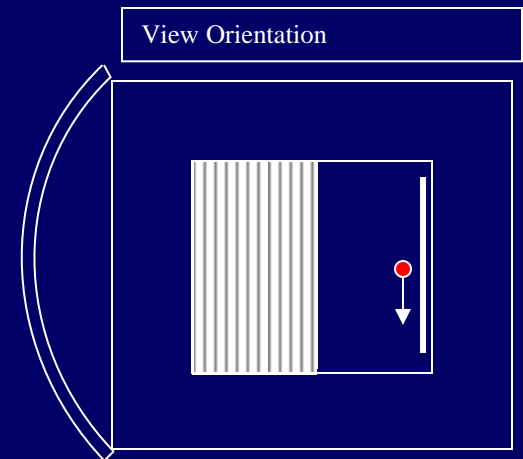
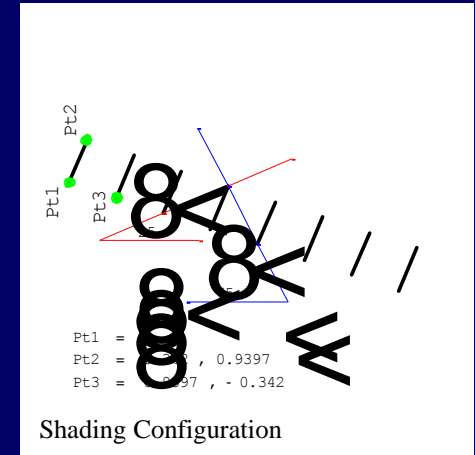
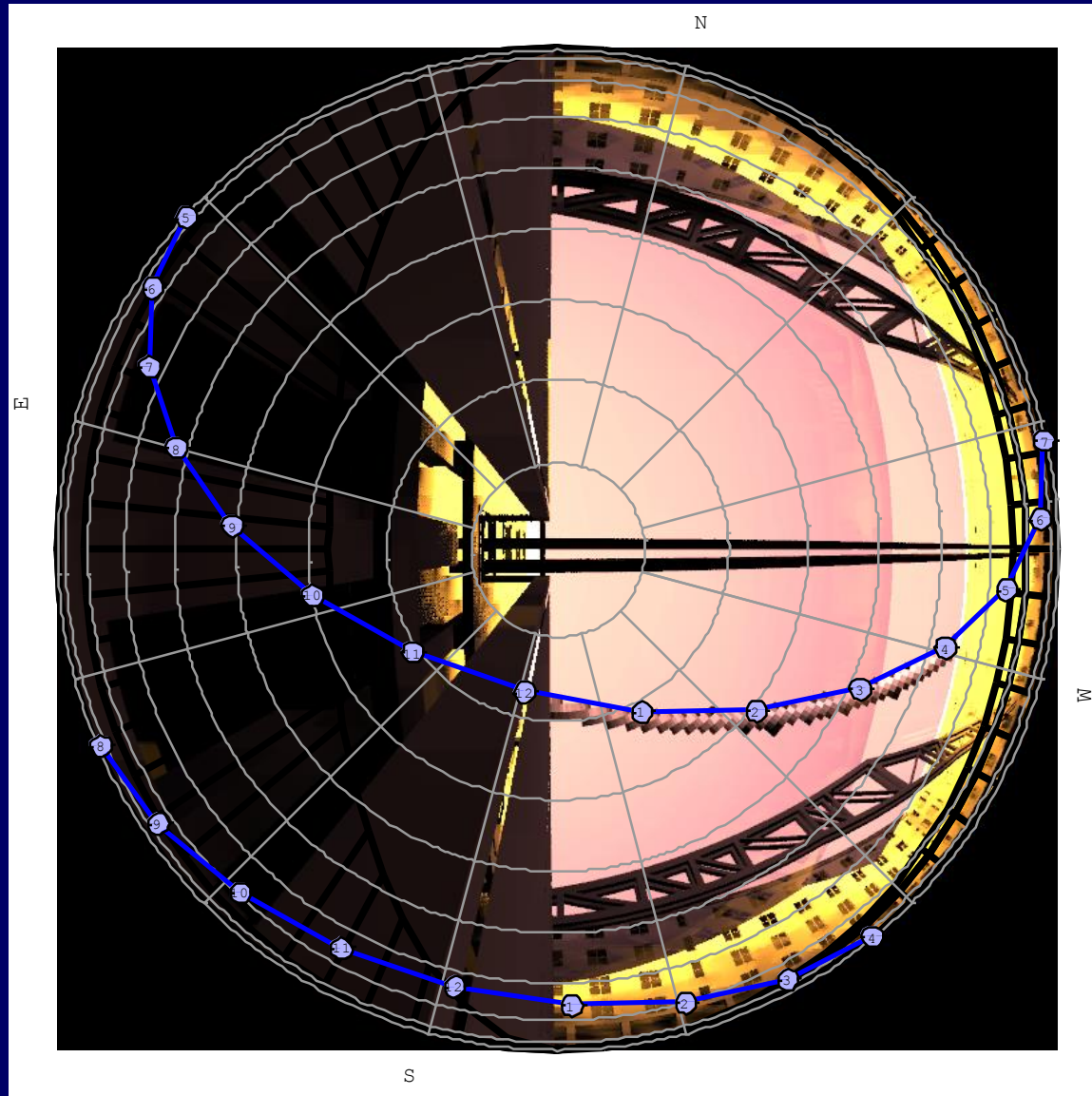


4:35pm

Penn Station Videowall

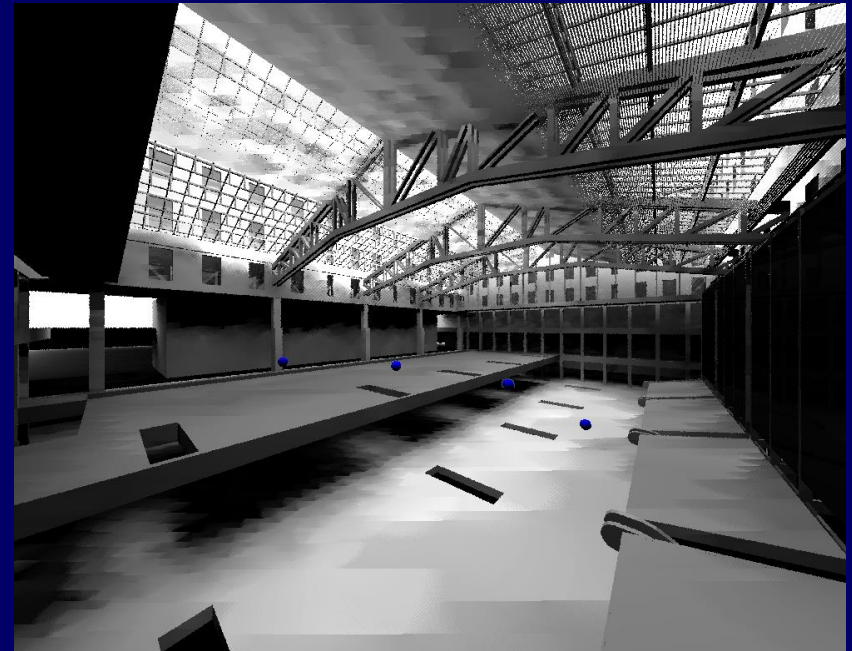
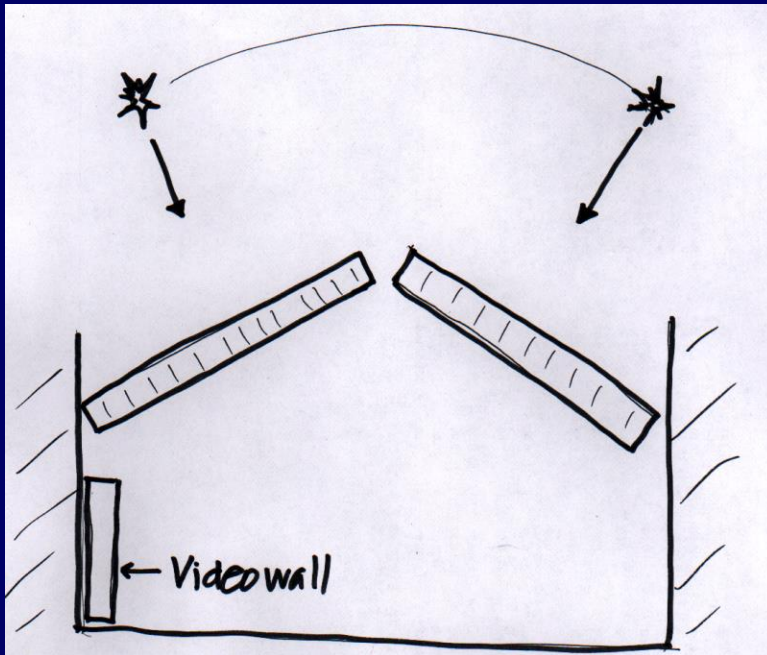


Penn Station Videowall



Penn Station Videowall

*Diagram of shading strategy required:
improved and clearer version of that below.*



Viewpoints

Penn Station Videowall

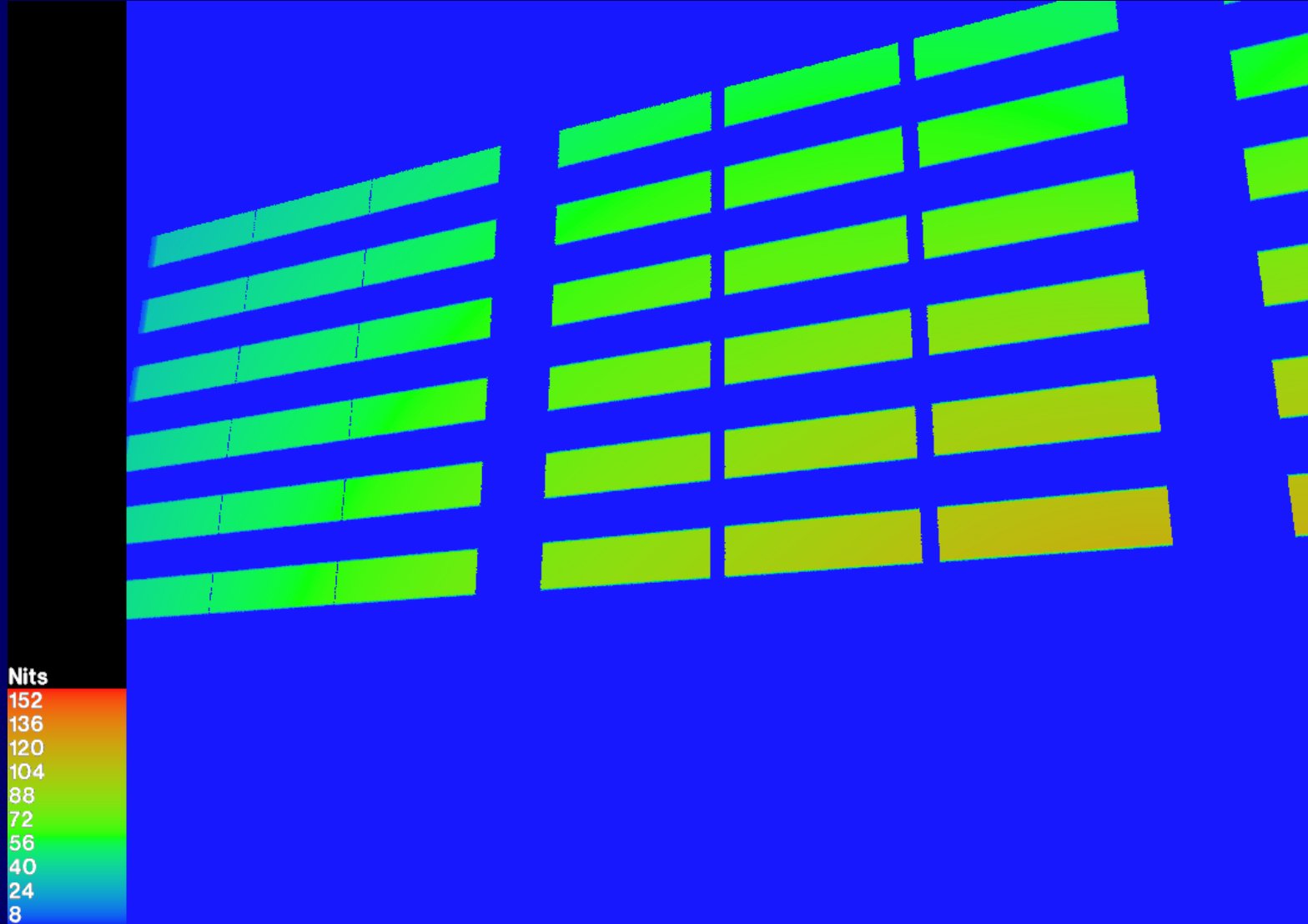


Viewpoint 1

Video Image

June 21, 9:00 a.m.

Penn Station Videowall



Viewpoint 1

100% Contrast Image Only

Penn Station Videowall

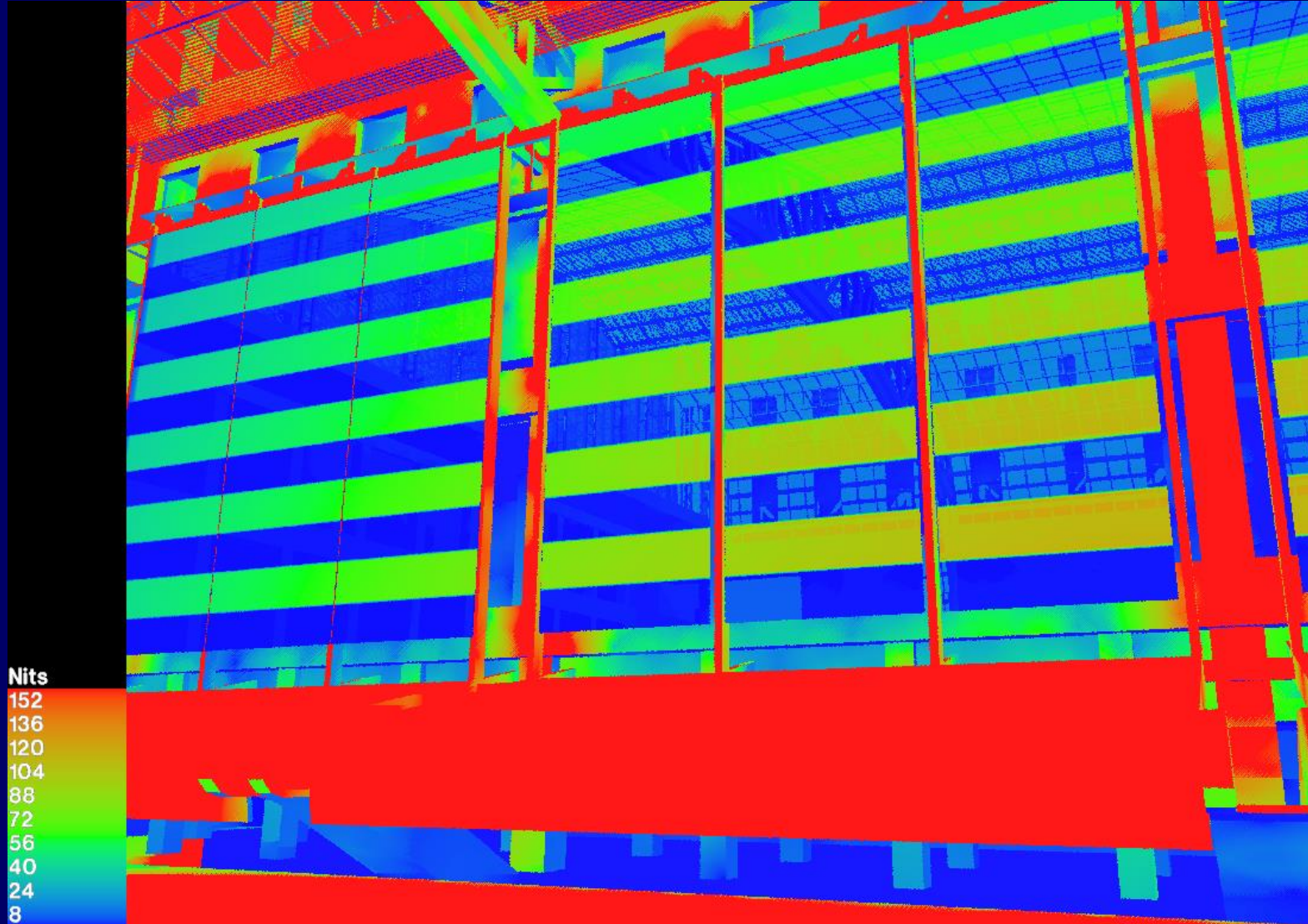


Viewpoint 1

100% Contrast Image and Reflection

June 21, 9:00 a.m.

Penn Station Videowall



Viewpoint 1

100% Contrast Image and Reflection

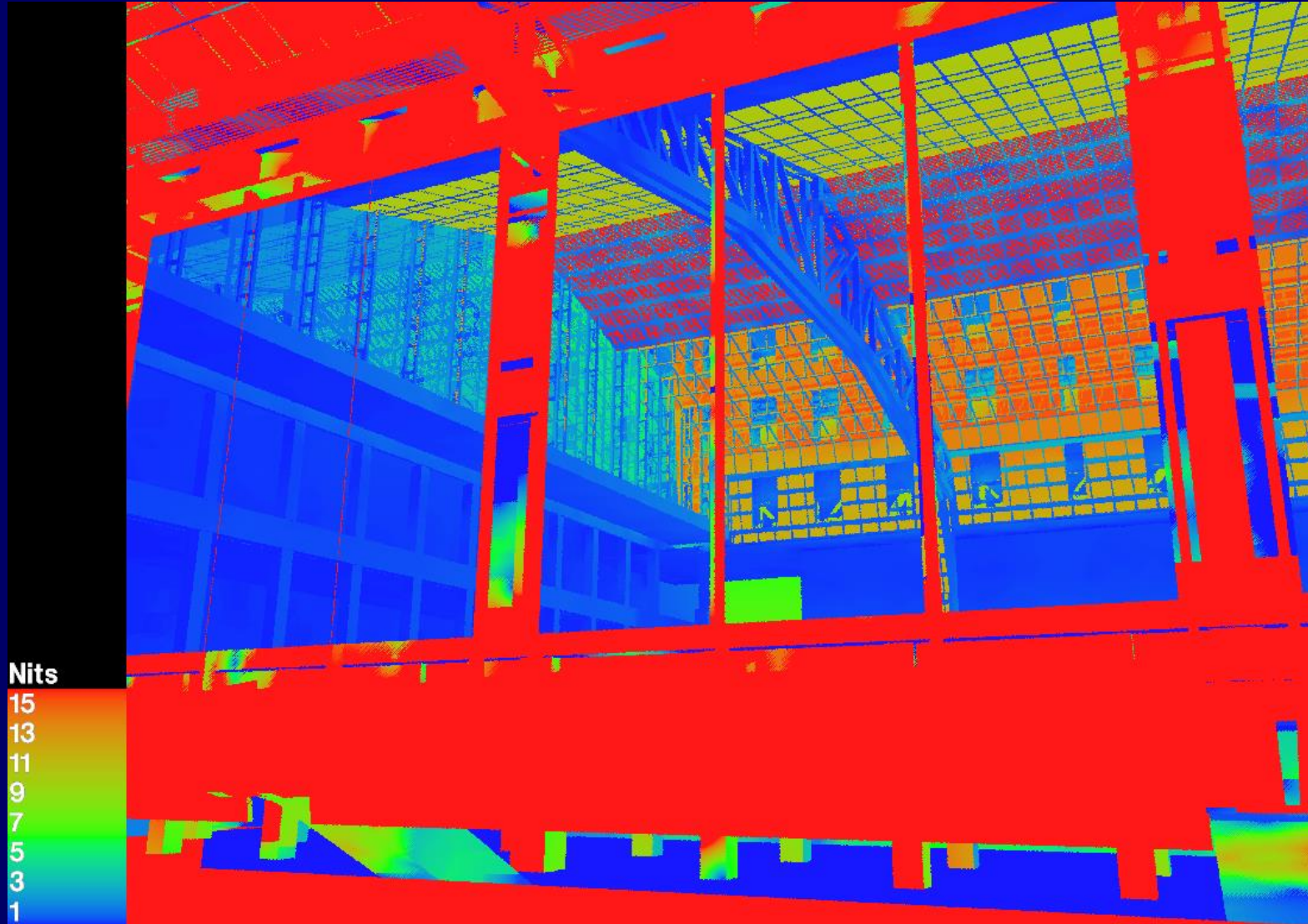
June 21, 9:00 a.m.

Fribourg 2002

Radiance Workshop

Page 52

Penn Station Videowall

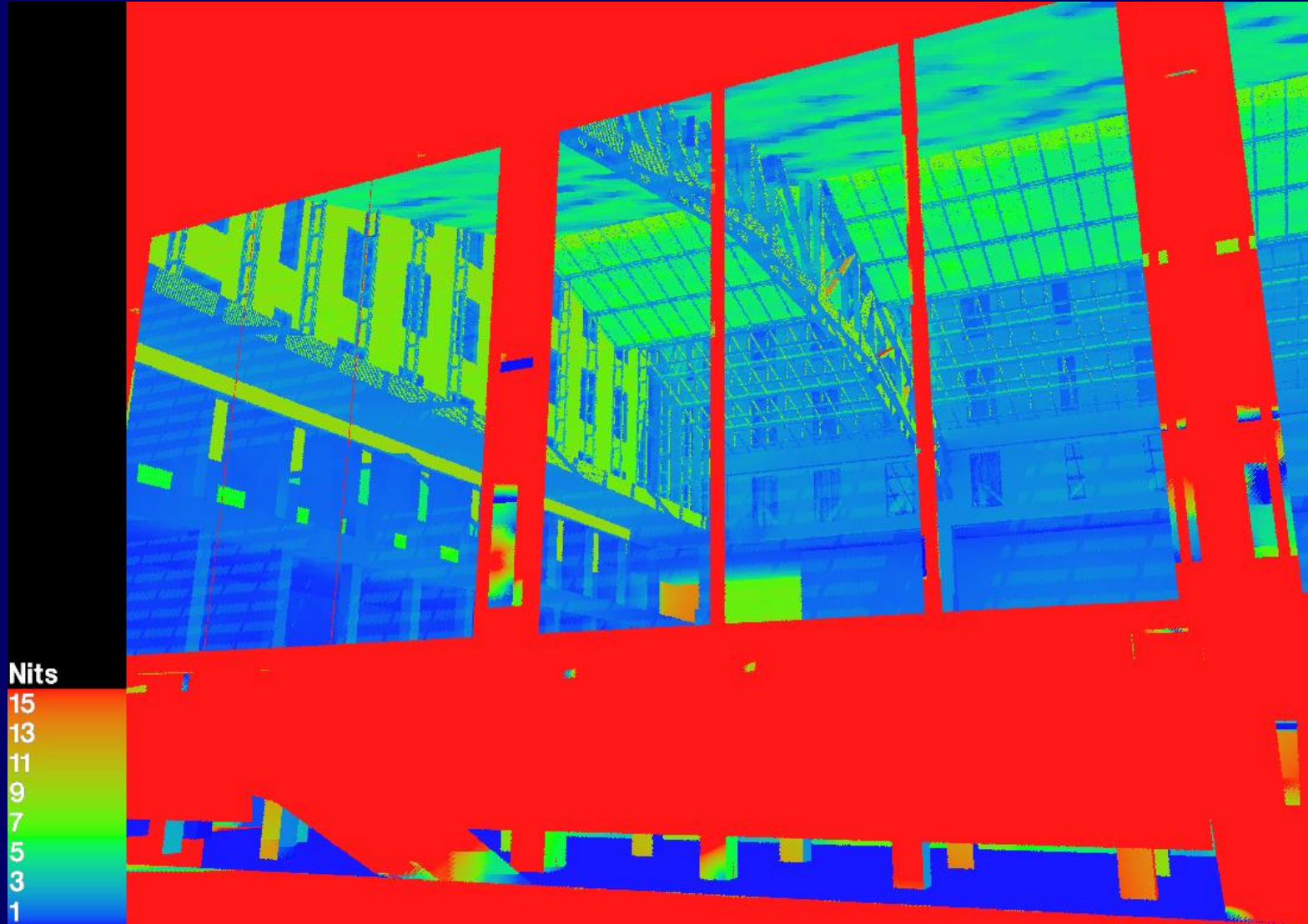


Viewpoint 1

Reflection Only

June 21, 9:00 a.m.

Penn Station Videowall

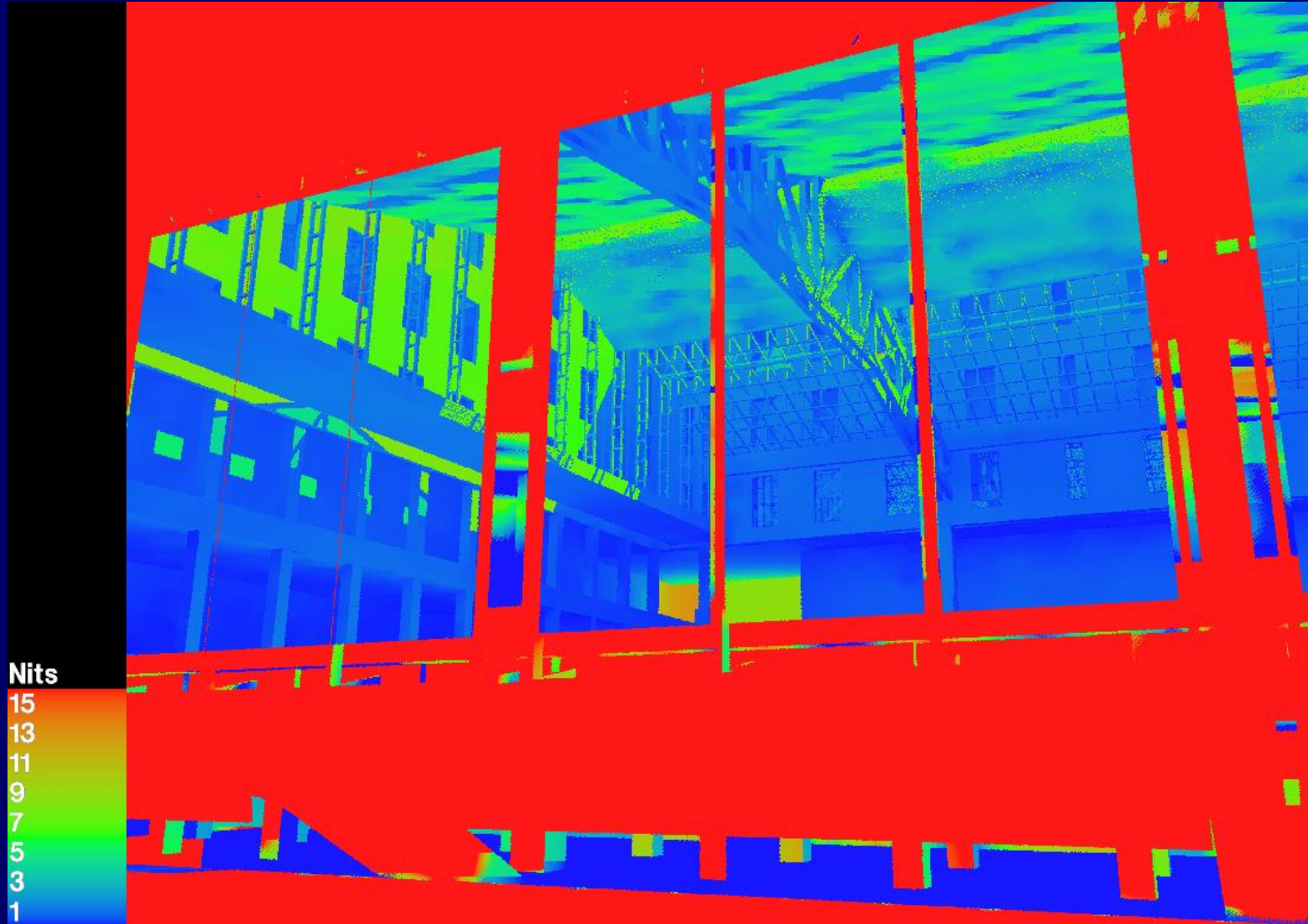


Viewpoint 1

Reflection Only

June 21, 1:00 p.m.

Penn Station Videowall

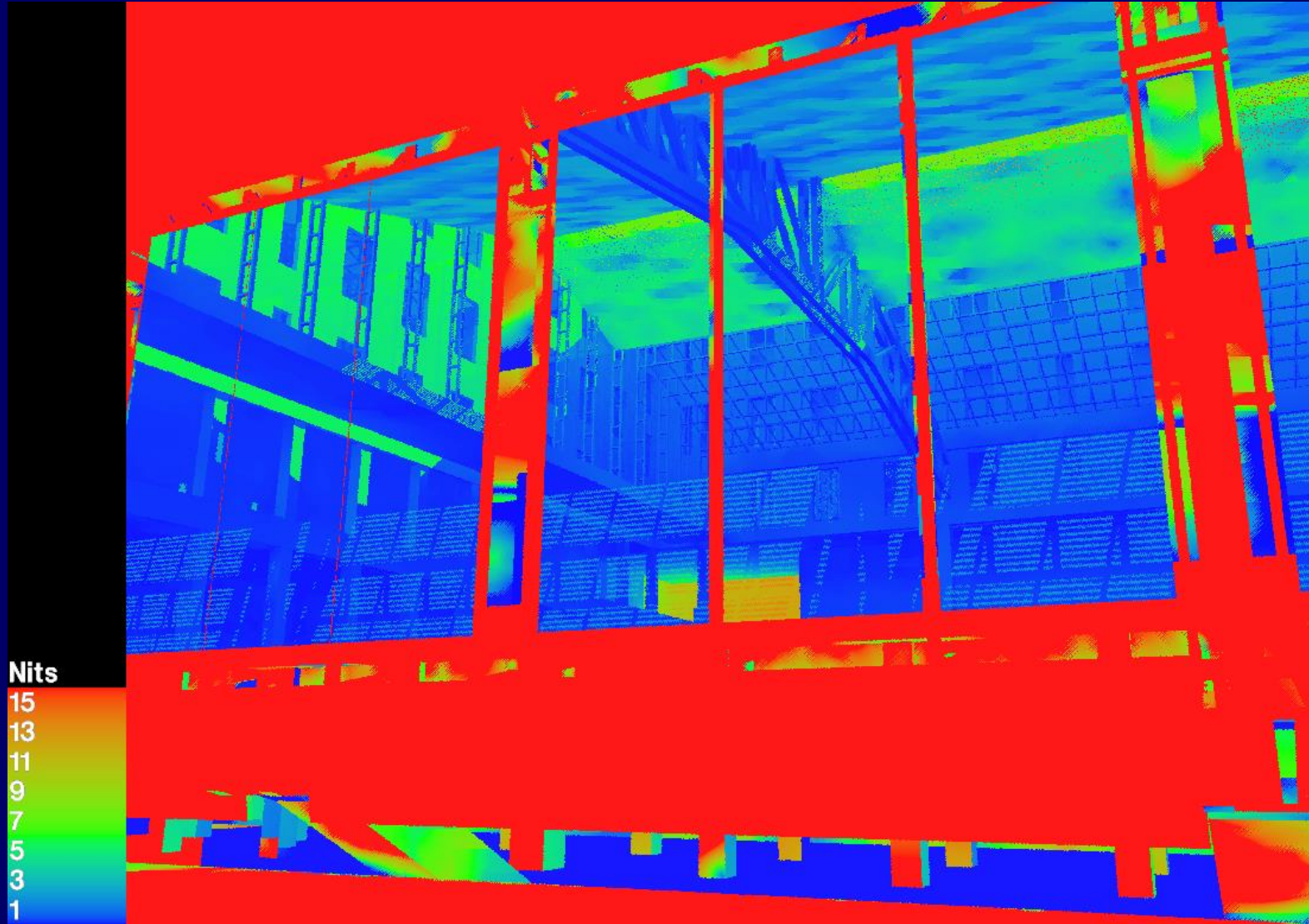


Viewpoint 1

Reflection Only

June 21, 2:30 p.m.

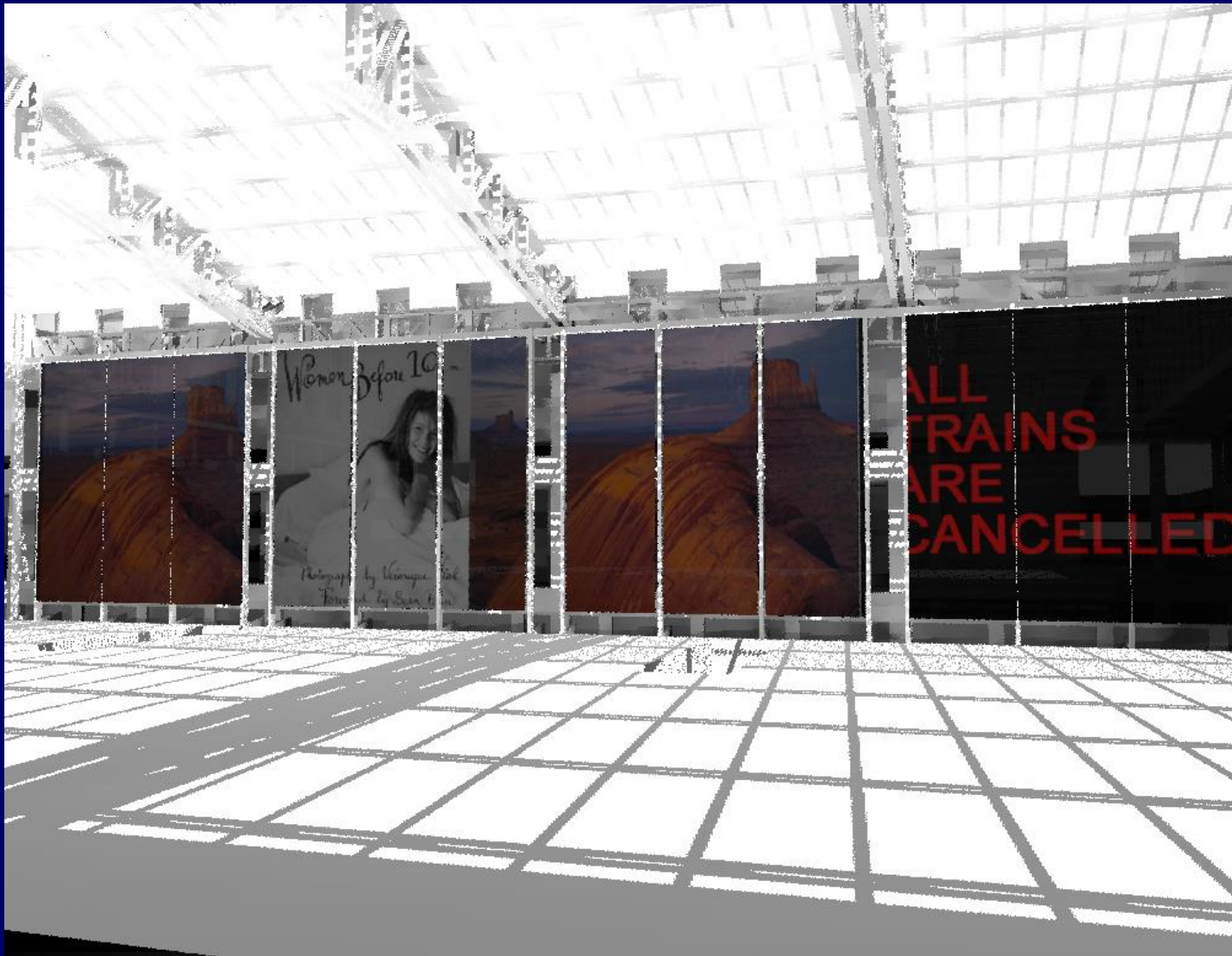
Penn Station Videowall



Viewpoint 1

Reflection Only

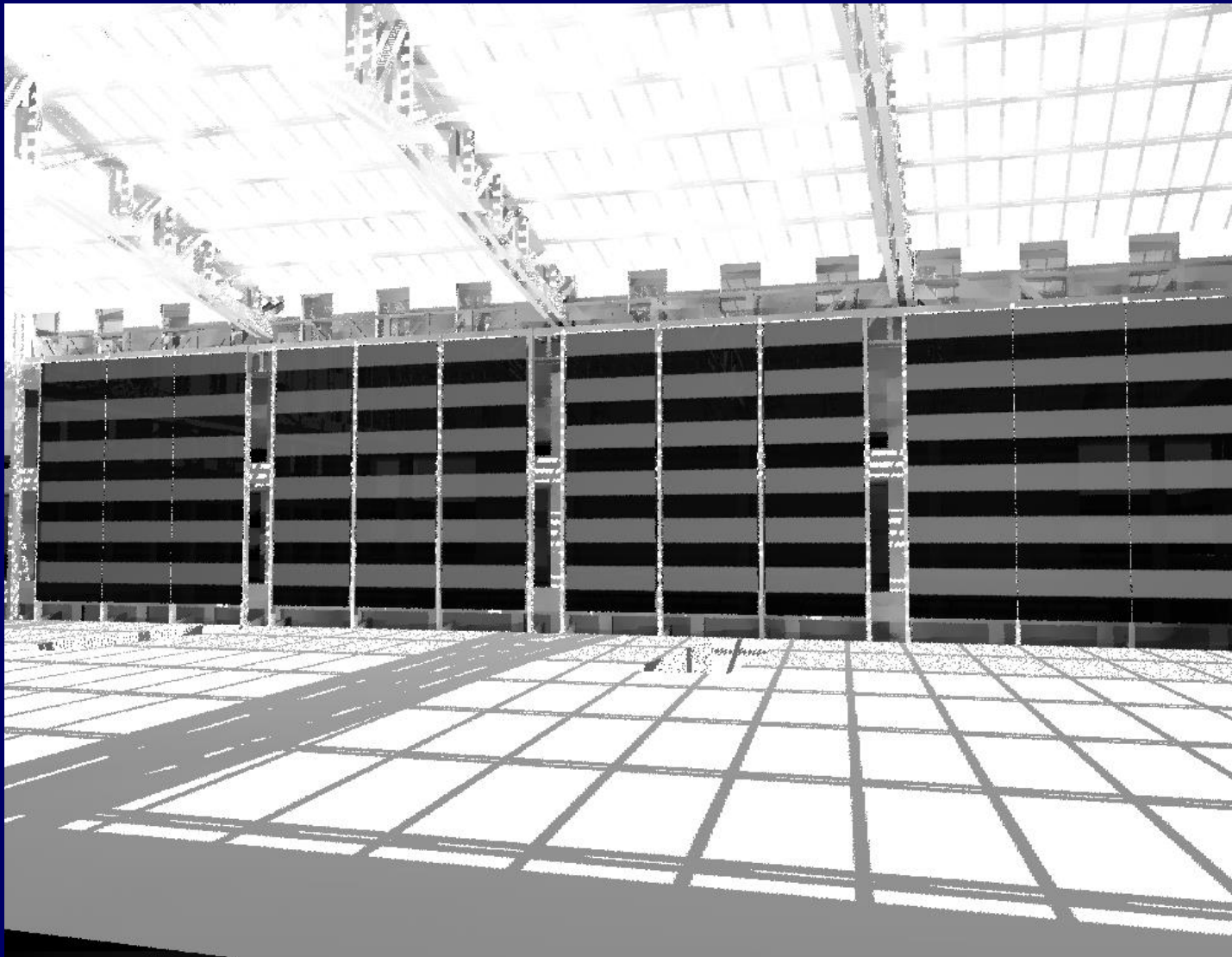
June 21, 3:45 p.m.



Viewpoint 2

Video Image

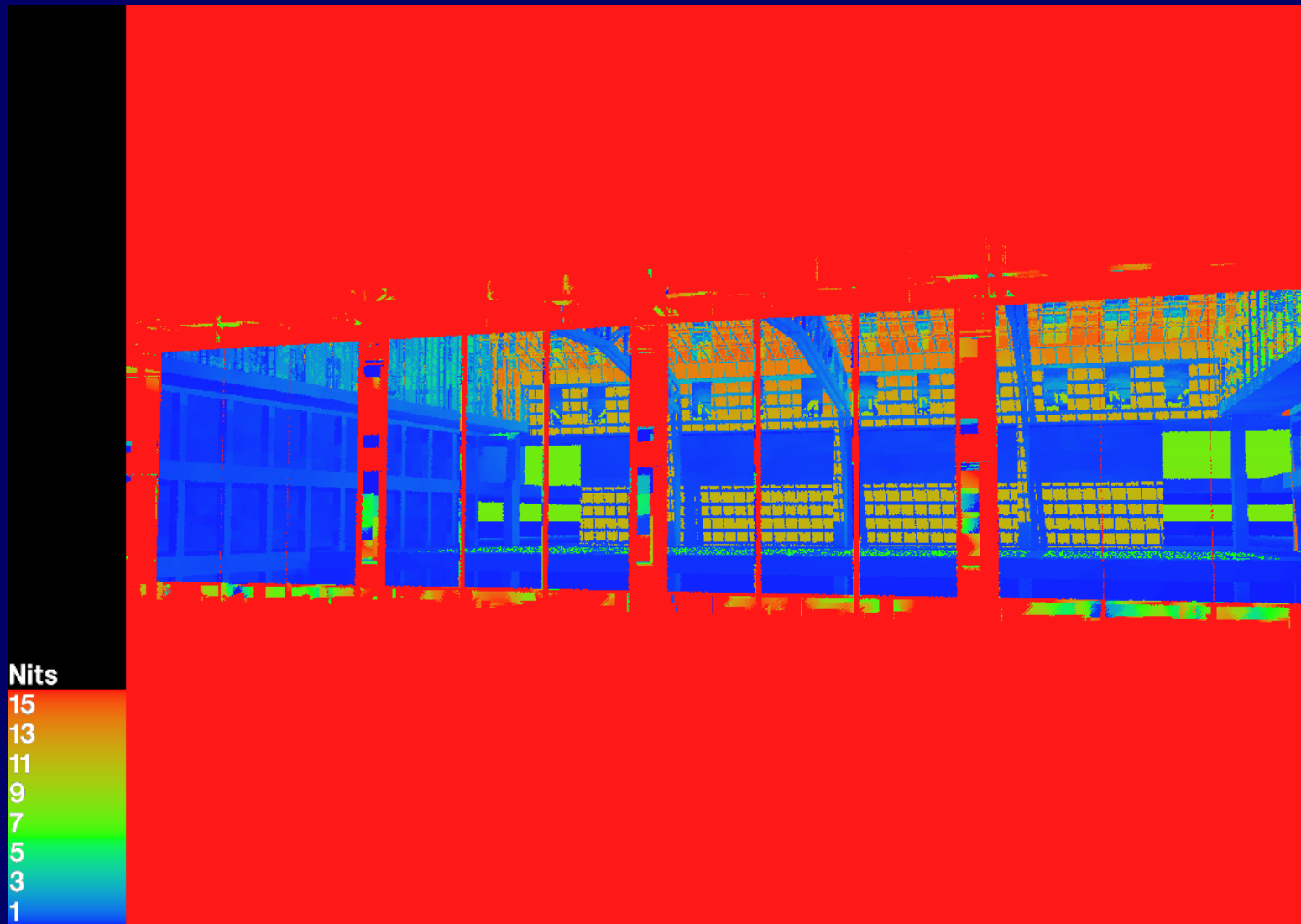
June 21, 1:00 p.m.



Viewpoint 2

100% Contrast Image and Reflection

June 21, 1:00 p.m.



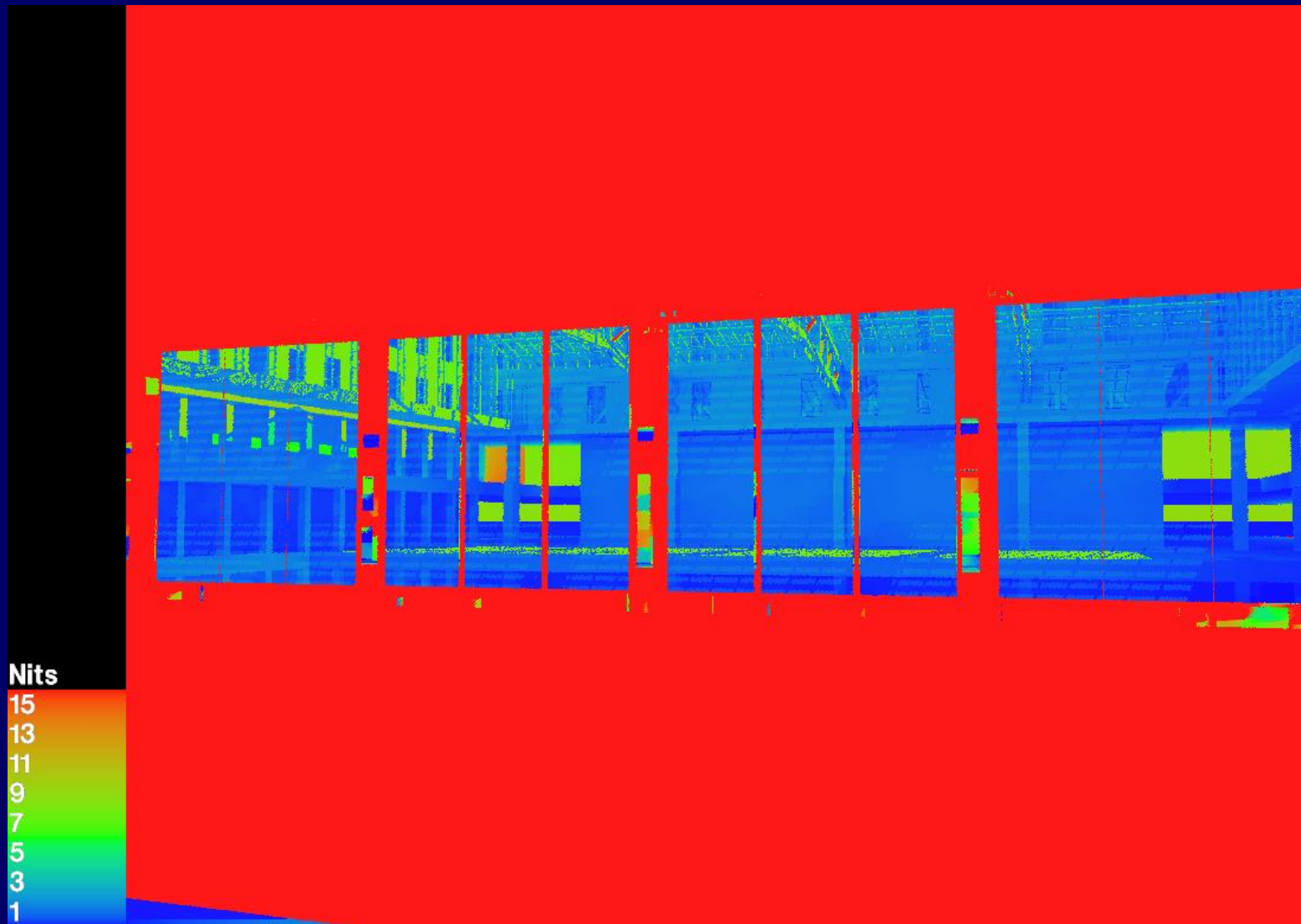
Nits

15
13
11
9
7
5
3
1

Viewpoint 2

Reflection Only

June 21, 9:00 a.m.



Nits

15
13
11
9
7
5
3
1

Viewpoint 2

Reflection Only

June 21, 1:00 p.m.

Austin Museum of Art

Main entrance



Austin Museum of Art

Gluckman Mayner
Architects

Scale Model



Austin Museum of Art

Project Challenges:

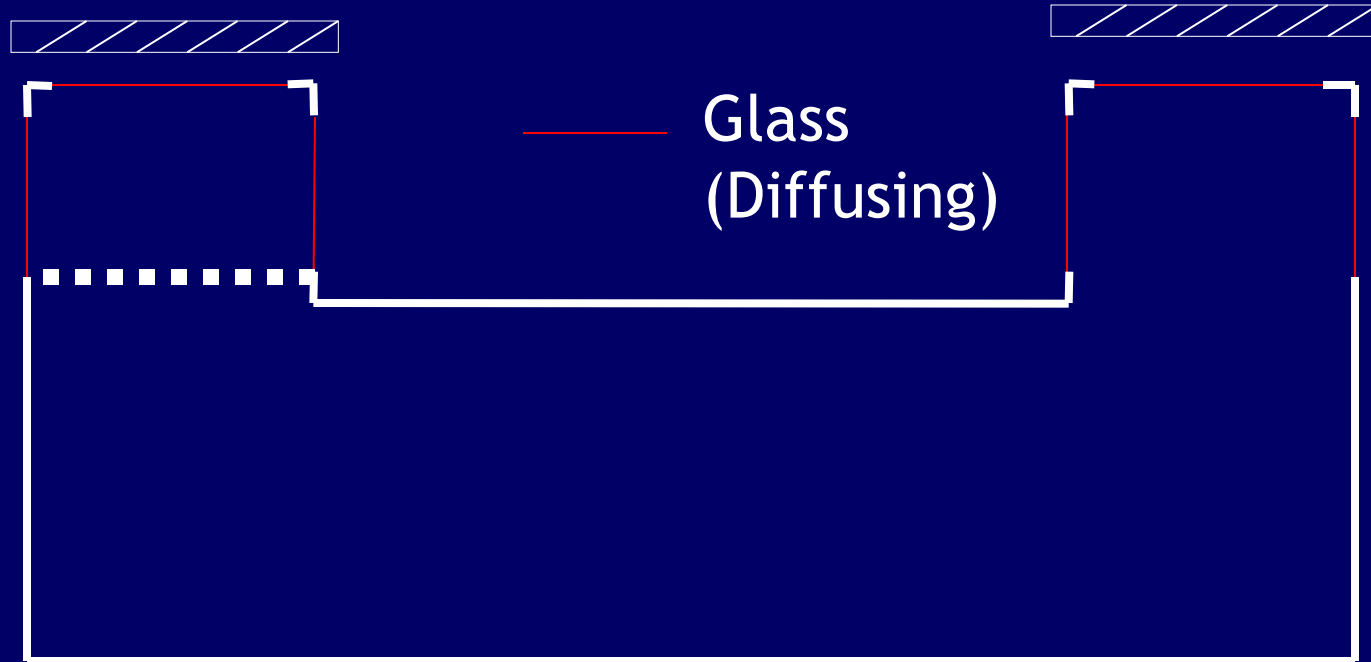
- Daylight in Texas
- Conservation of exhibits
- “White box” rooms
- Fast Design Phase



Austin Museum of Art

Horizontal Louvers

Horizontal Louvers



Austin Museum of Art

Daylighting Conservation Criteria:

- Light Exposure: < 650 klx.hours per annum
- UV < 75 μ W/lm

External Daylight Exposure: 150 Mlx.hours per annum

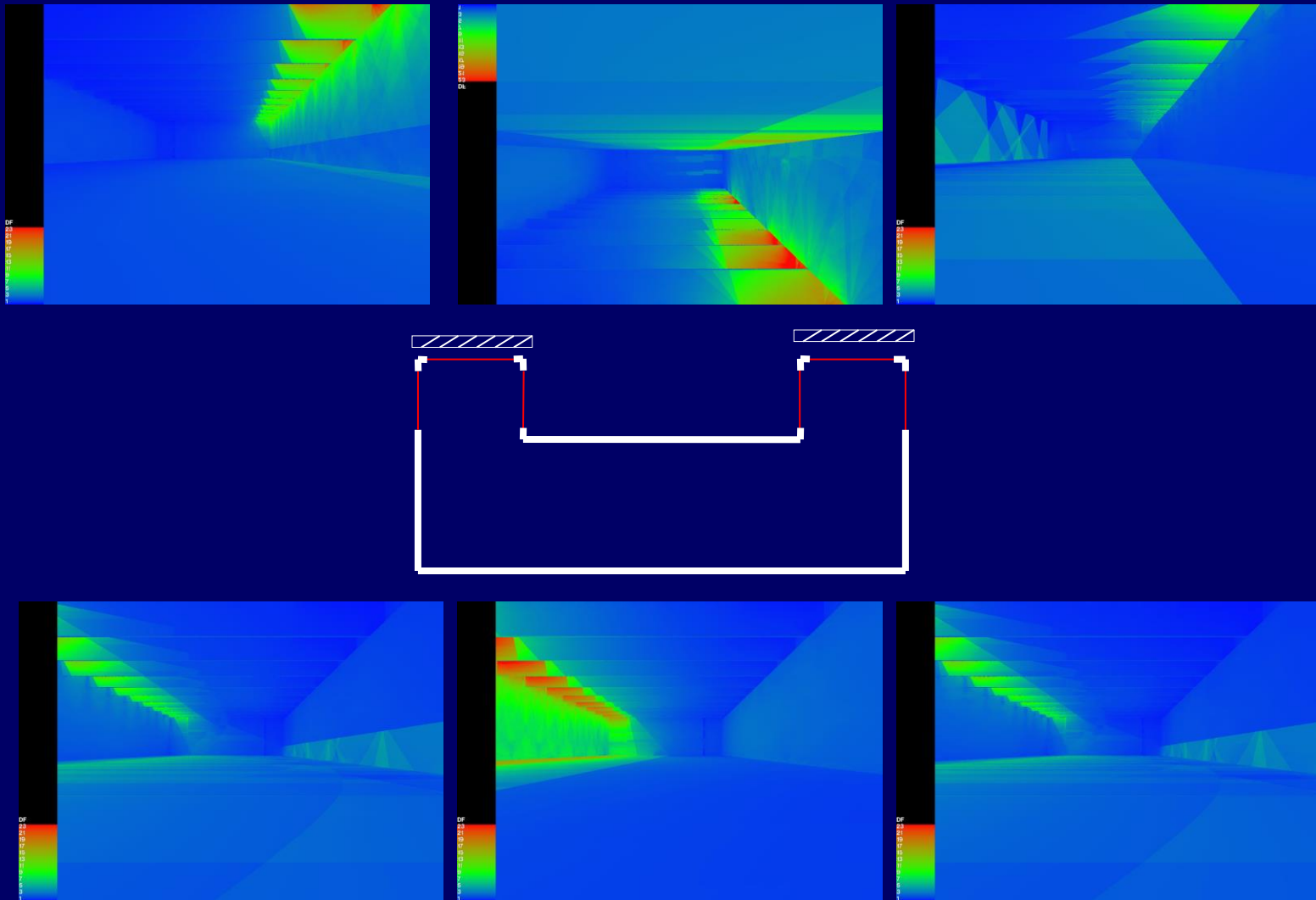
Electric Lighting Criteria:

Illuminance 200 lx (20 ft.candles) or 50 lx

Galleries without sensitive exhibits:

750 lx +

Austin Museum of Art

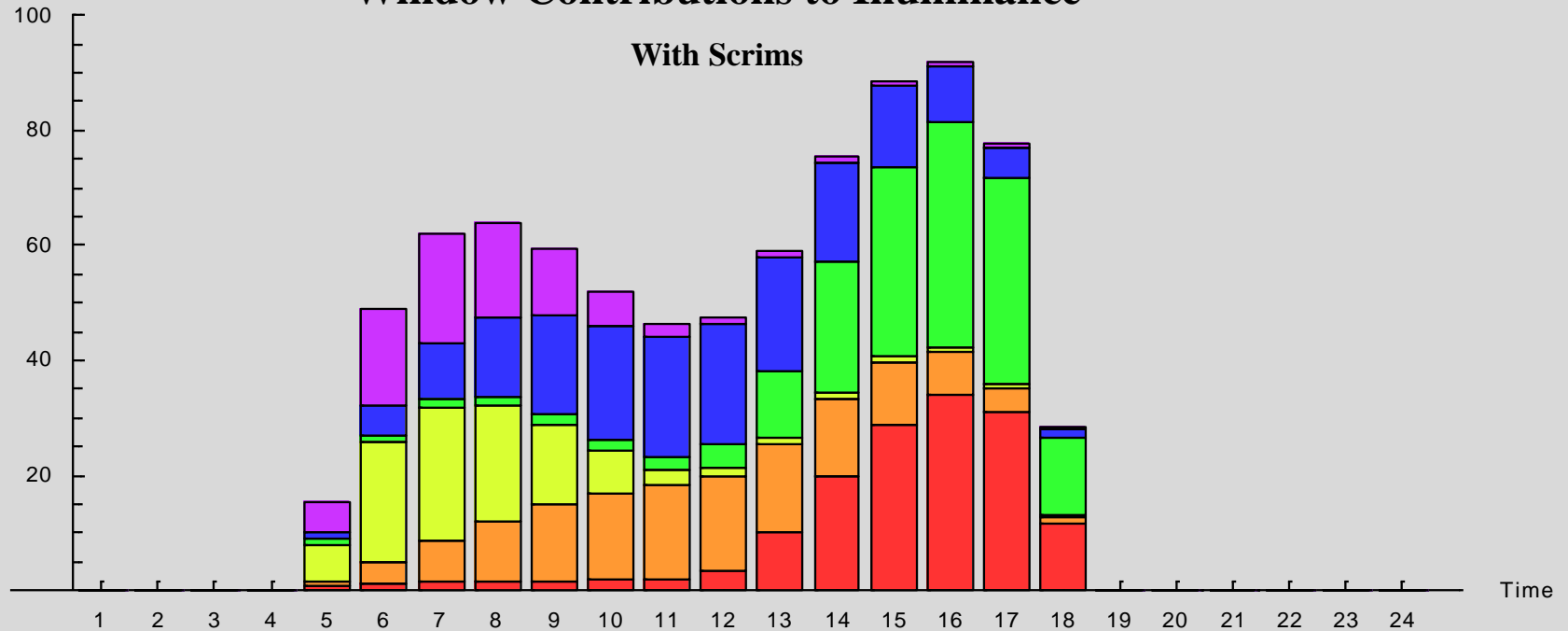


Austin Museum of Art

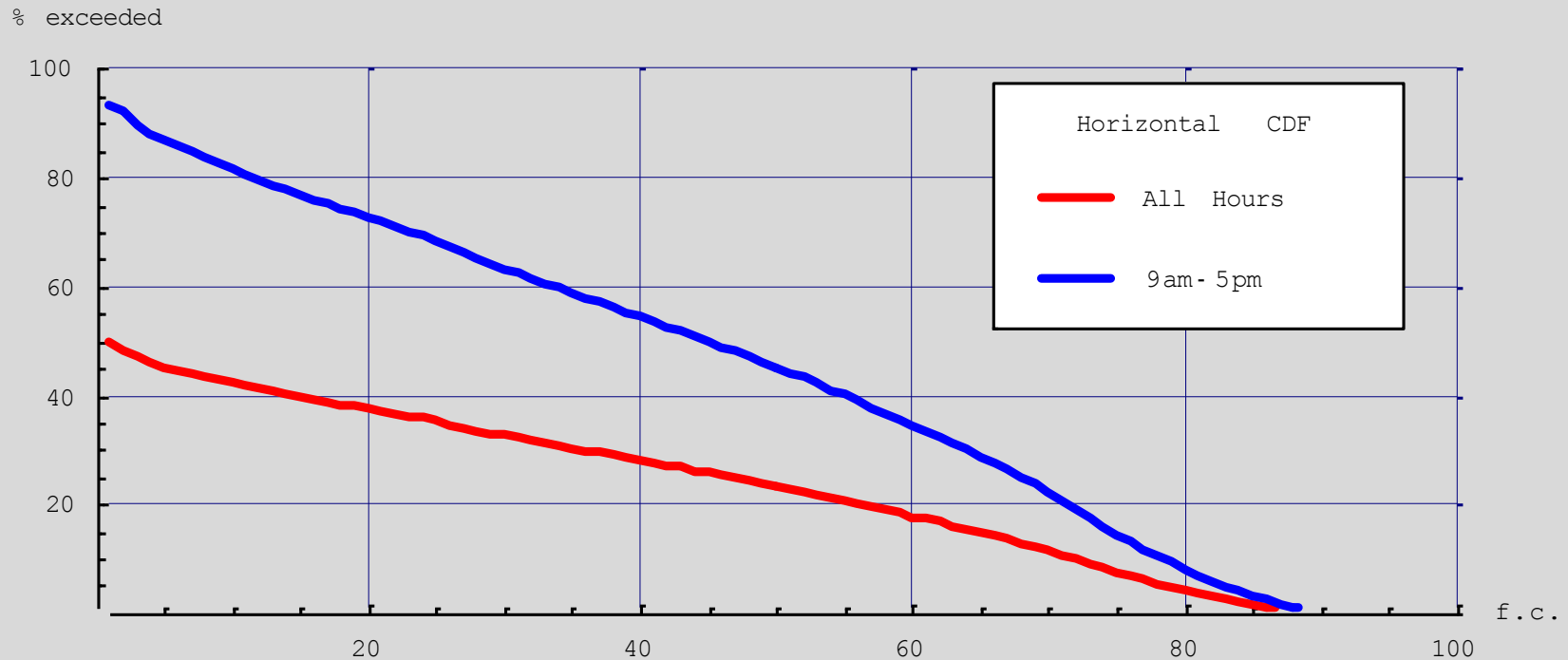
FootCandles

Window Contributions to Illuminance

With Scrims

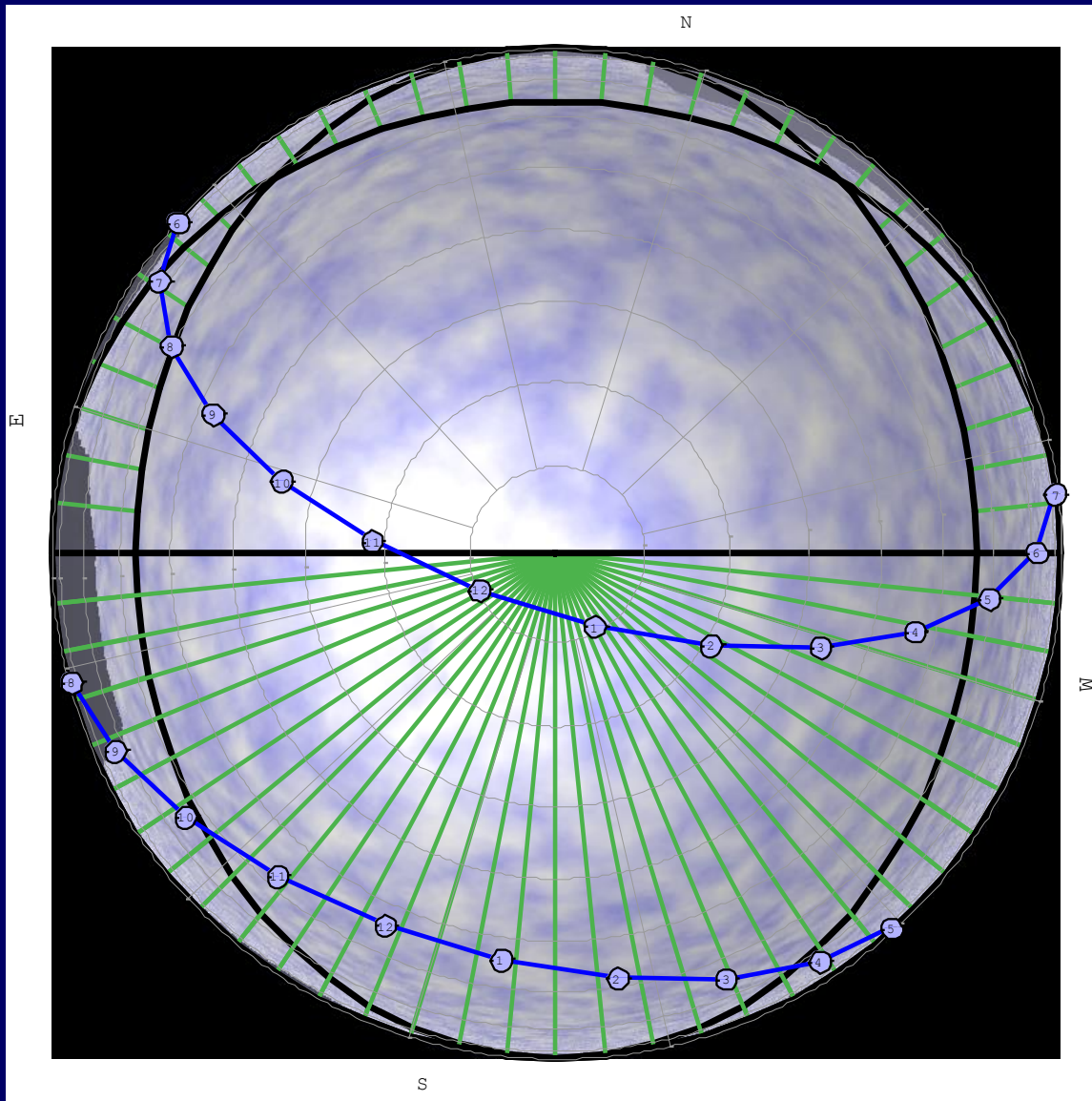


Austin Museum of Art



Cumulative Distribution of Illuminance Values

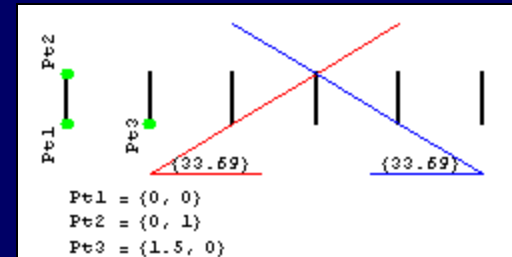
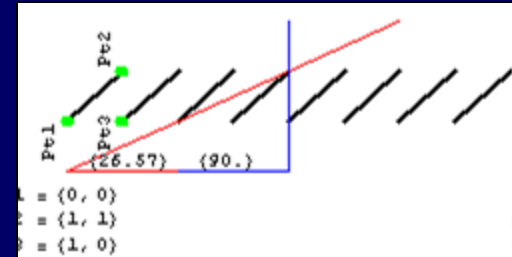
Austin Museum of Art



Transmission: ???

Sunlight Hours: 3 Hours

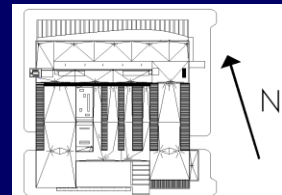
Time: 9:00a to 12:00p C.D.T.



E-W Shading: No Overlap

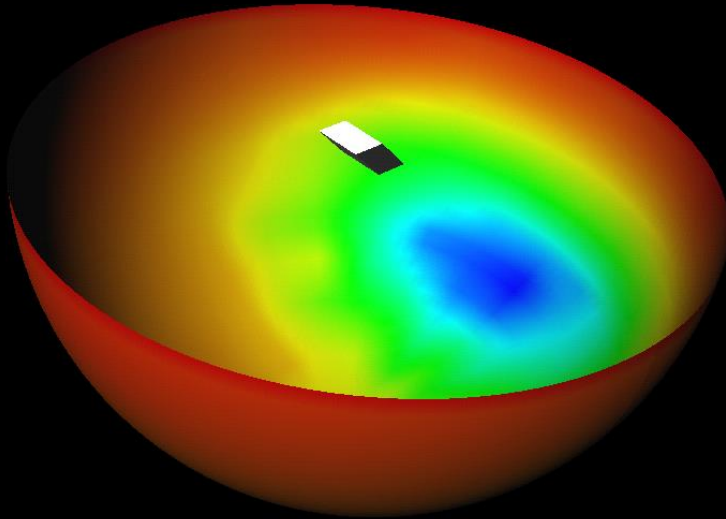
N-S Shading: 1:1.5 Spacing

Finish: 80% Reflectance



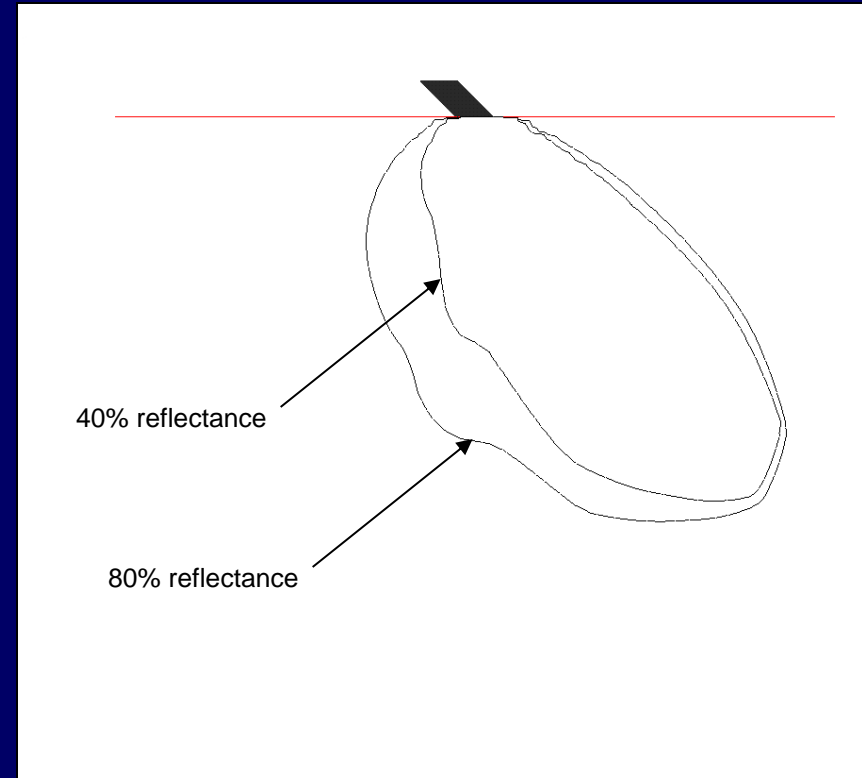
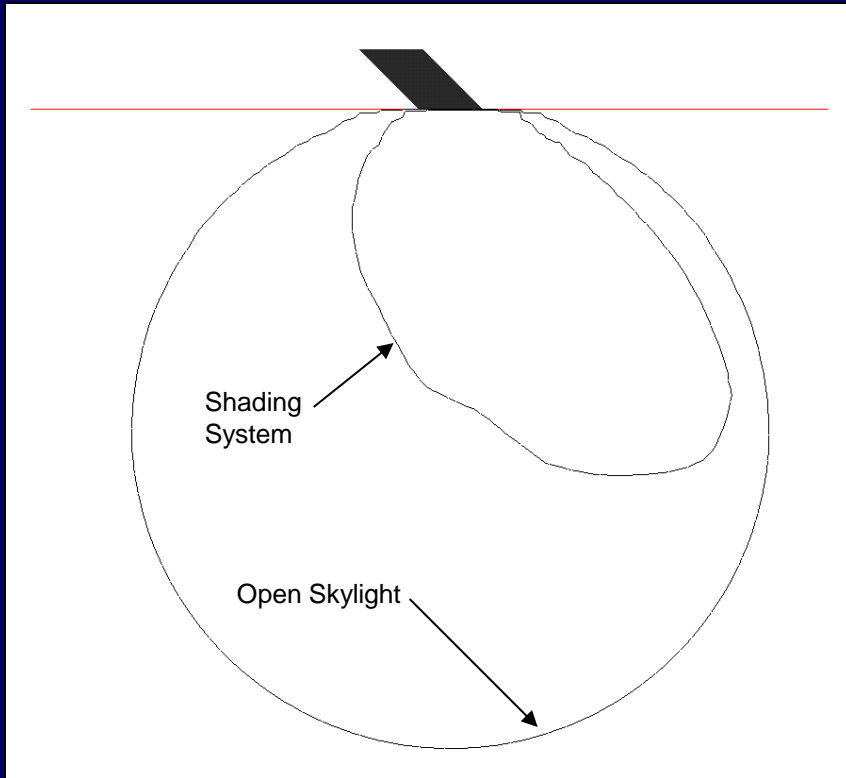
Austin Museum of Art

180
150
120
90
60
30
0

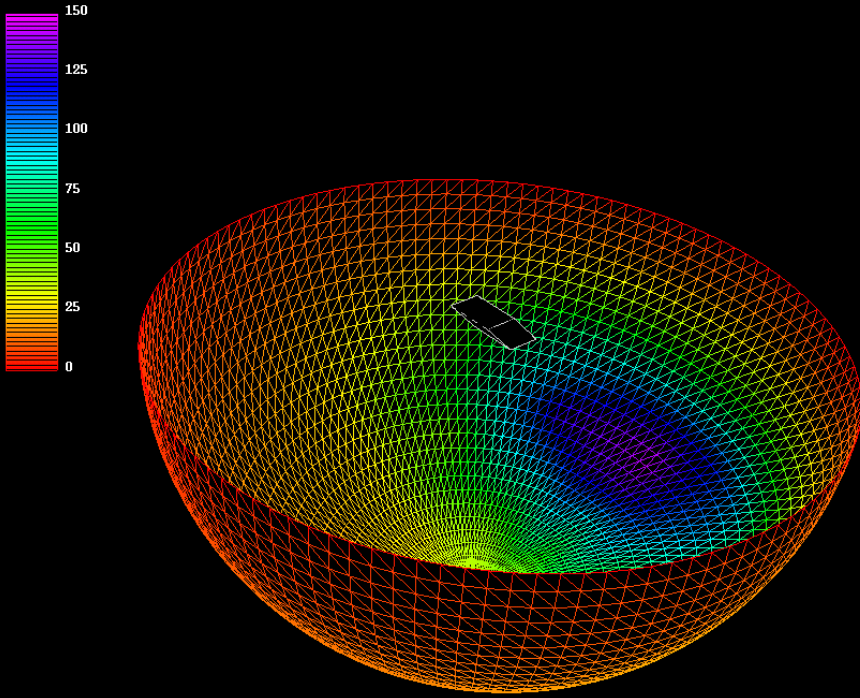


Virtual louvre, single cell,
lighting distribution.

Austin Museum of Art



Austin Museum of Art



Spherical Sampling Grid.

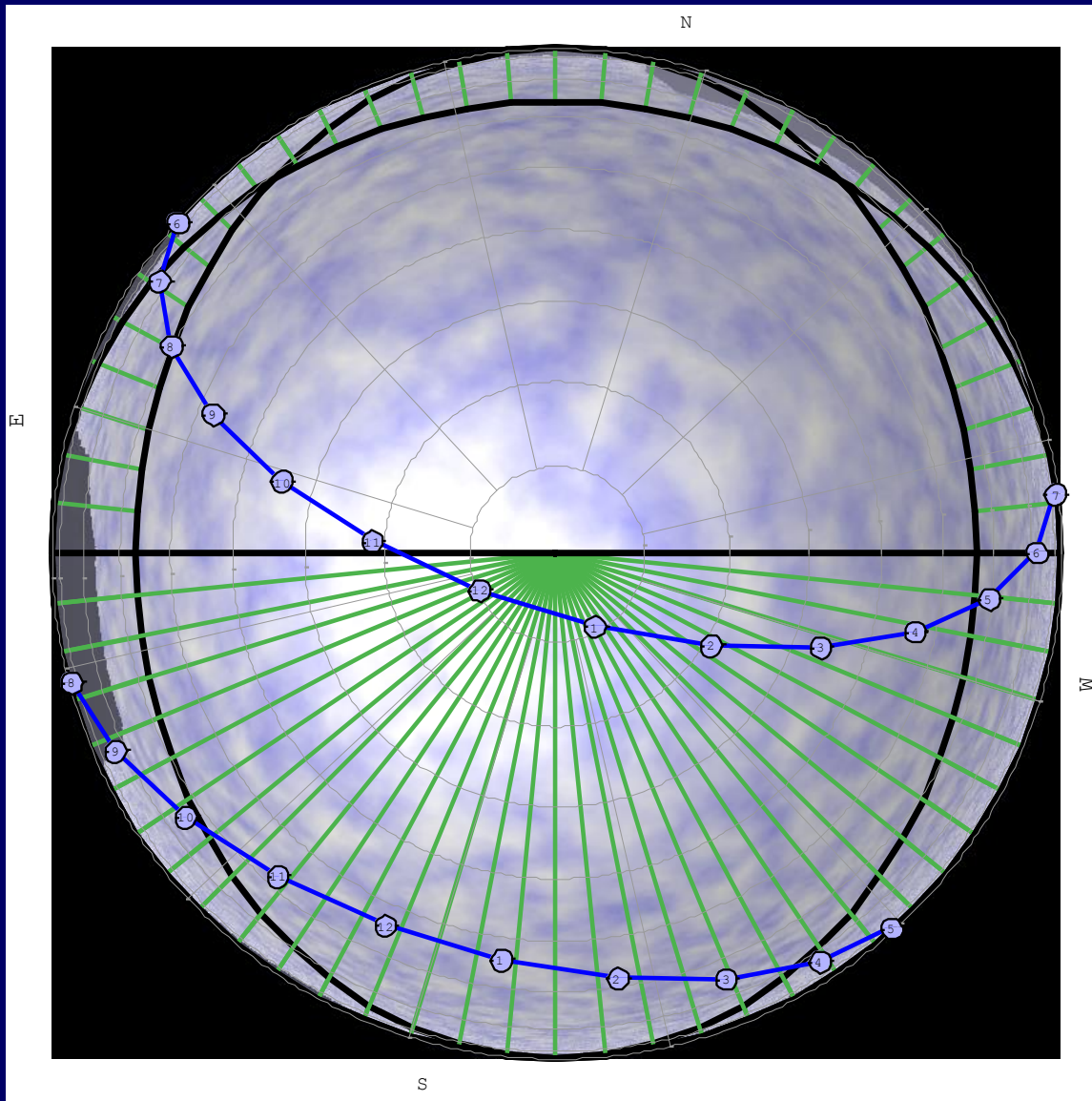
“mkillum” data

The diagram illustrates the second stage of the FFT algorithm. It shows a butterfly network with inputs E , N , M , and j . The outputs are labeled with various mathematical expressions involving N , M , i , j , and trigonometric functions like Sin and Cos . The diagram is divided into two main sections by a vertical line.

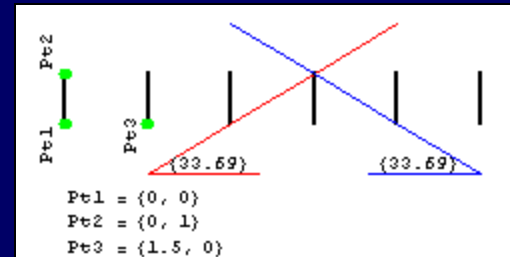
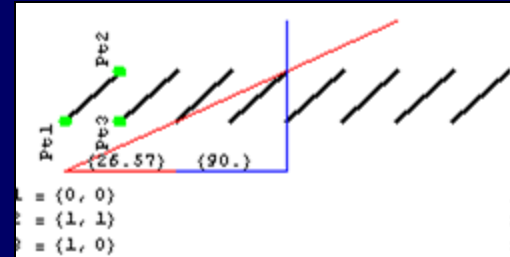
On the left side, the inputs are E , N , M , and j . The outputs are labeled with 2 , M , N , and j . The butterfly structure is shown with lines connecting the inputs to the outputs.

On the right side, the inputs are j , i , Sin , and Cos . The outputs are labeled with i , i , i , and i . The butterfly structure is shown with lines connecting the inputs to the outputs.

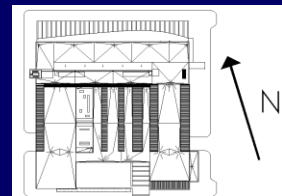
Austin Museum of Art



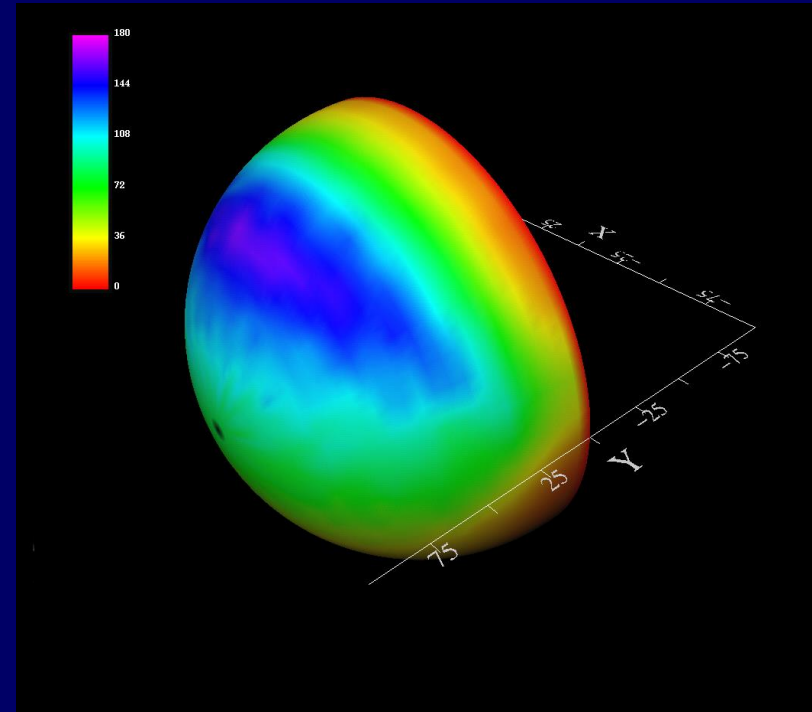
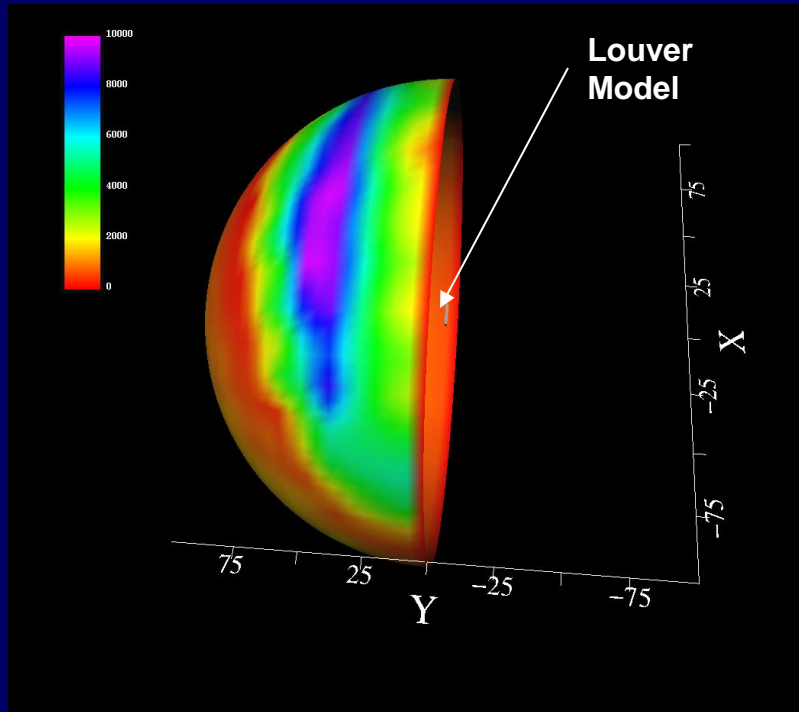
Transmission: 22.4%
Sunlight Hours: 3 Hours
Time: 9:00a to 12:00p C.D.T.



E-W Shading: No Overlap
N-S Shading: 1:1.5 Spacing
Finish: 80% Reflectance



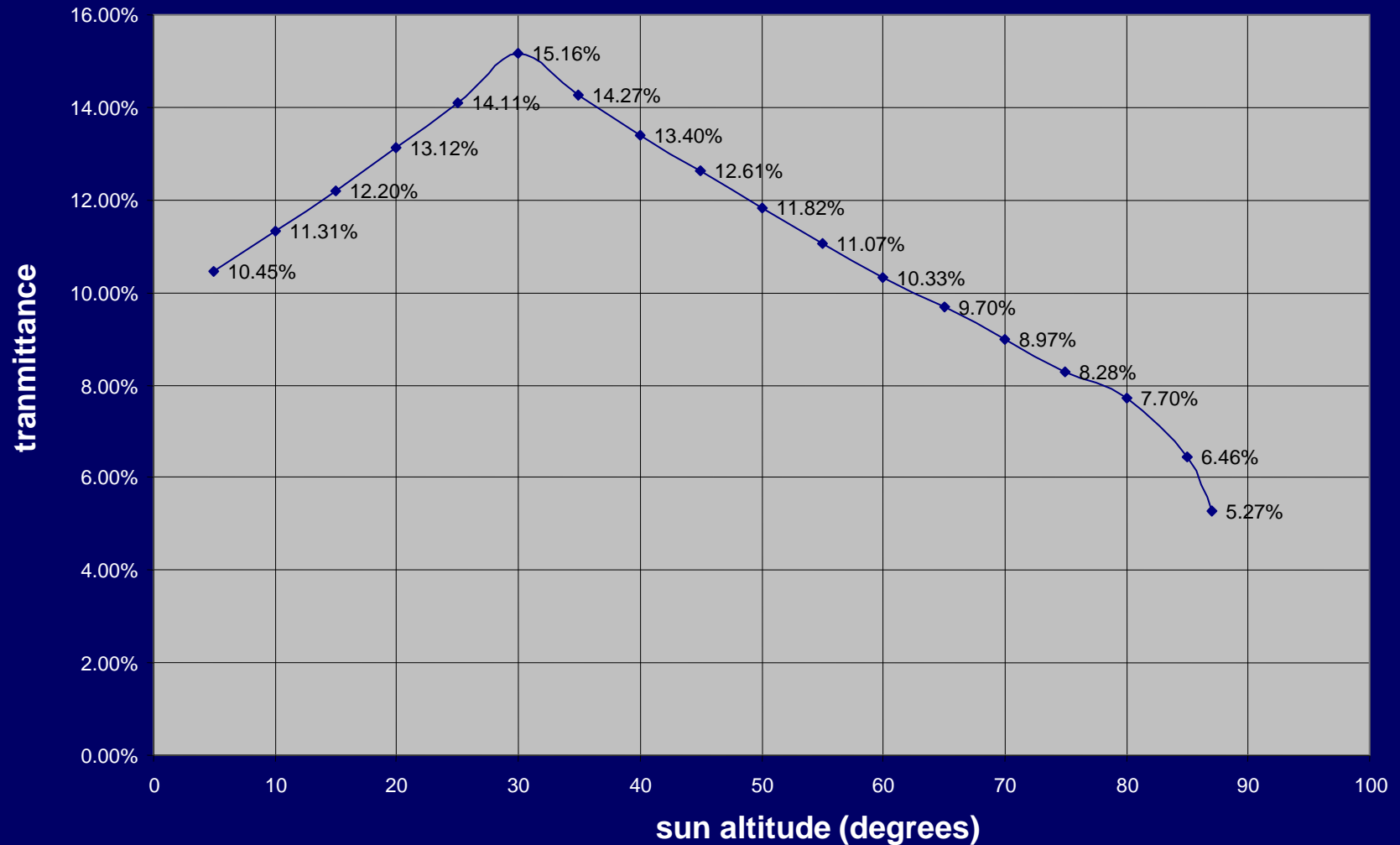
Austin Museum of Art



Luminance Distribution From Louver -
Direct Sunlight Component

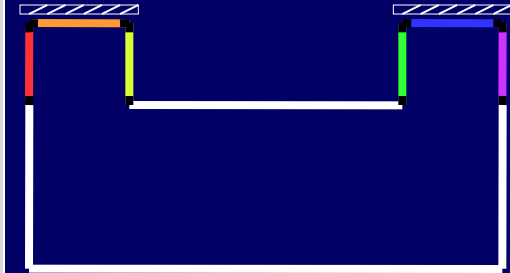
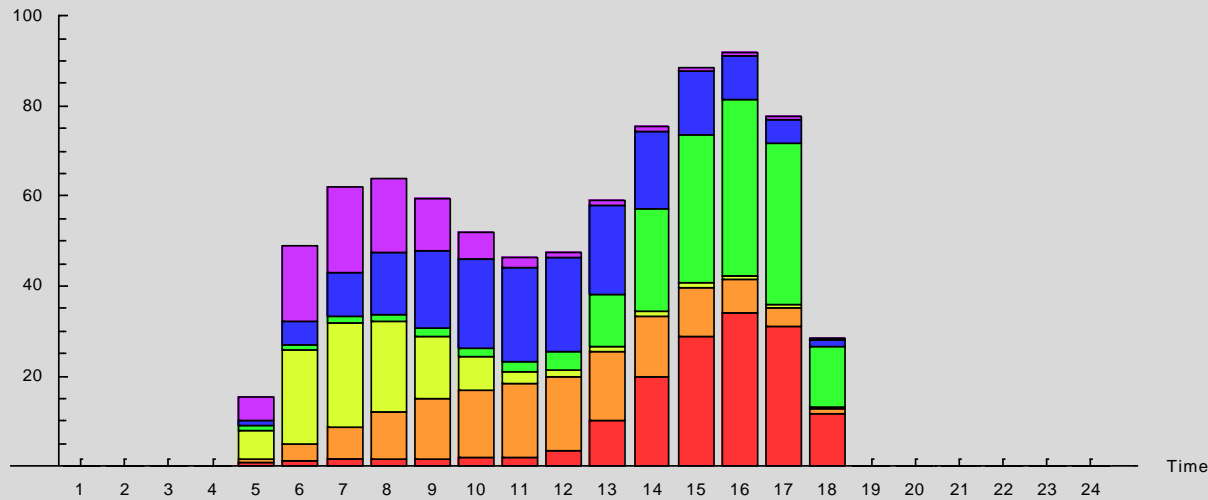
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Louver Transmittance - 30 degree opening, 0 degree azimuth



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FootCandles



FootCandles

