25 Years of Radiance at ARUP

ARUP

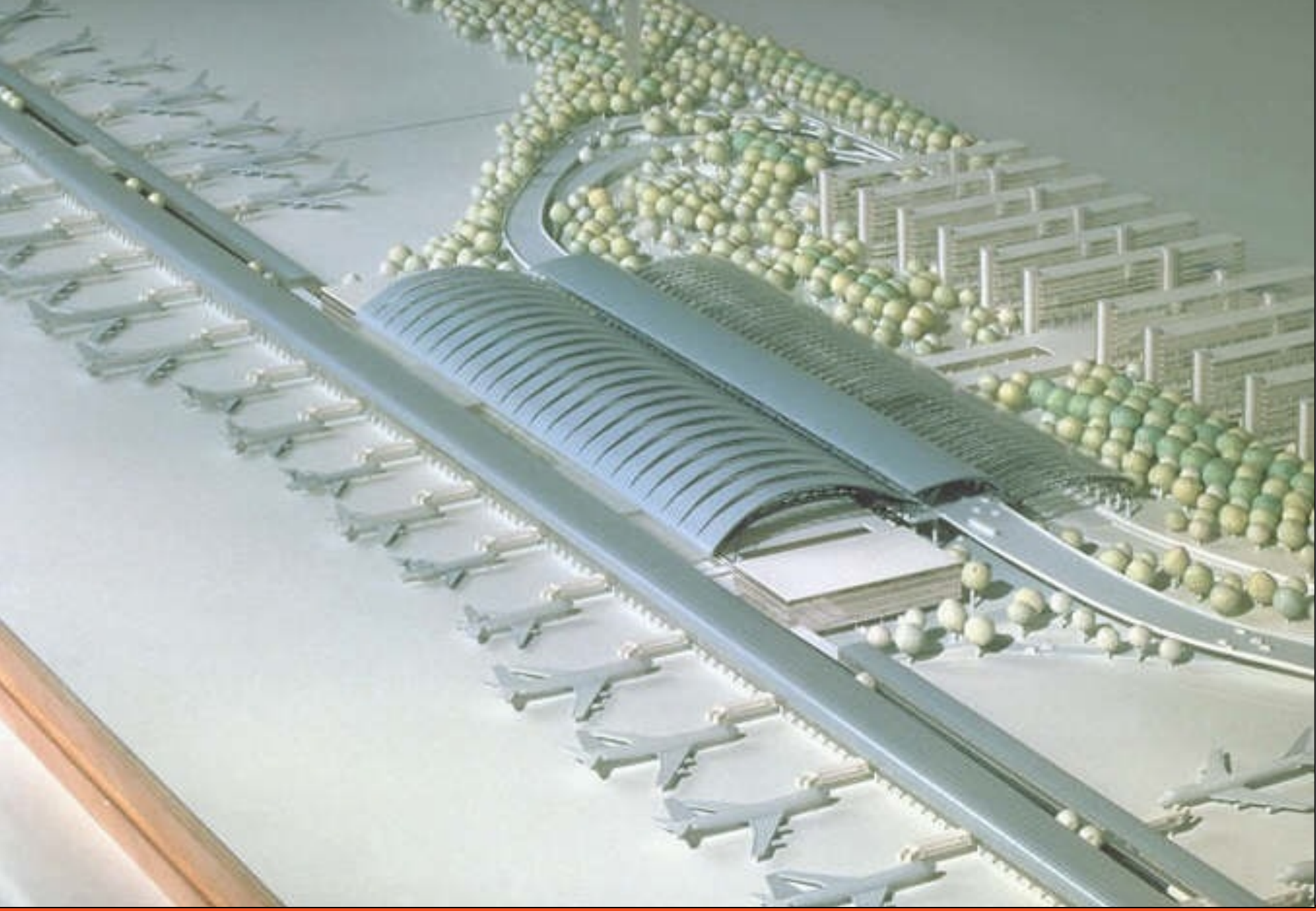
1989-1996

The pioneers

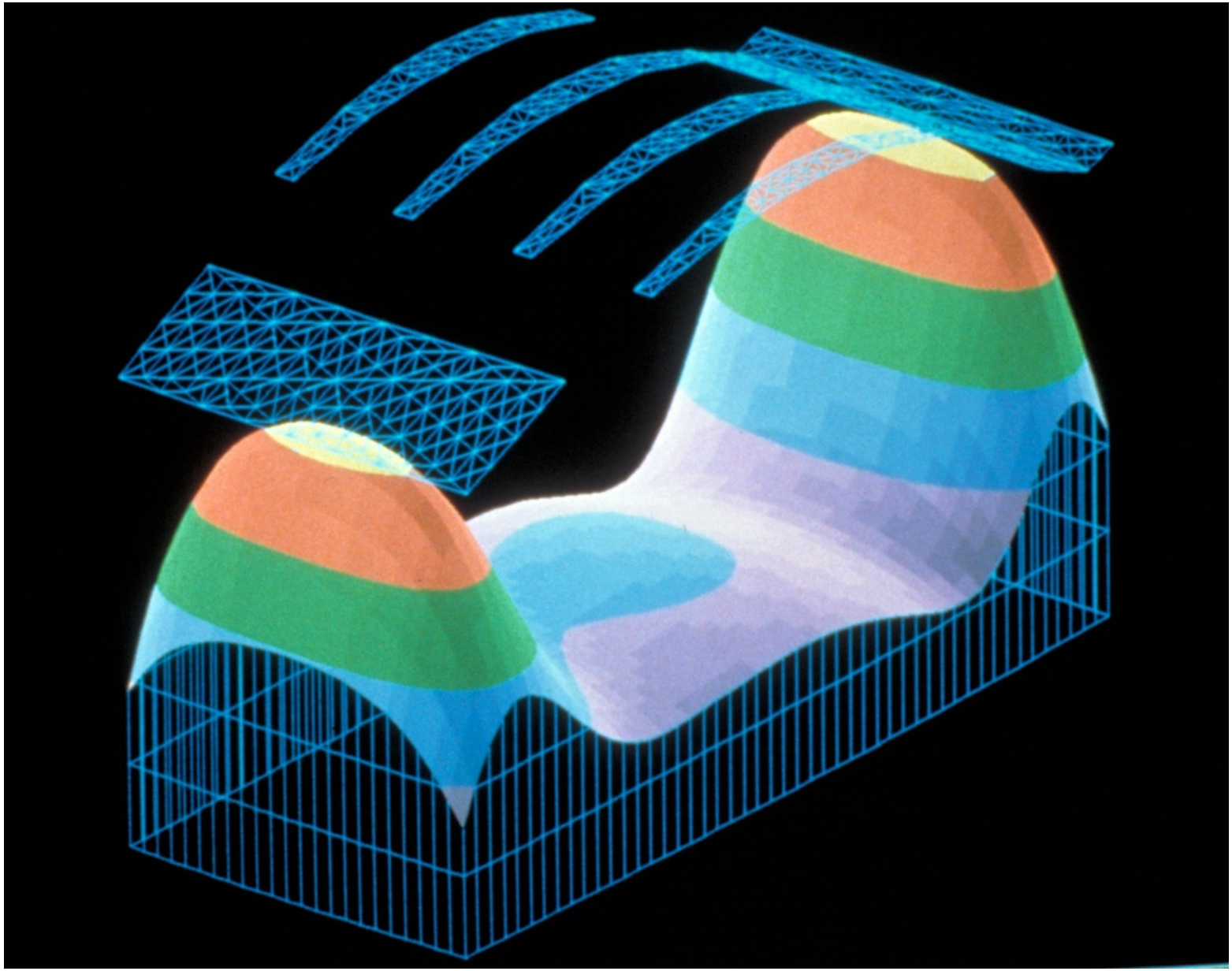
ARUP

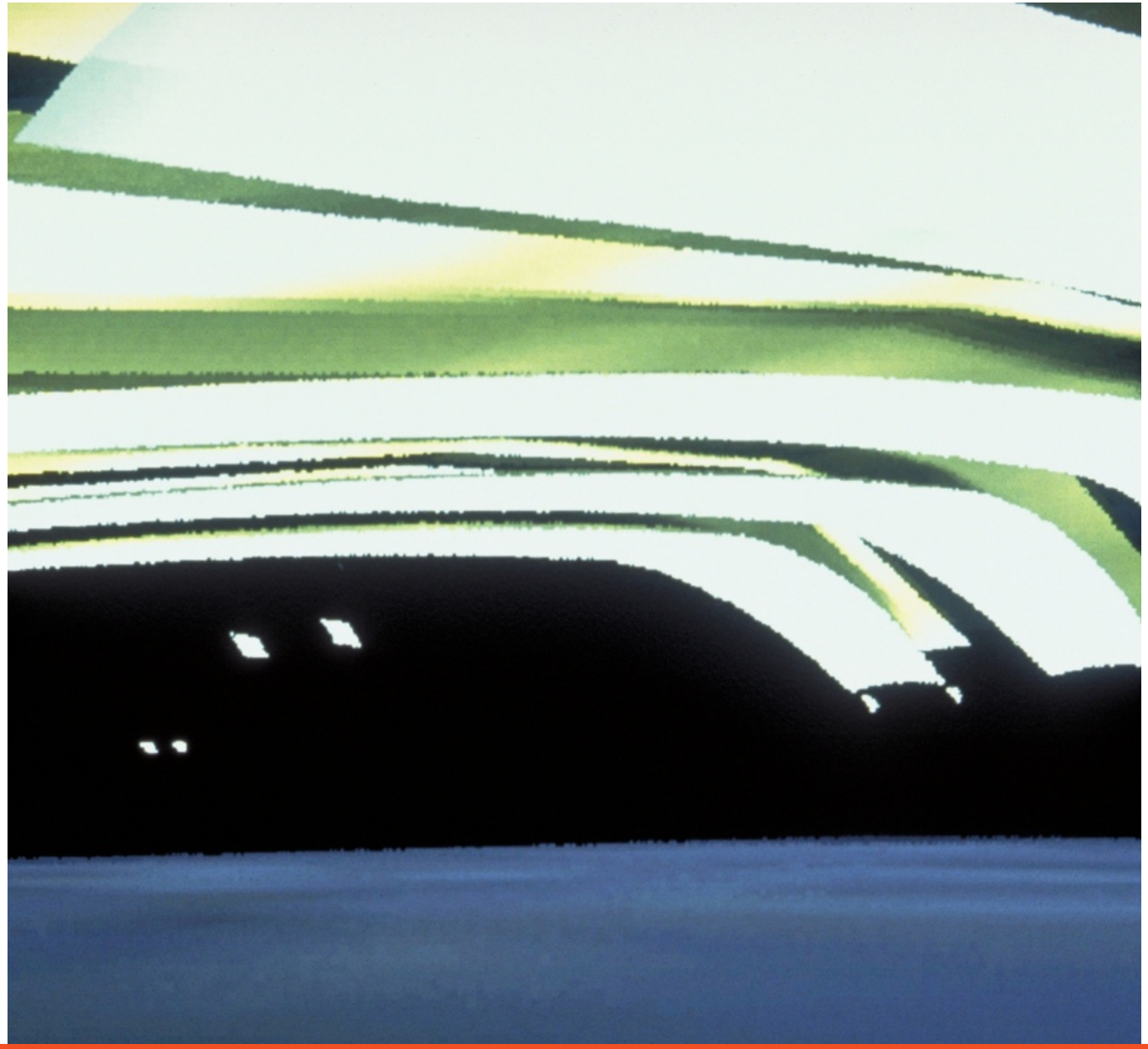
Andy Sedgwick

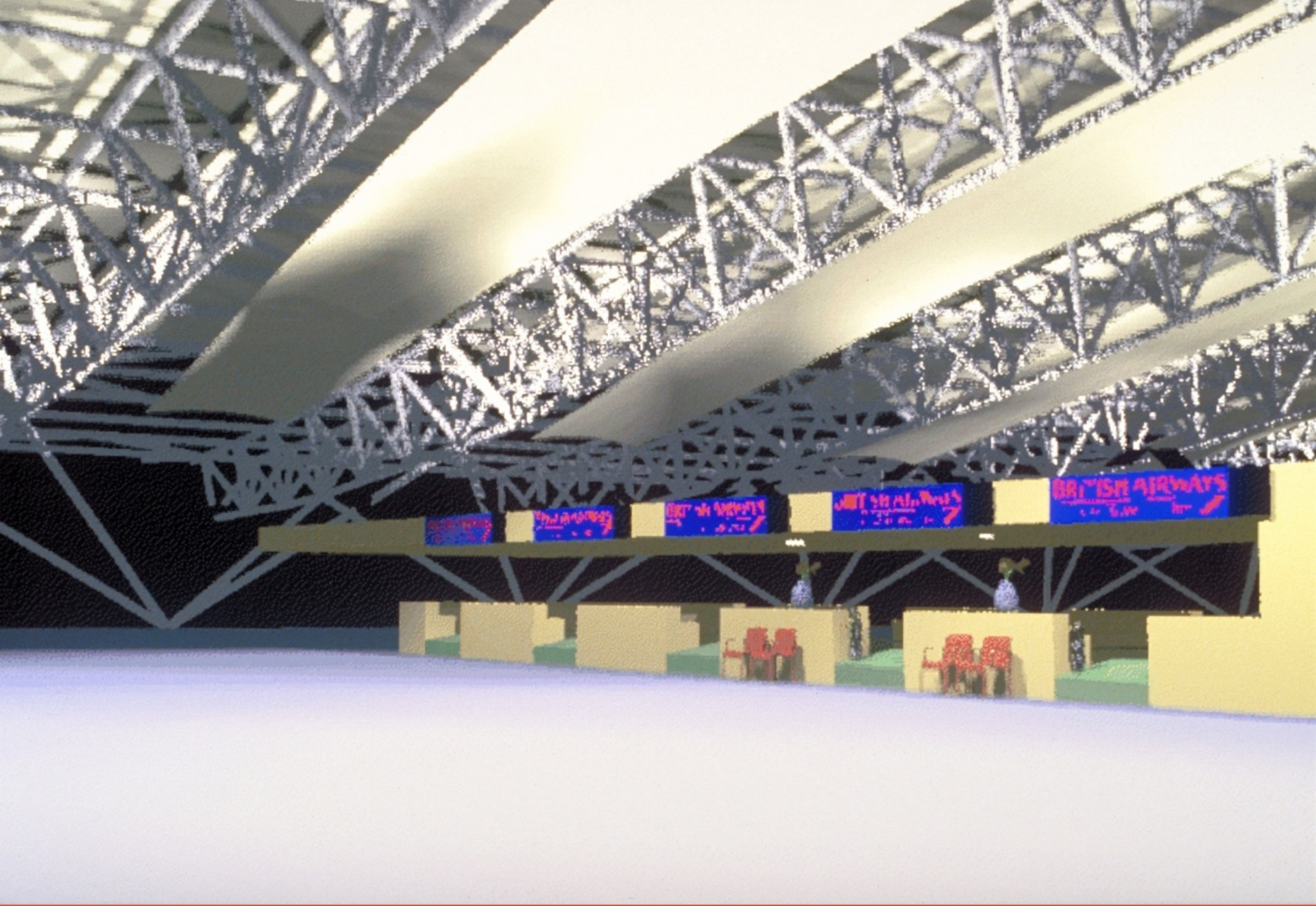
ARUP



ARUP






BRITISH AIRWAYS

Ove Arup & Partners

13 Fitzroy Street
London W1P 6BQ
Telephone 01-636 1531
Telex 295341 OVARPT G
Facsimile 01-580 3924

5247/01/AS/JMW
16 October 1989

Greg Ward
Lawrence Berkeley Laboratory
1 Cyclotron Road
Berkeley
CA 94720

Dear Greg Ward

Radiance Software

Please find enclosed a copy of our Radiance Request Form, a 30 Mbyte tape cartridge and a pre-paid mailer for our San Francisco office. We will be grateful to receive a copy of the Radiance software, as we have followed with interest the developments you have presented in last year's ACM Proceedings, and in the IES Journal.

You may remember that one of our directors, Tom Barker, visited your laboratories about nine months ago. He was most impressed with the graphic images you demonstrated, and which could provide an exciting way of presenting architectural and engineering schemes.

We hope that we will provide useful feedback to you as we explore the software and make our own developments.

Yours sincerely,

Andrew Sedgwick

encs.

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Steve Walker

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Sun Sparc – circa 1991, 8MB RAM, 40MHz (?)

Radiance version 1.2

1991 LUL Control Room, Neasden

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Rendering and printing with Radiance circa 1992

- Weds 10:30pm: started final rendering run
- Thurs 10am: peeked at intermediate results, stopped rpict and fixed scene problems and restarted final rendering
- Friday 12noon: realised rendering would be 3 weeks late at current pace. Started working on optimisations and negotiated deadline extension to Saturday lunchtime.
- Saturday 2am: started final rendering run…

Rendering and printing with Radiance circa 1992

- Saturday 9am: converted output file and wrote to transfer media (1/4” tape), 250MB capacity

- Saturday 11am: boarded train to Hatfield – special favour from a friend with a slide film writer and NEXT computer

Rendering and printing with Radiance circa 1992

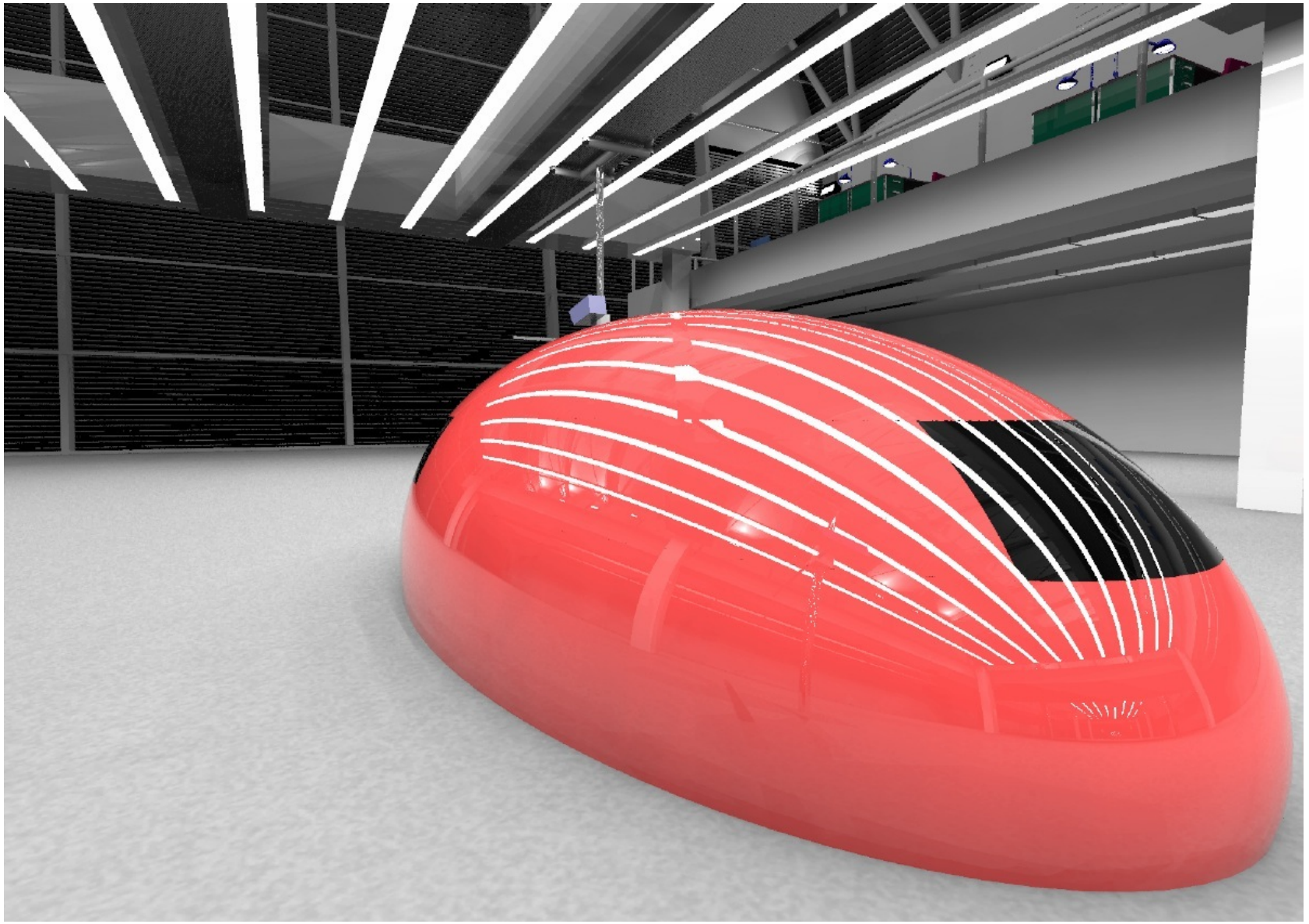
- Saturday 1pm: woke up in Peterborough (missed target by 30 miles). Paid penalty fare and set off on a southbound train to Hatfield
- Saturday 4pm: slides written and travelling back to London
- Saturday 8pm: special courier package sent, 36 hours without sleep…

Rendering and printing with Radiance circa 1992

- Monday 9am: client asked for more copies of slides…

Silicon Graphics Indigo 2 *Extreme* circa 1993
150MHz R4400 CPU, 96MB RAM
£30,000

Radiance version 2.1



Mercedes Benz, Sindelfingen

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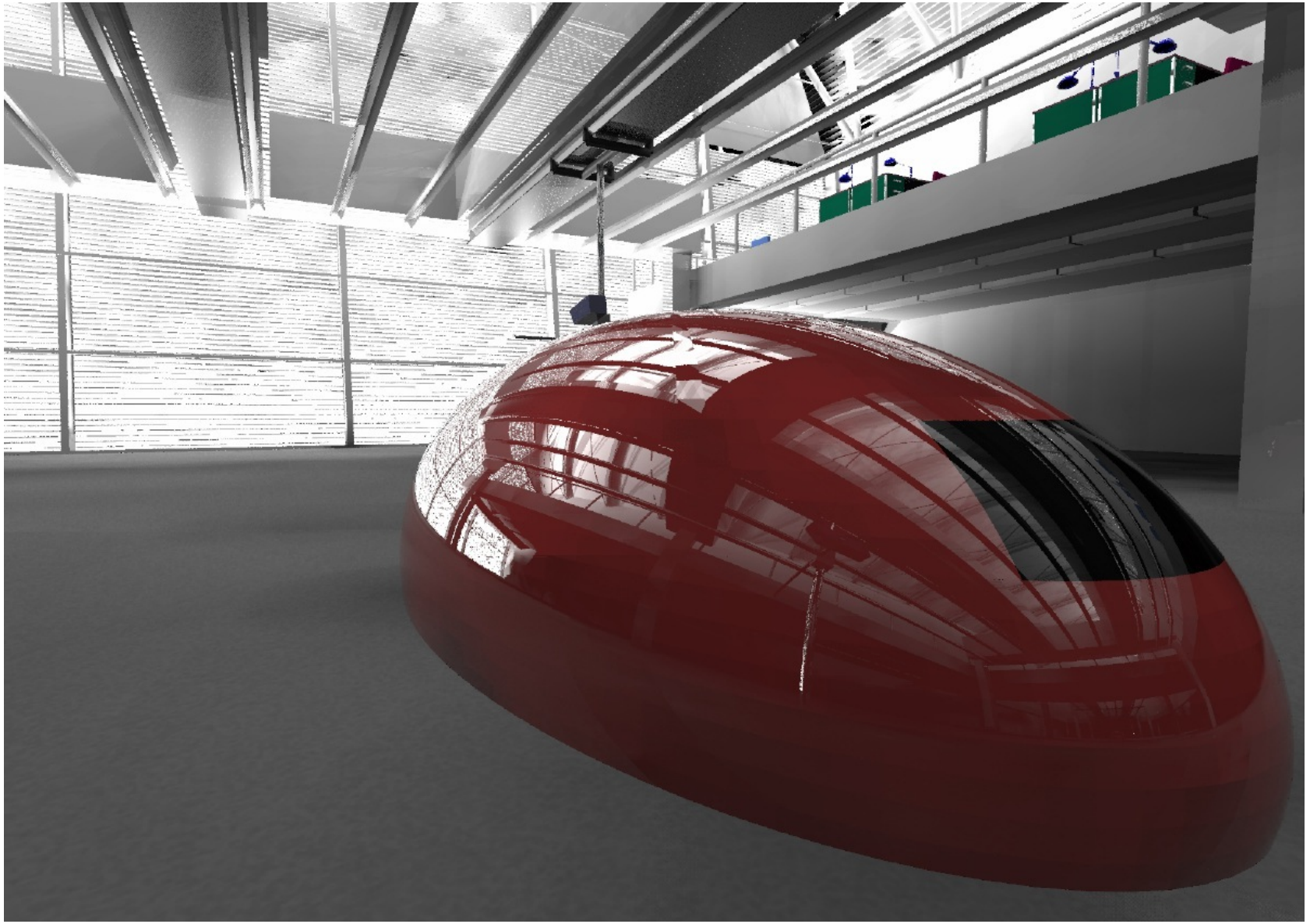
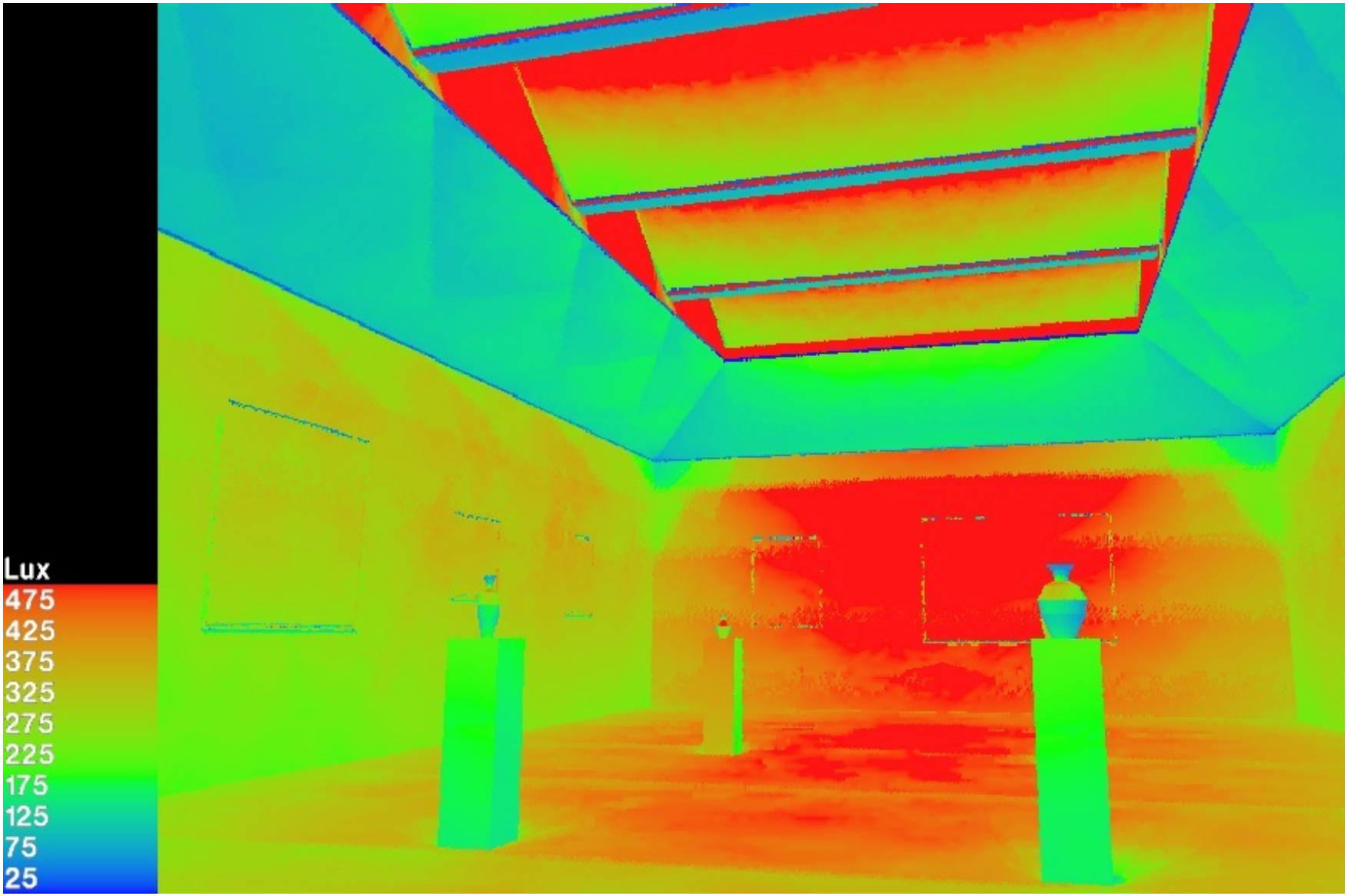


Mercedes Benz, Sindelfingen

ARUP

Mercedes Benz, Sindelfingen

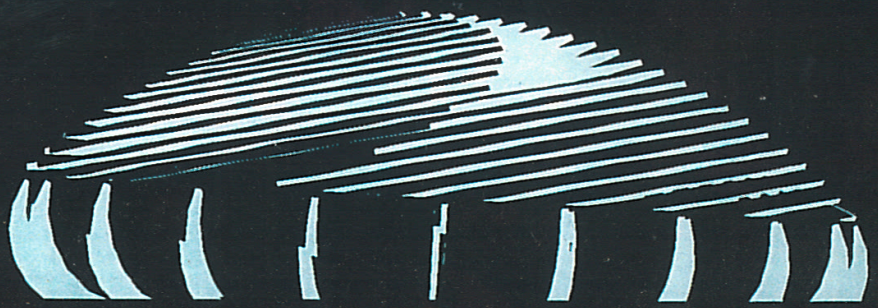
ARUP


Lux
475
425
375
325
275
225
175
125
75
25

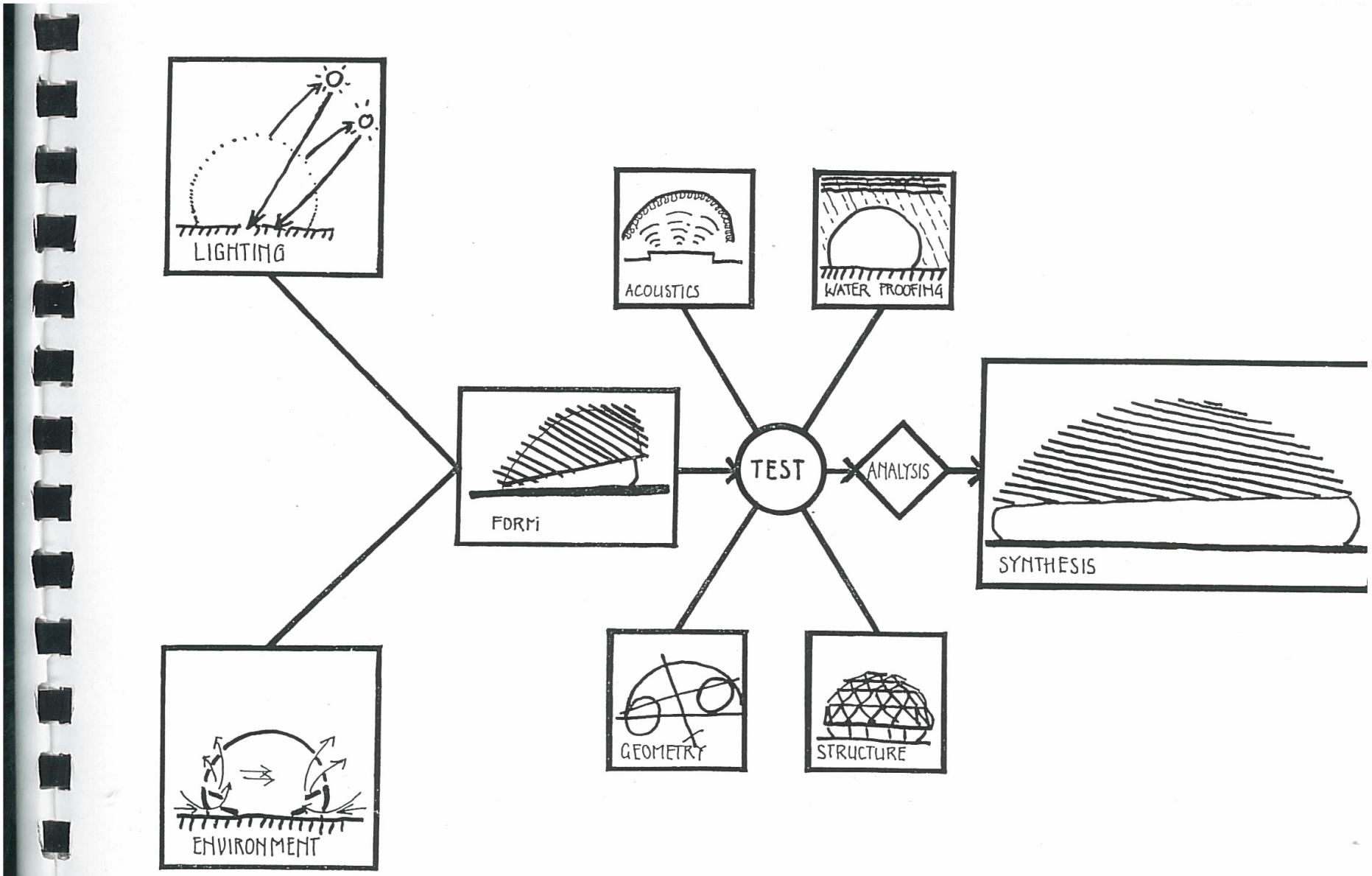
Florence Lam

ARUP

OSAKA DOME COMPETITION



ARUP


LIGHTING
ACOUSTICS
WATER PROOFING
FORM
TEST
ANALYSIS
SYNTHESIS
GEOMETRY
STRUCTURE
ENVIRONMENT

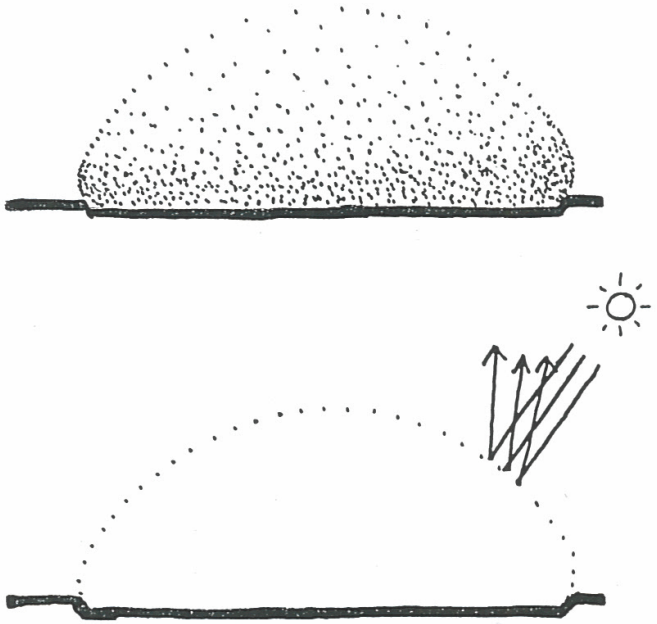
ARUP

LIGHTING

Achieving ideal natural lighting conditions in sports stadia can be particularly difficult without resorting to using large areas of translucent materials. These are expensive, require maintenance and generally have poor acoustic absorbency properties. Another solution is to adopt a double skin which is also expensive and often slow to build.

The favoured lighting conditions in baseball and other sports stadia are:

- The intensity of illuminance in the hemisphere enclosed should be maximum overhead gently reducing to a minimal level at the perimeter seating.
- The contrast between light and darker surfaces at any point in the hemisphere should be minimised. This is necessary for good playing conditions where the players and spectators can easily follow a ball.
- Direct sunlight onto the playing areas or spectators should be kept to a minimum.
- The occurrence of shadows on the playing field should be avoided.



LIGHTING CONCEPT

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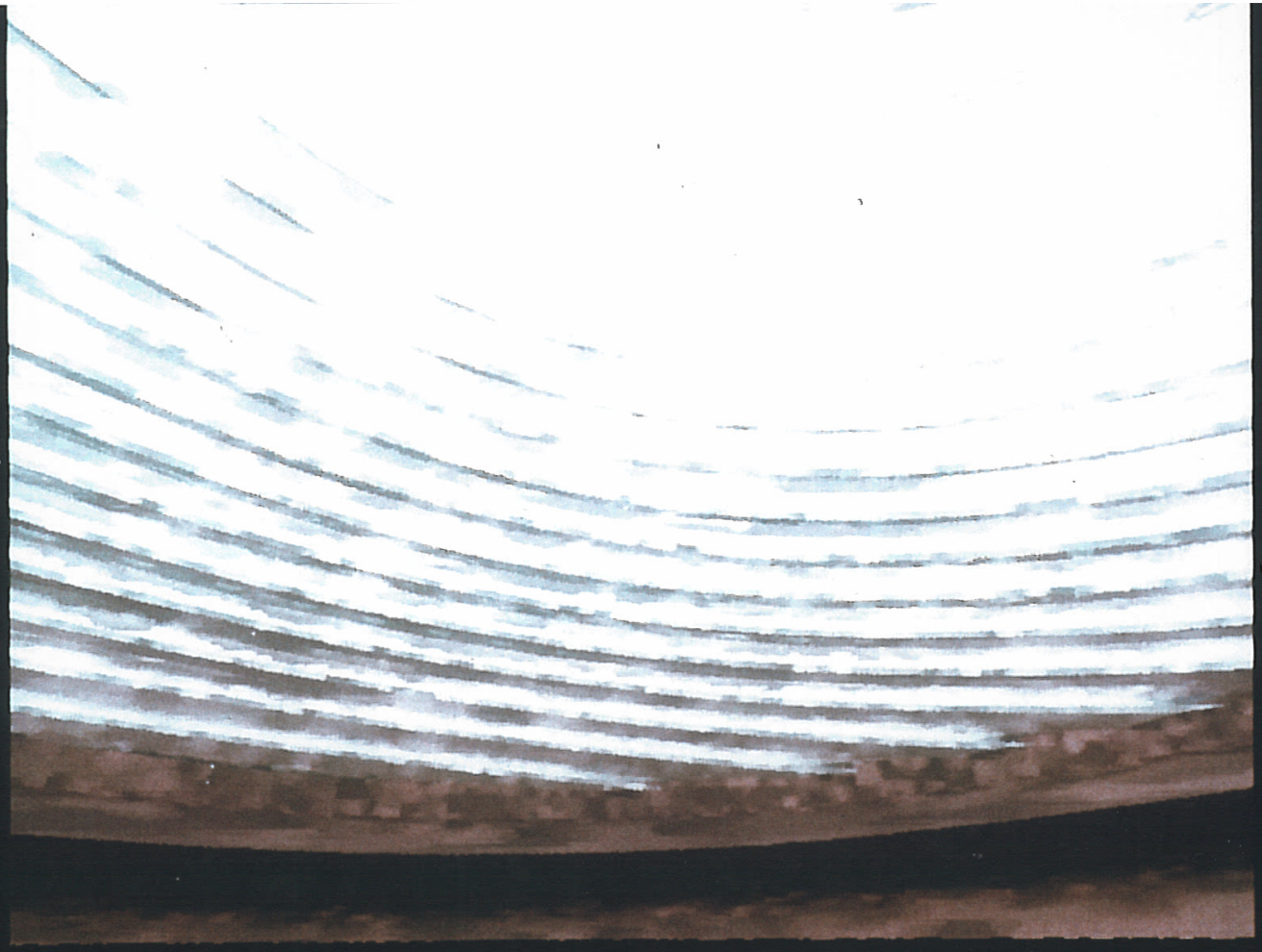

Interior view towards the tier.
Overcast sky on 21 June at 14:00

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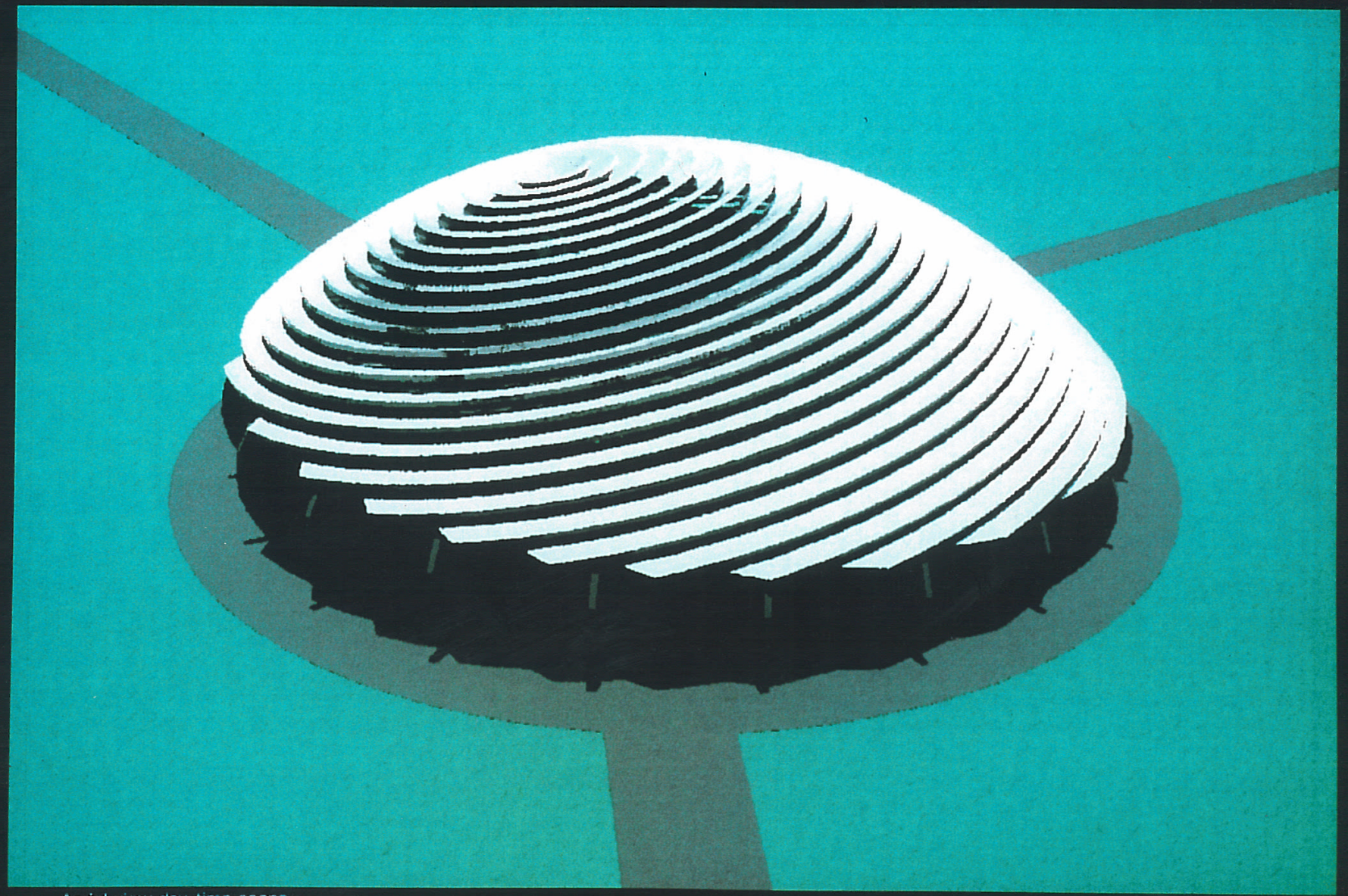
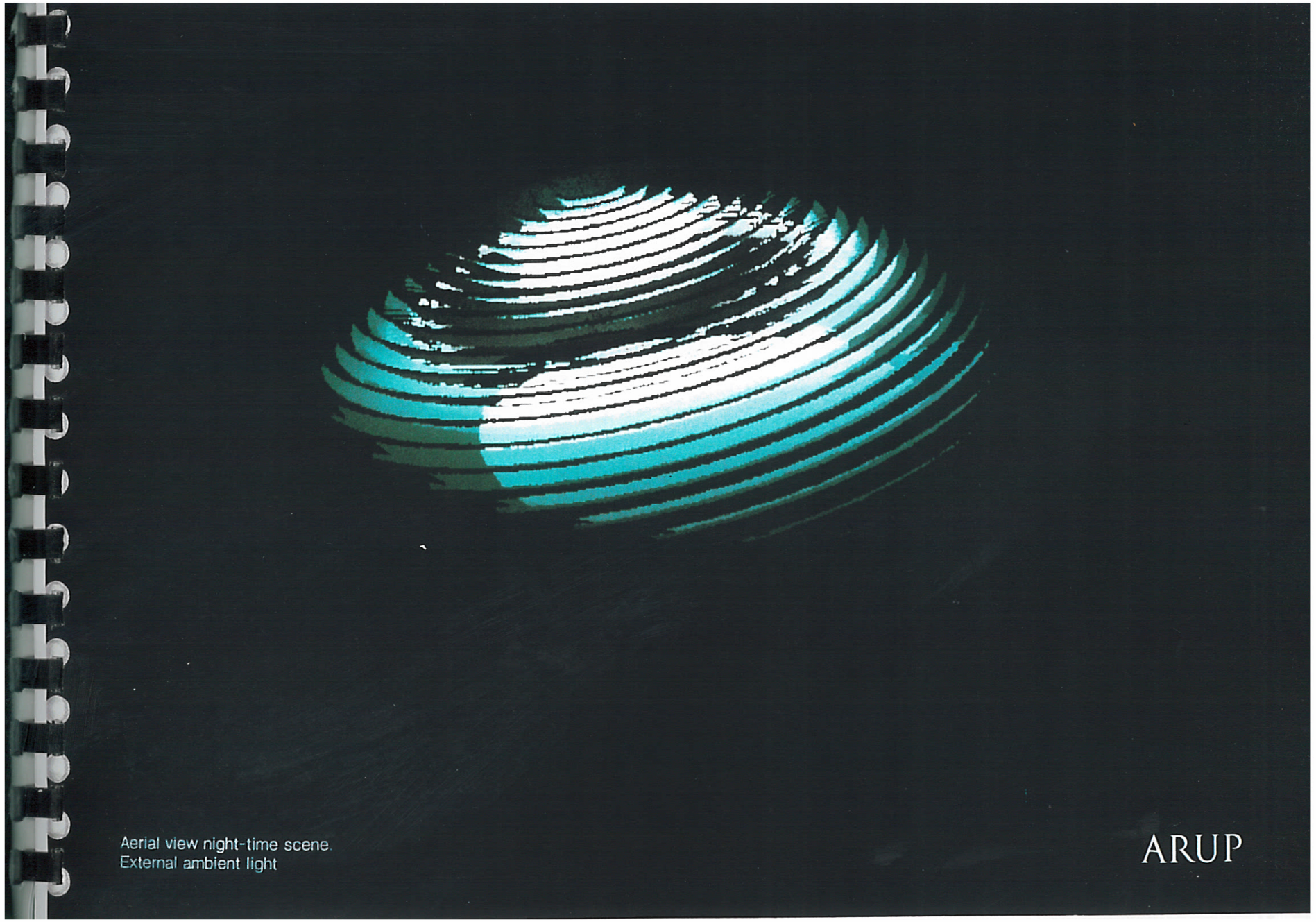


Aerial view day-time scene.
Overcast sky on 21 June at 14:00.

ARUP



Aerial view night-time scene.
External ambient light

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1996 - 2003

The golden age

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Jeff Shaw

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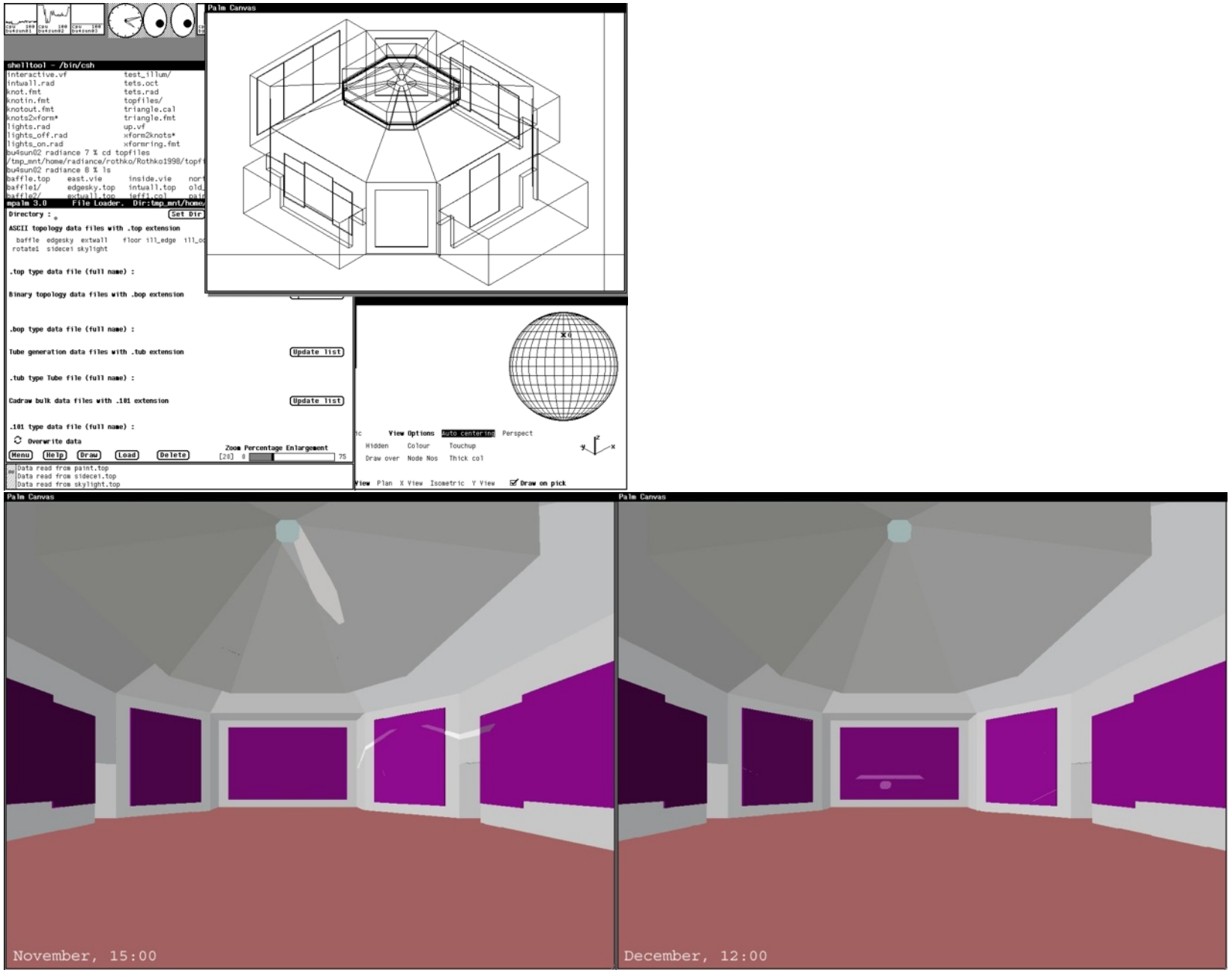
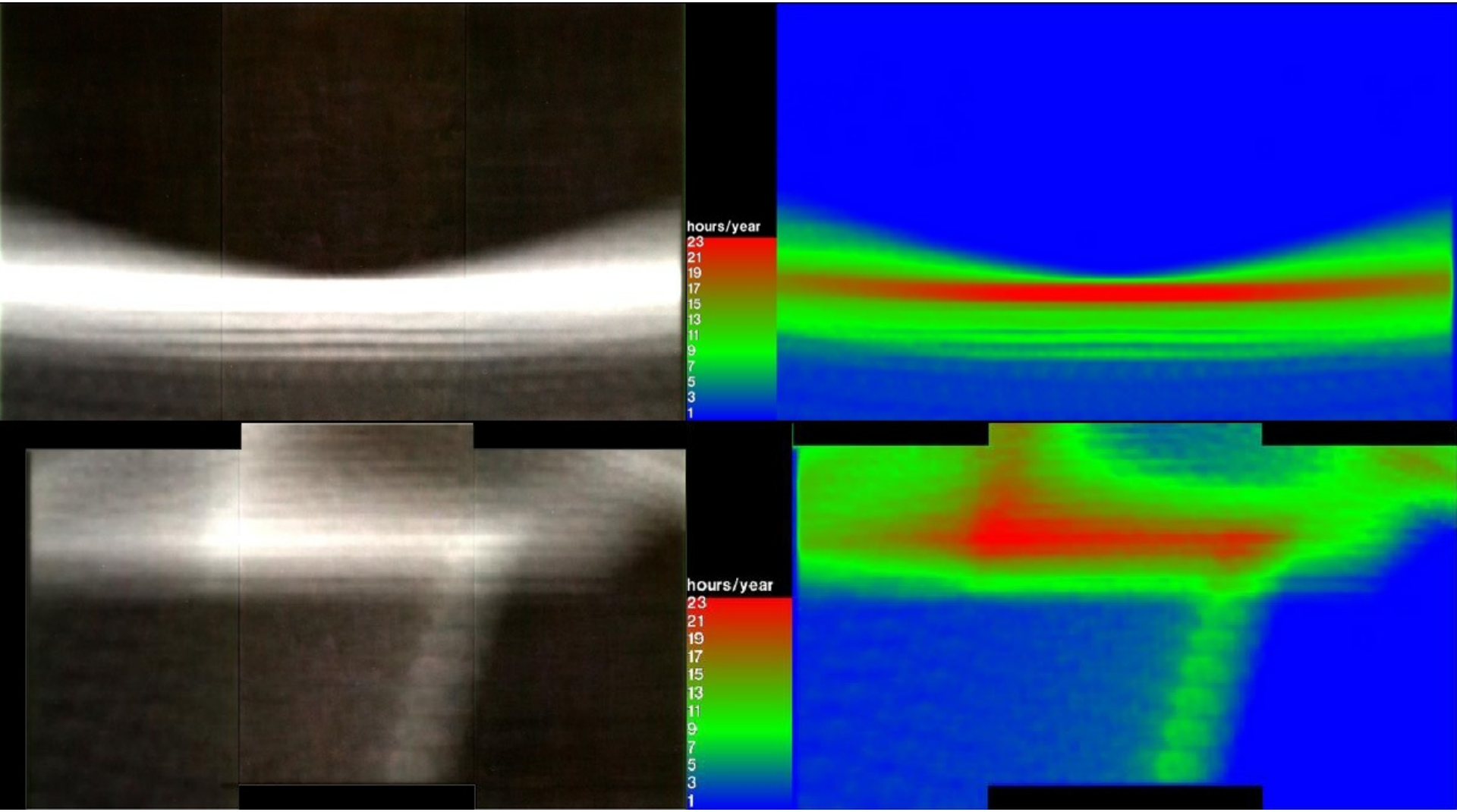
Jeff Shaw
Radiance in Arup
1996-2001

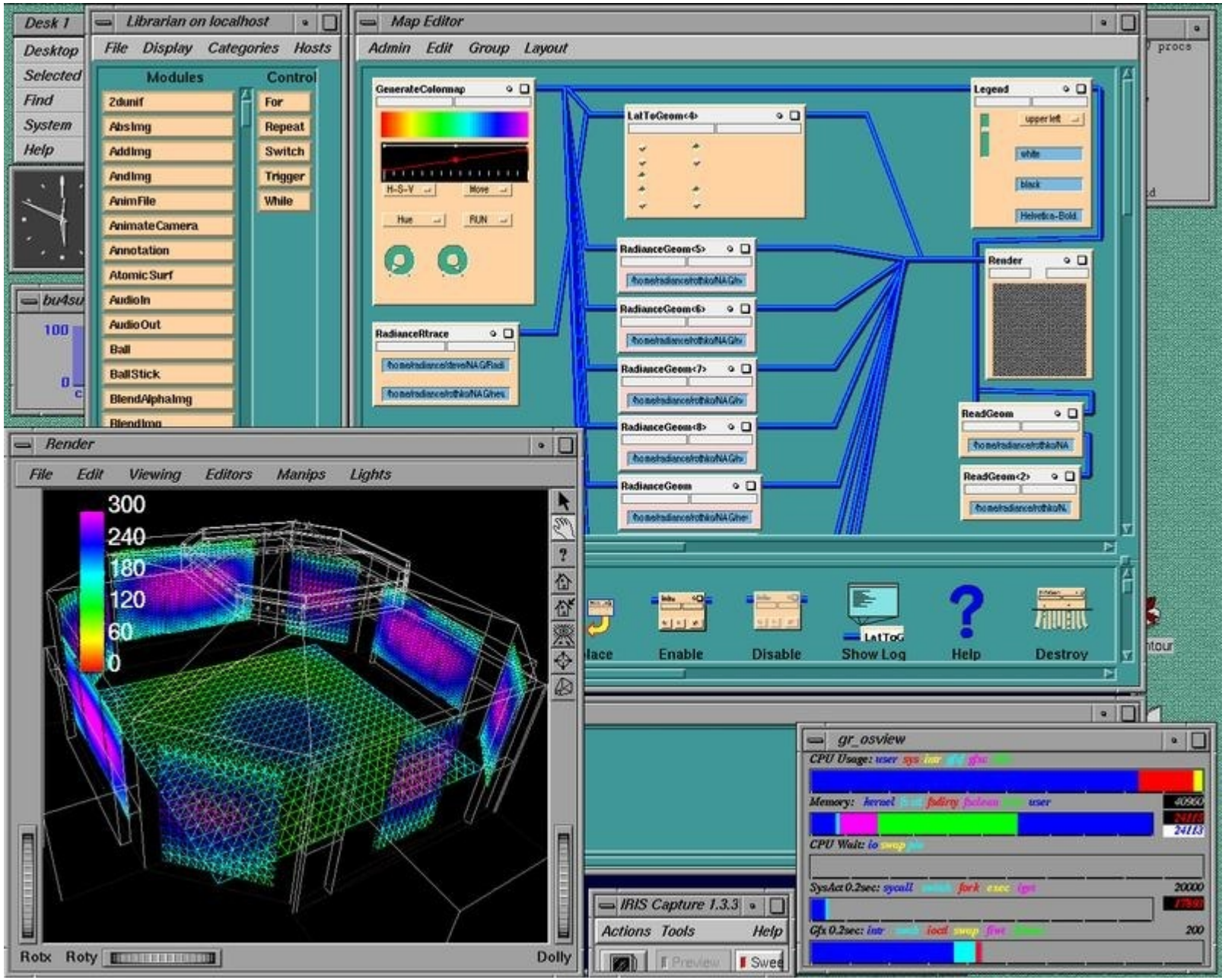
"C Shell, C Shell by J. C. Shaw…"
[sorry about that!]


Palm Canvas
shelltool - /bin/csh
interactive.vf
intwall.rad
knot.fmt
knotin.fmt
knotout.fmt
knots2xform*
lights.rad
lights_off.rad
lights_on.rad
test_illum/
tets.oct
tets.rad
topfiles/
triangle.cal
triangle.fmt
up.vf
xform2knots*
xformring.fmt
bu4sun02 radiance 7 % cd topfiles
bu4sun02 radiance 8 % ls
baffle.top
baffle1/
baffle2/
east.vie
edgesky.top
extwall.top
inside.vie
intwall.top
ifff1_col
mpalm 3.0 File Loader. Dir:tmp_mnt/home/
Directory :
Set Dir
ASCII topology data files with .top extension
baffle edgesky extwall floor ill_edge
rotate1 sidece1 skylight
.top type data file (full name) :
Binary topology data files with .bop extension
.bop type data file (full name) :
Tube generation data files with .tub extension
Update list
.tub type Tube file (full name) :
Cadraw bulk data files with .101 extension
Update list
.101 type data file (full name) :
Overwrite data
Menu
Help
Draw
Load
Delete
Zoom Percentage Enlargement
Data read from paint.top
Data read from sidece1.top
Data read from skylight.top
View Options
Auto centering
Perspect
Hidden
Colour
Touchup
Draw over
Node Nos
Thick col
Plan
X View
Isometric
Y View
Draw on pick
Palm Canvas
November, 15:00
Palm Canvas
December, 12:00



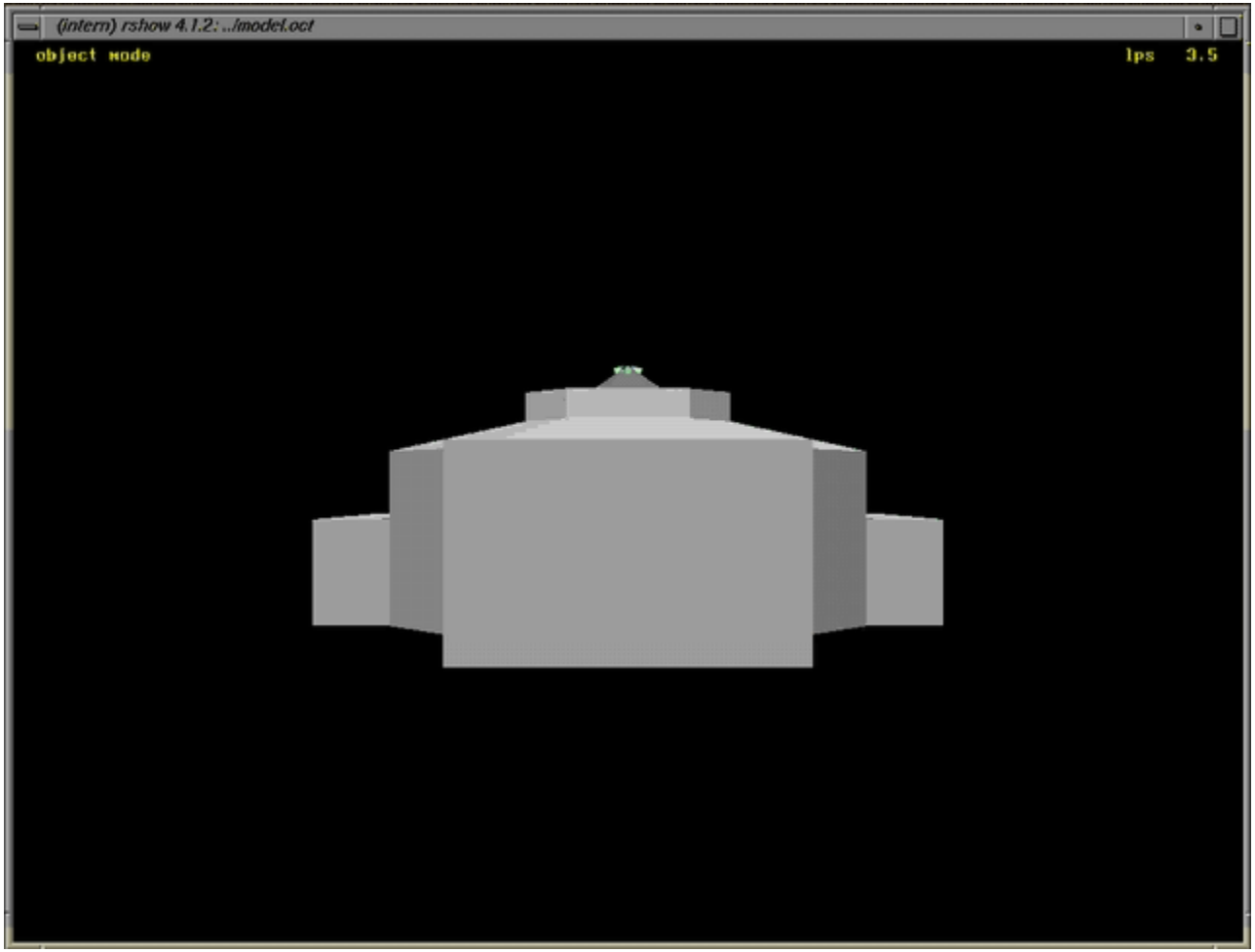
The Rothko Chapel, Houston, USA – 1997-1998

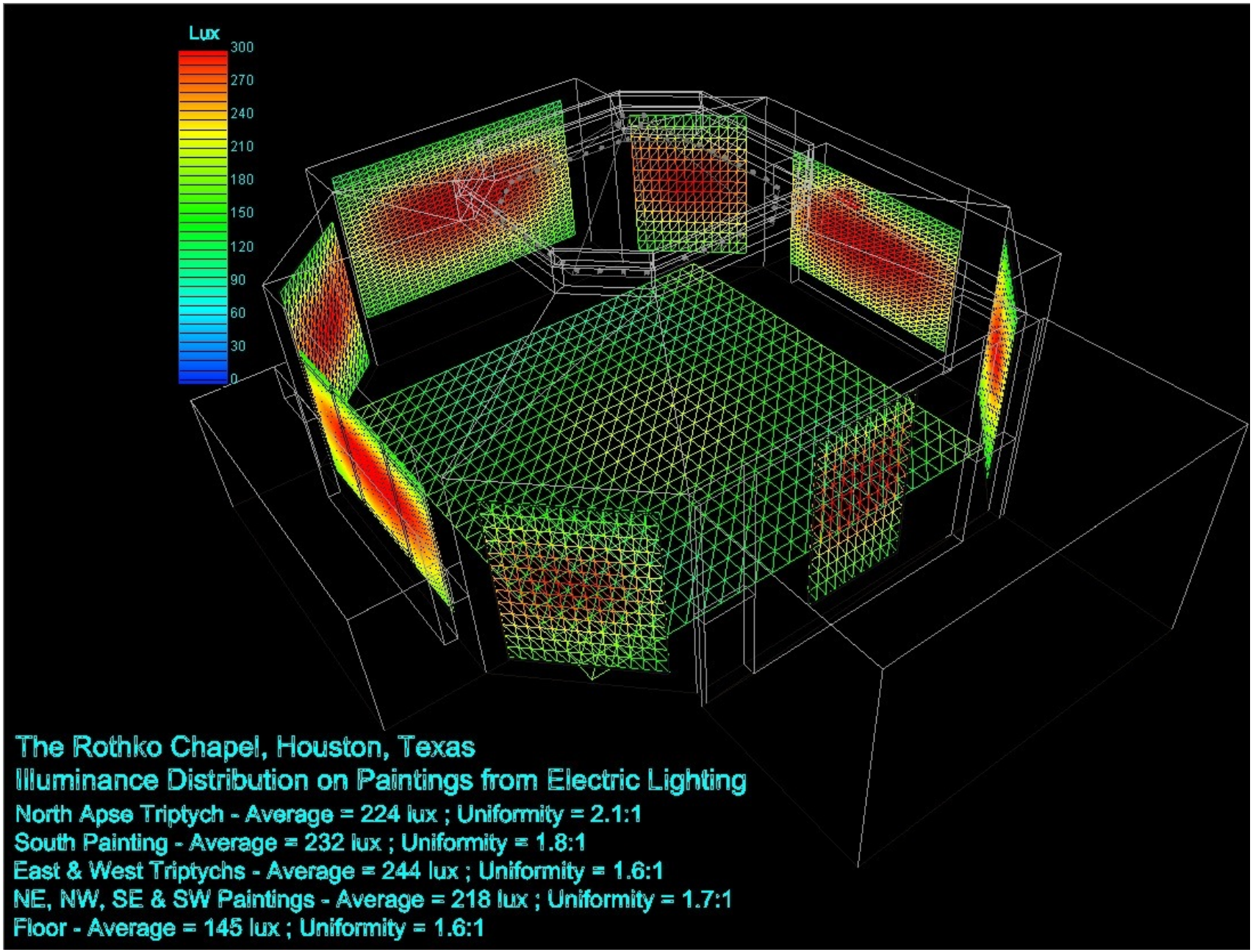
ARUP

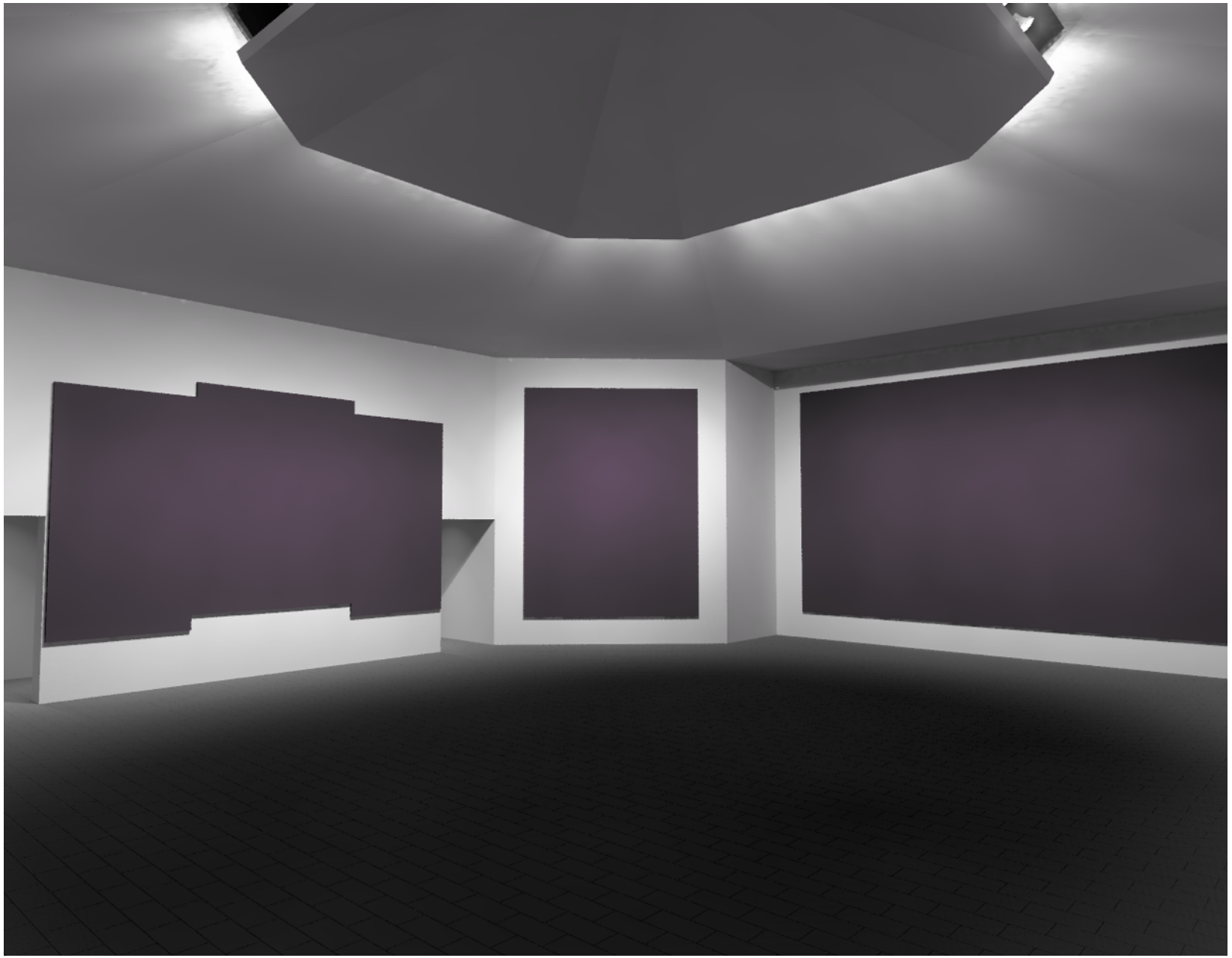


The Rothko Chapel, Houston, USA – 1997-1998

ARUP

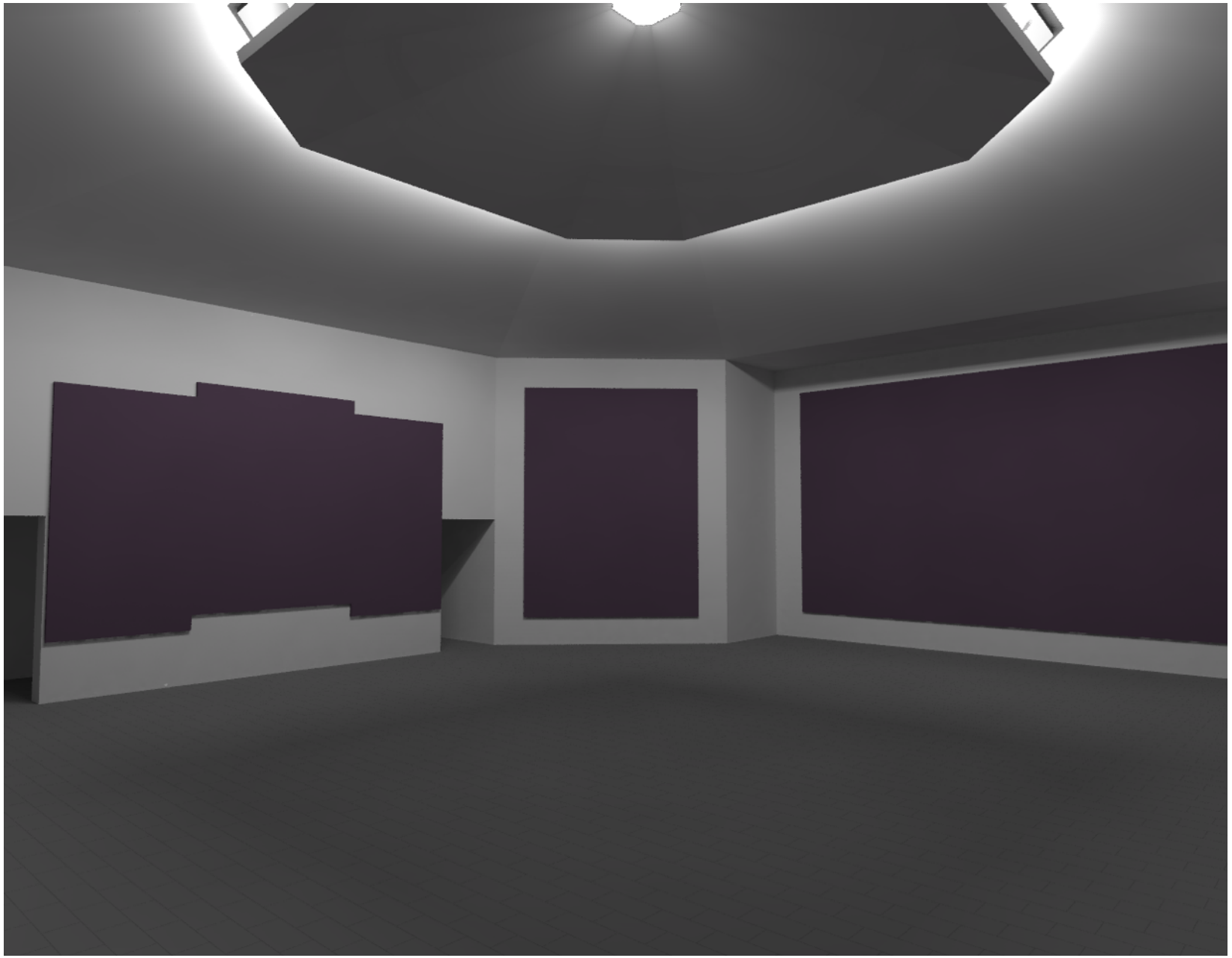

(intern) rshow 4.1.2: ../model.oct
object mode
lps 3.5


Lux
300
270
240
210
180
150
120
90
60
30
0
The Rothko Chapel, Houston, Texas
Illuminance Distribution on Paintings from Electric Lighting
North Apse Triptych - Average = 224 lux ; Uniformity = 2.1:1
South Painting - Average = 232 lux ; Uniformity = 1.8:1
East & West Triptychs - Average = 244 lux ; Uniformity = 1.6:1
NE, NW, SE & SW Paintings - Average = 218 lux ; Uniformity = 1.7:1
Floor - Average = 145 lux ; Uniformity = 1.6:1



The Rothko Chapel, Houston, USA – 1997-1998

ARUP



The Rothko Chapel, Houston, USA – 1997-1998

ARUP

The Rothko Chapel, Houston, USA – 1997-1998

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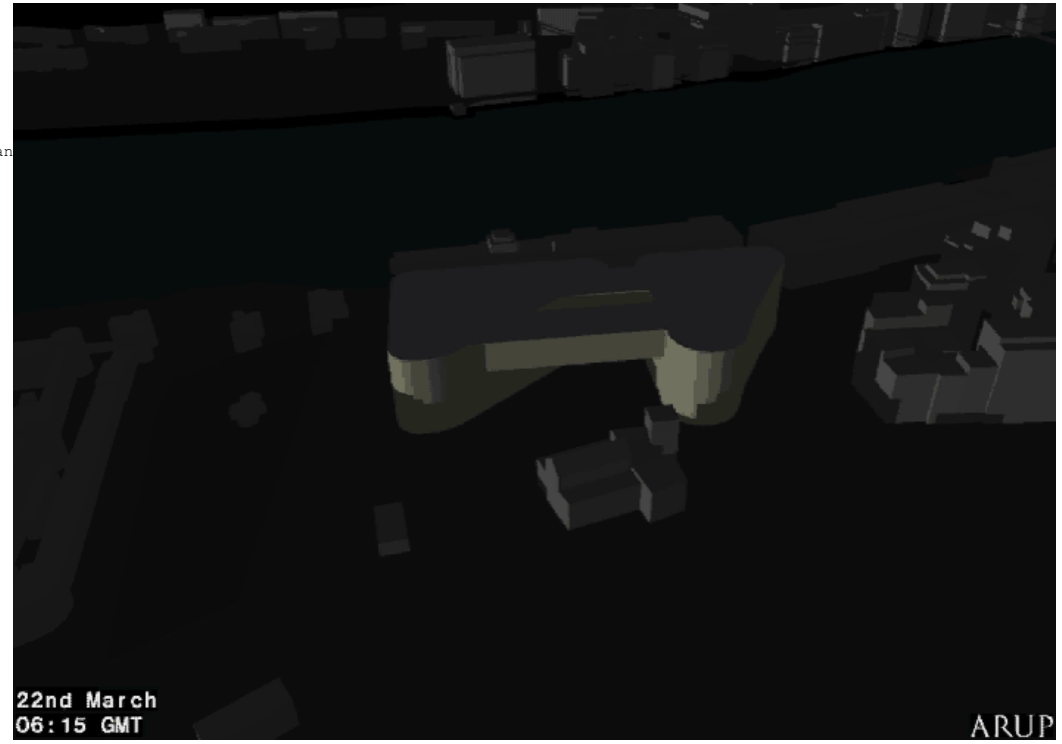
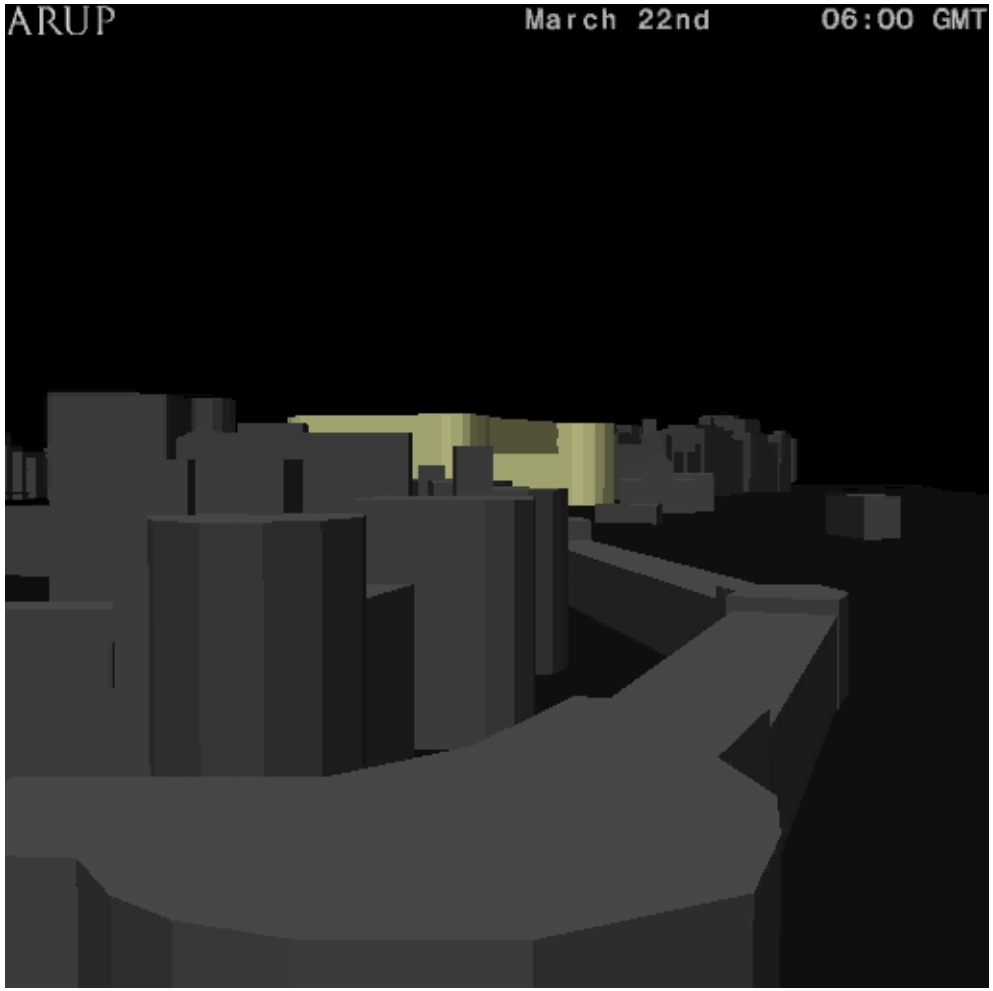
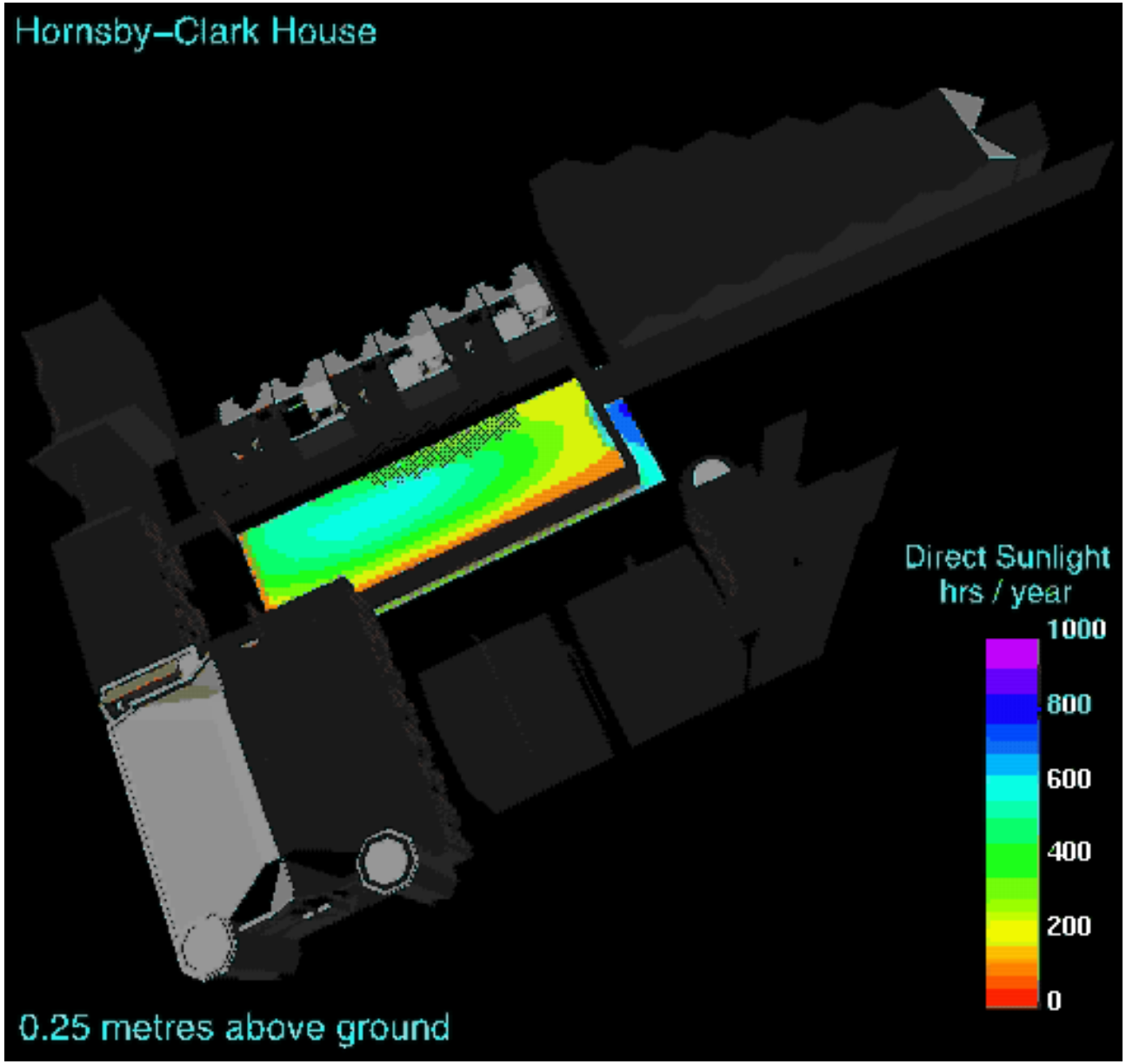
```
#!/bin/csh -f
#
#                   shell script to generate shadow movement movie from fixed viewpoint
#
#                   RADIANCE PICTURES, TIFF FILES including time index and Arup logo output
#
#                   See shadowmovie.man for manual page
#
#                   Run ExposureCheck before this script
#
#                   Written by Jeff Shaw, March 1998
#                   Version 1.1 December 1998
#                   Time Zone Bug fixed

#################################################################
#                   ## ARGUMENTS ##

# Error message
if ($#argv == 0) then
                    echo "Usage:"
                    echo "ShadowMovie -a [latitude] -l [longitude] -s [standard meridian
                    echo "-z [winter/summer time] -zl [time zone label] -o [octree]"
                    echo "-vf [viewfile] -x [x pixels] -y [y pixels] -m [month no.]"
                    echo "-ml [month name] -d [day of month] -dl [date label]"
                    echo "-t [start time(decimal)] -f [finish time (decimal)]"
                    echo "-dt [delta time (mins)] -e [picture exposure setting]"
                    echo "-al [arup logo filename] -lp [position of logo]"
                    echo "-ip [position of date and time index]"
                    echo ""
                    echo "The following have default settings as follows:"
                    echo "-z            0"
                    echo "-zl            "
                    echo "-x            500"
                    echo "-y            500"
                    echo "-dl           [day; month name]"
                    echo "-e            -6"
                    echo "-al           arup.pic"
                    echo "-lp           tr"
                    echo "-ip           bl"
                    echo "All other arguments must be set by user for script to run"
                    echo ""
                    echo "Please consult man page and try again."
                    exit
endif

# Defaults
set ZONE = 0
set LABEL = ""
set X = 500
set Y = 500
set EXP = -6
set LOGO = arup.pic
set LOGOPOS = tr
set INDEXPOS = bl
set TMP = 1

# Set arguments
while ($#argv > 0)
        switch ($1)
        case -a:
                shift argv
                set LAT = $1
                breaksw
        case -l:
                shift argv
                set LONG = $1
                breaksw
        case -s:
                shift argv
                set MER = $1
                breaksw
        case -z:
                shift argv
                set ZONE = $1
                breaksw
```

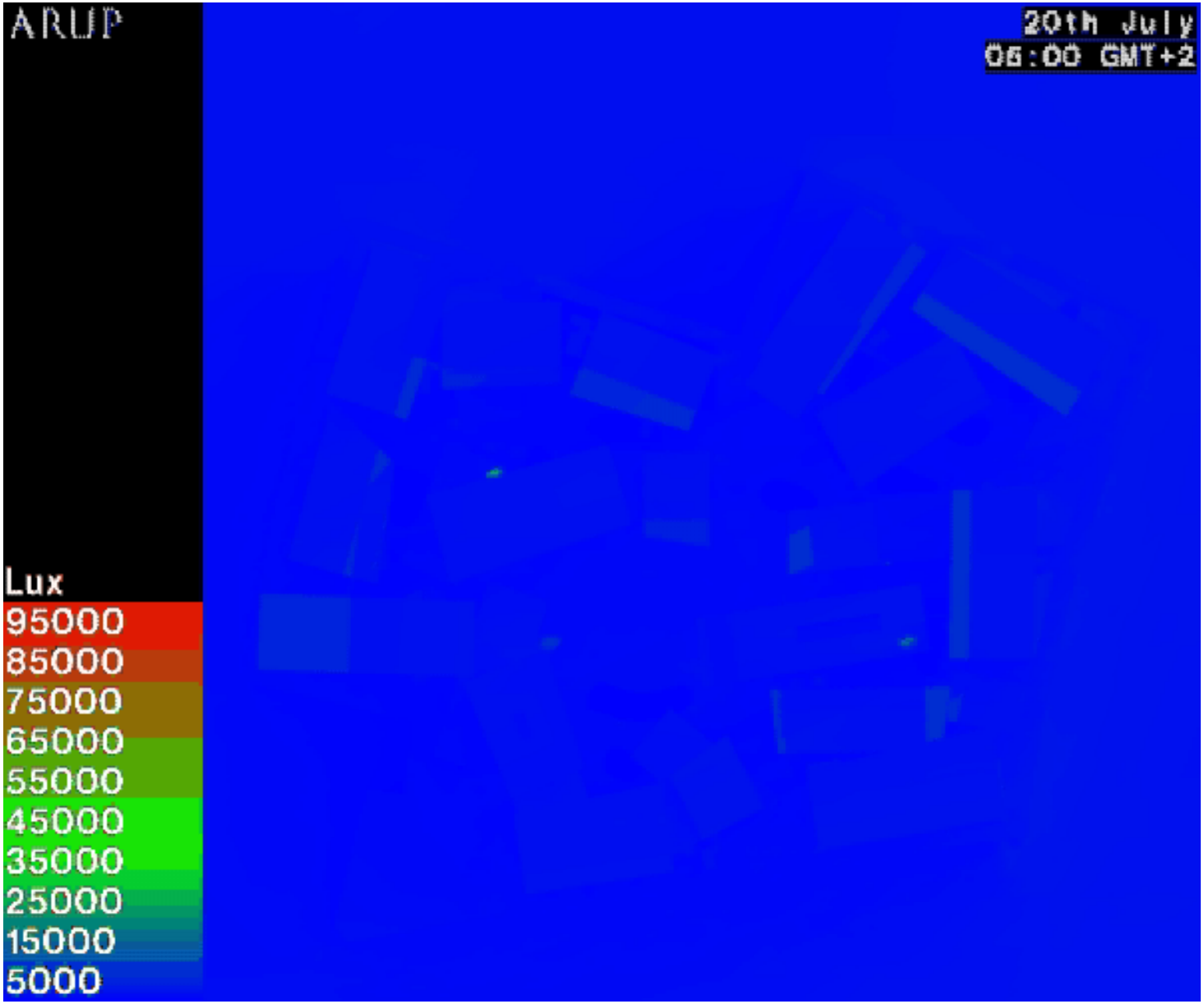


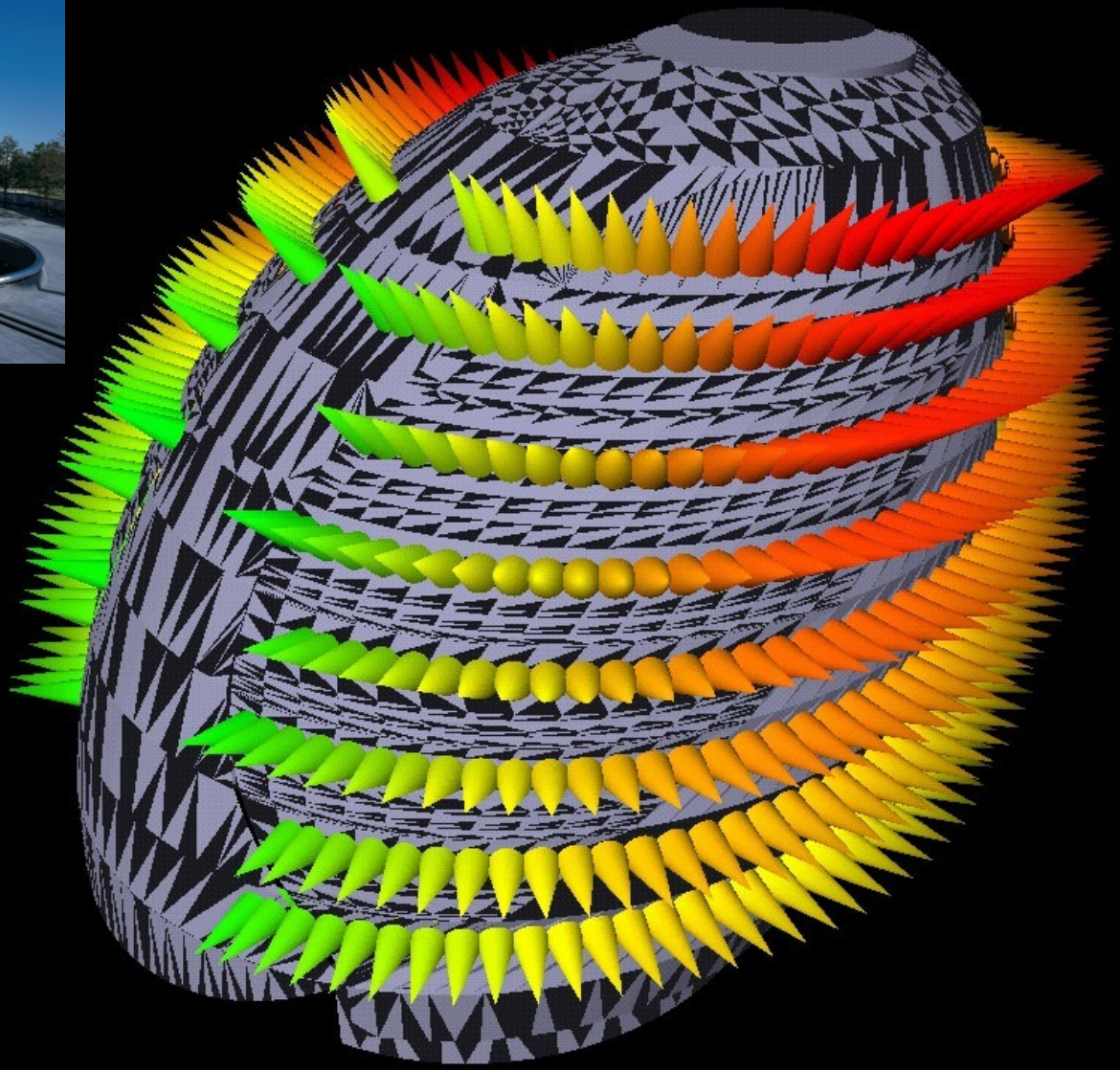
```
#!/bin/csh -f

#                   script to generate sun direction views
#                   to be used for an animation

#                   INITIAL VARIABLE VALUES
#                   { USING SOLAR TIME }
set LAT = 32.783
et LON = 96.8
set MER = 1.571
set JD = 265
# Start time 06:24
set START = 6.4
# Finish time 18:18
set FINISH = 18.3
# 6 minute intervals
set DELTA = 6
set VF = sep.vf


#                   INITIALISE
rm -f $VF
set FRAMESPERHOUR = `ev "60/$DELTA"`

# Start Time
set STARTHR = `echo $START | rcalc -e '$1=floor($1)'`
set STARTMIN = `ev "$START-$STARTHR"`

# Finish Time
set FINHR = `echo $FINISH | rcalc -e '$1=floor($1)'`
set FINMIN = `ev "$FINISH-$FINHR"`
rshow -kf march.vf -o mar/mar%03d ../site.oct
#                   december

set COUNTHR = $STARTHR

while ($COUNTHR <= $FINHR)

  if ("$COUNTHR" == "$STARTHR") then
    set COUNTMIN = `ev "60*$STARTMIN/$DELTA"`
  else
    set COUNTMIN = 0
  endif

  if ("$COUNTHR" == "$FINHR") then
    set END = `ev "1+(60*$FINMIN/$DELTA)"`
  else
    set END = $FRAMESPERHOUR
  endif

  while ($COUNTMIN < $END)
    set THISHR = $COUNTHR
    set THISMIN = `ev "$COUNTMIN*$DELTA"`
    echo "Time - "$THISHR":"$THISMIN

    genvie $LAT $LON $MER $JD $THISHR $THISMIN \
    | rcalc -i input.fmt -o output.fmt -f vpar.cal >> $VF

  @ COUNTMIN++
  end

@ COUNTHR++
end
```

```
rshow -kf march.vf -o mar/mar%03d ../site.oct
```




Hornsby–Clark House
Direct Sunlight
hrs / year
1000
800
600
400
200
0
0.25 metres above ground


ARUP
20th July
06:00 GMT+2
Lux
95000
85000
75000
65000
55000
45000
35000
25000
15000
5000



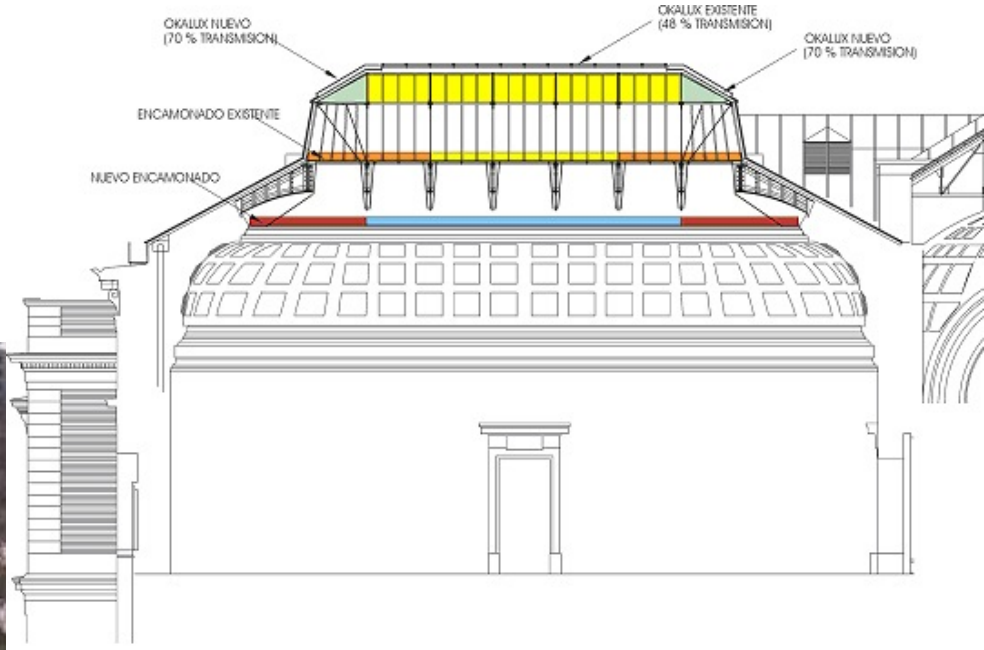
City Hall, London, UK - 1999

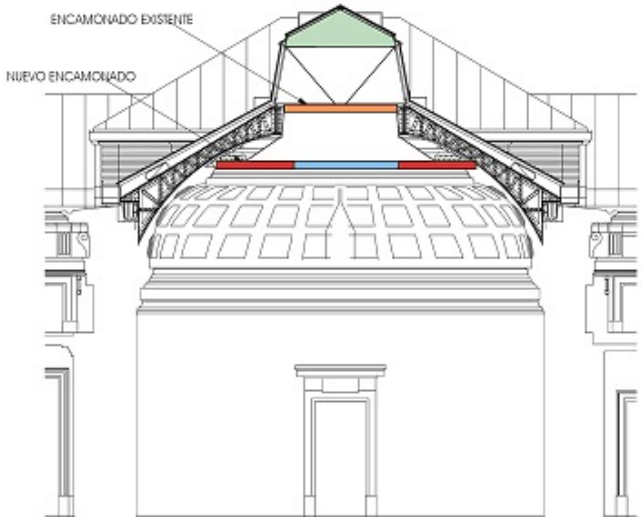
ARUP

Arfon Davies

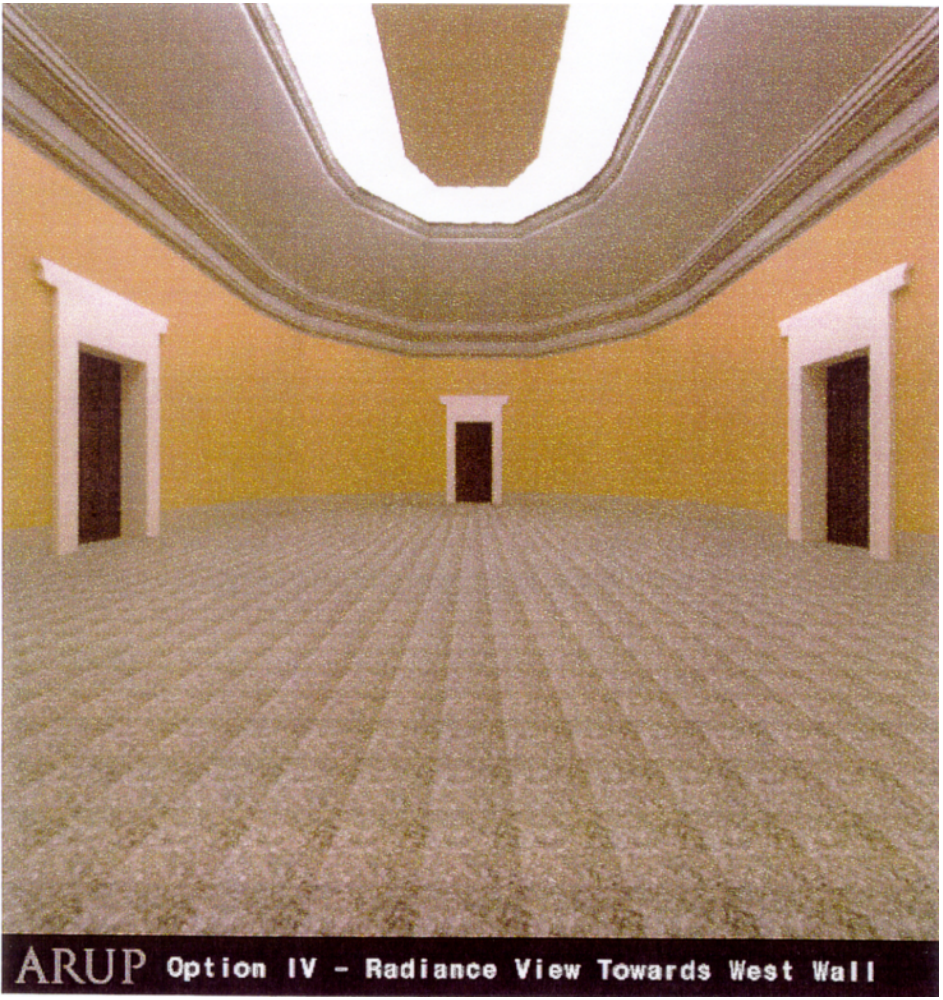
ARUP

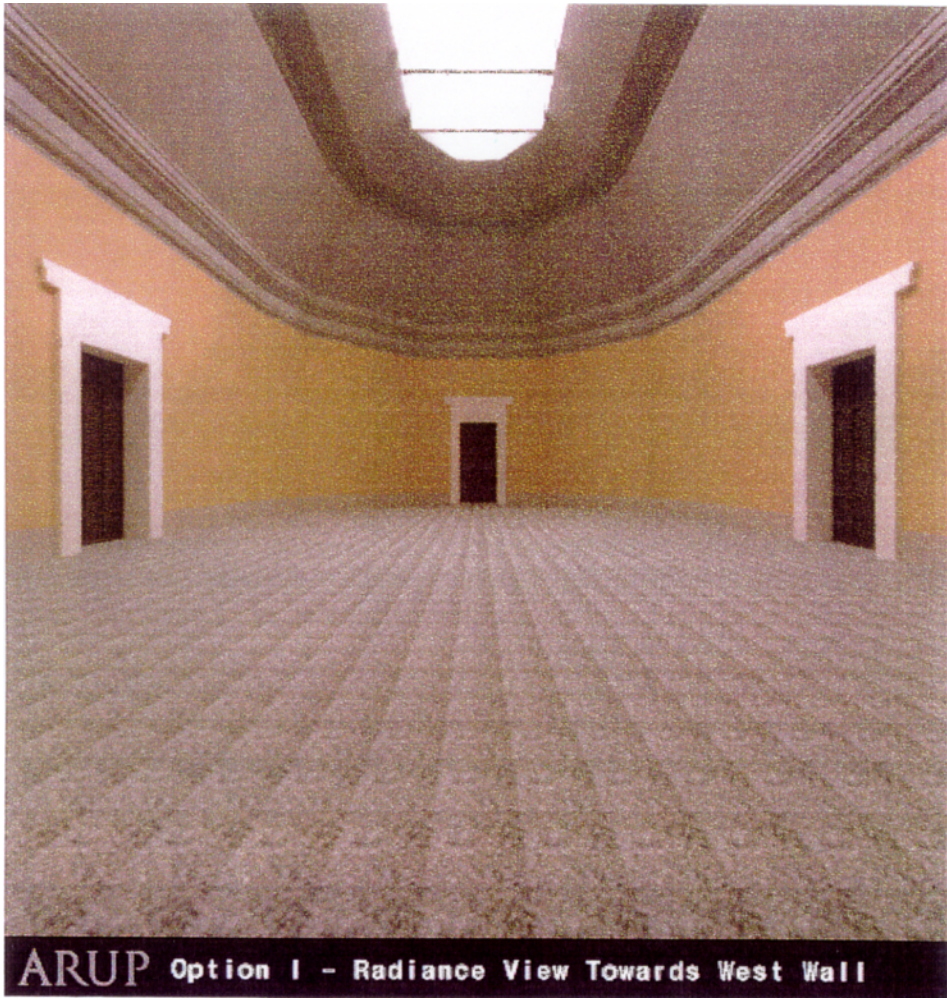
1998 - my first project...
Prado Museum, Madrid



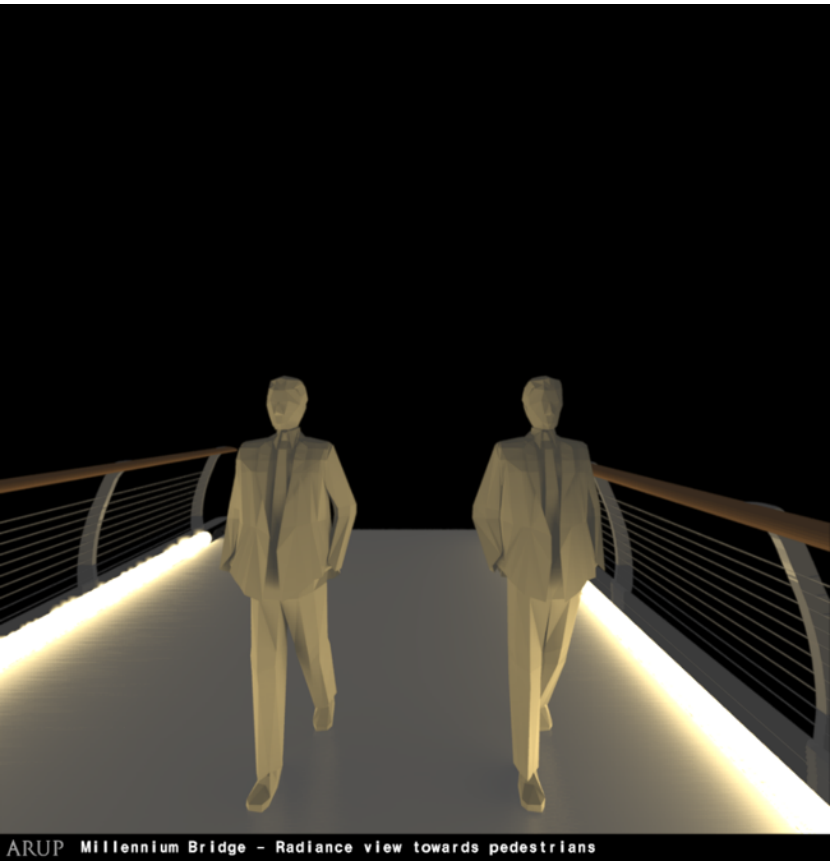


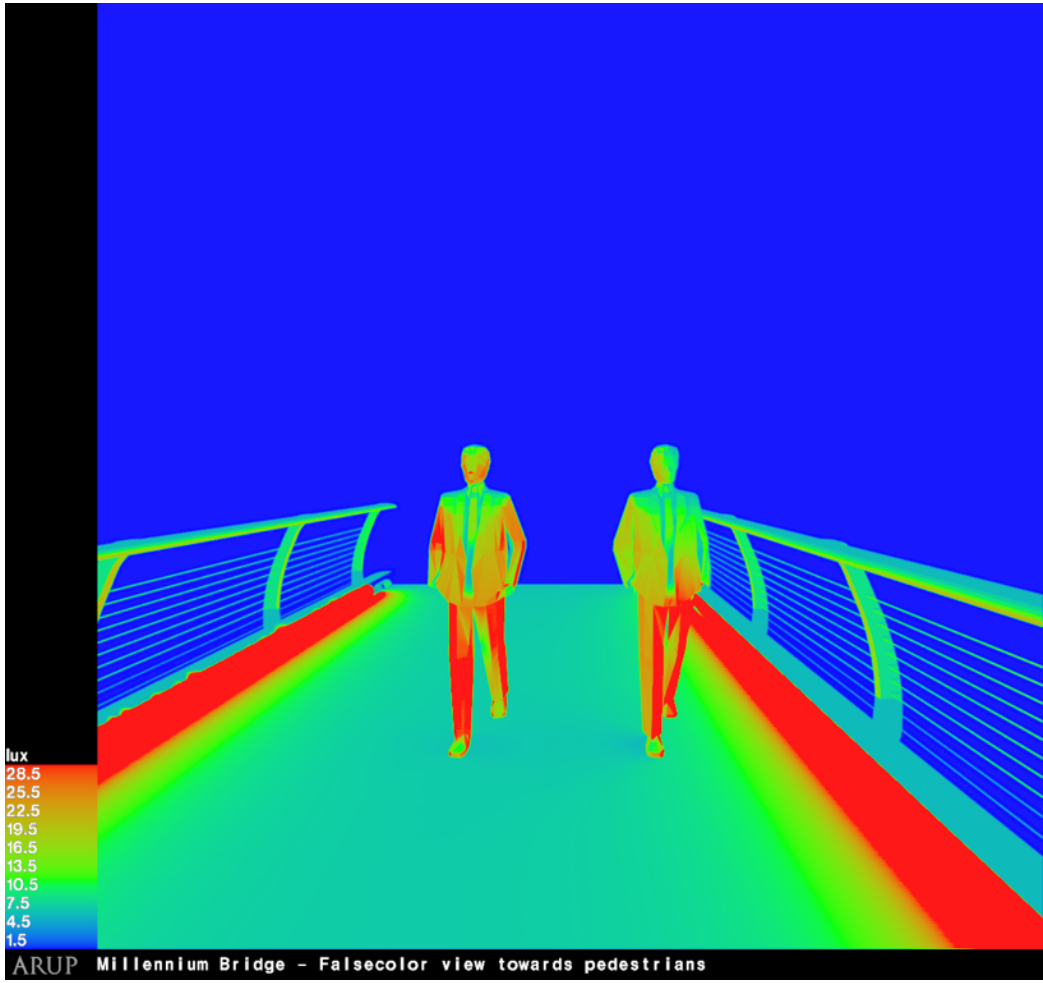
1998 - my first render... using Adeline
Prado Museum, Madrid





1999 - my first render with a man in it... Millennium Bridge, London





2000 – I discovered C++

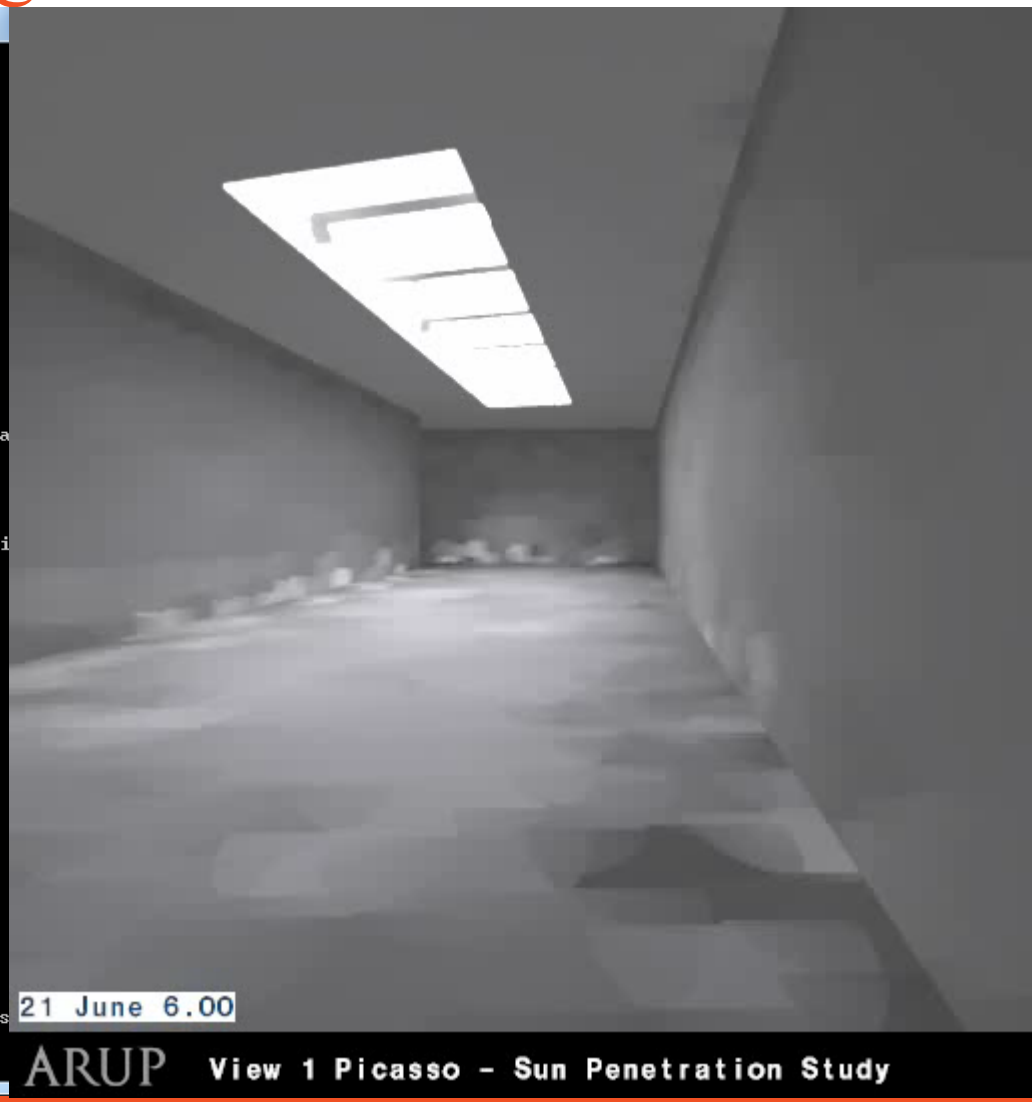
Lieven
Back in the old days of Adeline it was possible to do some limited scripts within a DOS batch file, although running in NT made this process very difficult.
Now that DTR has been complied in NT it is possible to do a vast range of scripts using Win32 Console programs written in Visual C++. Basically, the C++ program is used to generate views, skies, materials, geometry and console command lines which run radiance through the console. Sunviews, animations and all the script examples provided in the Siggraph '98 course notes and Rendering with Radiance are possible. If you have no knowledge of C++ then now is the time to start learning. Have fun!

Arfon Davies
Ove Arup & Partners
Lighting Consultancy
13 Fitzroy Street
London
W1P 6BQ
T : +44 (0) 20 7465 2649
F : +44 (0) 20 7465 3679

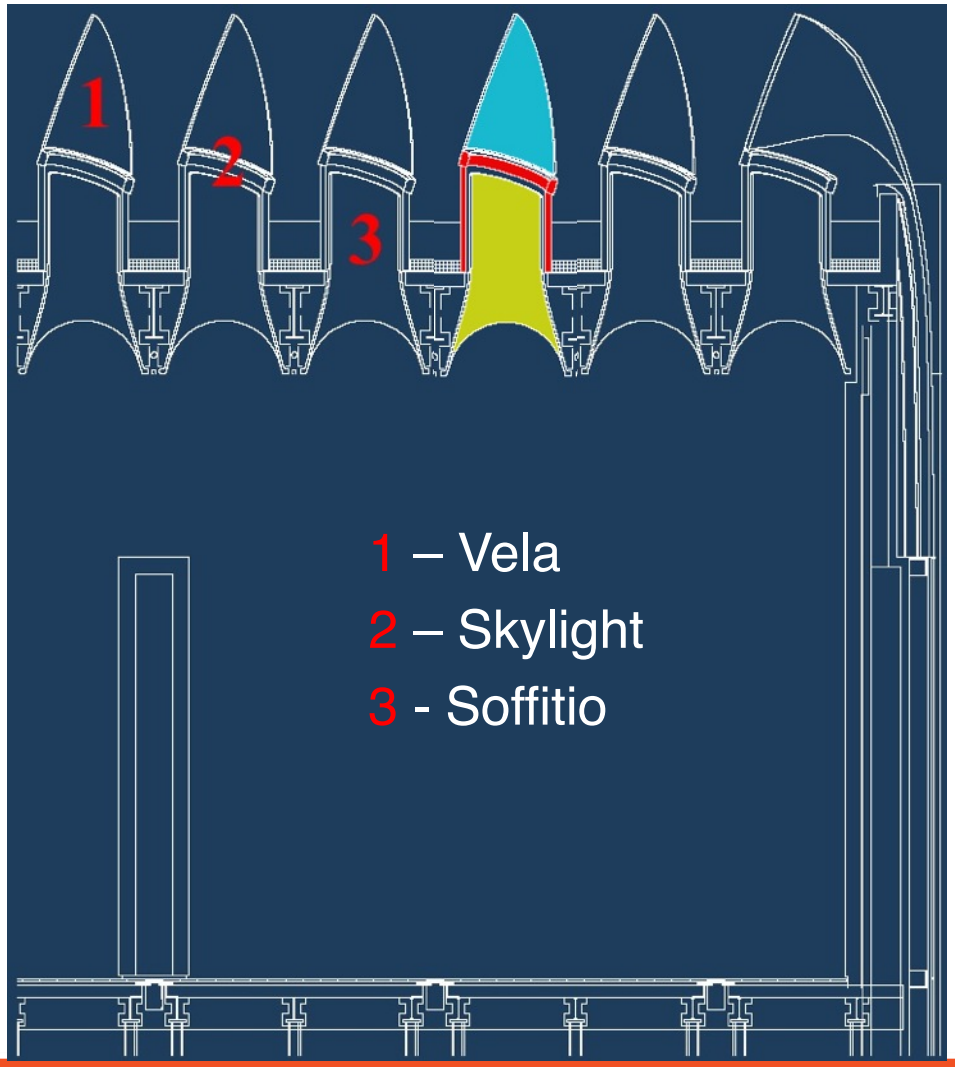
2000 – 1st use of picsun
Picasso Museum, Malaga

J:\General\Reference & Tools\Software\Radiance\C++\MyProjects\Pic_sun\Debug\Pic_sun.exe

```
------------------------------------------------------
                PICSUN Version 1.6

Sunpath and shadow study animation utility Version 1.6
       Last modified by Arfon Davies 14/02/03

------------------------------------------------------

Enter label for pictures (max 60 characters) : Radiance-Conf-2014
Press 1 to use ArupLighting logo, 2 for Arup logo : 1
Enter directory name for pictures : pics

Enter picture resolution :

        X : 512
        Y : 512

Enter animation type :

        1 for sunview;
        2 for shadow study or specific view(s), producing individual anima
        3 for combined shadow and sunview animation,
        4 for combined two view animation.

Enter 1, 2, 3 or 4 : 1

        N.B. rif file must contain the following statement for view defini

        view= V -vf view.vf

Enter name of rif file (excluding .rif) : test
Enter Latitude in degrees (+ve for northern hemisphere) : 51
Enter Longitude in degrees (+ve west of greenwich) : 0
Enter Standard Meridian (Degrees) : 0

Define Model rotation :

Radiance sun geometry - y axis is north, x axis is east.
If the model is not correctly aligned a rotation can be
applied.  This rotation is applied to the view and sun
generation.

Enter rotation angle in degrees (-ve for clockwise) : 0

Enter sunview distance (m) : 1000

Enter sunview aim point

        X : 0
        Y : 0
        Z : 0

Enter view size (in parallel projection vh and vv are in world coordinates

Horizontal view size (-vh) : _
```

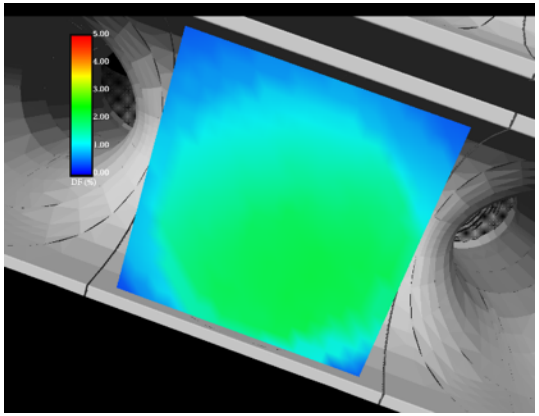


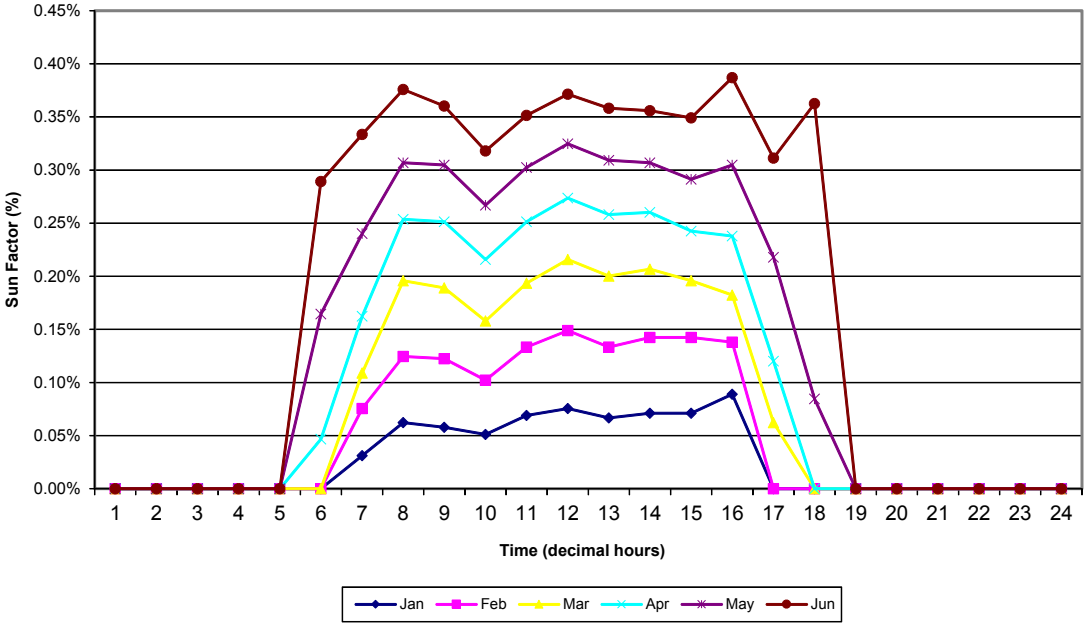
2001 – 1st use of climate based analysis
High Museum, Atlanta

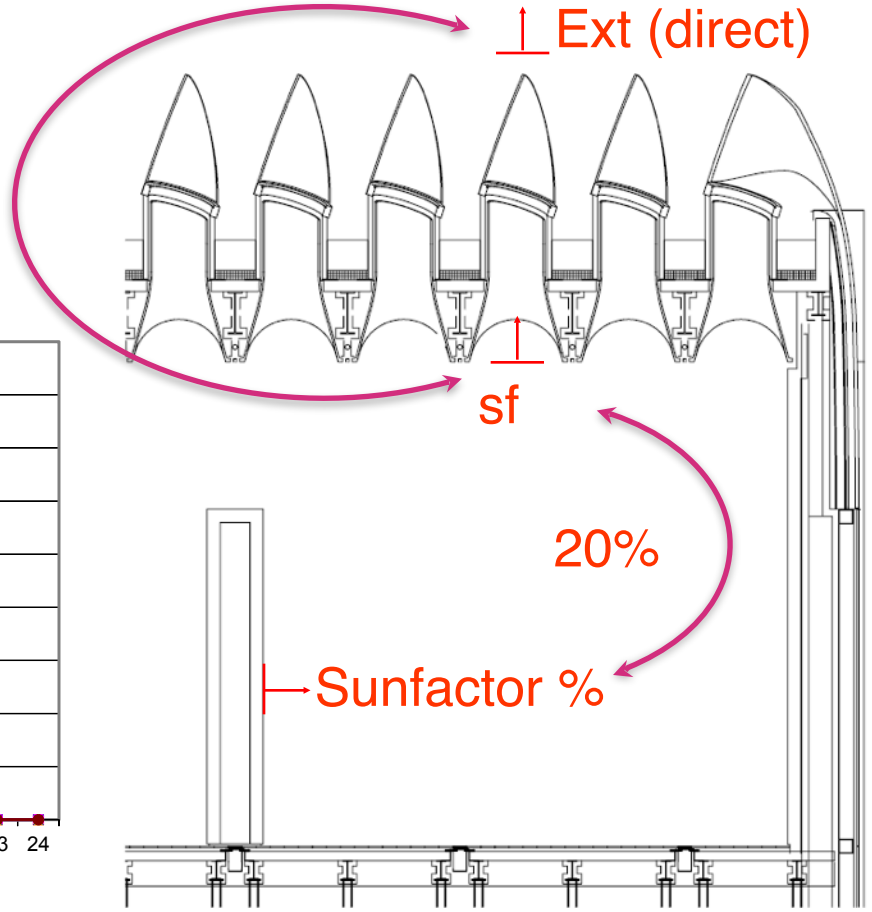


2001 – 1st use of sunfactor / suncalc
High Museum, Atlanta

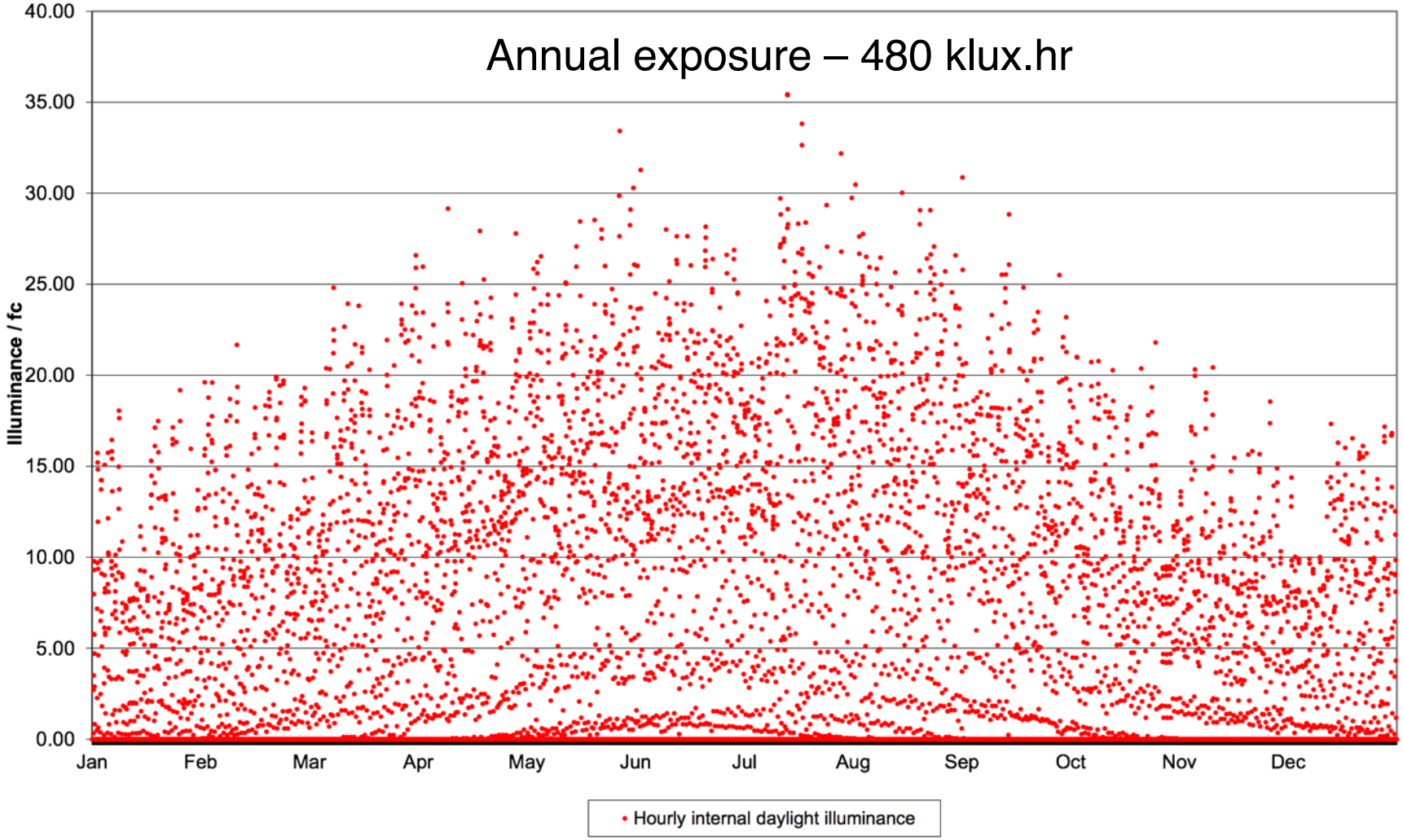
Ewall = (EDirect x Sunfactor) + (EDiffuse x DF



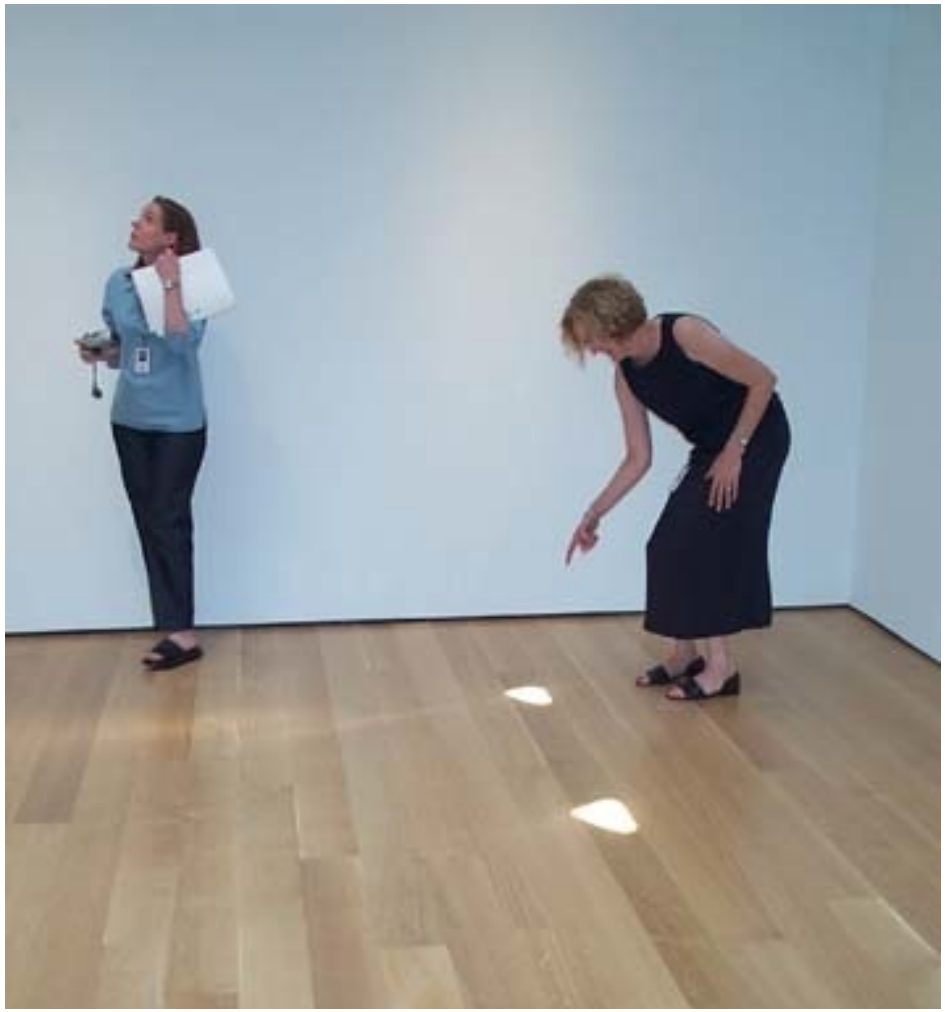


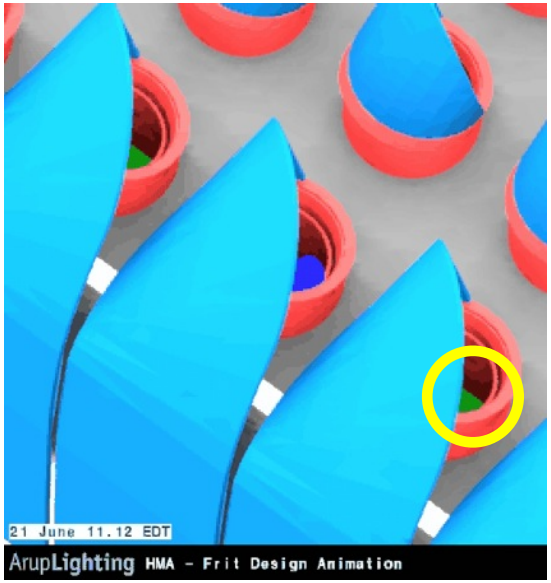


2001 – 1st use of sunfactor / suncalc
High Museum, Atlanta

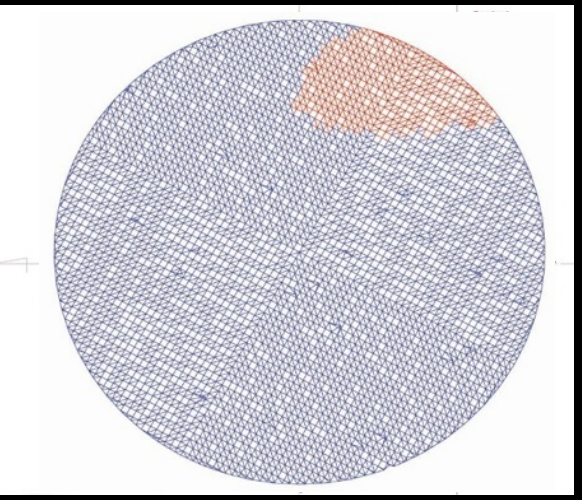


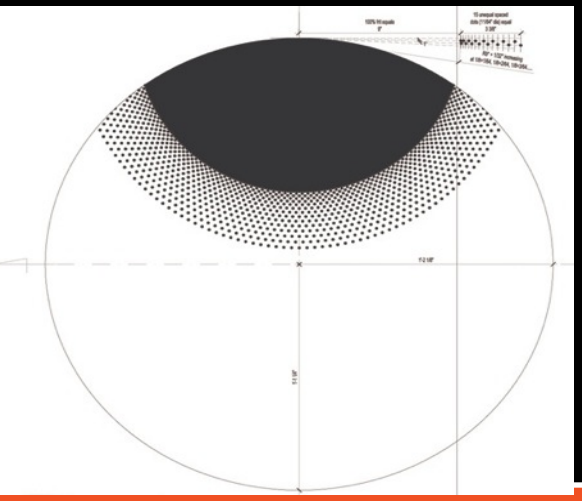
2001 – 1st use of suntrace
High Museum, Atlanta

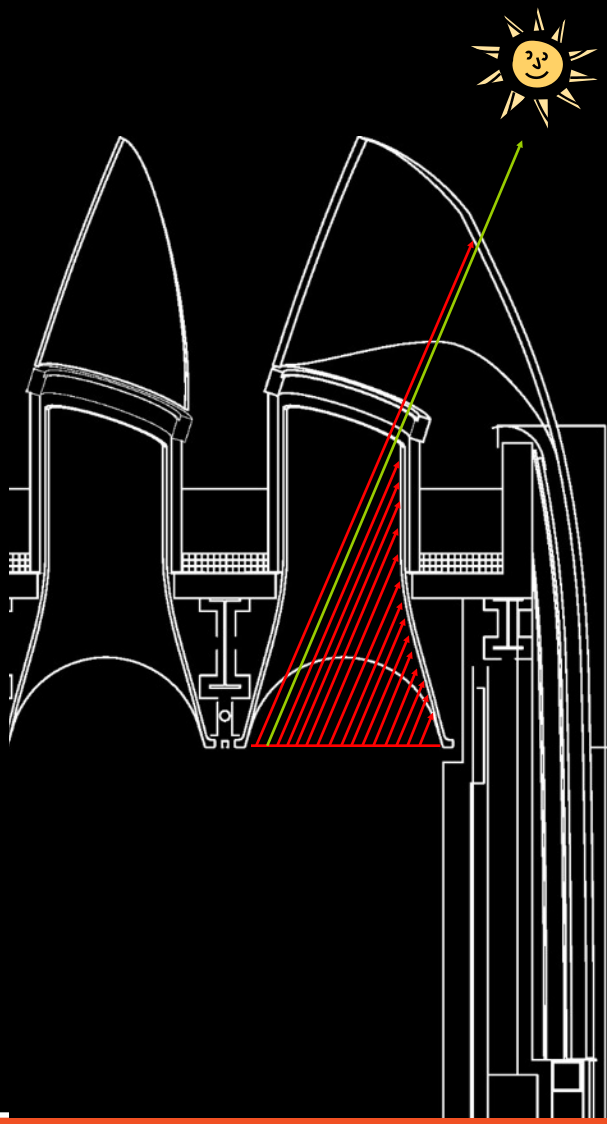




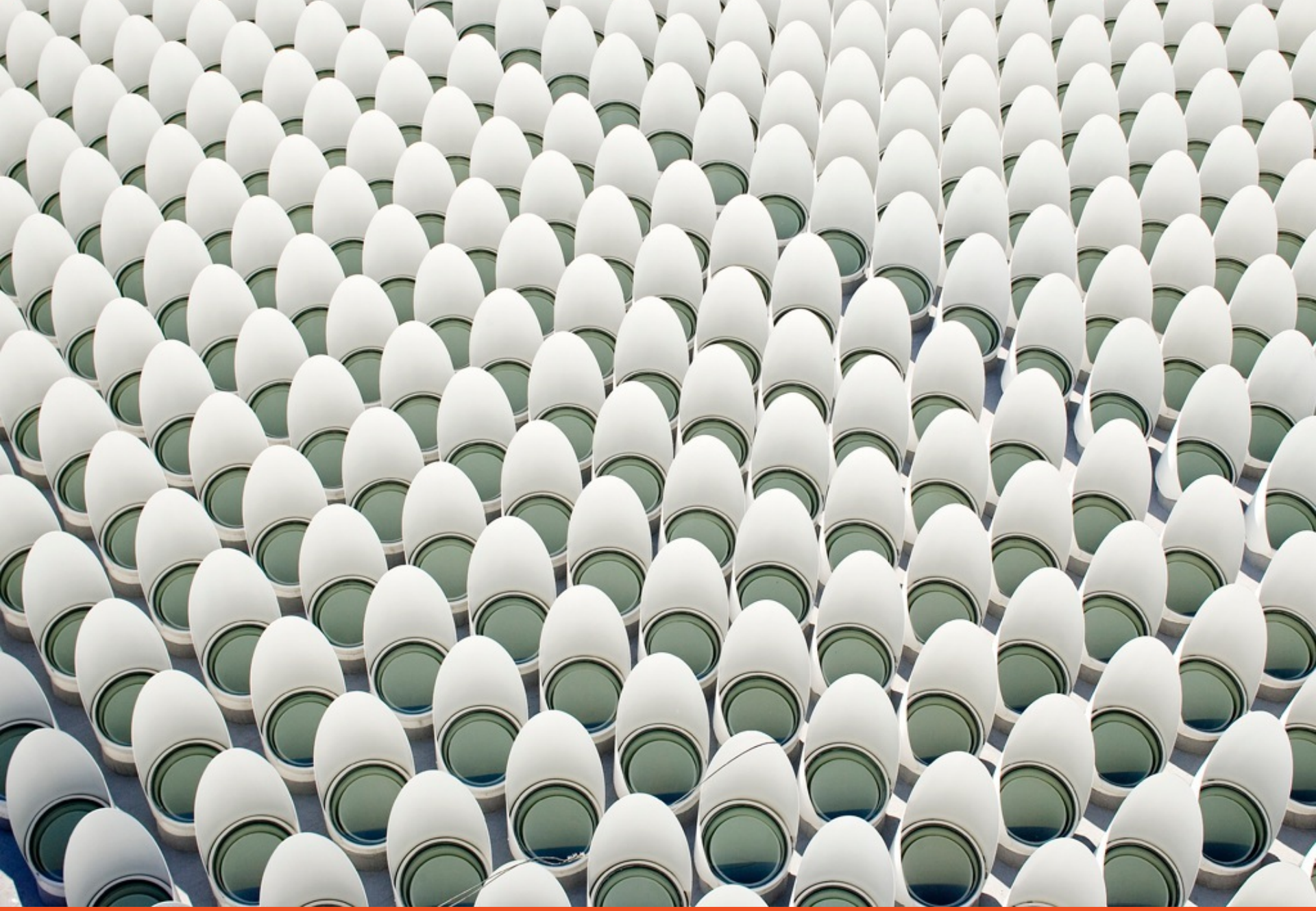
2001 – 1st use of suntrace
High Museum, Atlanta







ARUP



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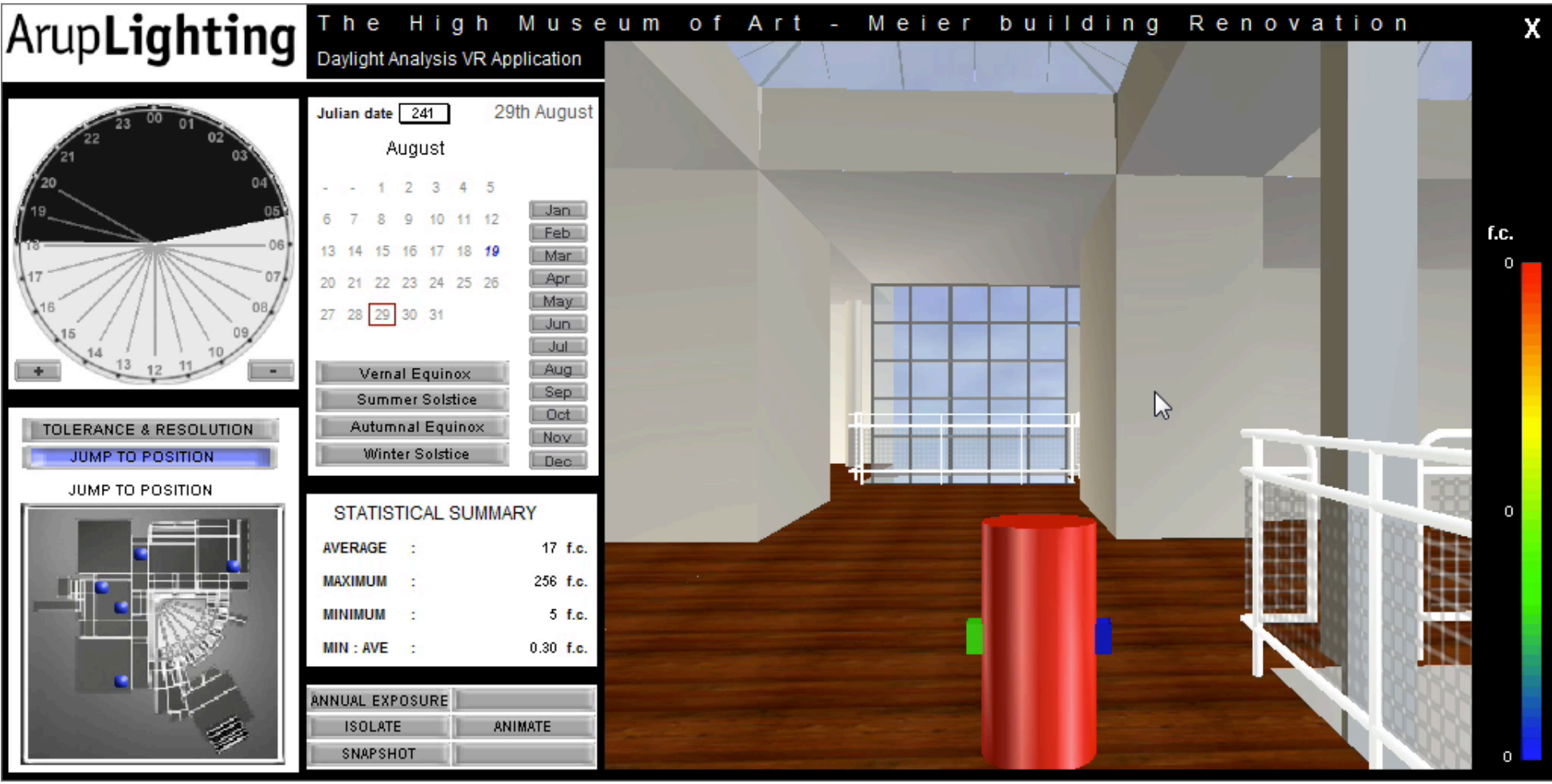
2003 – 1st use of director
Meier Building @ High Museum, Atlanta

2003 – 1st use of director
Meier Building @ High Museum, Atlanta



2003 - 2014

Renaissance

ARUP

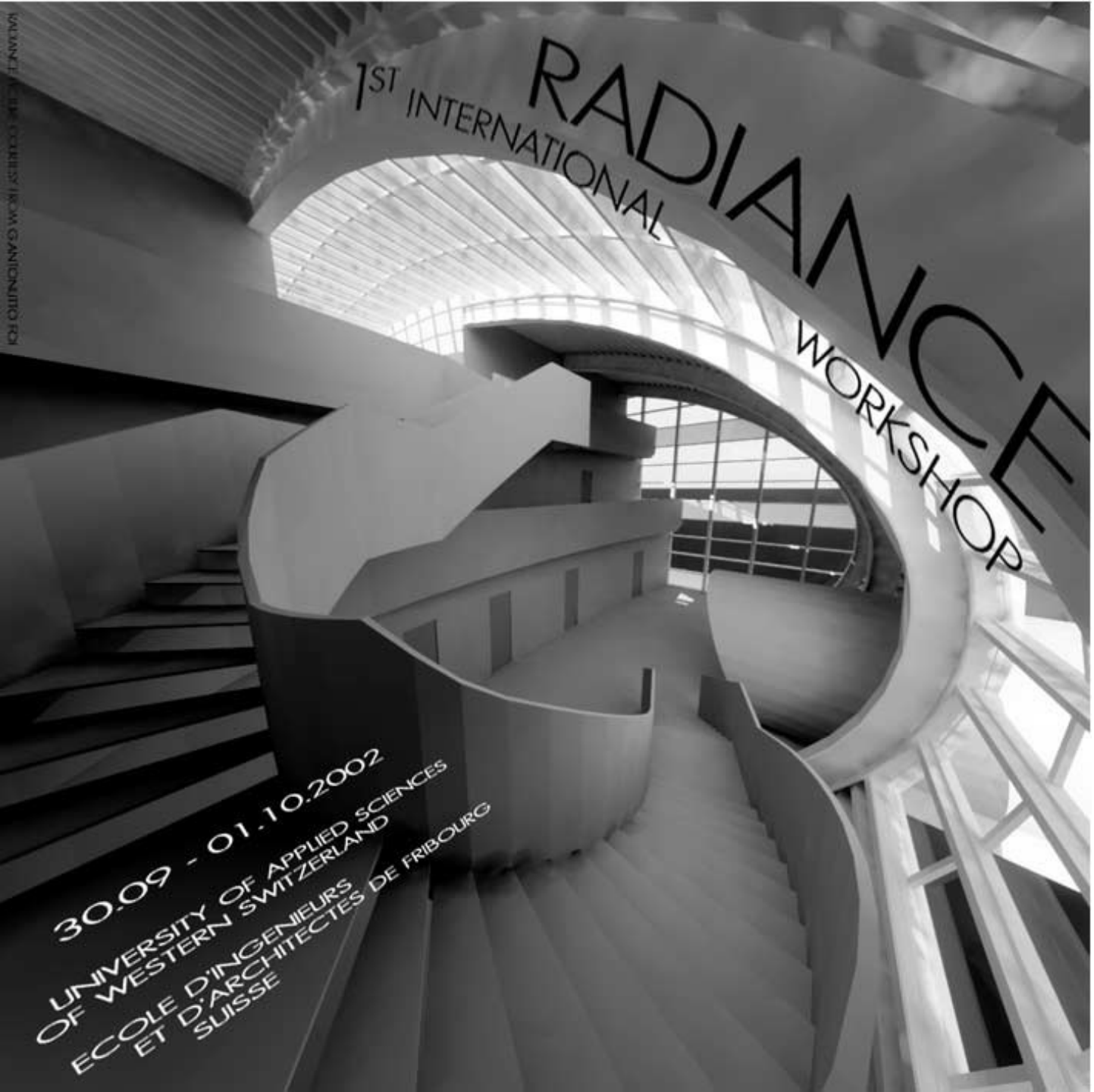
Giulio Antonutto

ARUP

3d models, 100 - 200 MB

8GB ram
1GB HD
2GHz PPC Processor
2 Cores

3,000 Pounds


RADIANCE
1ST INTERNATIONAL
WORKSHOP
30.09 - 01.10.2002
UNIVERSITY OF APPLIED SCIENCES
OF WESTERN SWITZERLAND
ECOLE D'INGENIEURS
ET D'ARCHITECTES DE FRIBOURG
SUISSE

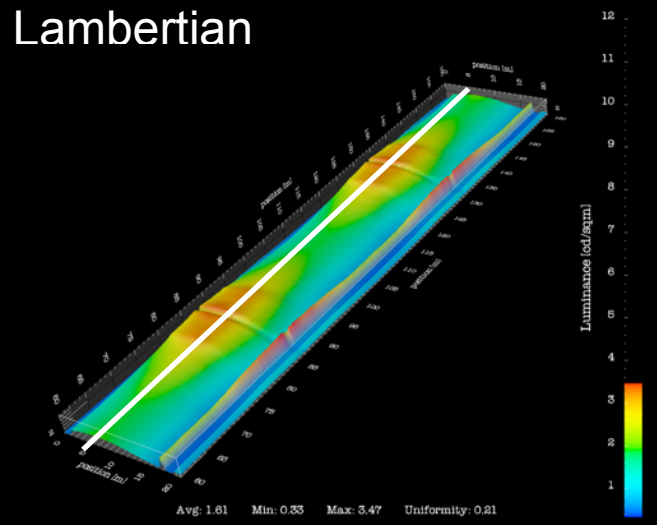
ARUP


3rd international RADIANCE workshop
Ecole d'ingénieurs et d'architectes de Fribourg
11&12 October 2004 Fribourg Switzerland
Radiance picture
courtesy from:
Giulio Antonutto
ARUP Lighting

ARUP

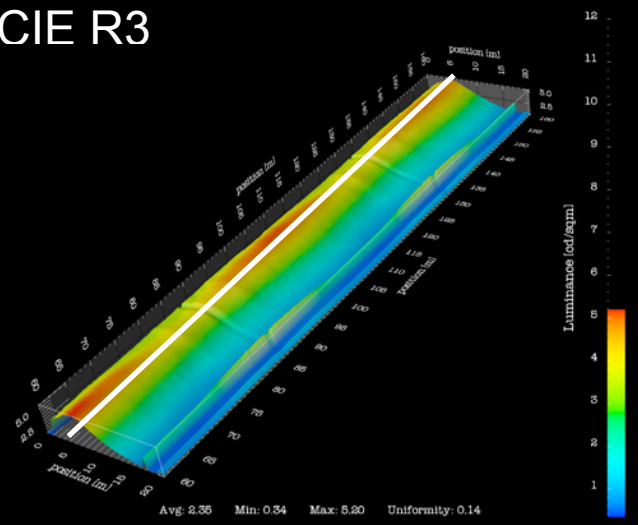
BRDF before BRDF, an asphalt matter!

Lambertian



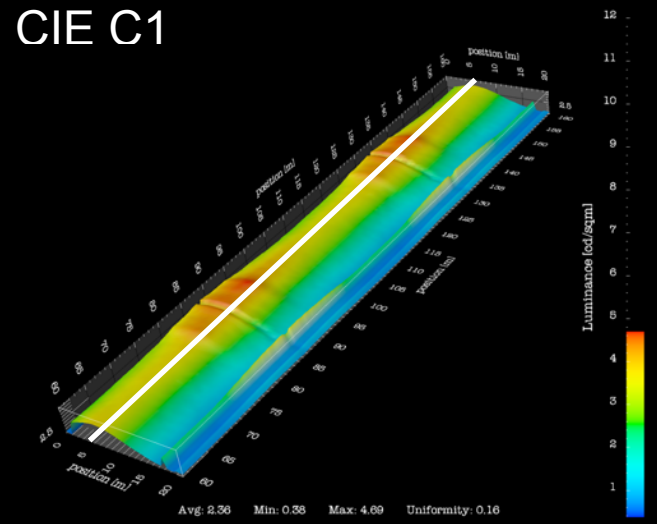
Longitudinal Uniformity: U_L=0.46

CIE R3



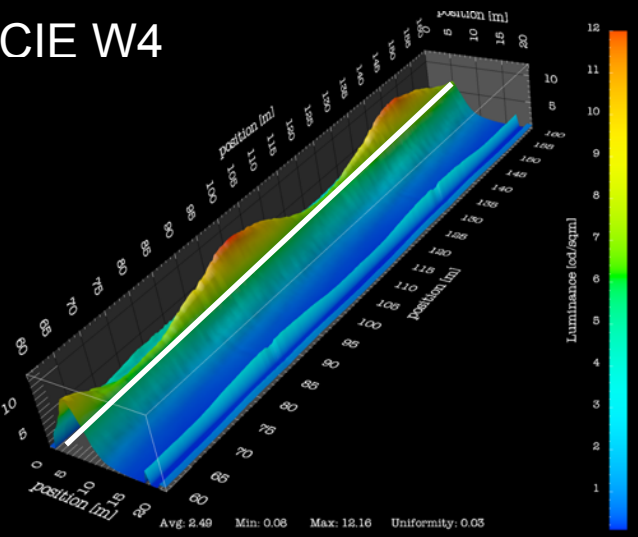
Longitudinal Uniformity: U_L=0.71

CIE C1



Longitudinal Uniformity: U_L=0.69

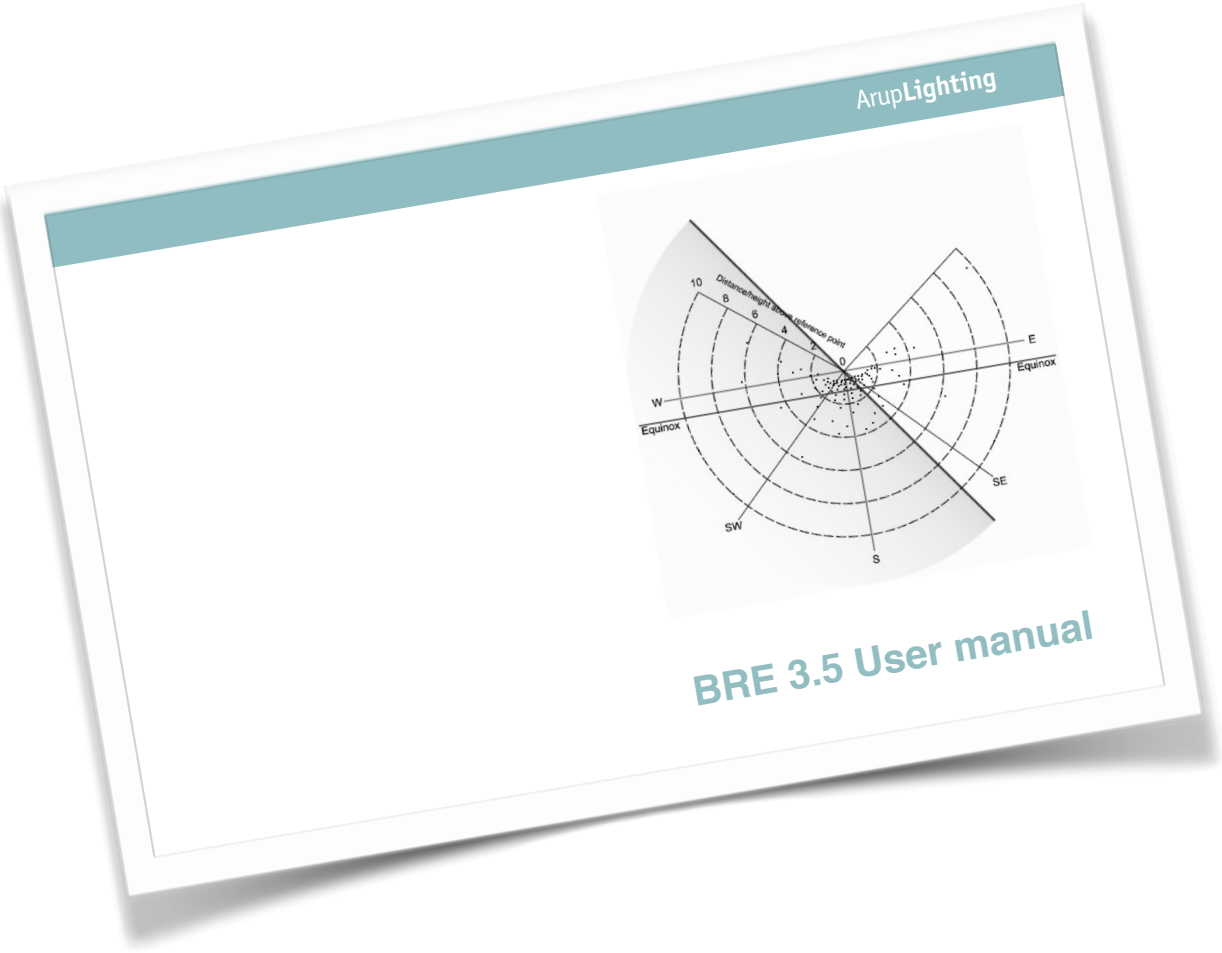
CIE W4

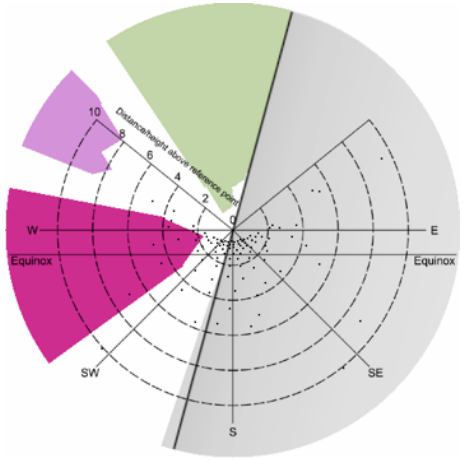


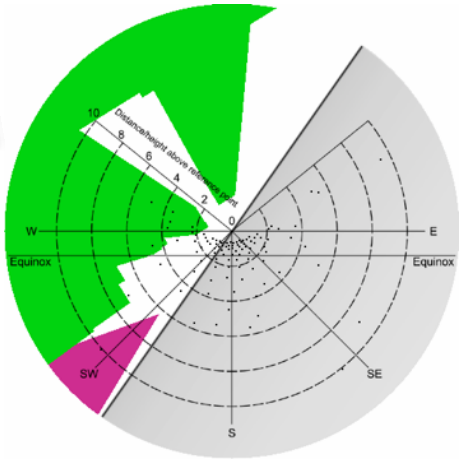
Longitudinal Uniformity: U_L=0.43

ARUP

From BRE 209: pen and pencil way to computer age

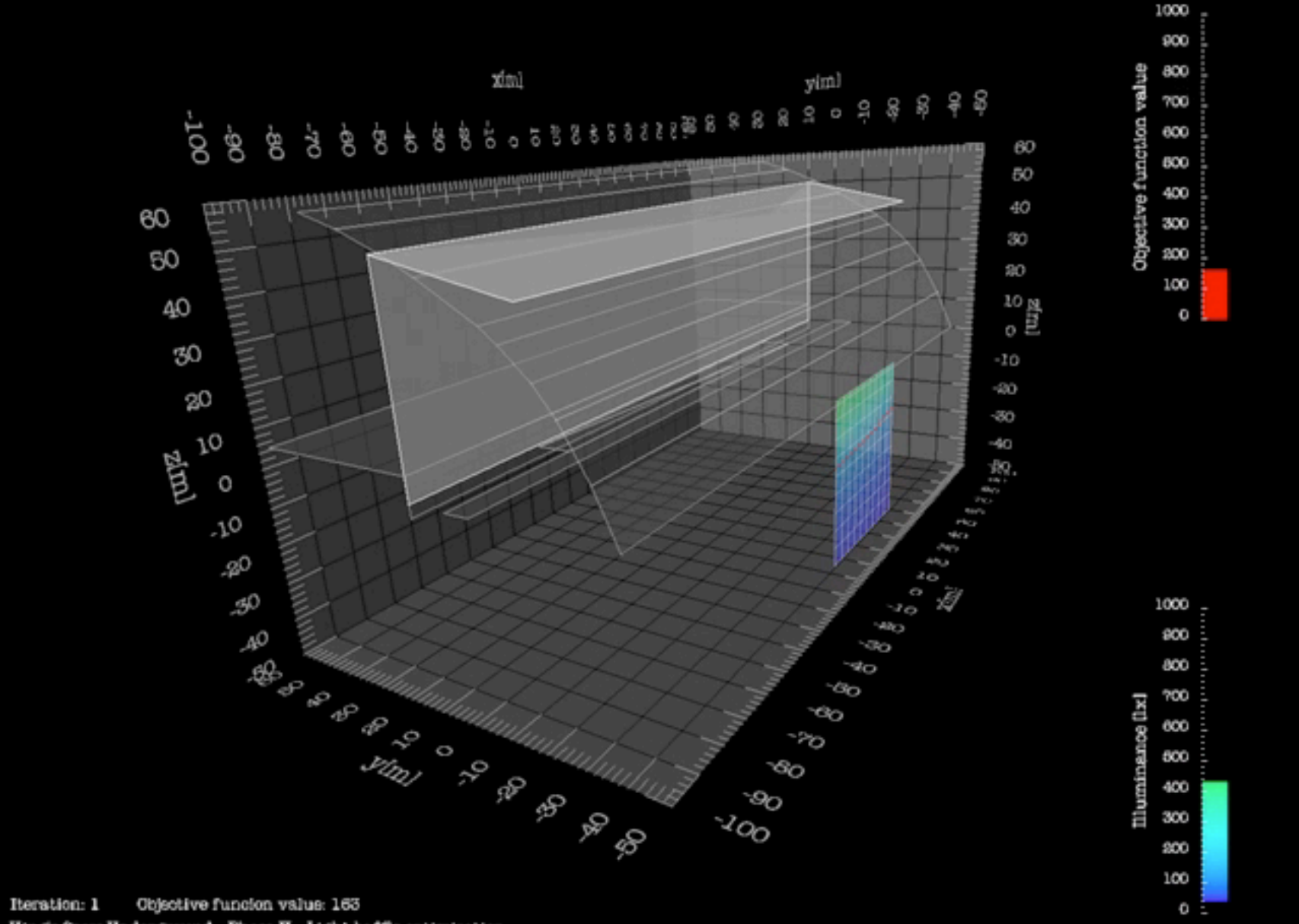




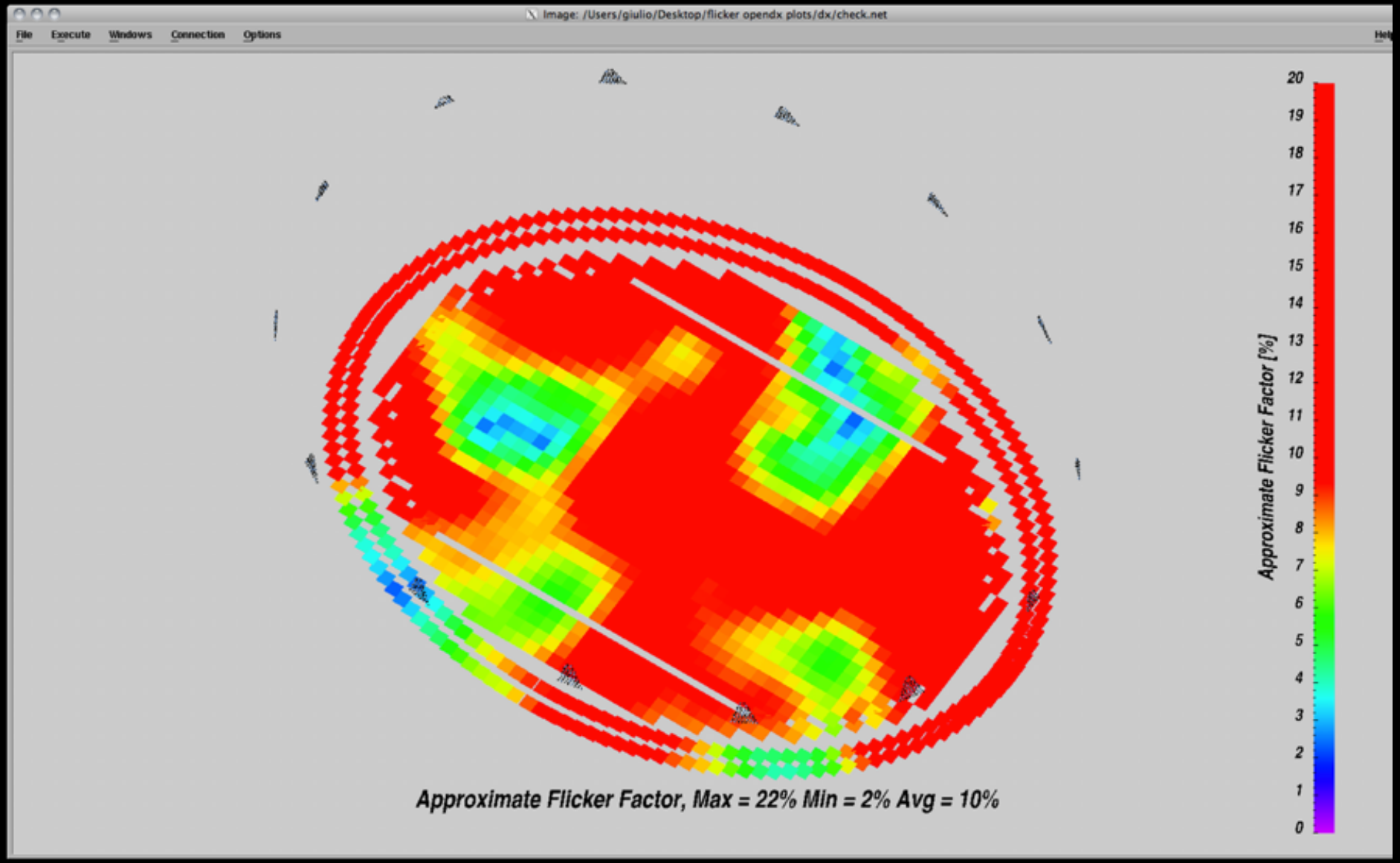


From 2 caravans to 10,000 windows…

Introducing Computational Design Optimisation to the Radiance world

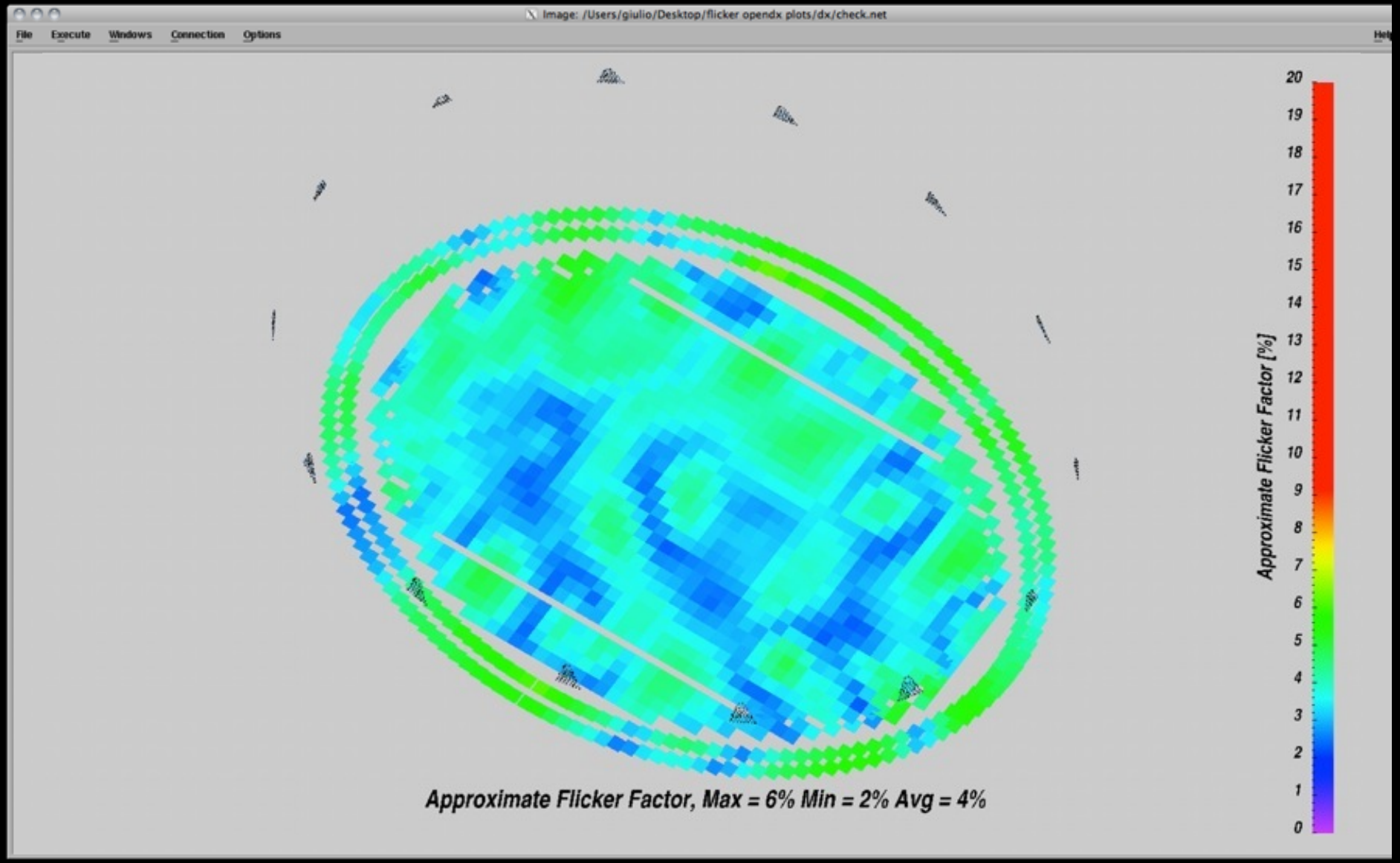


…looking for an interesting problem

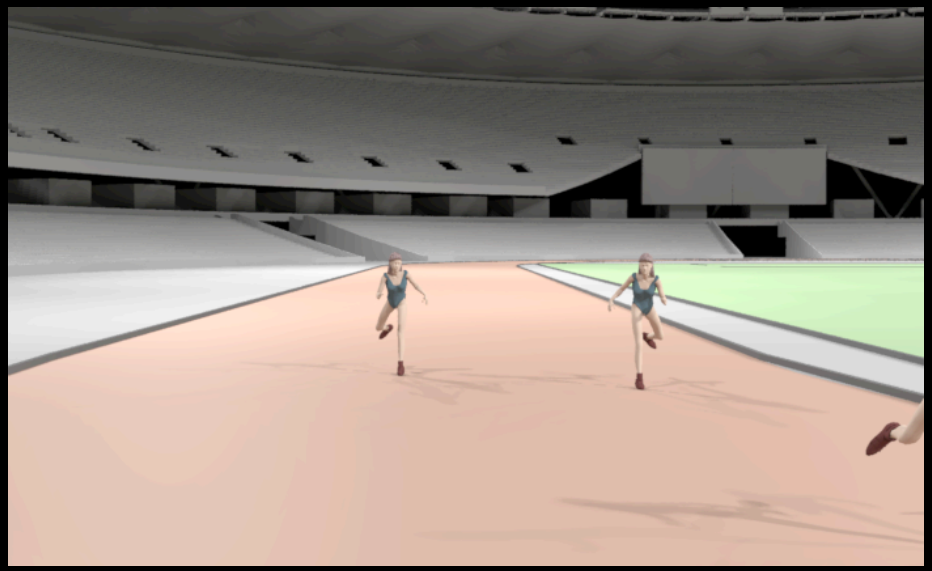


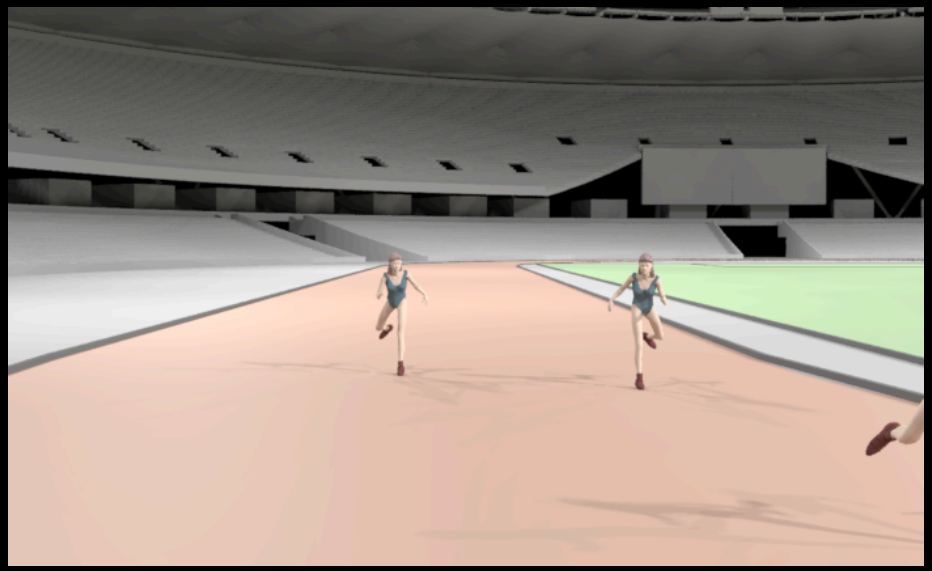
ARUP

and solve it…



ARUP



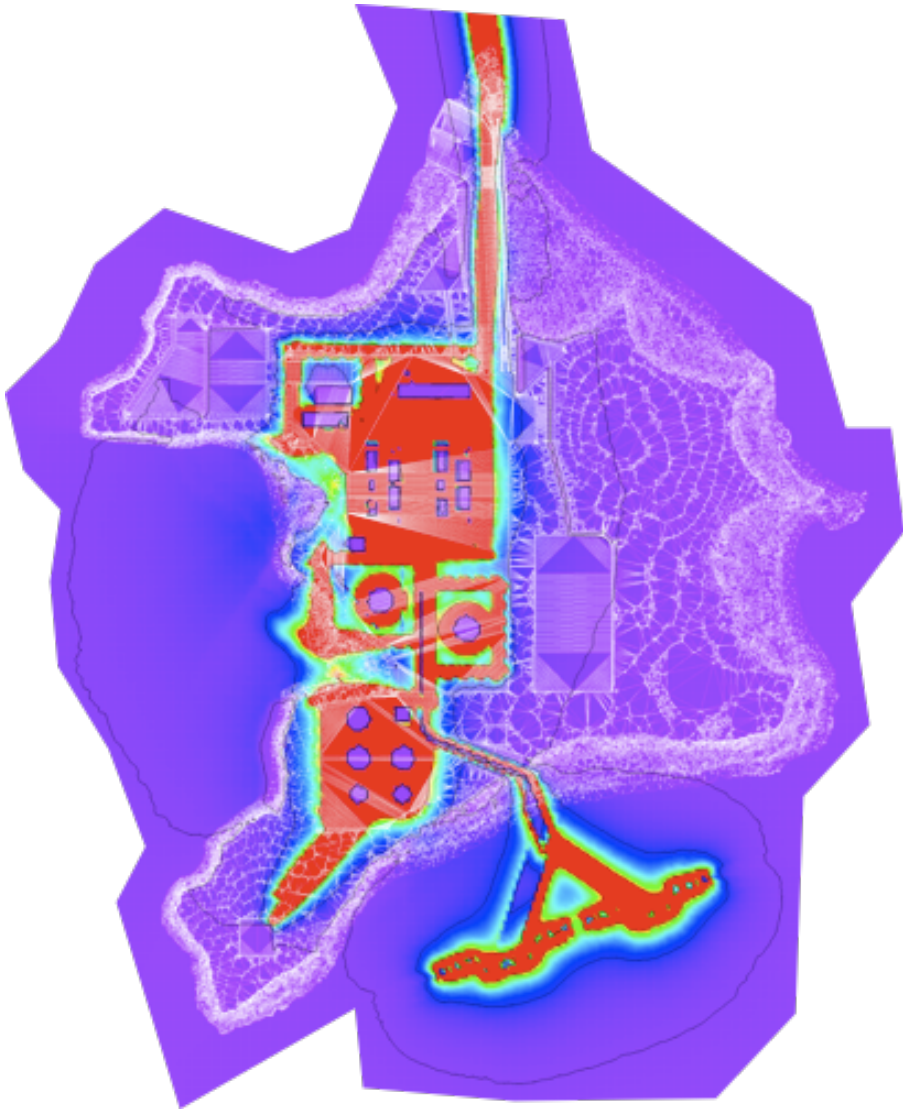


like this.

ARUP

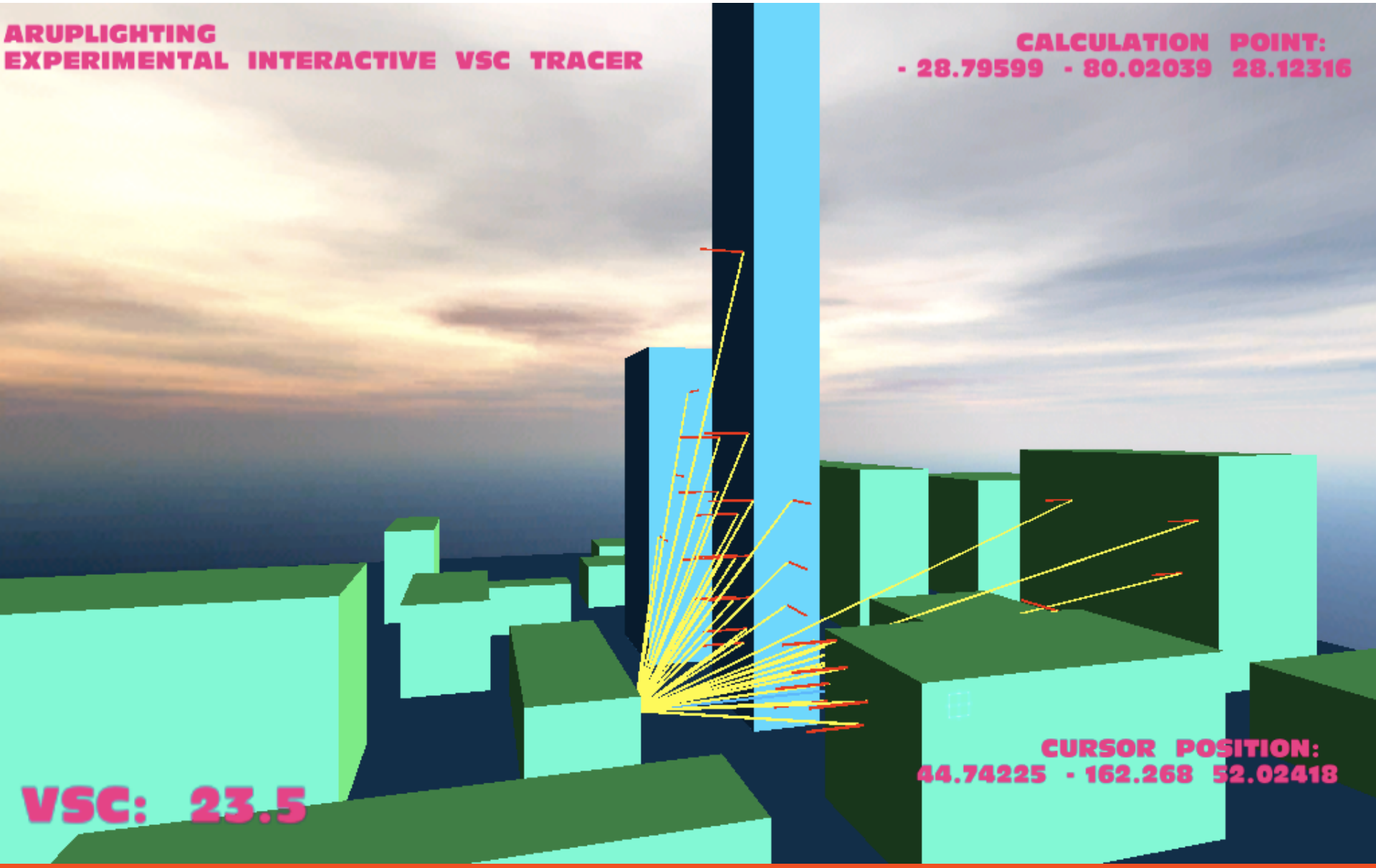
Multispectral analysis of large lighting schemes

An industrial facility with a 160m gas flame in the middle of the sea of turtles...

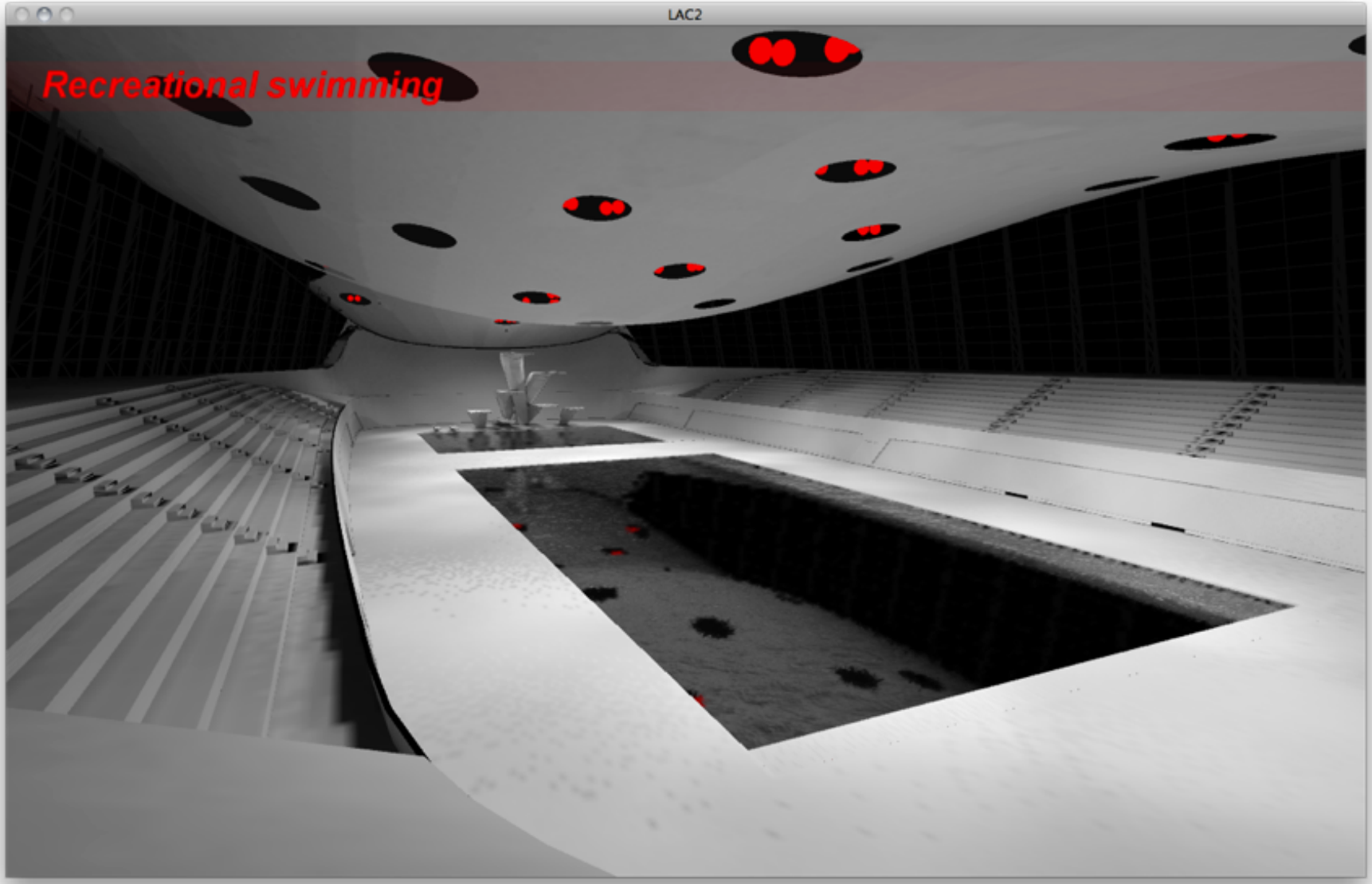


Key data:
10,000+ light sources
160m gas flame
Large analysis grid (circa 5 x 10 km)
Light levels analysis down to 0.1 lux
Multi-spectral distribution analysis

Unity3d and Radiance



Unity3d and Radiance



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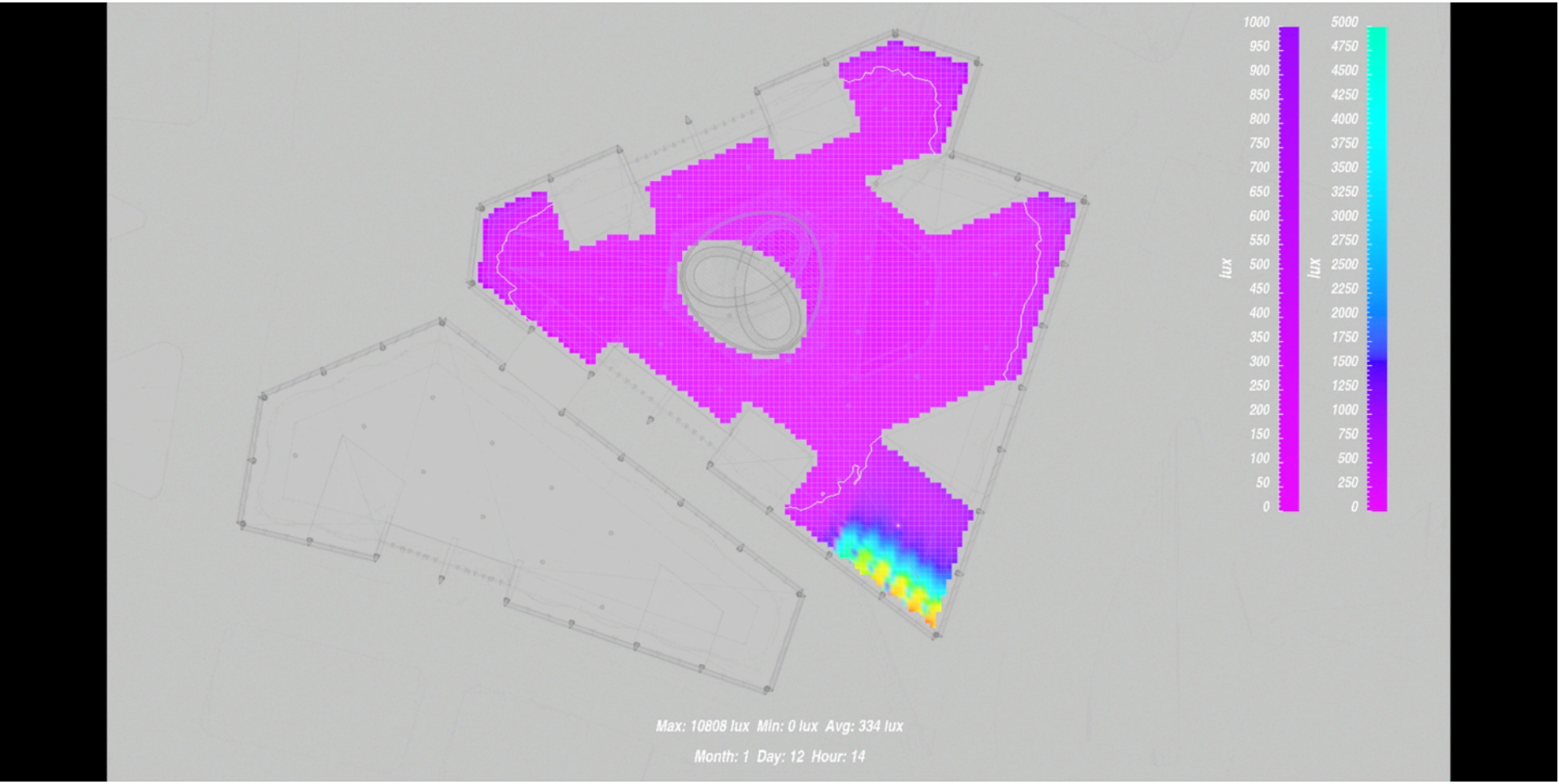
Music with Radiance…

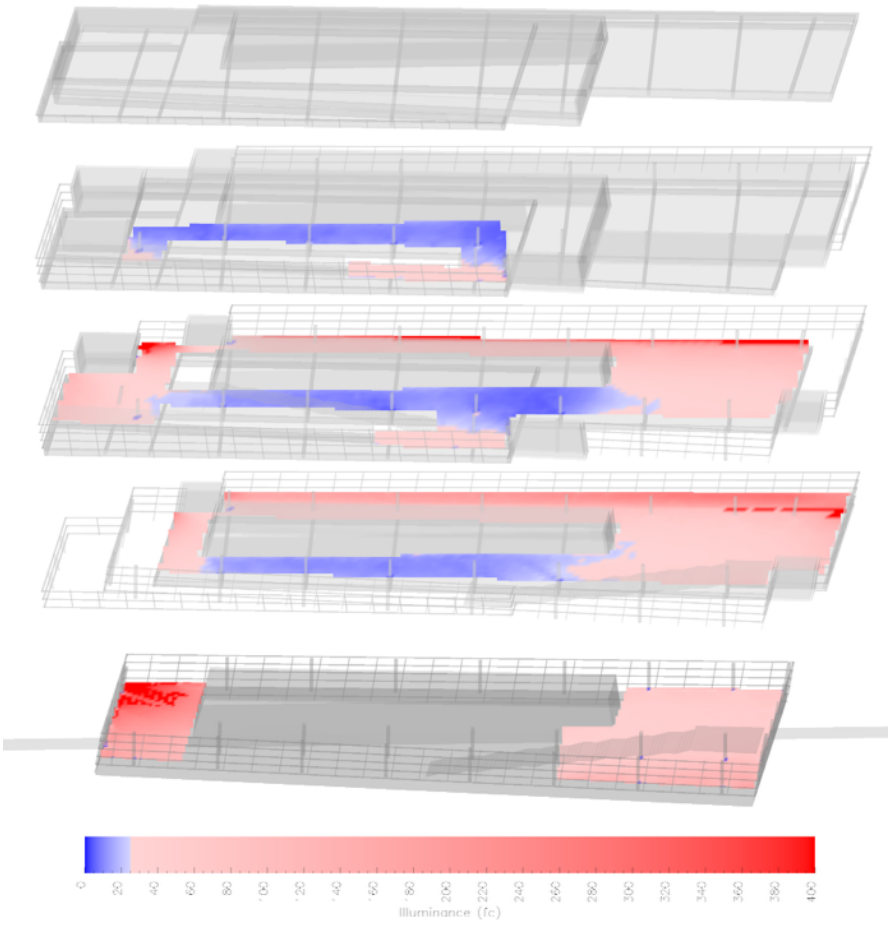


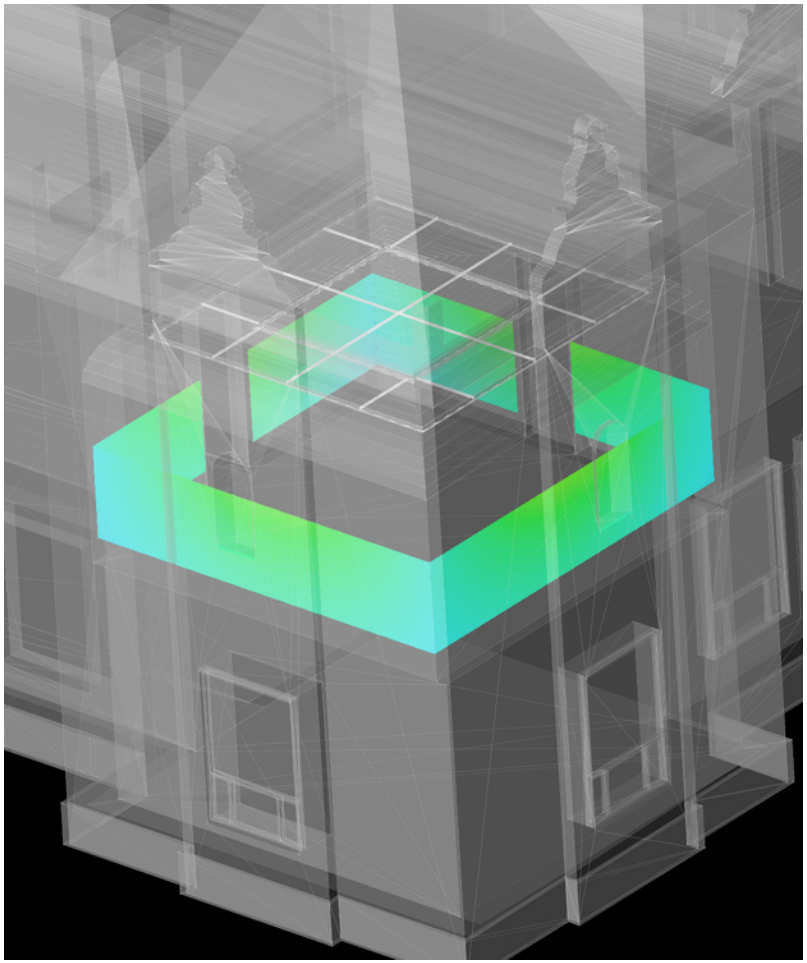
Andrew McNeil

ARUP

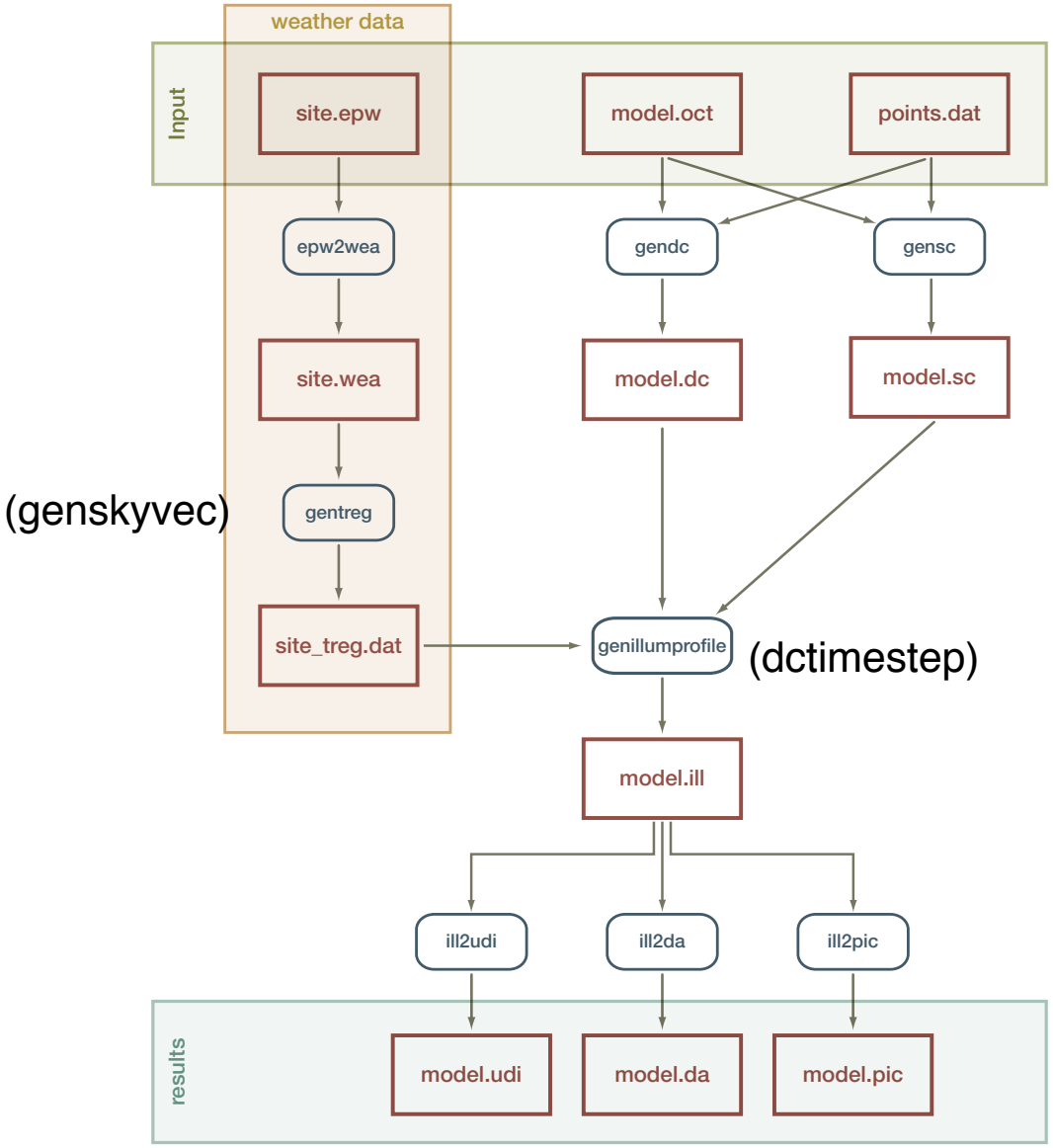
rad2odx - geometry converter

- rad2odx - Converts Radiance polygons to OpenDX geometry format





Annual Daylight Simulation Tools (2009)



ARUP

$$\begin{pmatrix} E_{1\,1} & E_{1\,2} & \dots & E_{1\,m} \\ E_{2\,1} & E_{2\,2} & \dots & E_{2\,m} \\ \dots & \dots & \dots & \dots \\ E_{n\,1} & E_{n\,2} & \dots & E_{n\,m} \end{pmatrix} = \begin{pmatrix} DS_{1\,1} & DS_{1\,2} & \dots & DS_{1\,145} & C_{1\,1} & C_{1\,2} & \dots & C_{1\,p} \\ DS_{2\,1} & DS_{2\,2} & \dots & DS_{2\,145} & C_{2\,1} & C_{2\,2} & \dots & C_{2\,p} \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ DS_{m\,1} & DS_{m\,2} & \dots & DS_{m\,145} & C_{m\,1} & C_{m\,2} & \dots & C_{m\,p} \end{pmatrix} x \begin{pmatrix} L_{1\,1} & L_{1\,2} & \dots & L_{1\,n} \\ L_{2\,1} & L_{2\,2} & \dots & L_{2\,n} \\ \dots & \dots & \dots & \dots \\ L_{145\,1} & L_{145\,1} & \dots & L_{145\,n} \\ R_{1\,1} & R_{1\,2} & \dots & R_{1\,n} \\ R_{2\,1} & R_{2\,2} & \dots & R_{2\,n} \\ \dots & \dots & \dots & \dots \\ R_{p\,1} & R_{p\,2} & \dots & R_{p\,n} \end{pmatrix}$$

Illuminance Matrix — **Contribution Matrix** — **Sky Matrix**

matrixmult *skymatrix.dat* *contribution.dat* > result.ill

inputs:

skymatrix.dat = sky matrix file

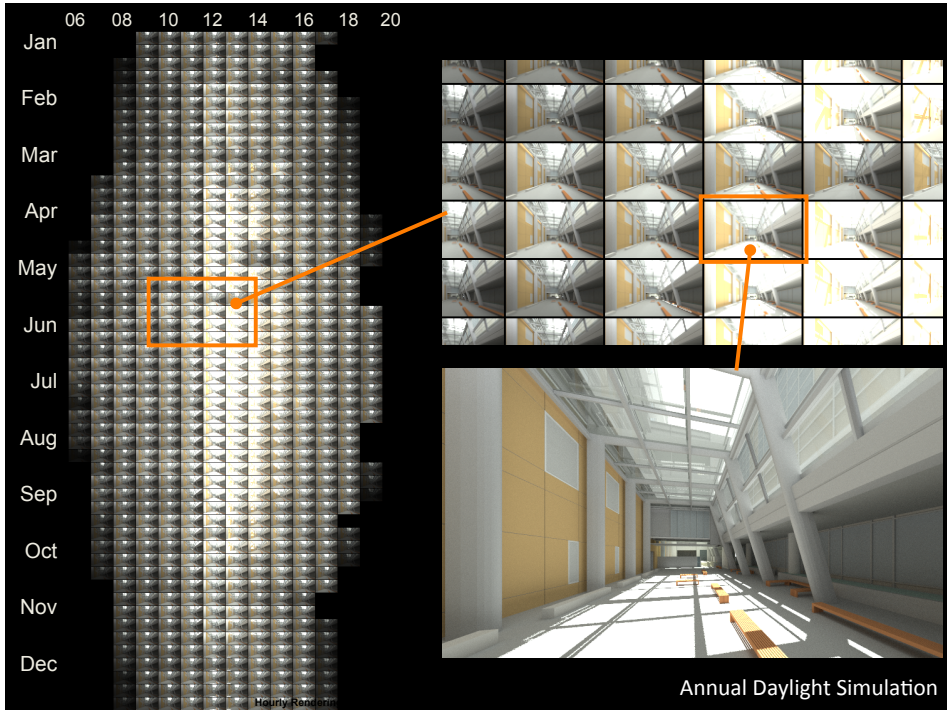
contribution.dat = contribution matrix file

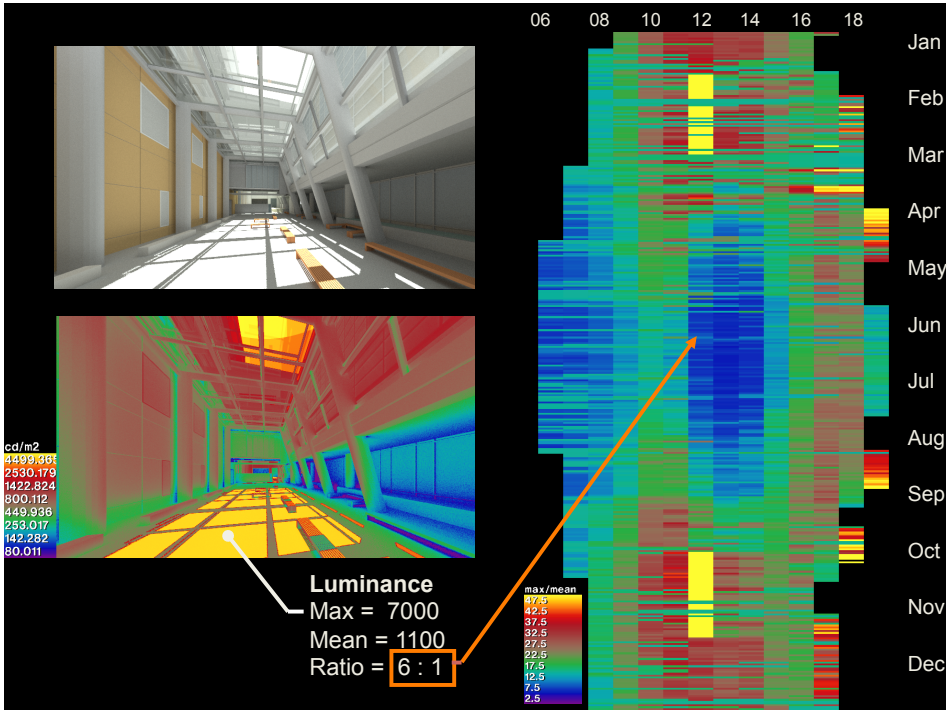
A multiplier can be specified with -m to affect the results for example to convert result to footcandles:

matrixmult -m 0.09267 *skymatrix.dat* *contribution.dat* > result.ill

ARUP

Annual Image Based Analysis (2009)





Some tools you can't do without…
These I brought to LBNL :)

- rgb2lum

  who has memorized

  rcalc -e '$1=179*($1*0.265+$2*… ?

- weekmask

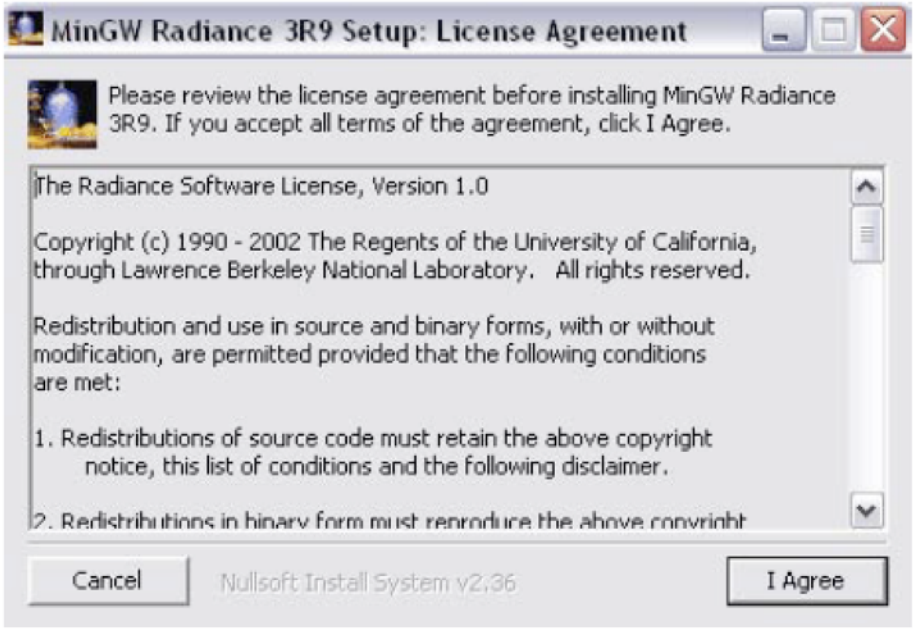
  When you don't want to use excel to filter out

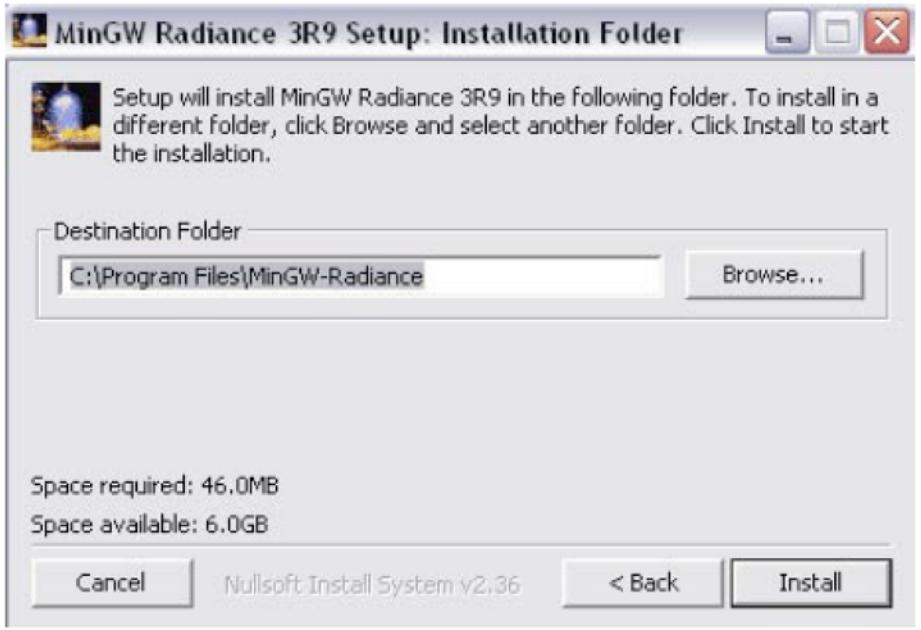
weekmask *[options]* result.ill > officehours.ill

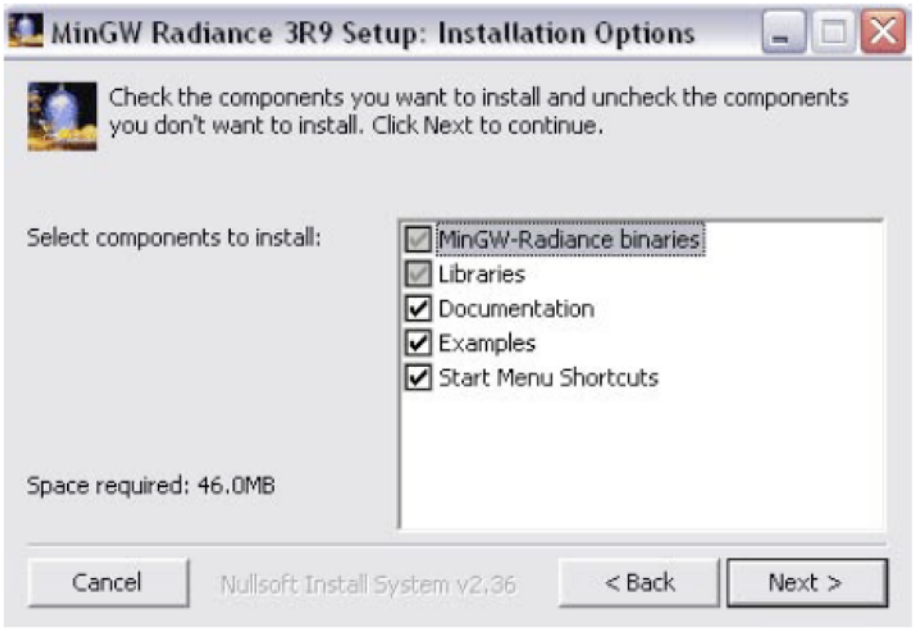
Options for weekmask	
-e *open close*	set start and end time for every day (Sun-Sat)
-d *open close*	set start and end time for Mon-Fri (daily)
-s *open close* **-m** *open close* **-t** *open close* **-w** *open close* **-r** *open close* **-f** *open close* **-a** *open close*	set start and end time for the corresponding day of the week. (s=sunday, m=monday, t=tuesday, w=wednesday, r=thursday, f=friday, a=saturday)
Notes: Hours are given in 24 hour decimal format. 17 = 5pm; 17.5 = 5:30pm. Specifying 0 0 open/close filters out all day. Open/closed specifications are processed in the order that they are given on the command line. For example -e 0 0 followed by -w 9 17 outputs no hours on sat & sunday and 9am -5pm for weekdays.	
-ds *start end*	Enacts daylight savings time. 'start' and 'end' are the Julian Dates coinciding with the start and end of daylight savings time.
-ds *us*	'us ' can be specified for US daylight savings time (64-309)
-ds *eu*	'eu' can be specified for European daylight savings time (85-302)
-i *interval*	Sets the input timestep interval to int minutes. Default is 60 minutes.

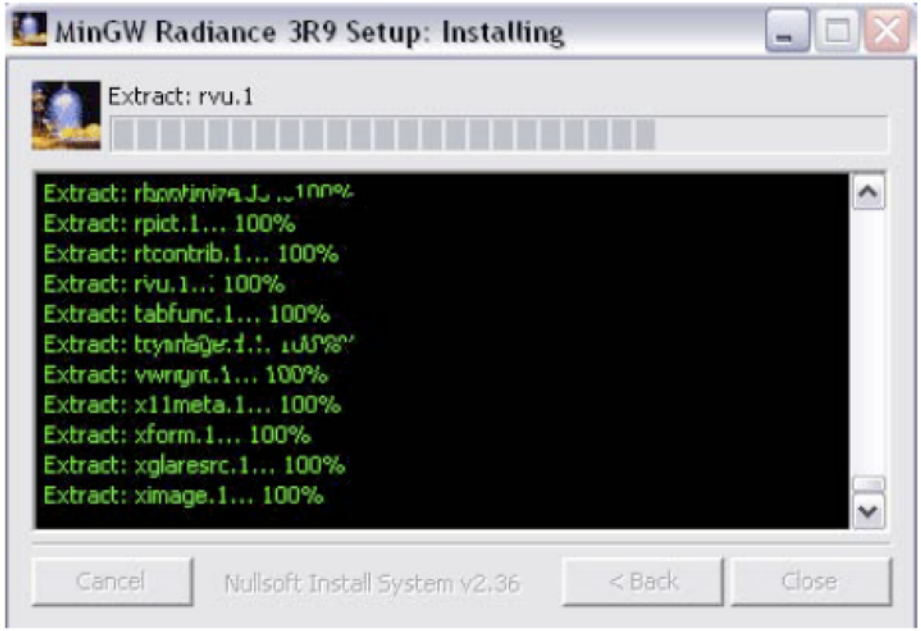
Francesco Anselmo

ARUP

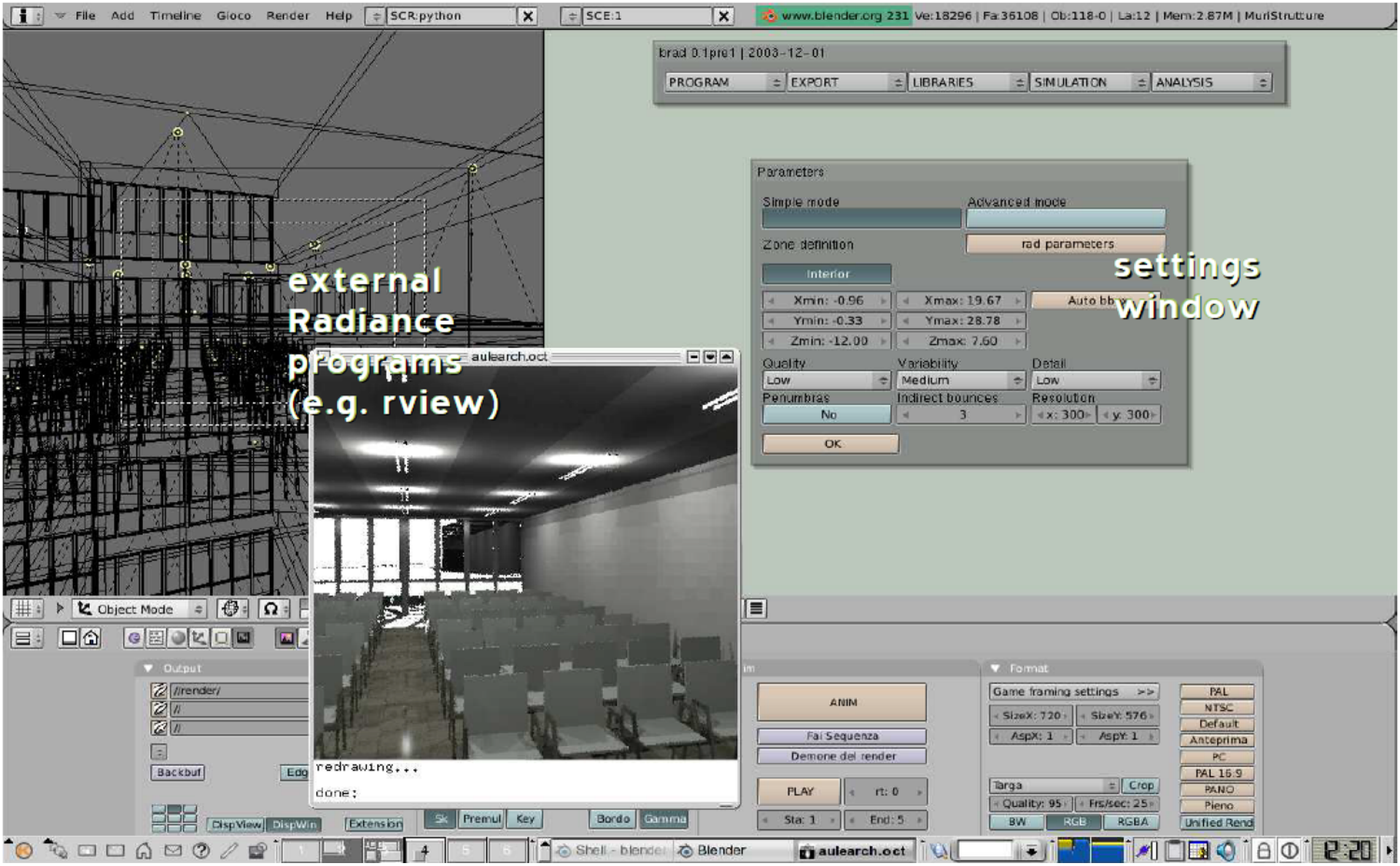

MinGW Radiance 3R9 Setup: License Agreement
Please review the license agreement before installing MinGW Radiance 3R9. If you accept all terms of the agreement, click I Agree.
The Radiance Software License, Version 1.0
Copyright (c) 1990 - 2002 The Regents of the University of California, through Lawrence Berkeley National Laboratory. All rights reserved.
Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:
1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
Cancel
Nullsoft Install System v2.36
I Agree


MinGW Radiance 3R9 Setup: Installation Folder
Setup will install MinGW Radiance 3R9 in the following folder. To install in a different folder, click Browse and select another folder. Click Install to start the installation.
Destination Folder
C:\Program Files\MinGW-Radiance
Browse...
Space required: 46.0MB
Space available: 6.0GB
Cancel
Nullsoft Install System v2.36
< Back
Install


MinGW Radiance 3R9 Setup: Installation Options
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.
Select components to install:
MinGW-Radiance binaries
Libraries
Documentation
Examples
Start Menu Shortcuts
Space required: 46.0MB
Cancel
Nullsoft Install System v2.36
< Back
Next >

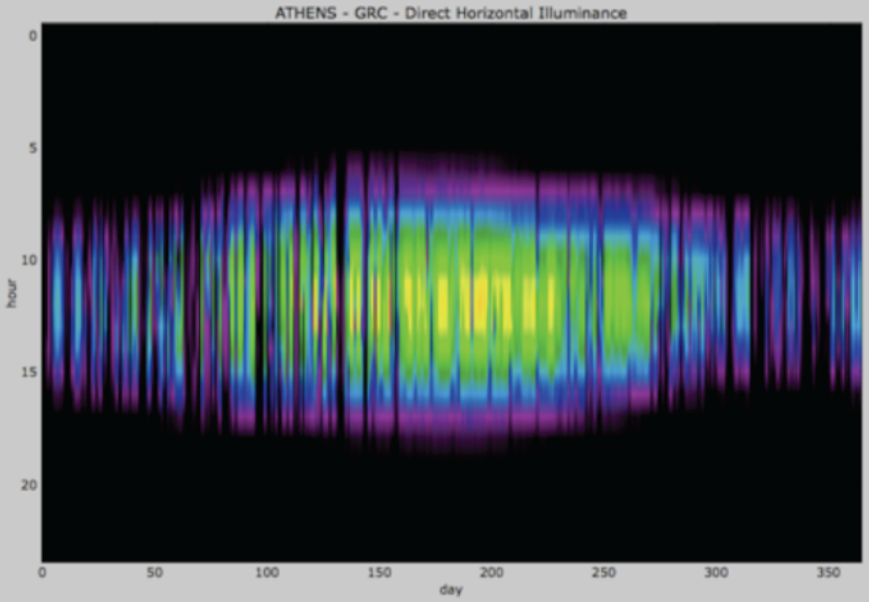

MinGW Radiance 3R9 Setup: Installing
Extract: rvu.1
Extract: rpict.1... 100%
Extract: rtcontrib.1... 100%
Extract: rvu.1... 100%
Extract: tabfunc.1... 100%
Extract: vwrgmt.1... 100%
Extract: x11meta.1... 100%
Extract: xform.1... 100%
Extract: xglaresrc.1... 100%
Extract: ximage.1... 100%
Cancel
Nullsoft Install System v2.36
< Back
Close

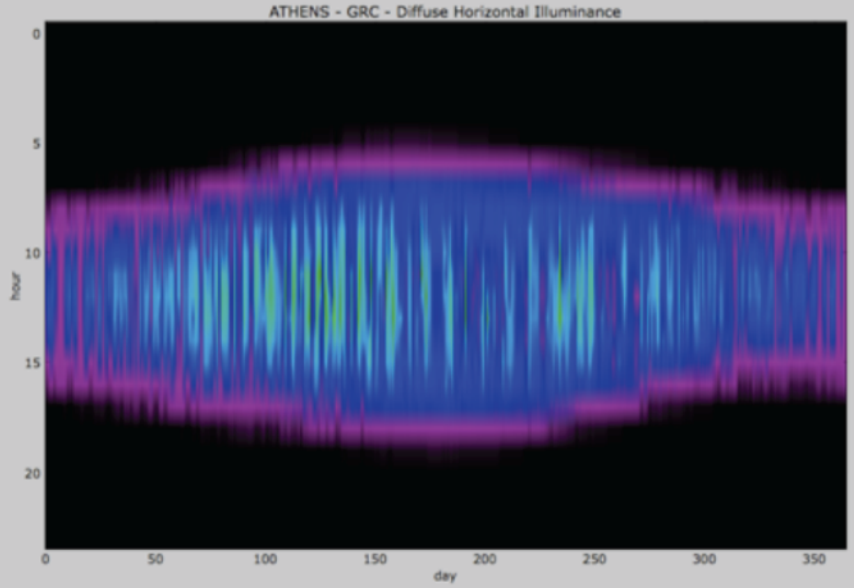
ARUP

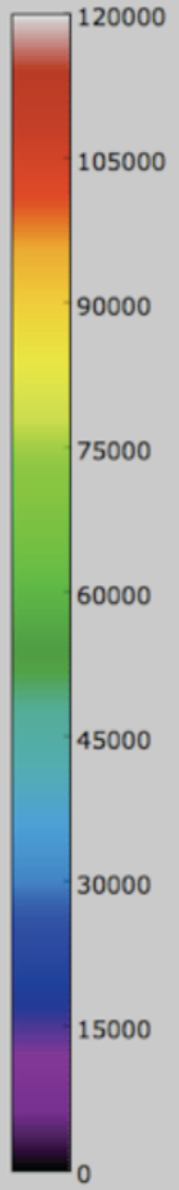


Blender/Radiance User Interface (blender/python) ARUP

Latitude: 37.90° North

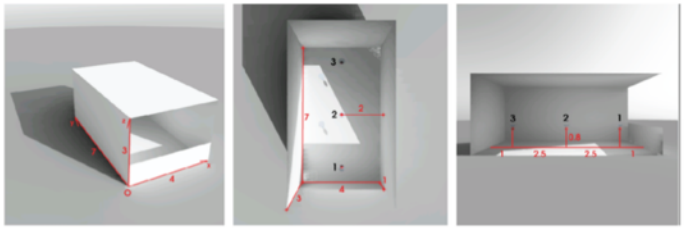


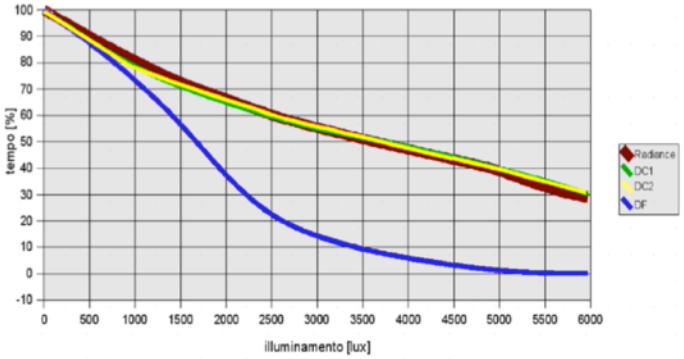


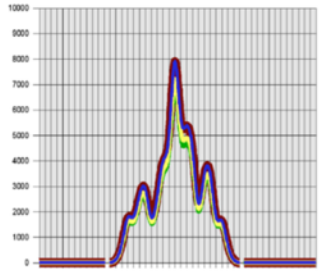


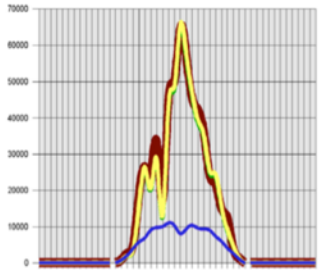
Weather Analysis and Visualisation Tools (python/scipy/matplotlib)

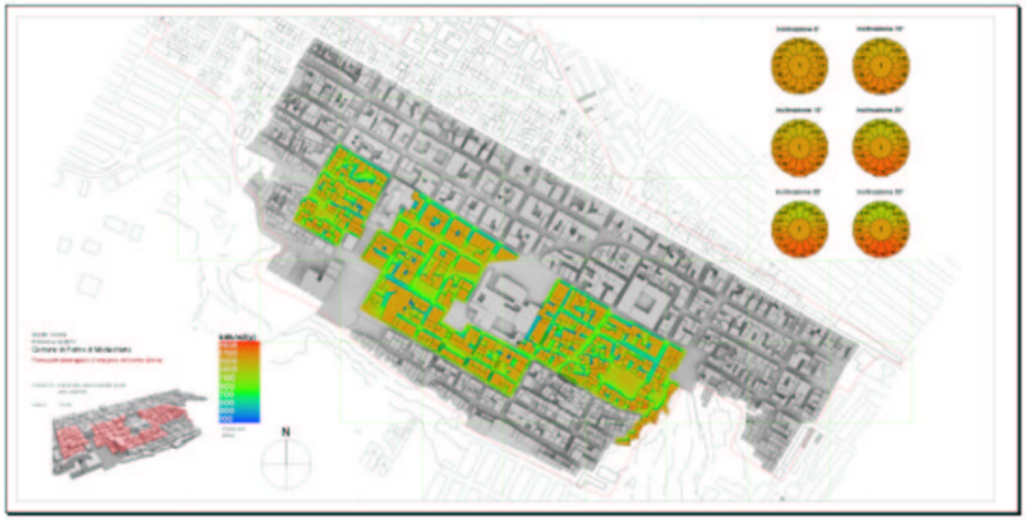
ARUP











[radmap] v. 0.4 / 2011-03-20

-h --help: get help information
-d --defaults: show default options
-v --version: show program version

-l --luxhours: calculate cumulative illuminance, not irradiation

--sunvangle [angle]: specify sun vertical resolution angle
--sunhangle [angle]: specify sun horizontal resolution angle
--skyvangle [angle]: specify sky vertical resolution angle
--skyhangle [angle]: specify sky horizontal resolution angle

-a, --latitude [n]: specify location latitude (it works only with EPW weather files)
-o, --longitude [n]: specify location longitude (it works only with EPW weather files)
-m, --meridian [n]: specify location meridian (it works only with EPW weather files)
-n, --hour-samples [n]: number of samples per hour

-w, --weather [file]: specify weather data file (can be .epw -EPW- or .tsv -SatelLight)
-s, --skip-lines [n]: skip n lines when reading the weather file
--no-albedo: no albedo component will be taken into account
--albedo [rfl]:set average ground reflectance
--no-sun: don't include sun descriptions (it works only with cumulative skies)
--genskyonly: generate only cumulative sky (it works only with cumulative skies)
--sun-efficacy [eff]: set sun efficacy
--sky-efficacy [eff]: set sky efficacy
--sky-resolution [res]: set temporary sky images resolution

--prefix [prefix]: prefix for output files
--radfile [file]: .rad file to be used
--viewfile [file]: view file to be used
--gridfile [file]: grid file to be used
--optionfile [file]: option file to be used
-x [res]: output image x resolution
-y [res]: output image y resolution

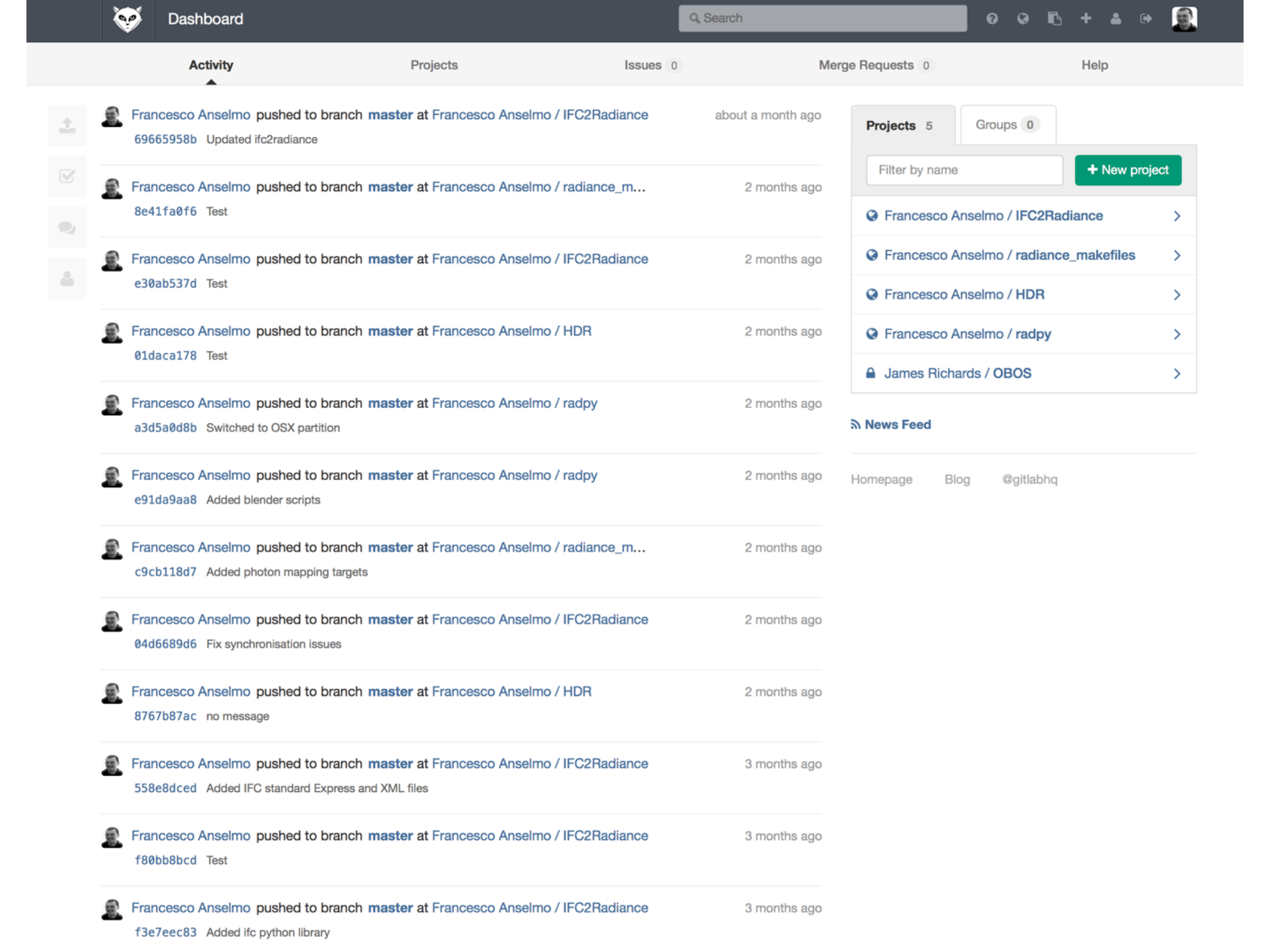
--keep-temporary-maps: don't erase temporary irradiation maps

--max-kWh [n]: max in kWh scale
--max-MJ [n]: max in MJ scale
--max-luxhours [n]: max in luxhours scale

--cumulative-sky: use the cumulative sky algorithm (default)
--reduced-cumulative-sky: use the reduced cumulative sky algorithm
--normalized-maps: use the normalized maps algorithm

radmap

ARUP


Dashboard
Search
Activity
Projects
Issues 0
Merge Requests 0
Help
Francesco Anselmo pushed to branch master at Francesco Anselmo / IFC2Radiance
about a month ago
69665958b Updated ifc2radiance
Francesco Anselmo pushed to branch master at Francesco Anselmo / radiance_m...
2 months ago
8e41fa0f6 Test
Francesco Anselmo pushed to branch master at Francesco Anselmo / IFC2Radiance
2 months ago
e30ab537d Test
Francesco Anselmo pushed to branch master at Francesco Anselmo / HDR
2 months ago
01daca178 Test
Francesco Anselmo pushed to branch master at Francesco Anselmo / radpy
2 months ago
a3d5a0d8b Switched to OSX partition
Francesco Anselmo pushed to branch master at Francesco Anselmo / radpy
2 months ago
e91da9aa8 Added blender scripts
Francesco Anselmo pushed to branch master at Francesco Anselmo / radiance_m...
2 months ago
c9cb118d7 Added photon mapping targets
Francesco Anselmo pushed to branch master at Francesco Anselmo / IFC2Radiance
2 months ago
04d6689d6 Fix synchronisation issues
Francesco Anselmo pushed to branch master at Francesco Anselmo / HDR
2 months ago
8767b87ac no message
Francesco Anselmo pushed to branch master at Francesco Anselmo / IFC2Radiance
3 months ago
558e8dced Added IFC standard Express and XML files
Francesco Anselmo pushed to branch master at Francesco Anselmo / IFC2Radiance
3 months ago
f80bb8bcd Test
Francesco Anselmo pushed to branch master at Francesco Anselmo / IFC2Radiance
3 months ago
f3e7eec83 Added ifc python library
Projects 5
Groups 0
Filter by name
+ New project
Francesco Anselmo / IFC2Radiance
Francesco Anselmo / radiance_makefiles
Francesco Anselmo / HDR
Francesco Anselmo / radpy
James Richards / OBOS
News Feed
Homepage
Blog
@gitlabhq

master | radiance_makefiles / + | Download zip

Name	Last Update	Last Commit > 8e41fa0f6aa – Test	history
Makefile	2 months ago	Francesco Anselmo Test	
README.md	2 months ago	Francesco Anselmo Test	
run_views_ab1.sh	2 months ago	Francesco Anselmo Test	

README.md

Radiance Makefile

The purpose of the Radiance Makefile project is to provide a simplified approach to managing Radiance simulations, with rpiece support and consistent directory and file naming.

Makefile use

The first thing to do is to download the Makefile and copy it into the working Radiance folder.

After that, you need to edit the file content so that the WORKPATH variable points to the Radiance folder.

Then, run the following command from the unix command line:

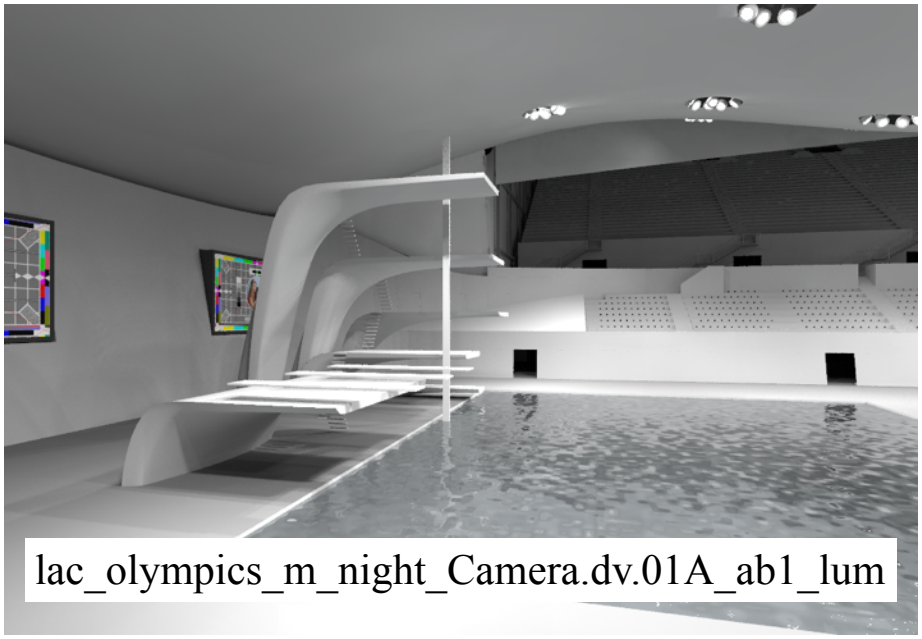
```
make dirs
```

Finally, the command to run a simulation is the following:

```
make RADNAME=name VIEWNAME=view SKYNAME=sky MATNAME=material rvu
```

The rvu target can be replaced by one of the following:

```
lumpic
illpic
lumrpiece
illrpiece
illgrid
dfgrid
```



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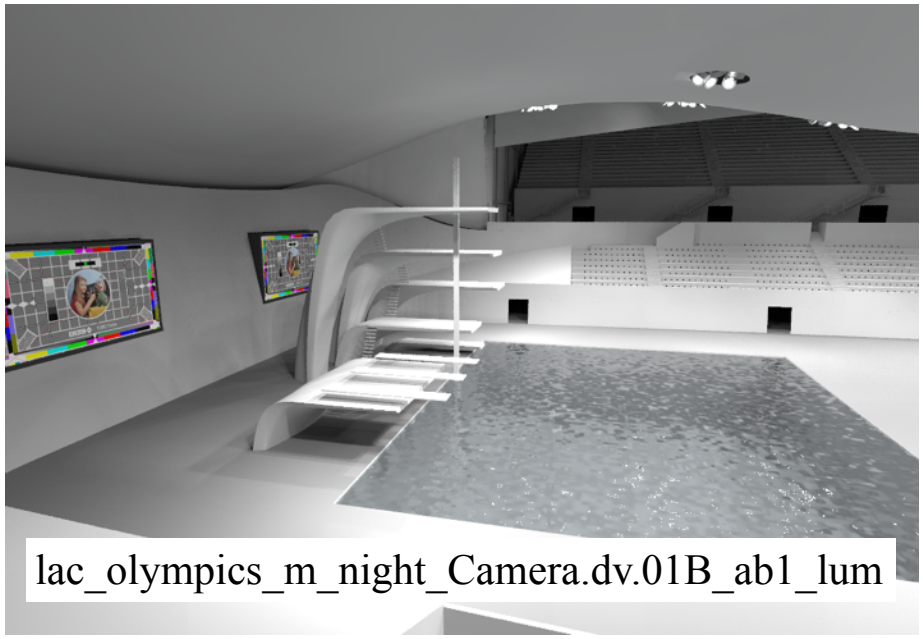

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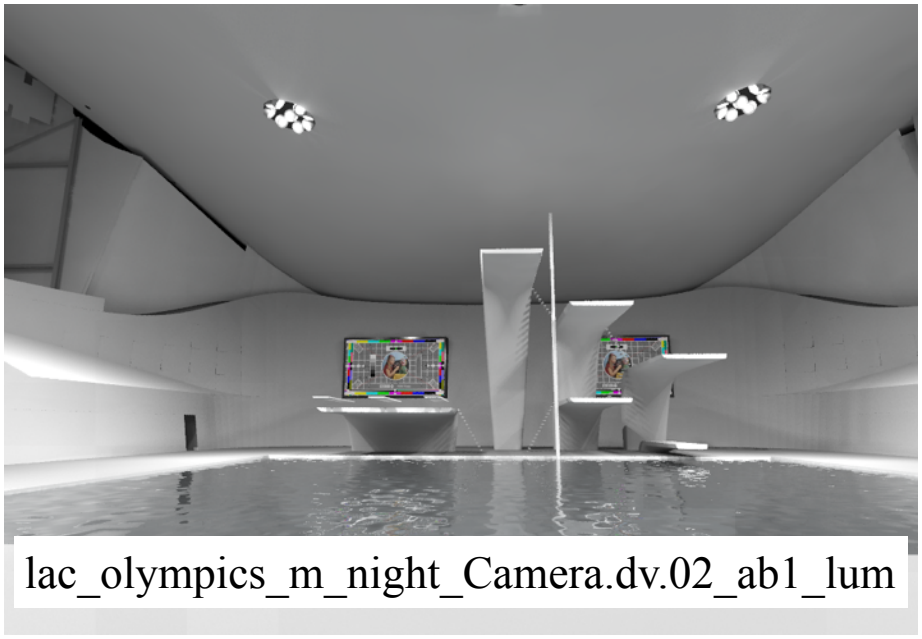

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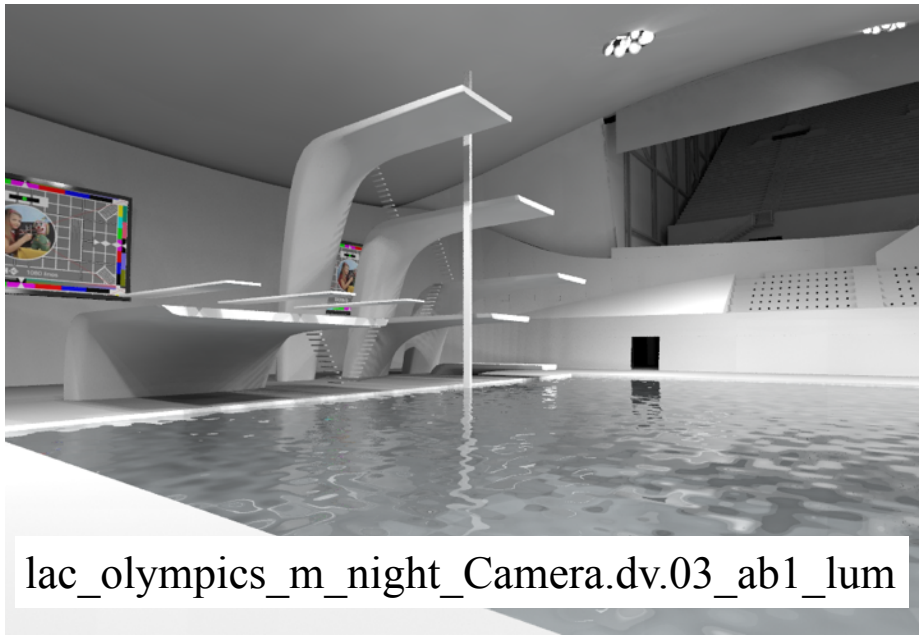

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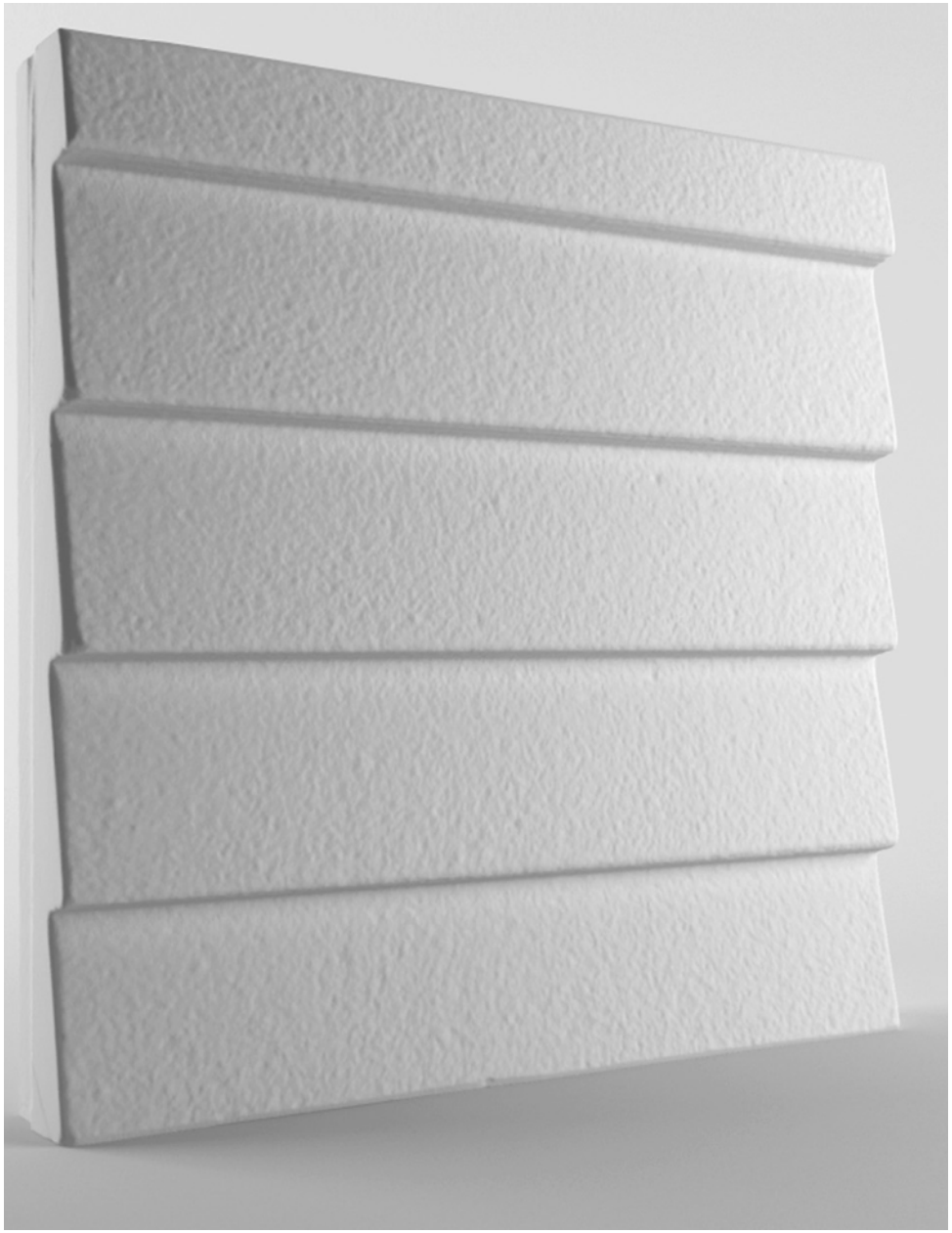

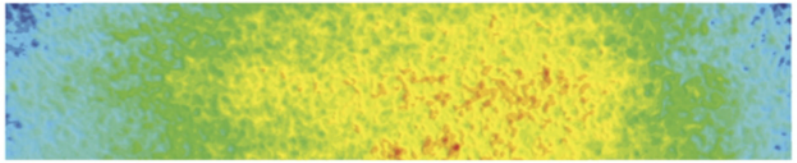

Figure 25. Height distribution of the cast glass surface

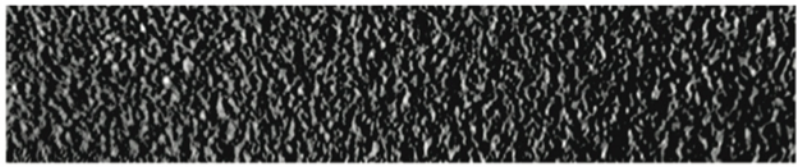

Figure 26. Gradient (slope) distribution of the cast glass surface

Materials

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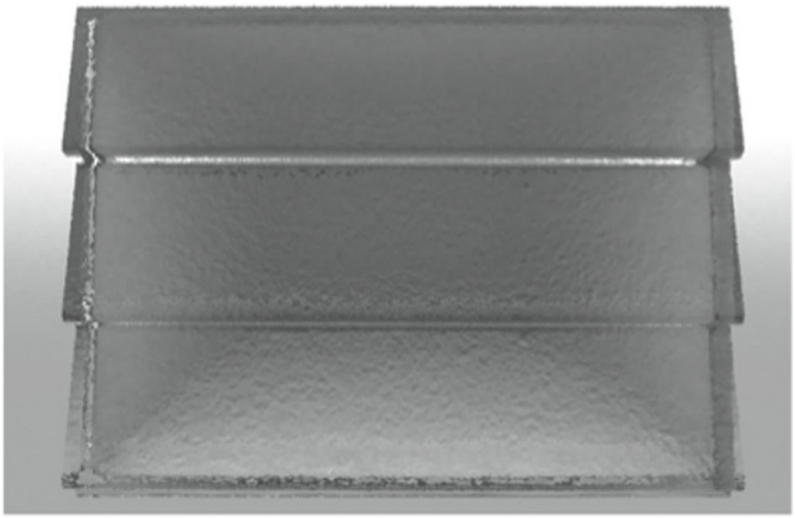
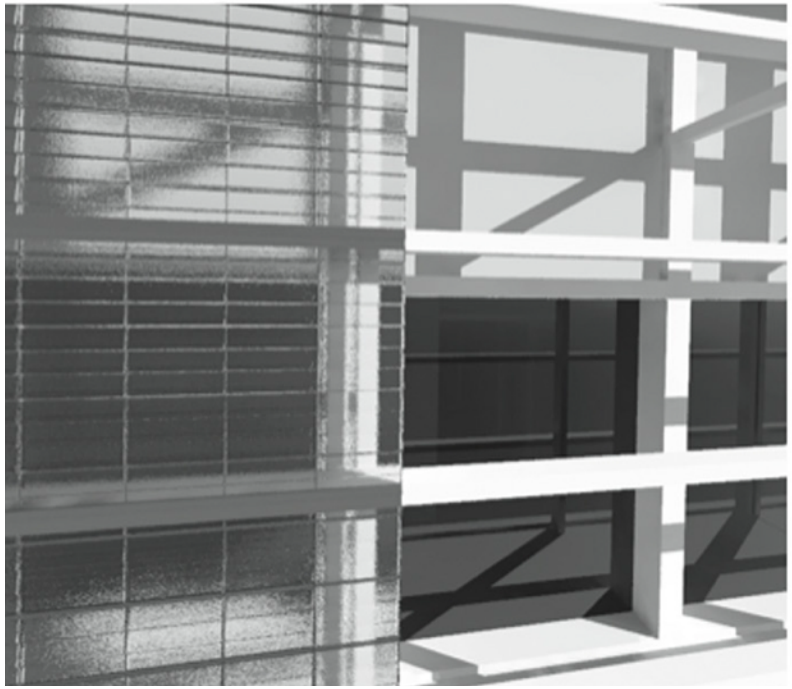
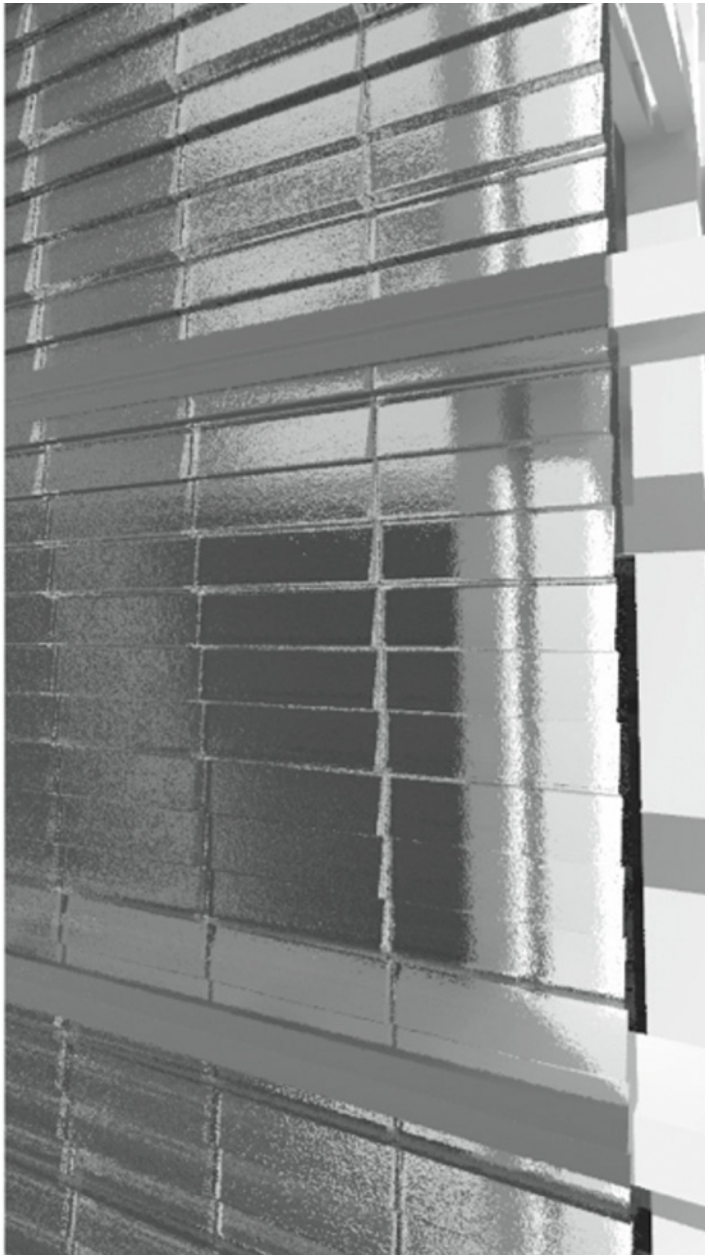
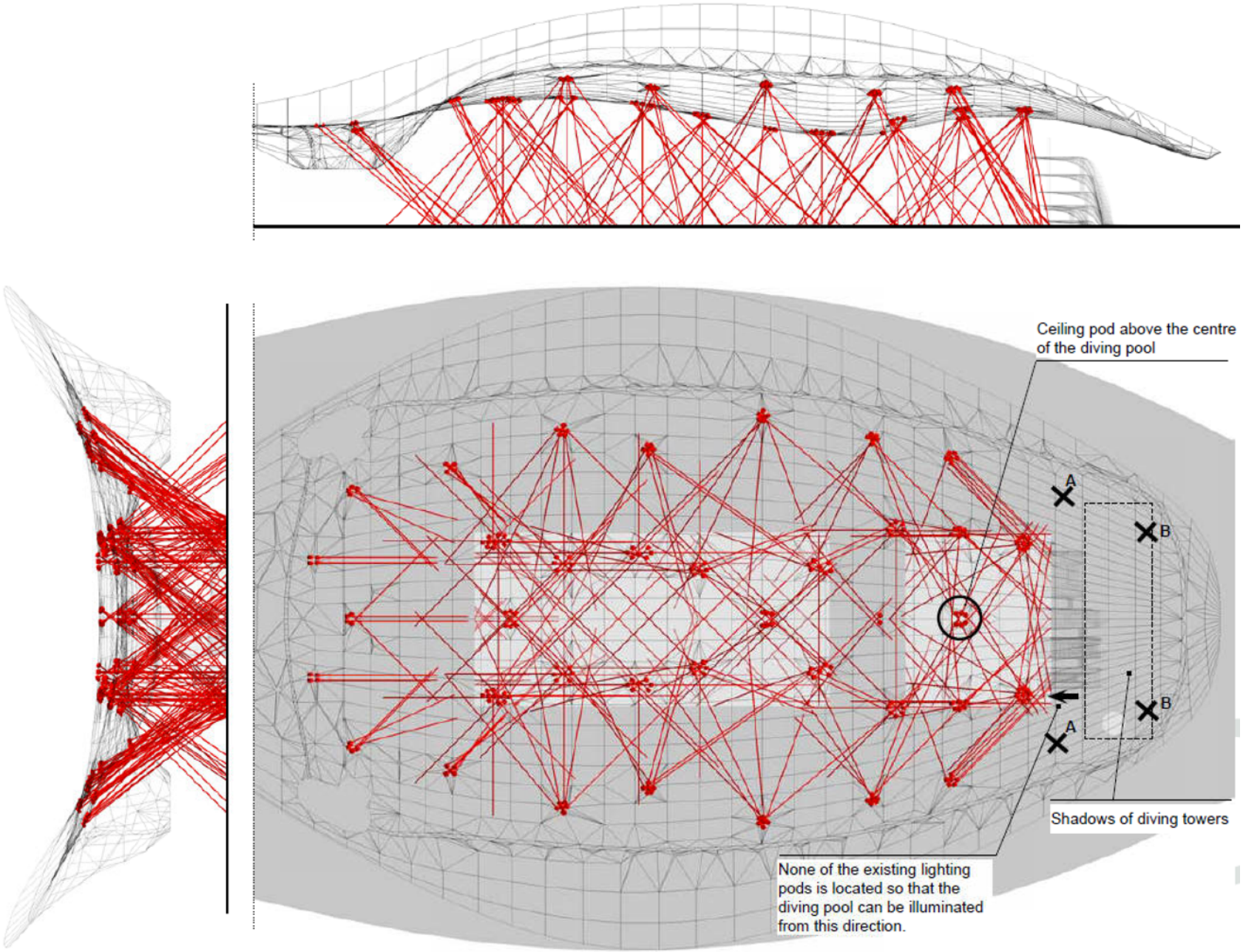






Materials

ARUP


Ceiling pod above the centre of the diving pool
A
B
B
A
Shadows of diving towers
None of the existing lighting pods is located so that the diving pool can be illuminated from this direction.

Aiming

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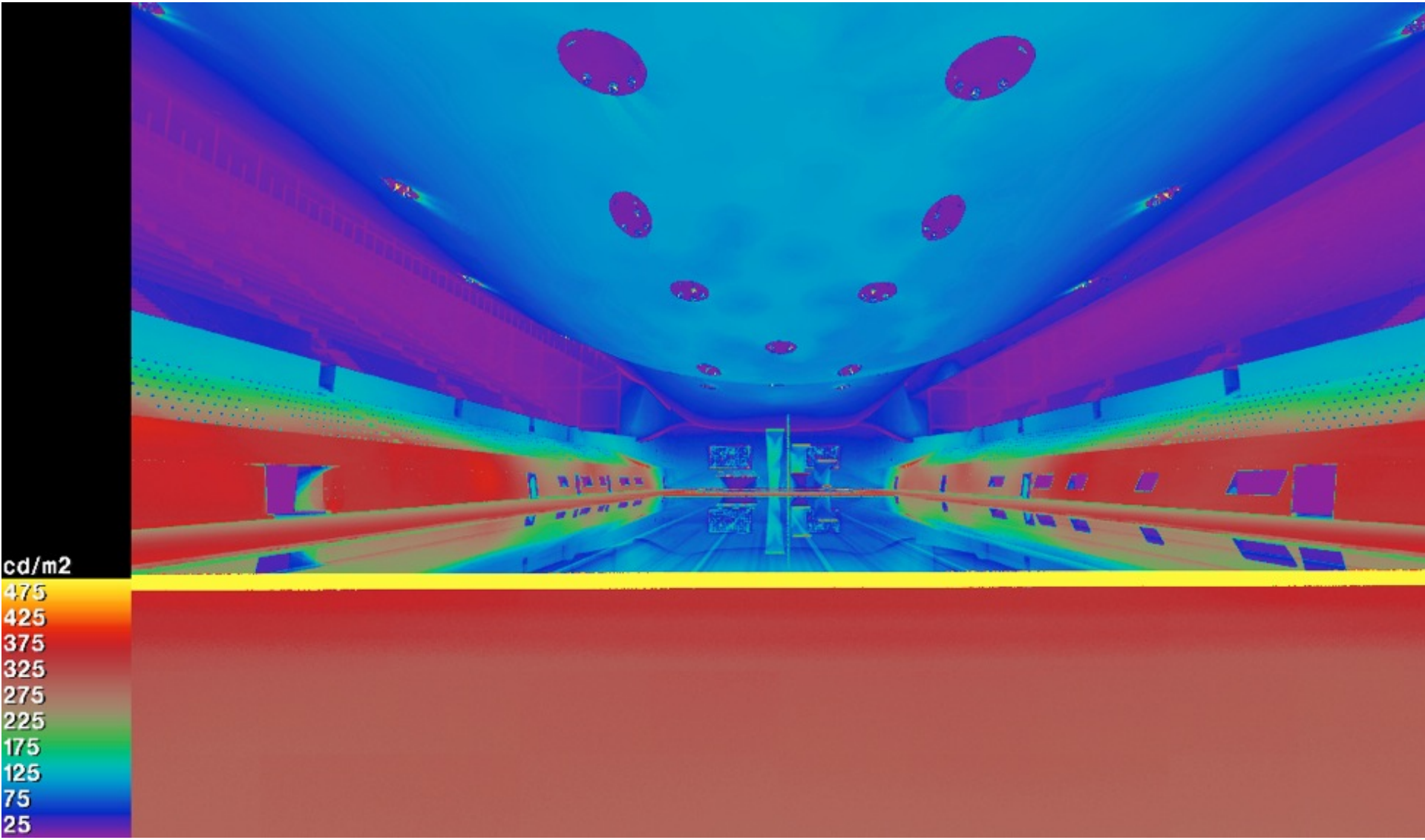
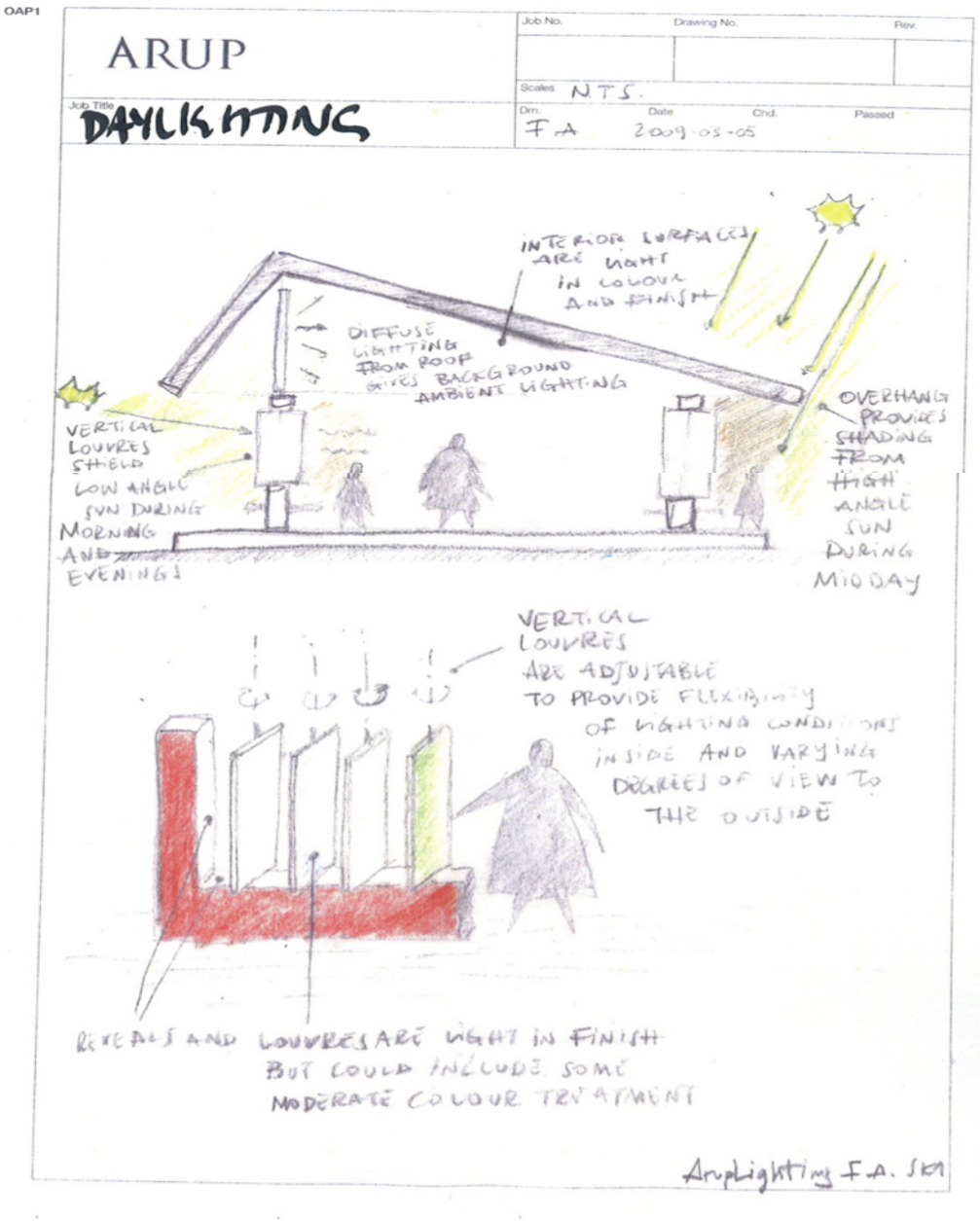
Visualisation

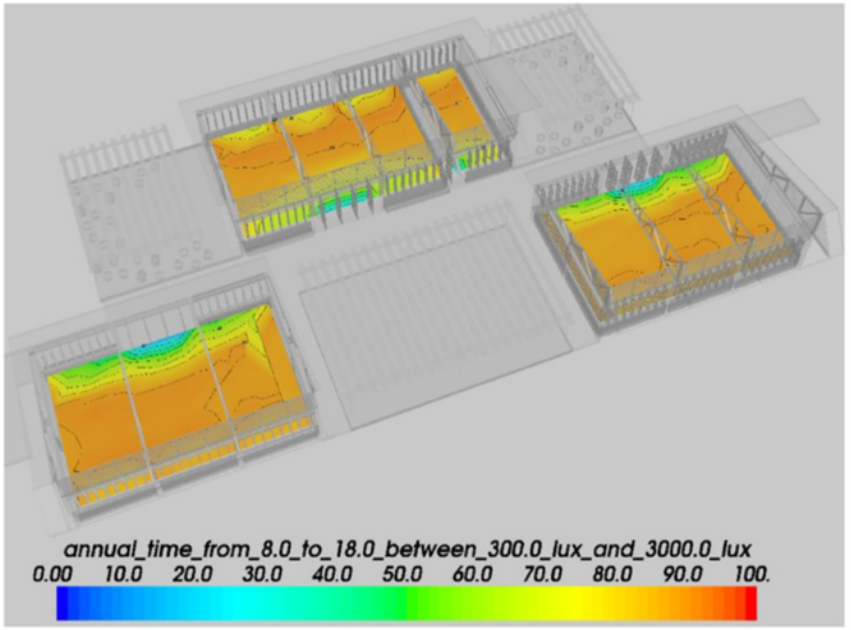
ARUP



Visualisation

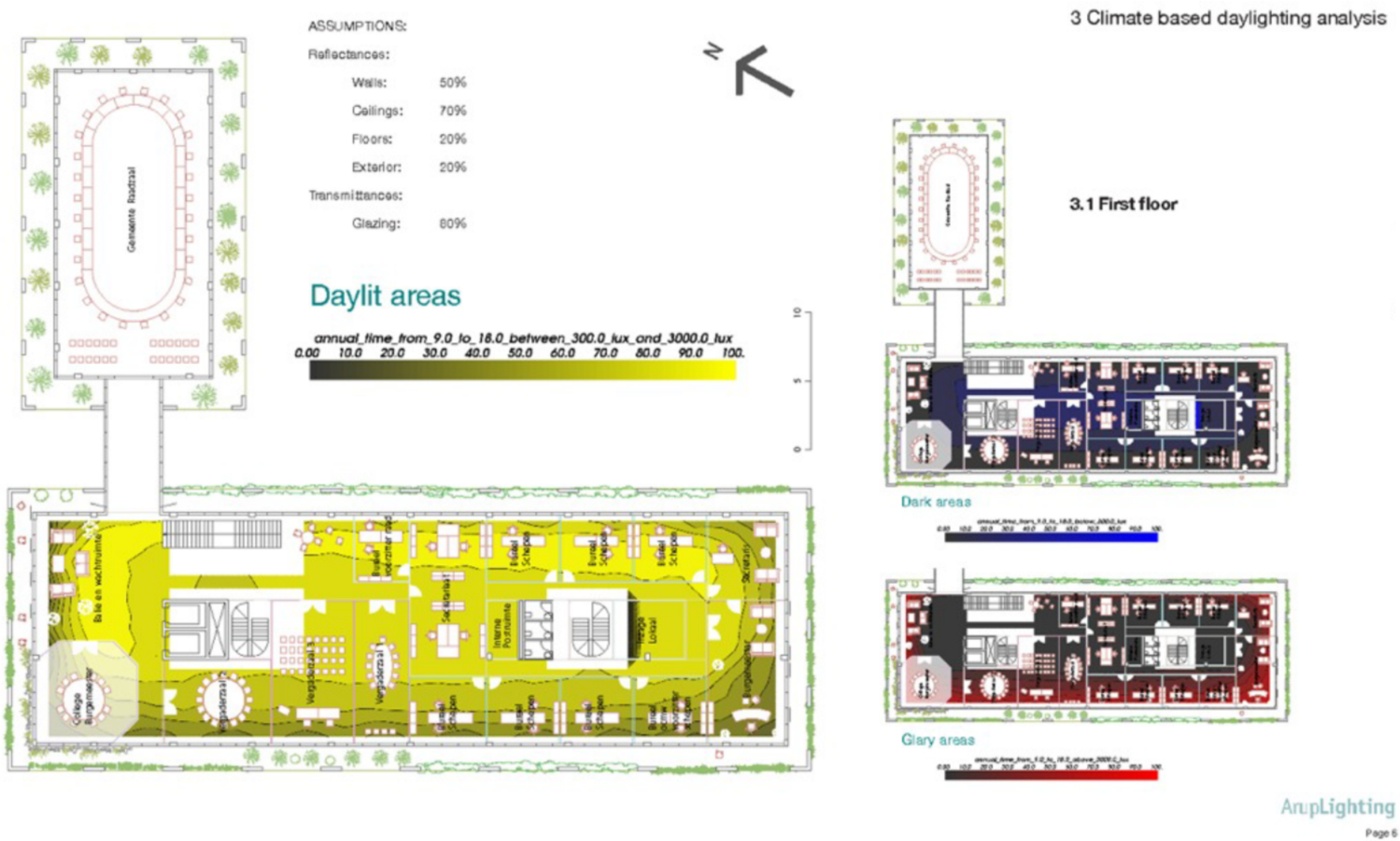
ARUP



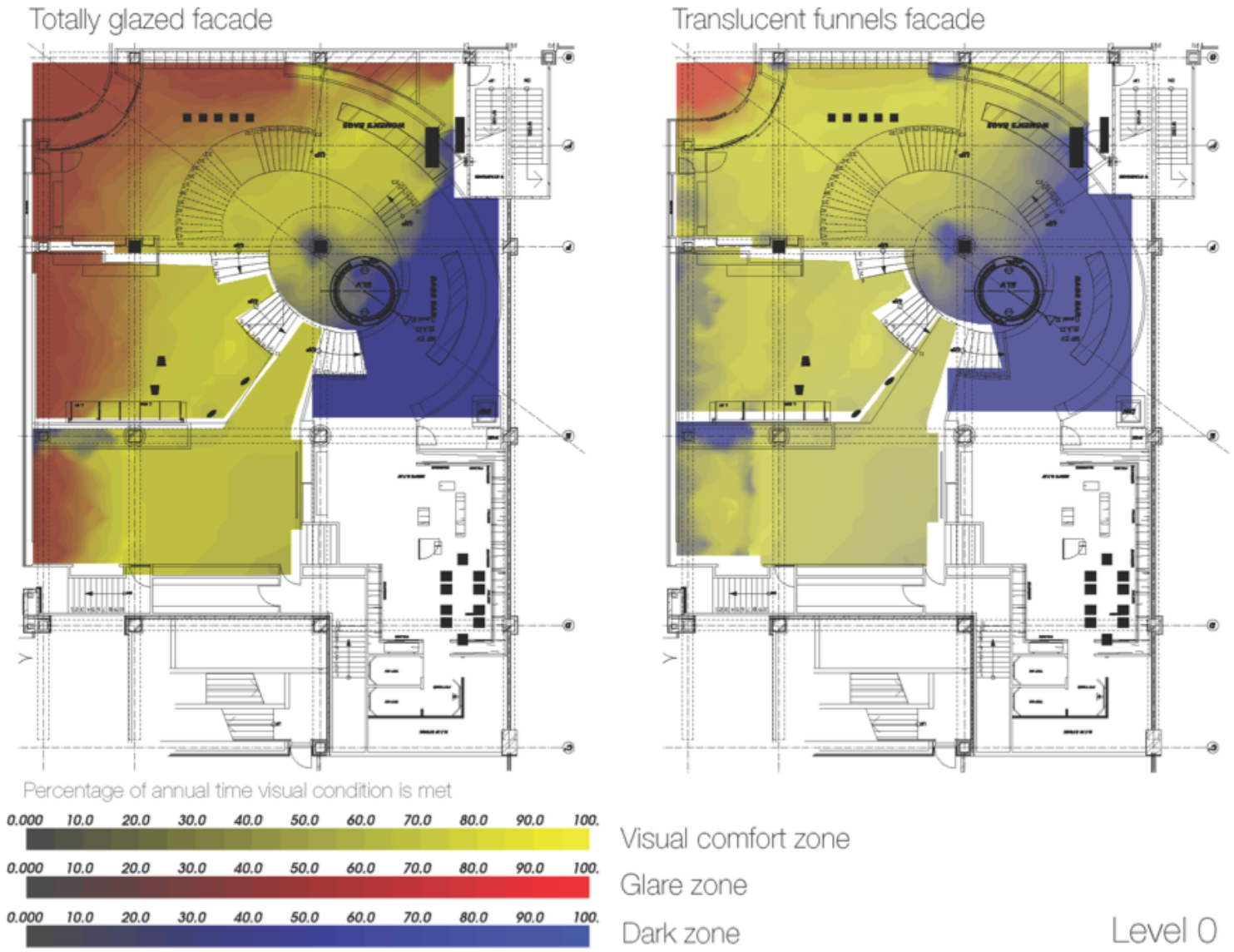


Daylight design and climate

ARUP

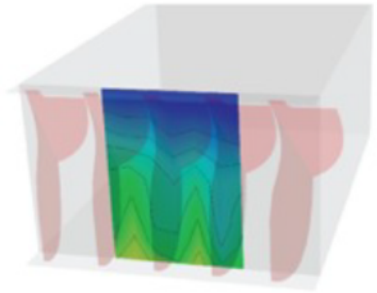


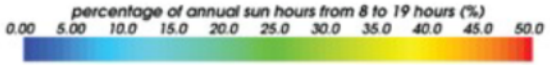
How to communicate climate based daylight design ARUP

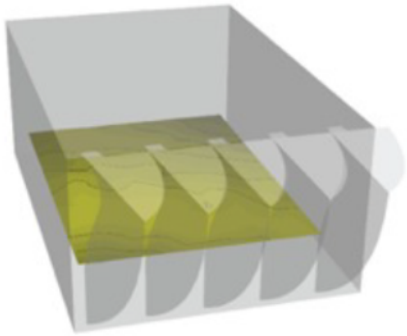


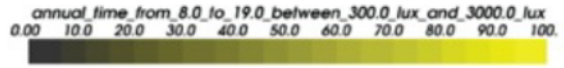
How to communicate climate based daylight design

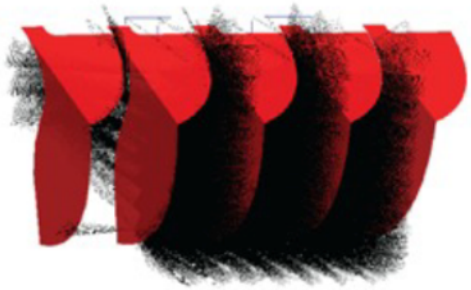
ARUP

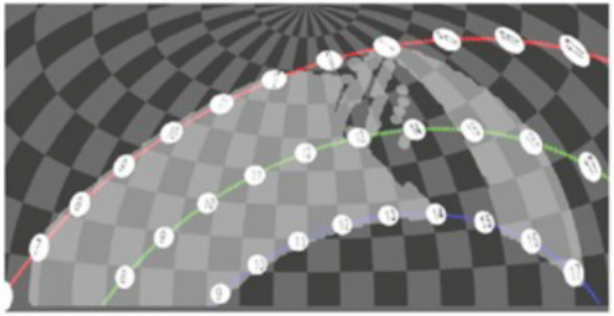


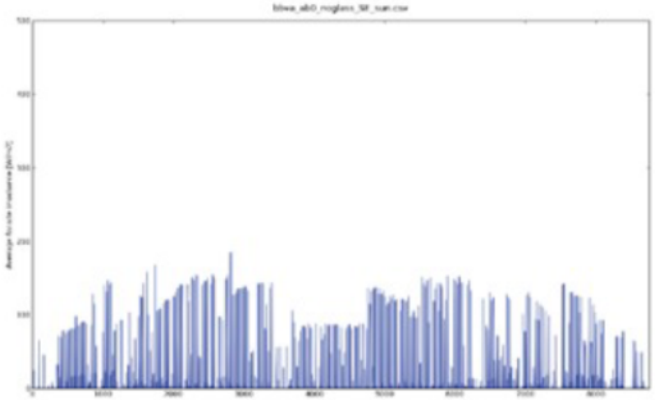




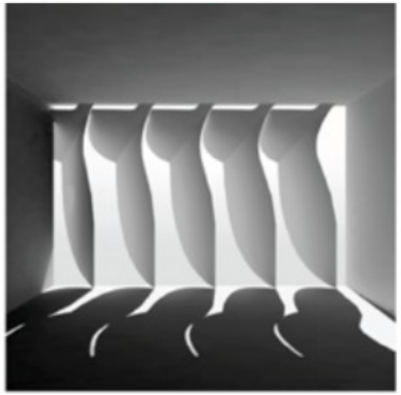


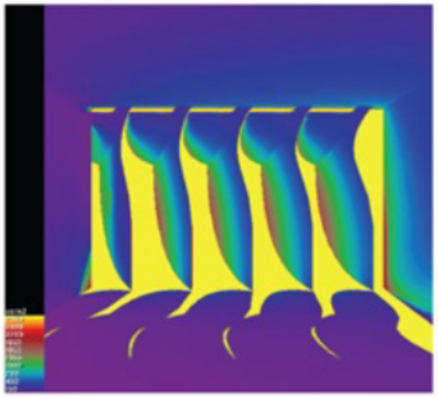






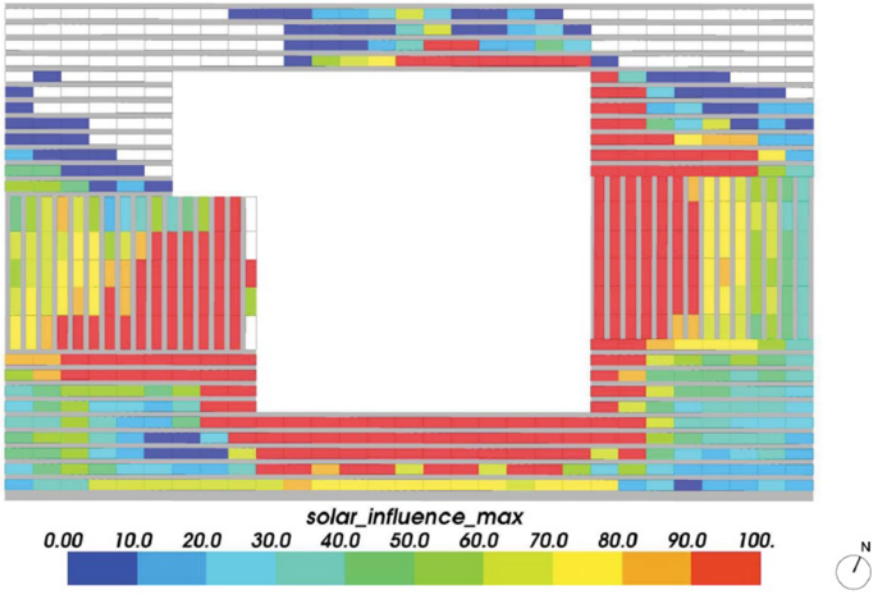
SE façade / Option 1

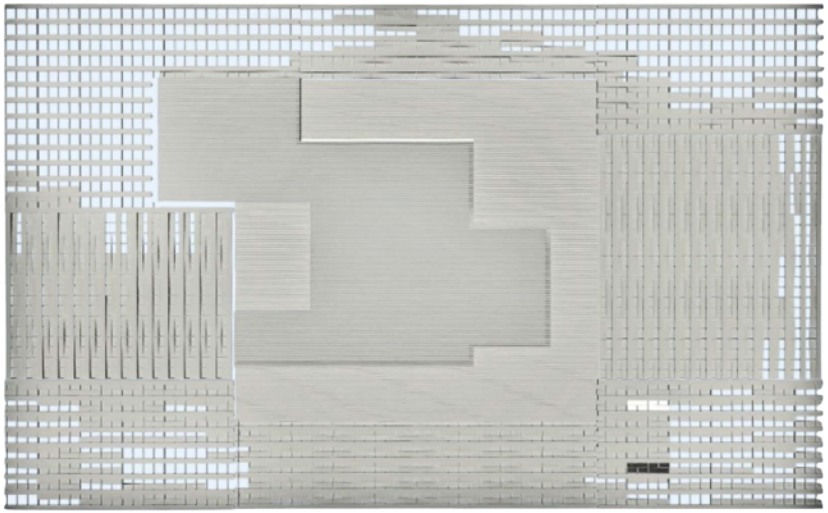




How to communicate climate based daylight design

ARUP





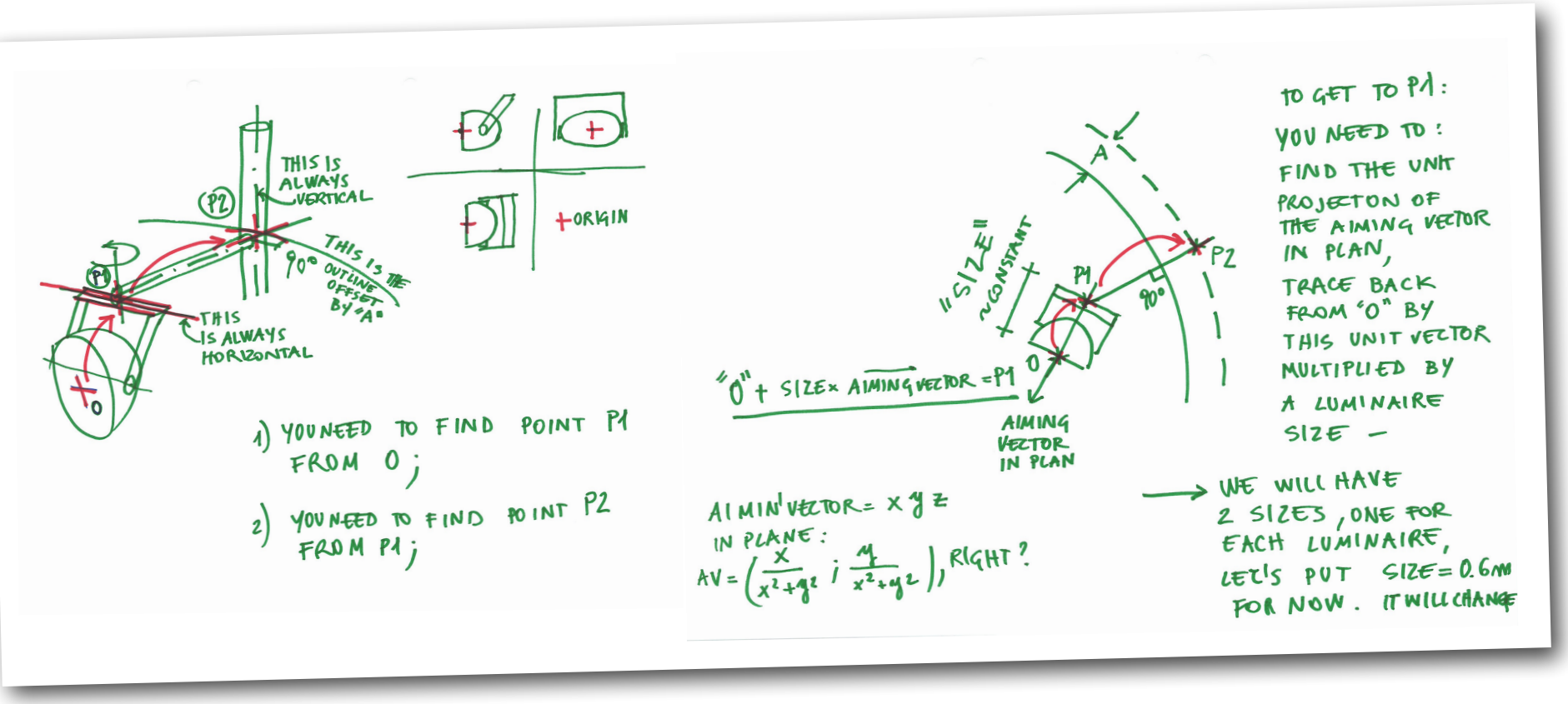
Daylight and architectural shape

ARUP

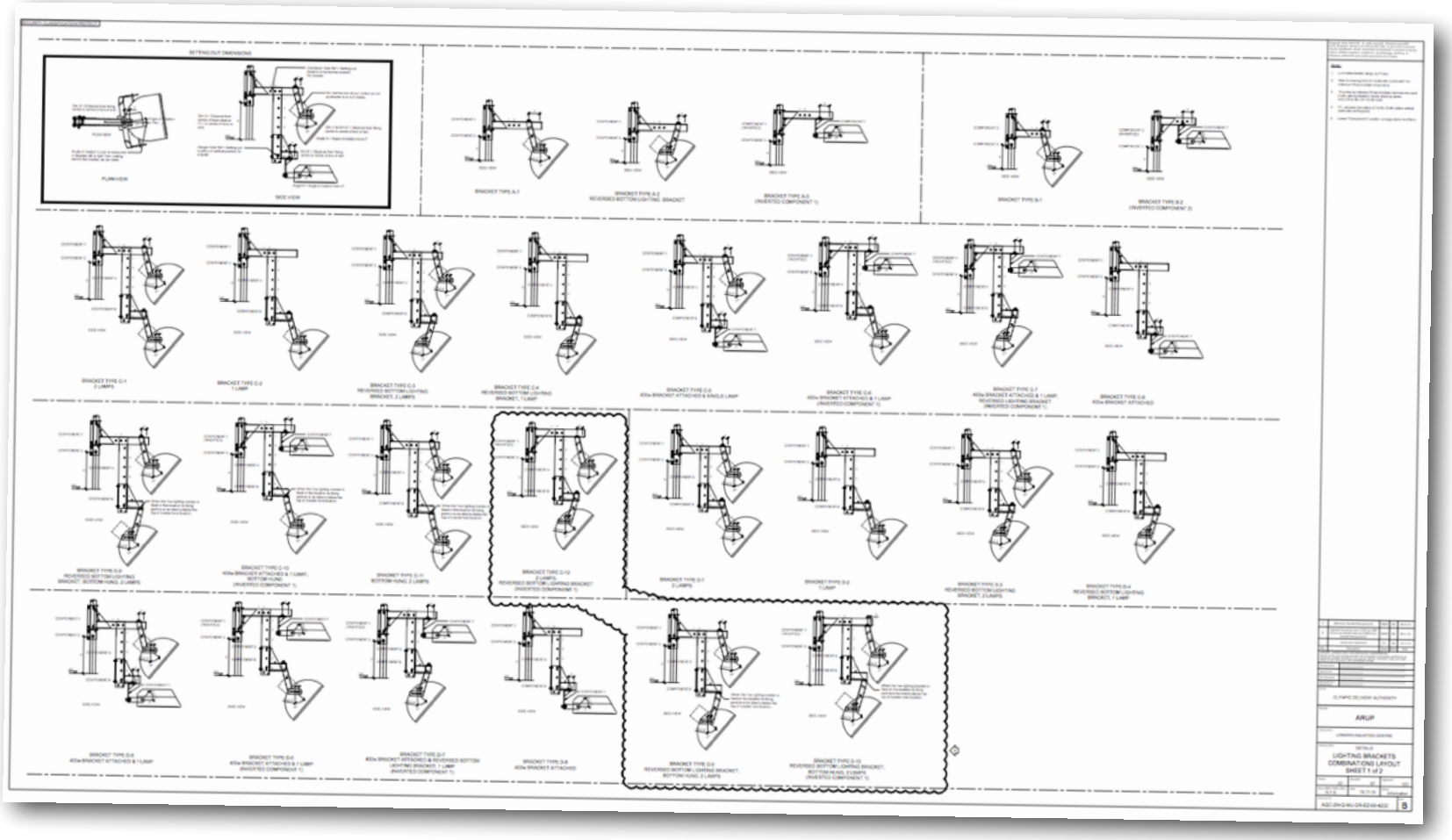
Santiago Torres

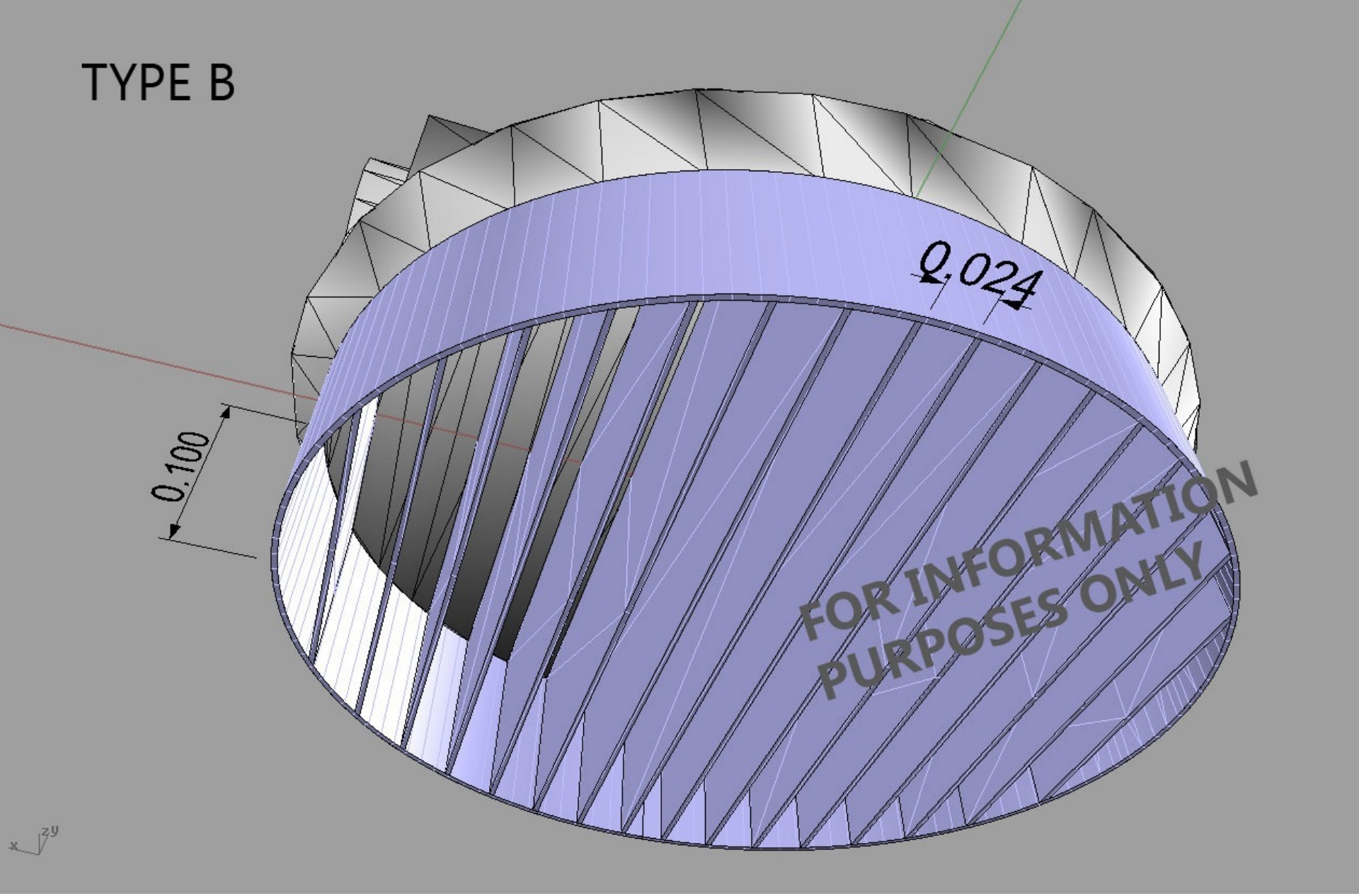
ARUP

BIM before it was called BIM…



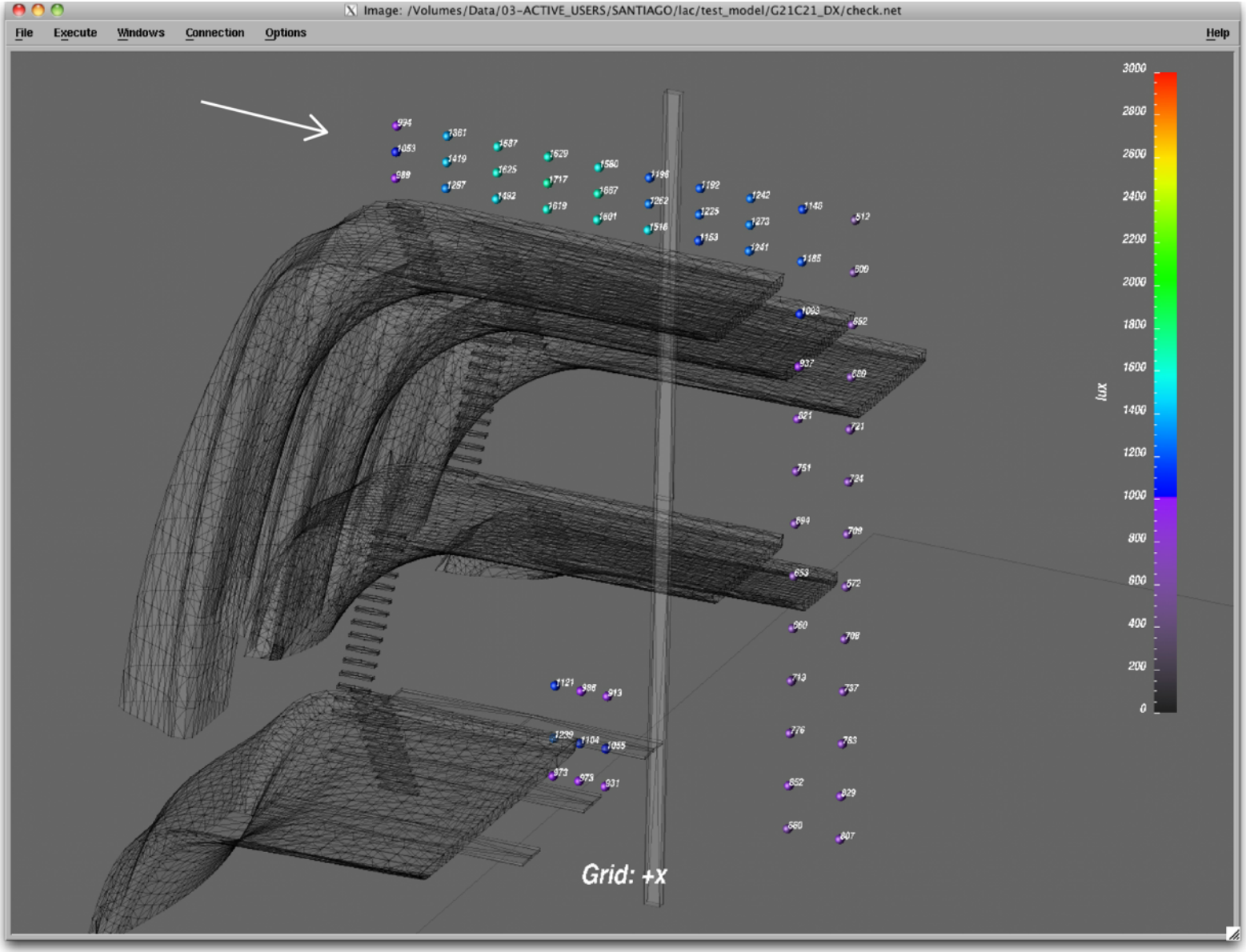
…that worked!





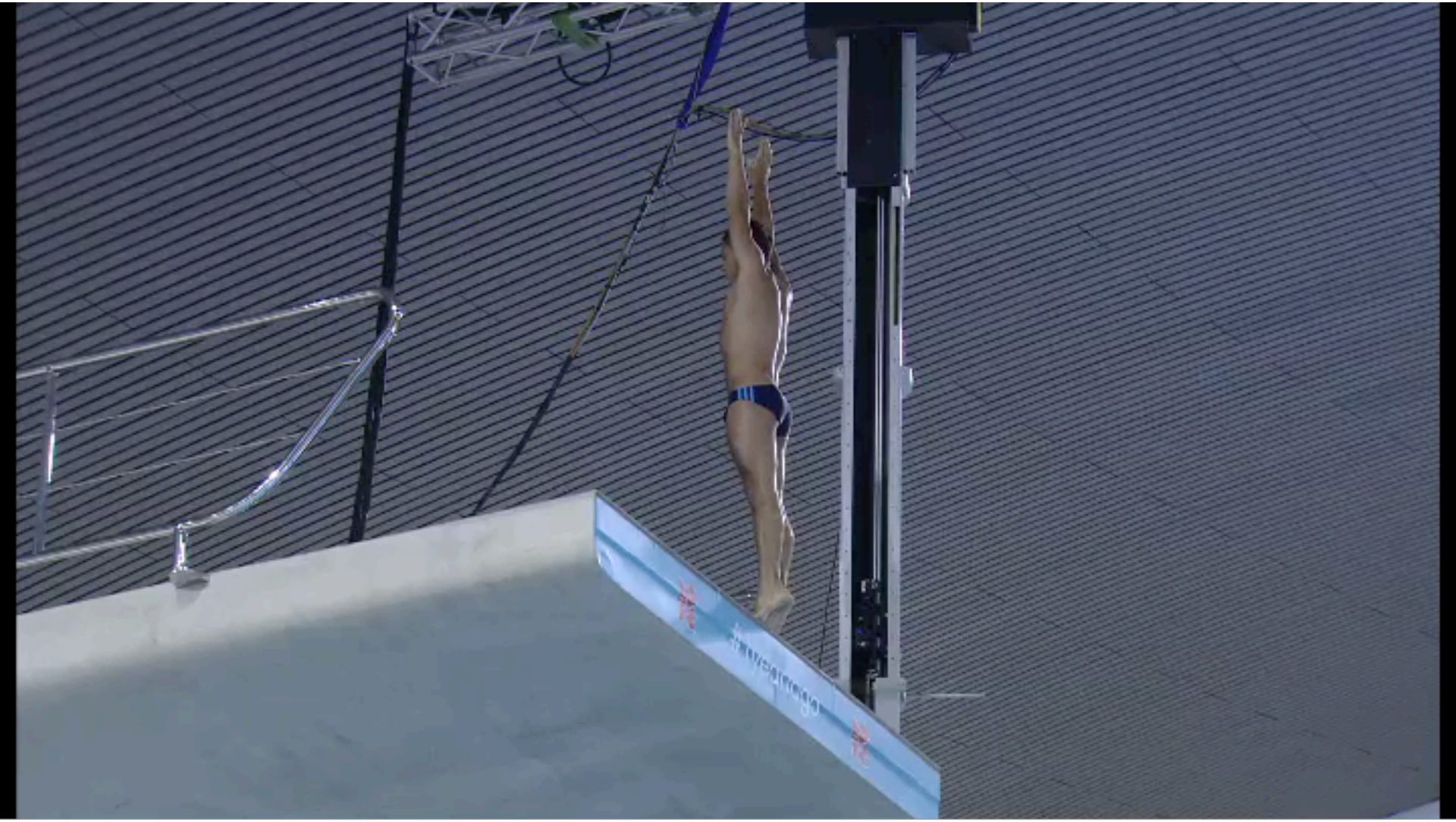
Improving designs / custom louver modelling

ARUP



Solving the broadcaster riddle

ARUP

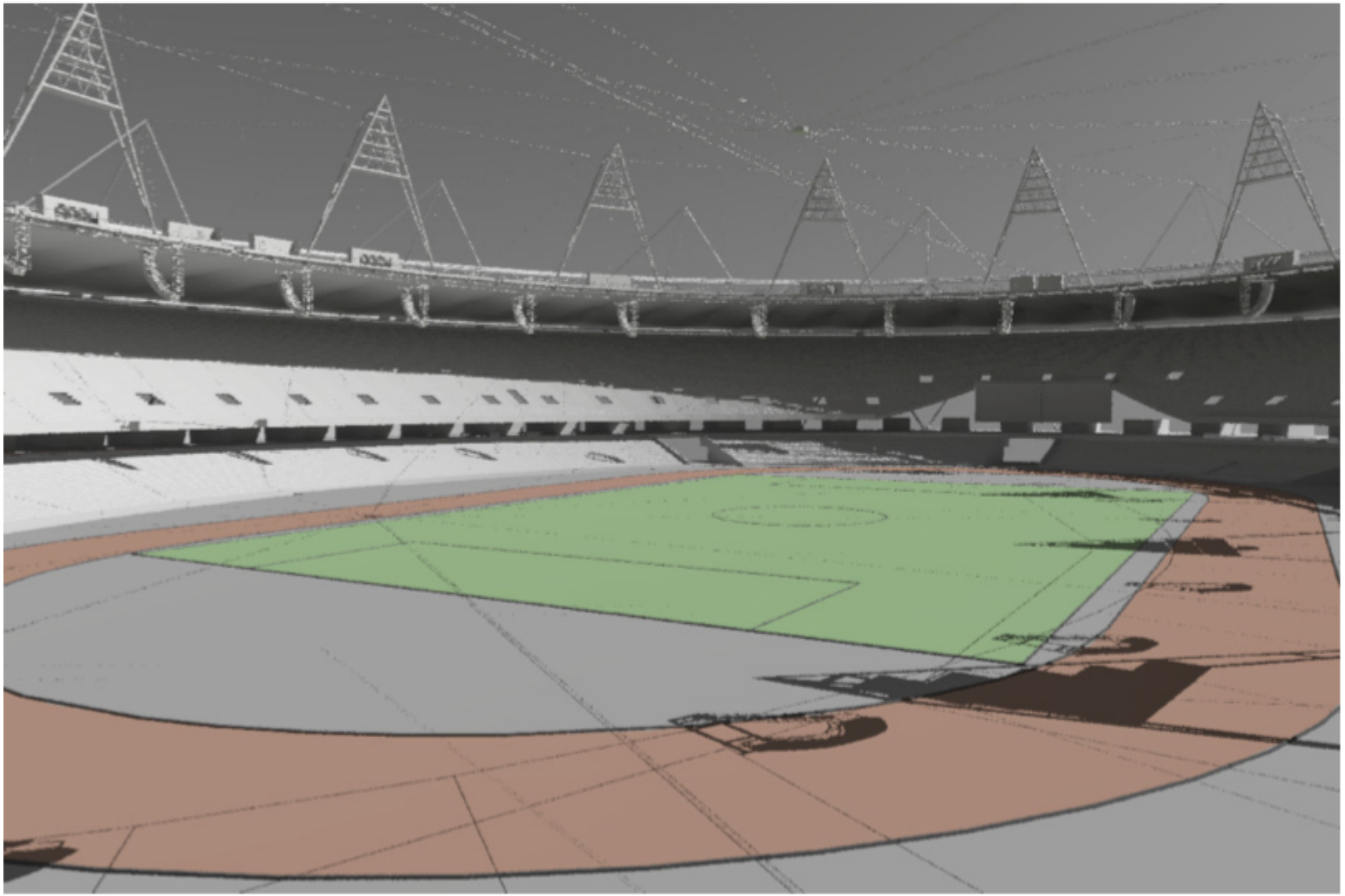


We were there!

ARUP

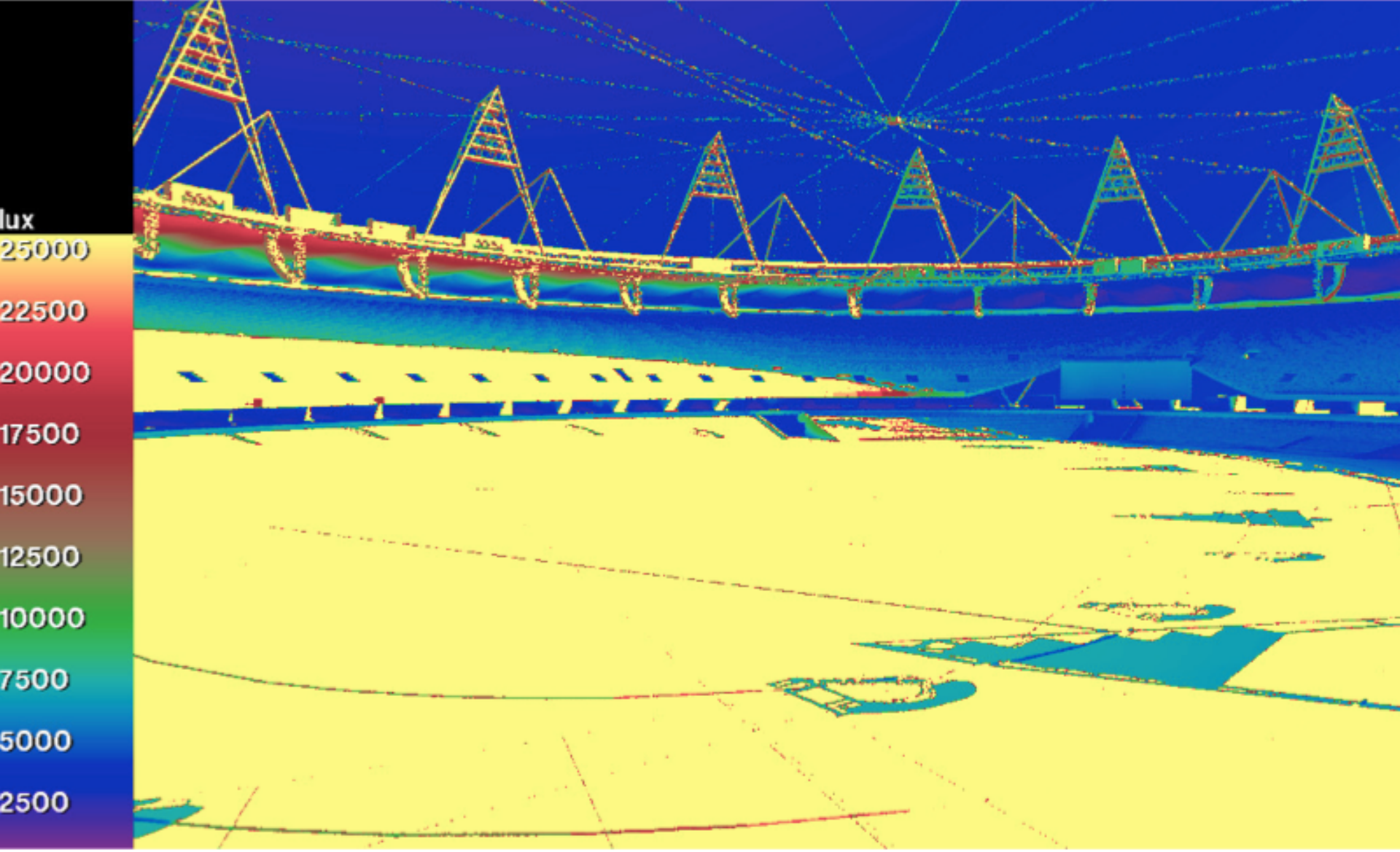
We were there!

ARUP



Correcting issues

ARUP



Correcting issues

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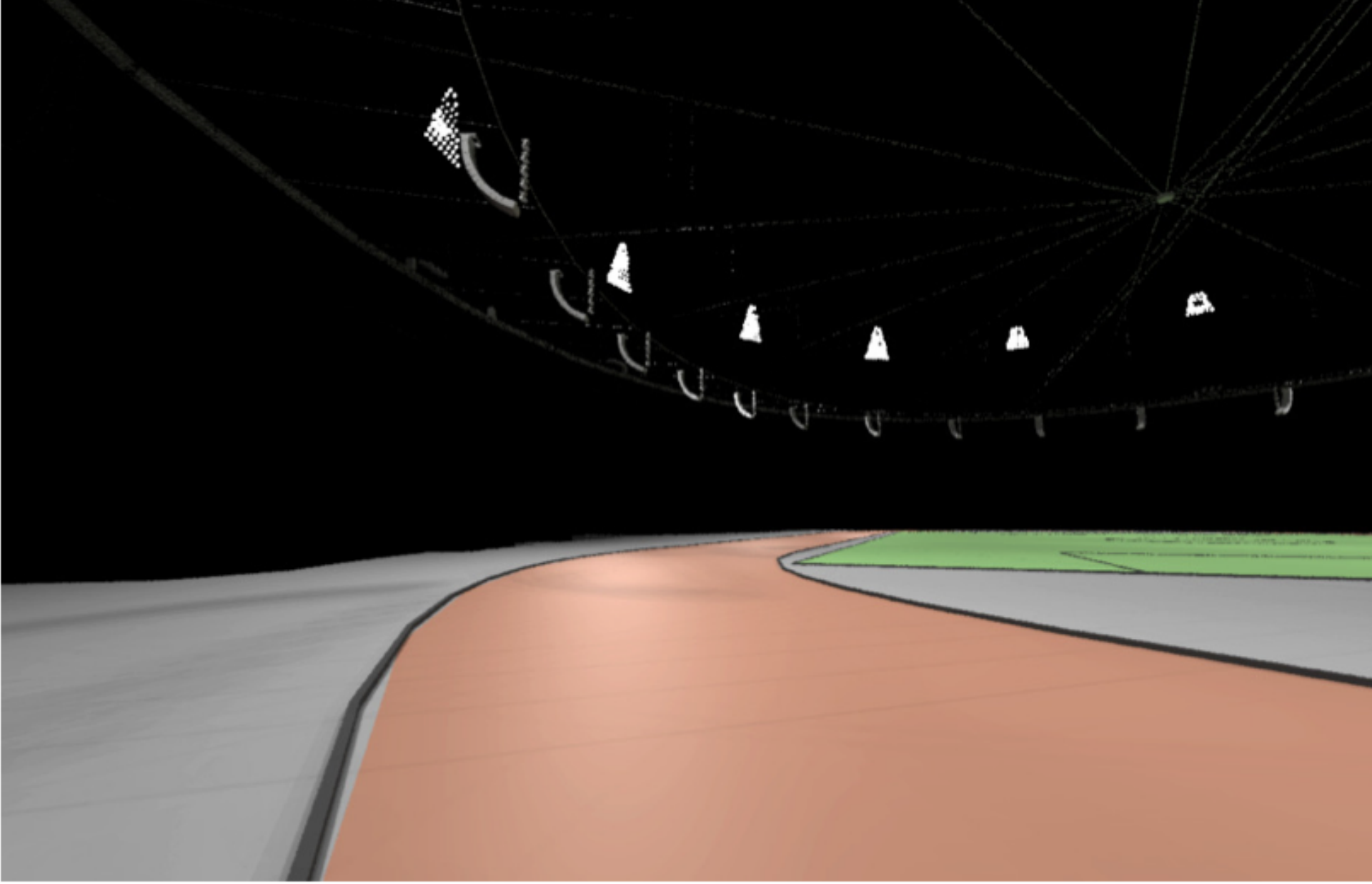
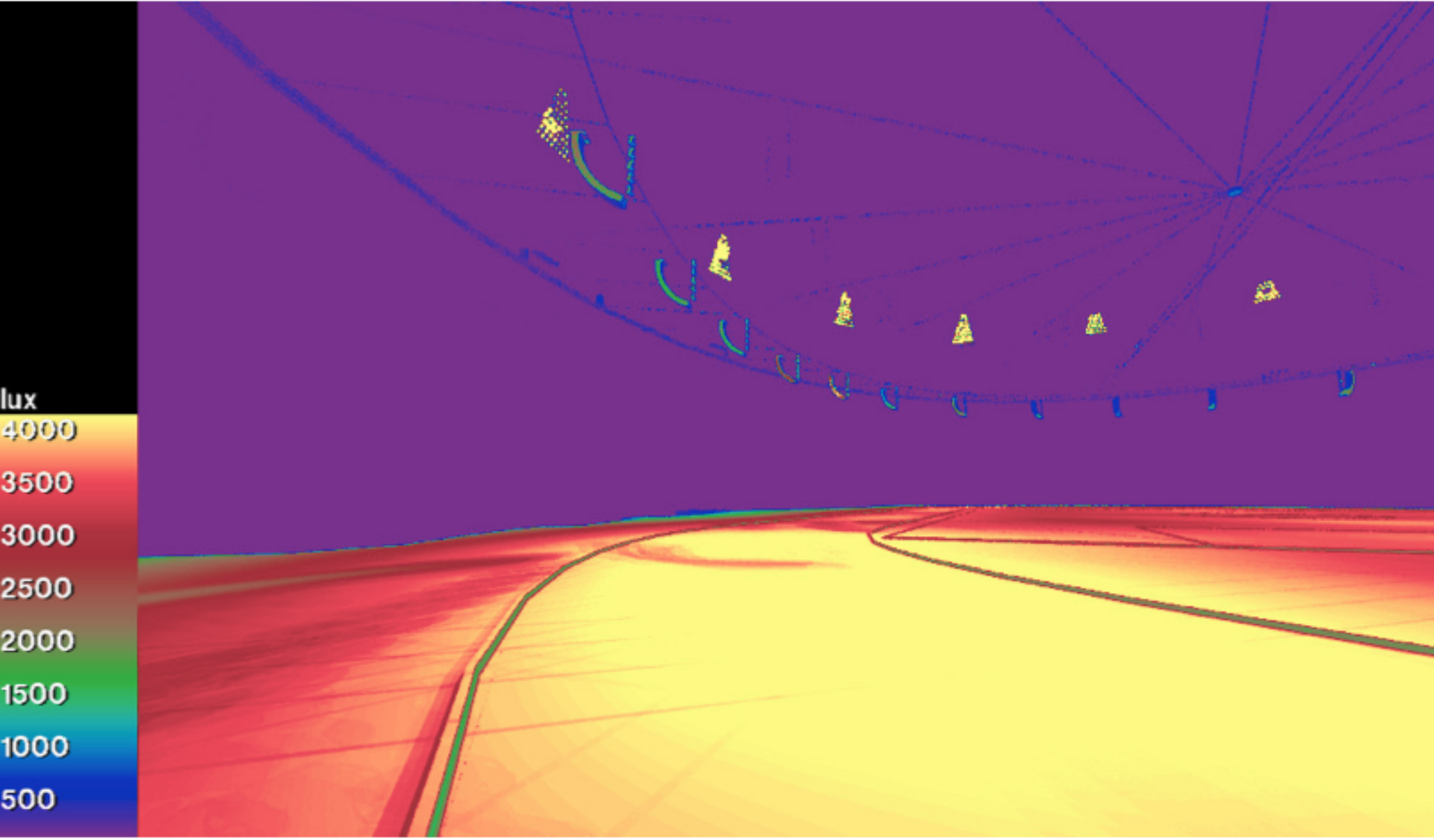


Correcting issues

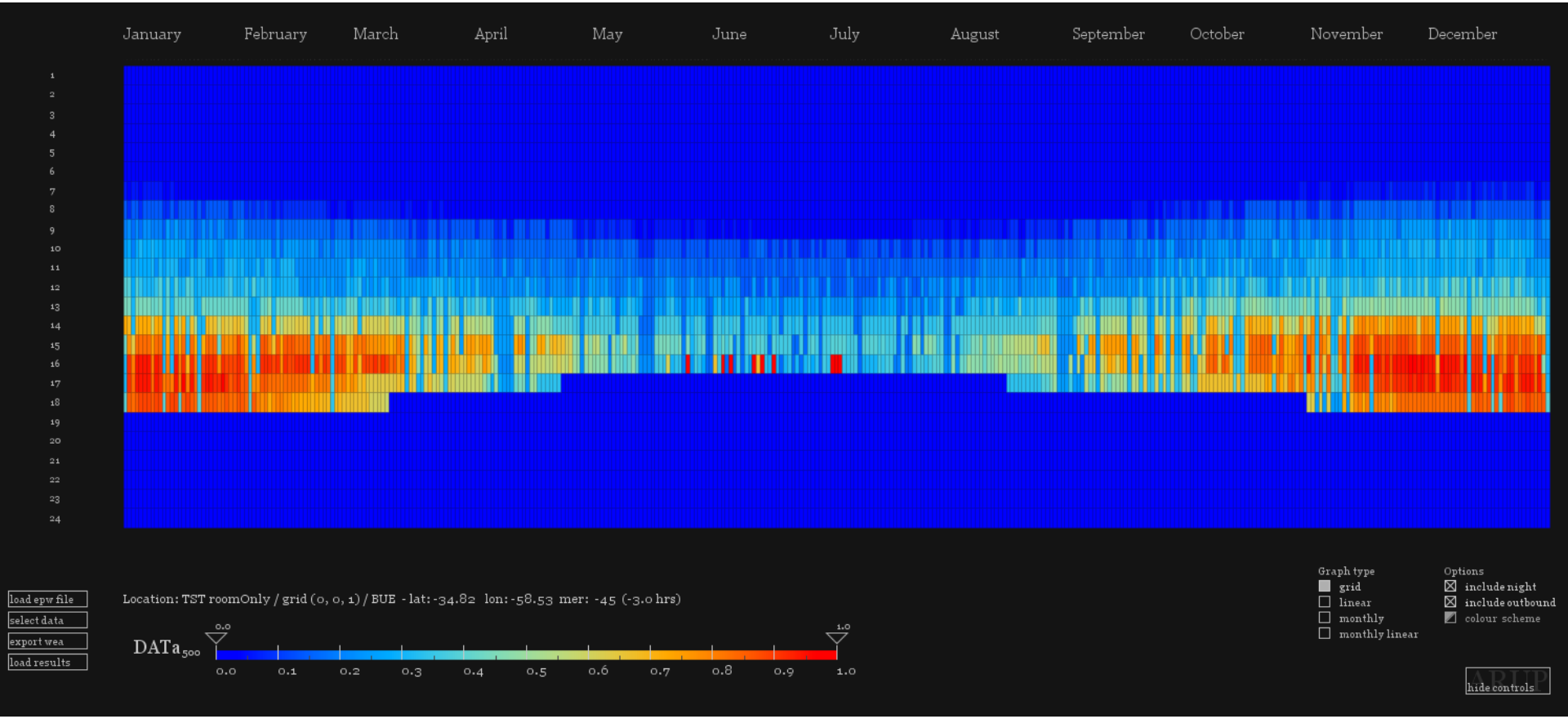
ARUP



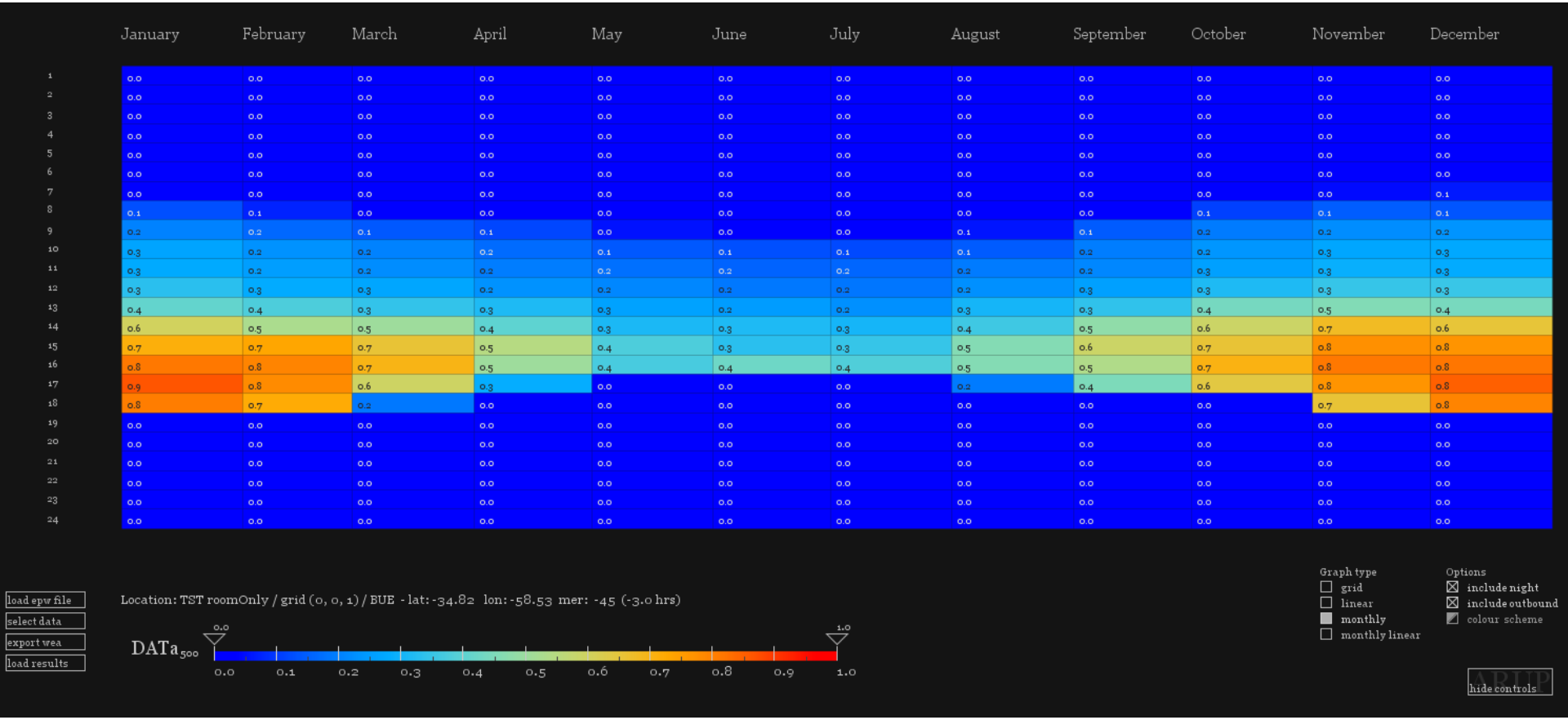
Correcting issues

ARUP

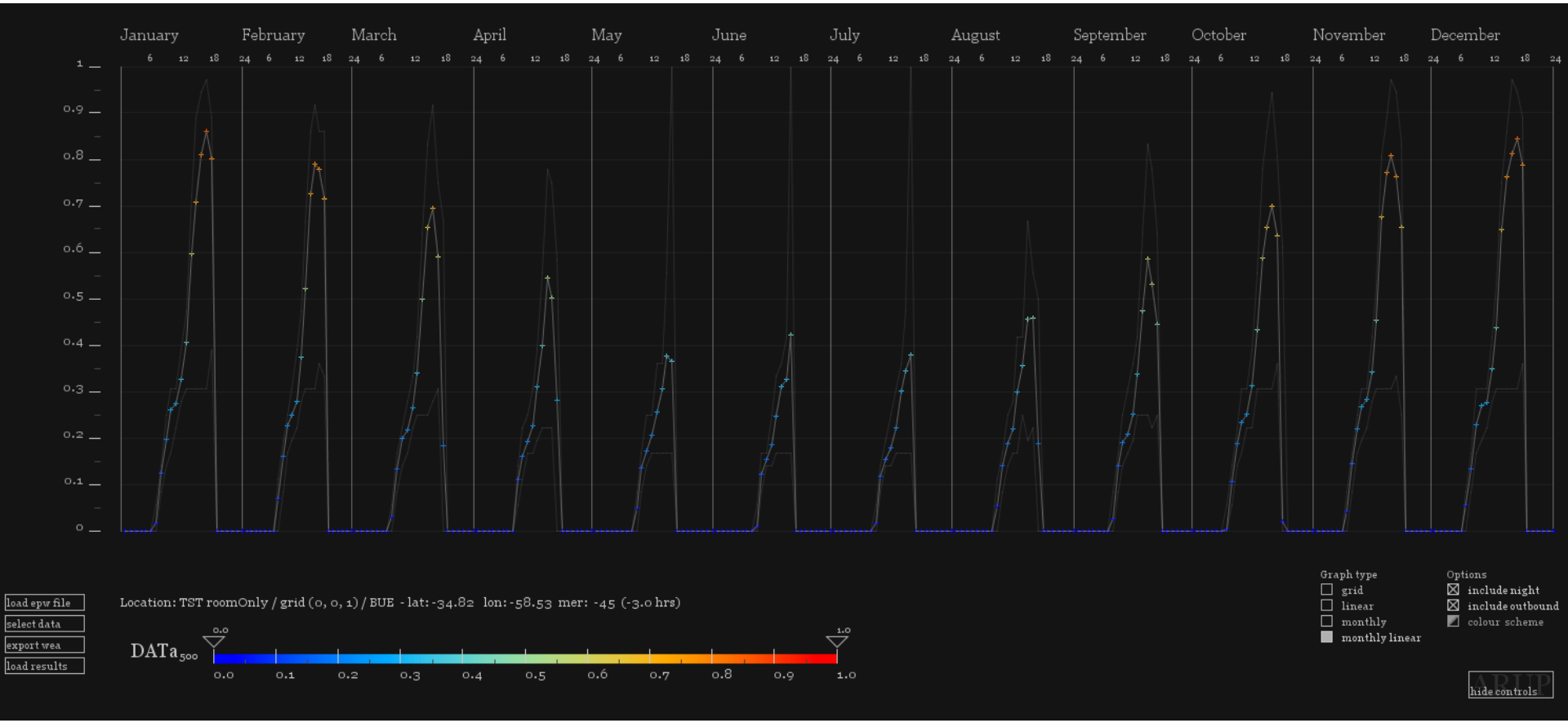
Open tools for weather data analysis



Open tools for weather data analysis



Open tools for weather data analysis



Pavlina Akritas

ARUP

3d models, 100 - 200 MB

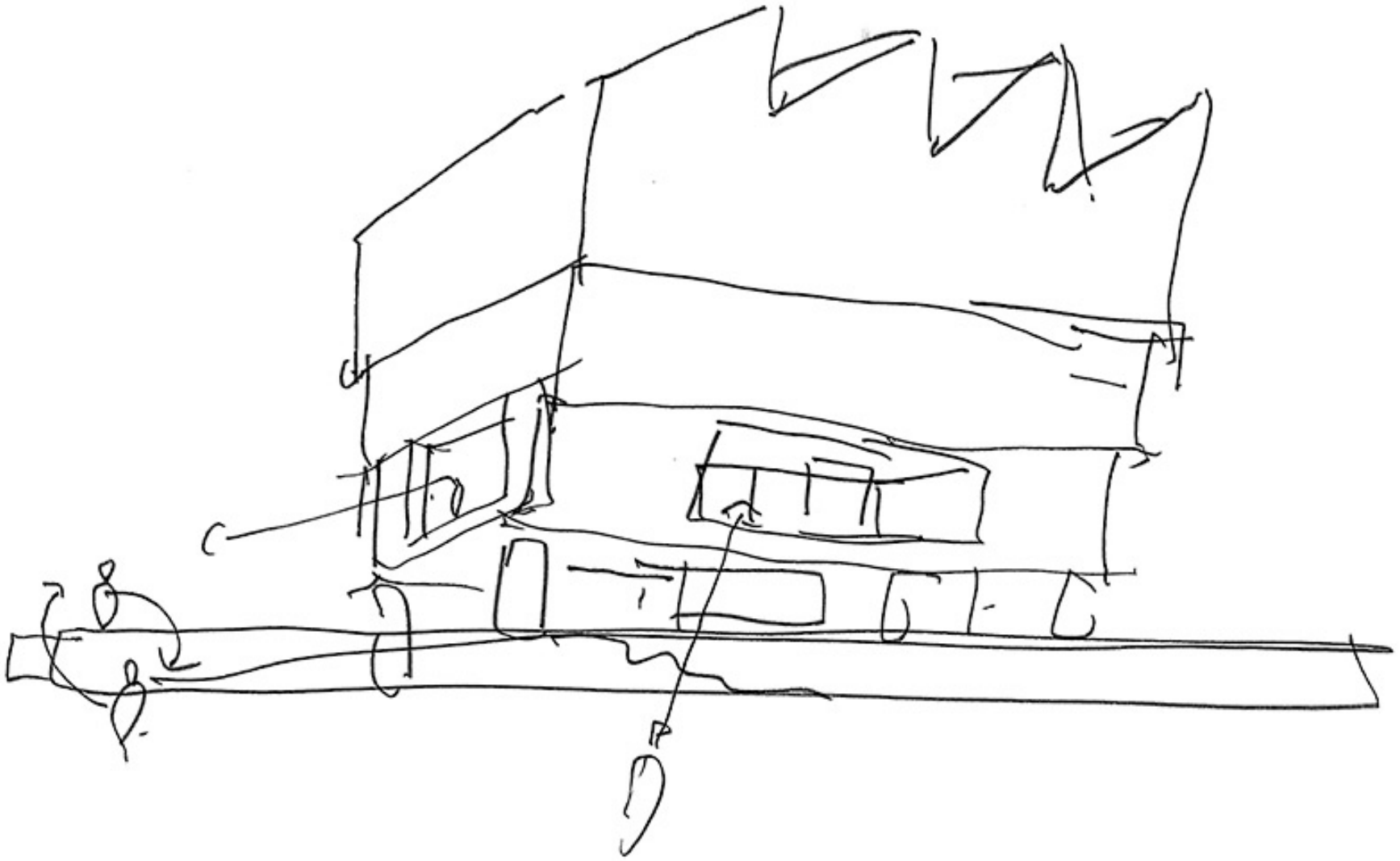
8GB ram
1GB HD
2GHz PPC Processor
2 Cores

3,000 Pounds

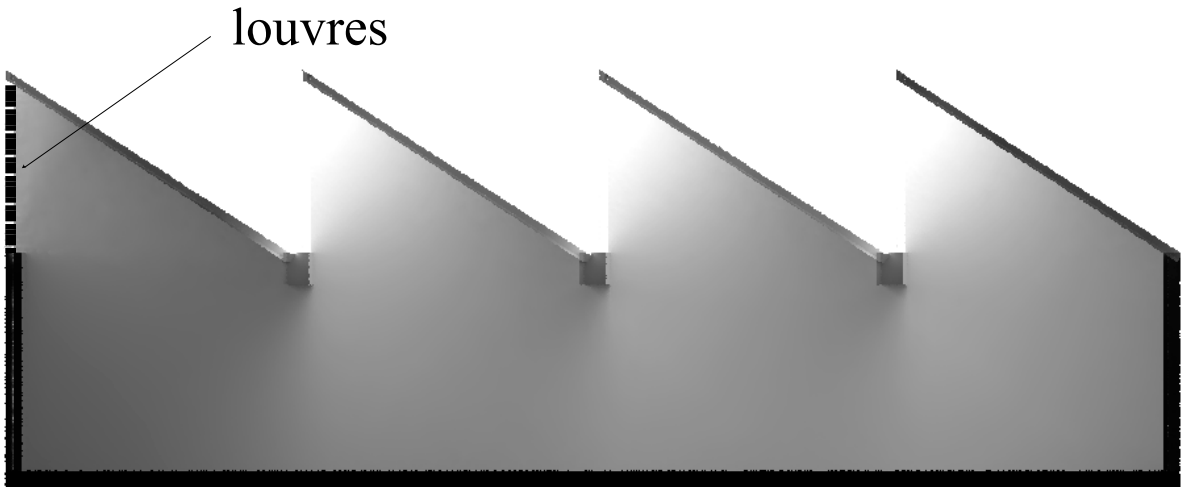
3d models, 200 - 500 MB

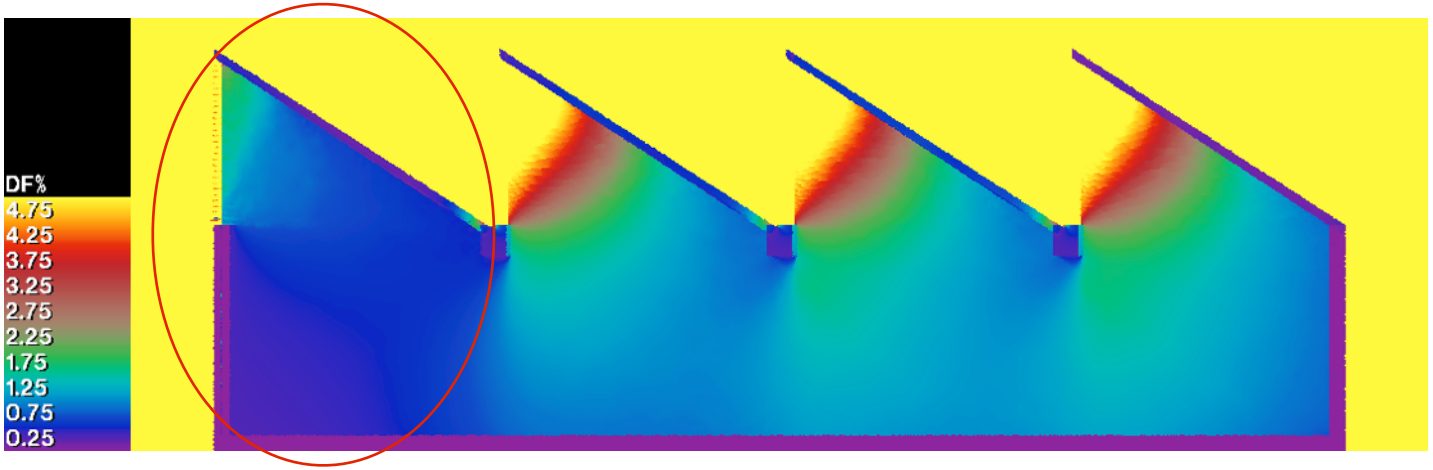
24GB ram
1TB HD
2GHz Intel Processor
24 cores

3,000 Pounds



Designing the roof



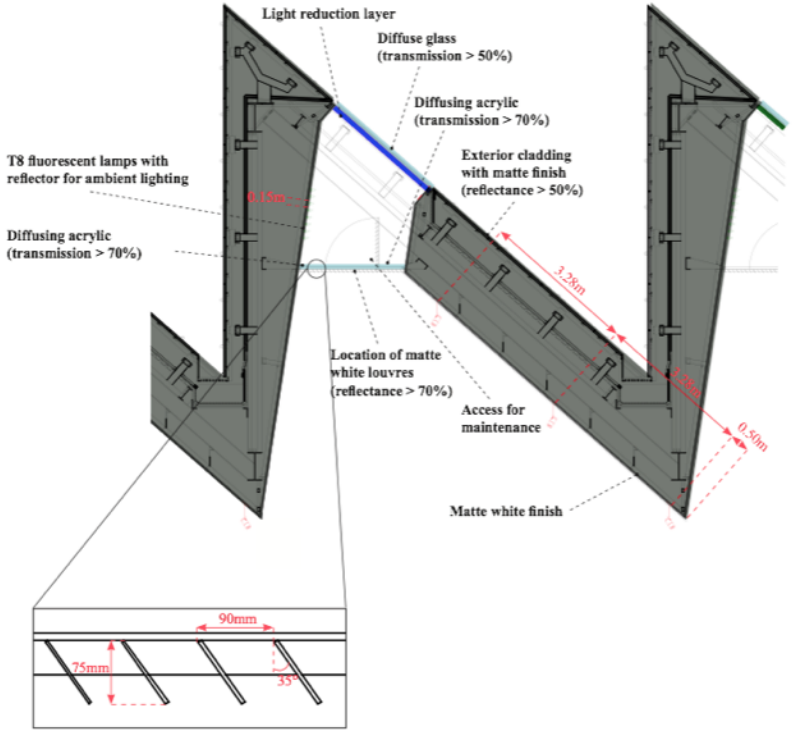


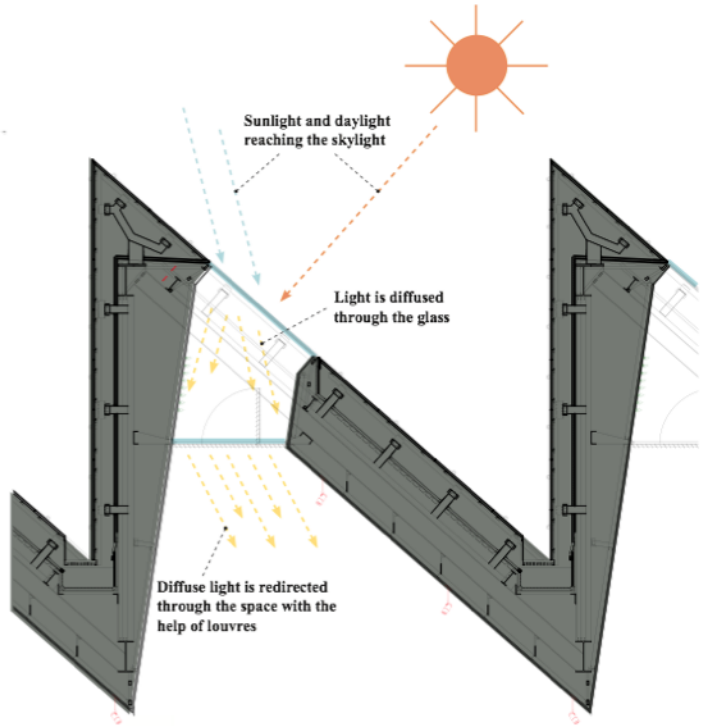
What about the site context?

What is the best option?

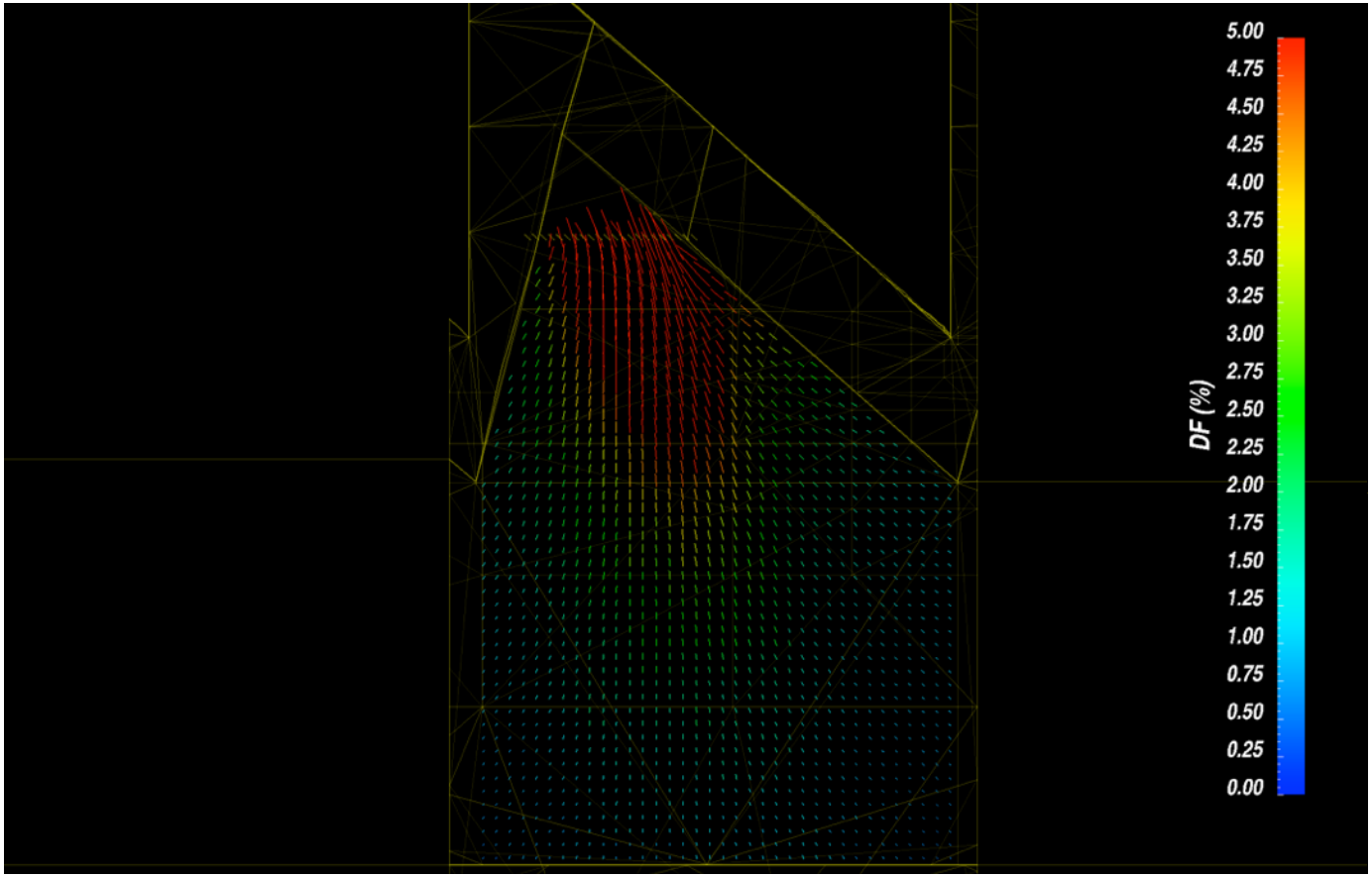
...but is this what we want?

What is the best option?





Does it work?



45deg

Jumex Museum

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Jumex Museum, Red carpet

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2014 - EOF

The future

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Guillermo Martinez

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3d models, **~1GB**

24GB ram
1TB HD
2GHz Intel Processor
24 cores

3,000 Pounds

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3d models, ~1GB

24GB ram

Processor

3,000 Pound

Still the same!

Time to upgrade…

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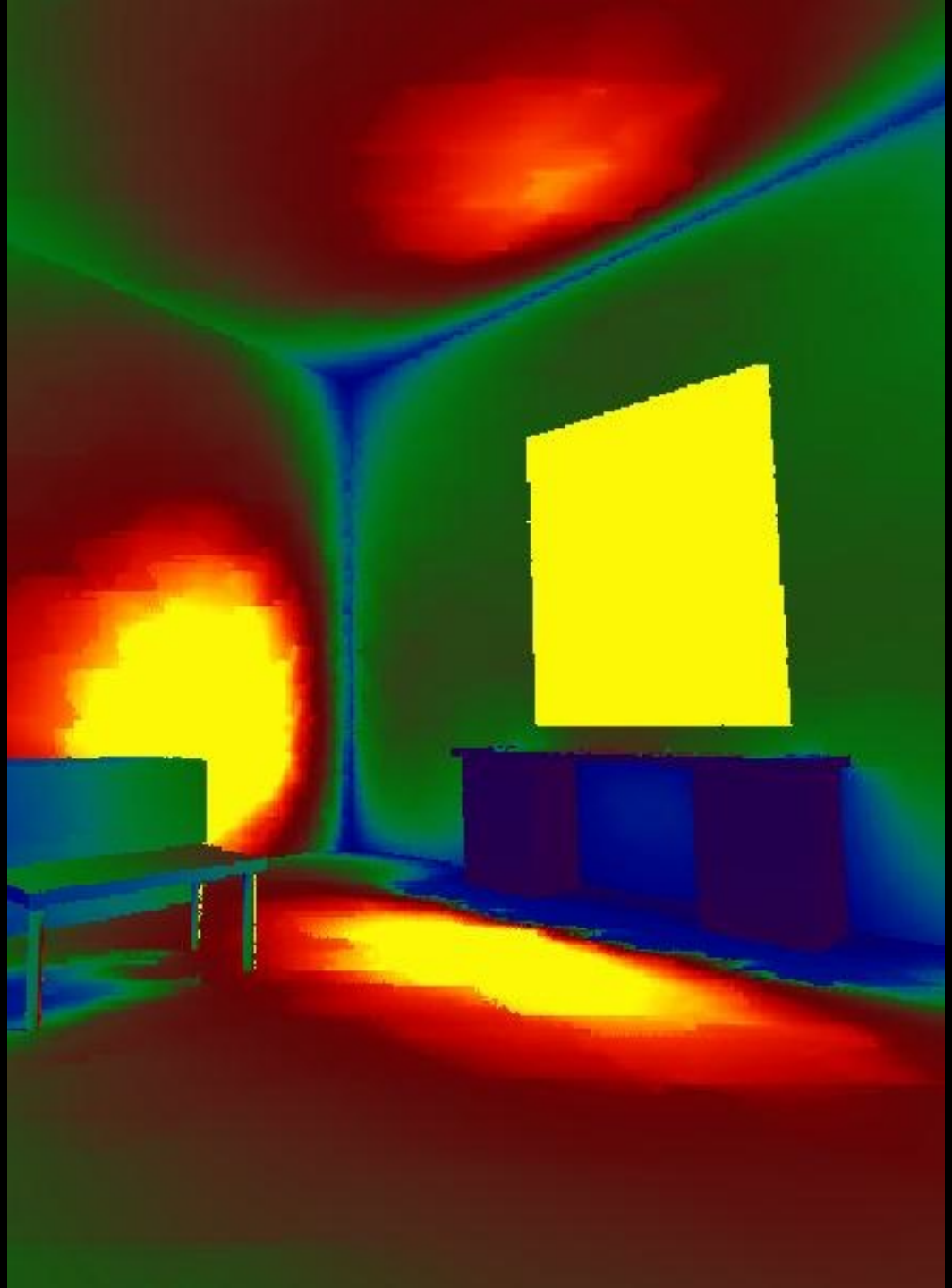

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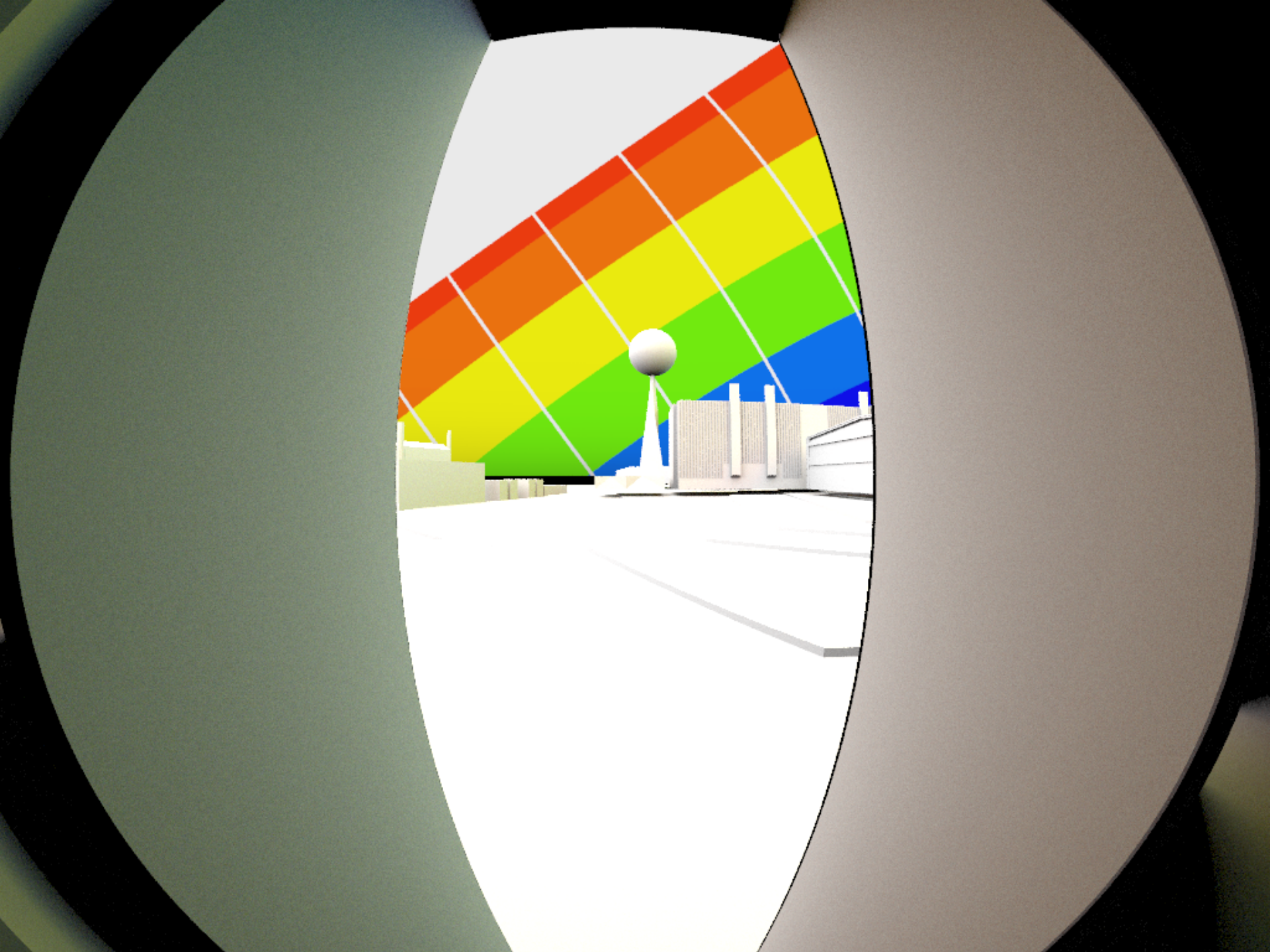

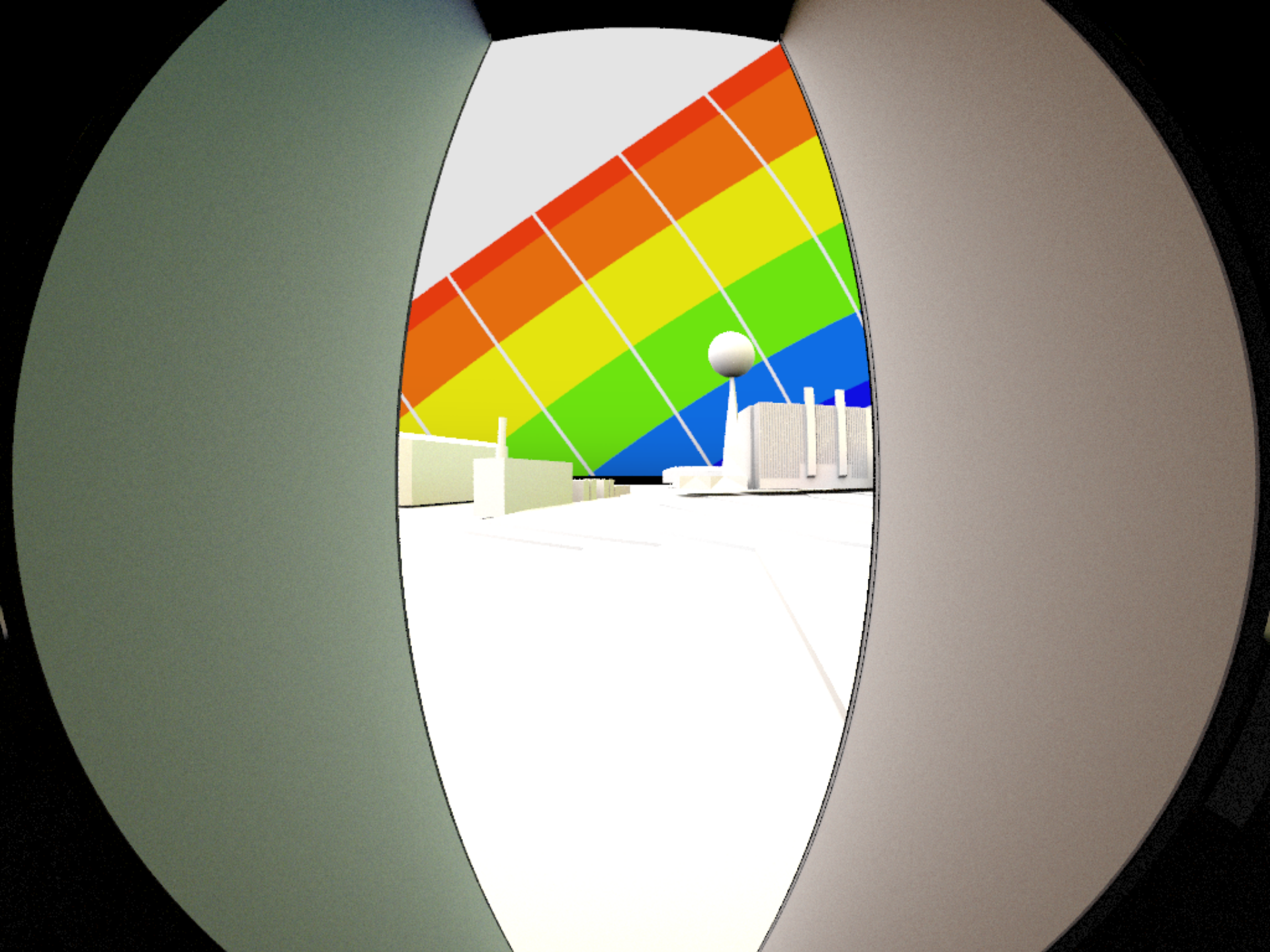

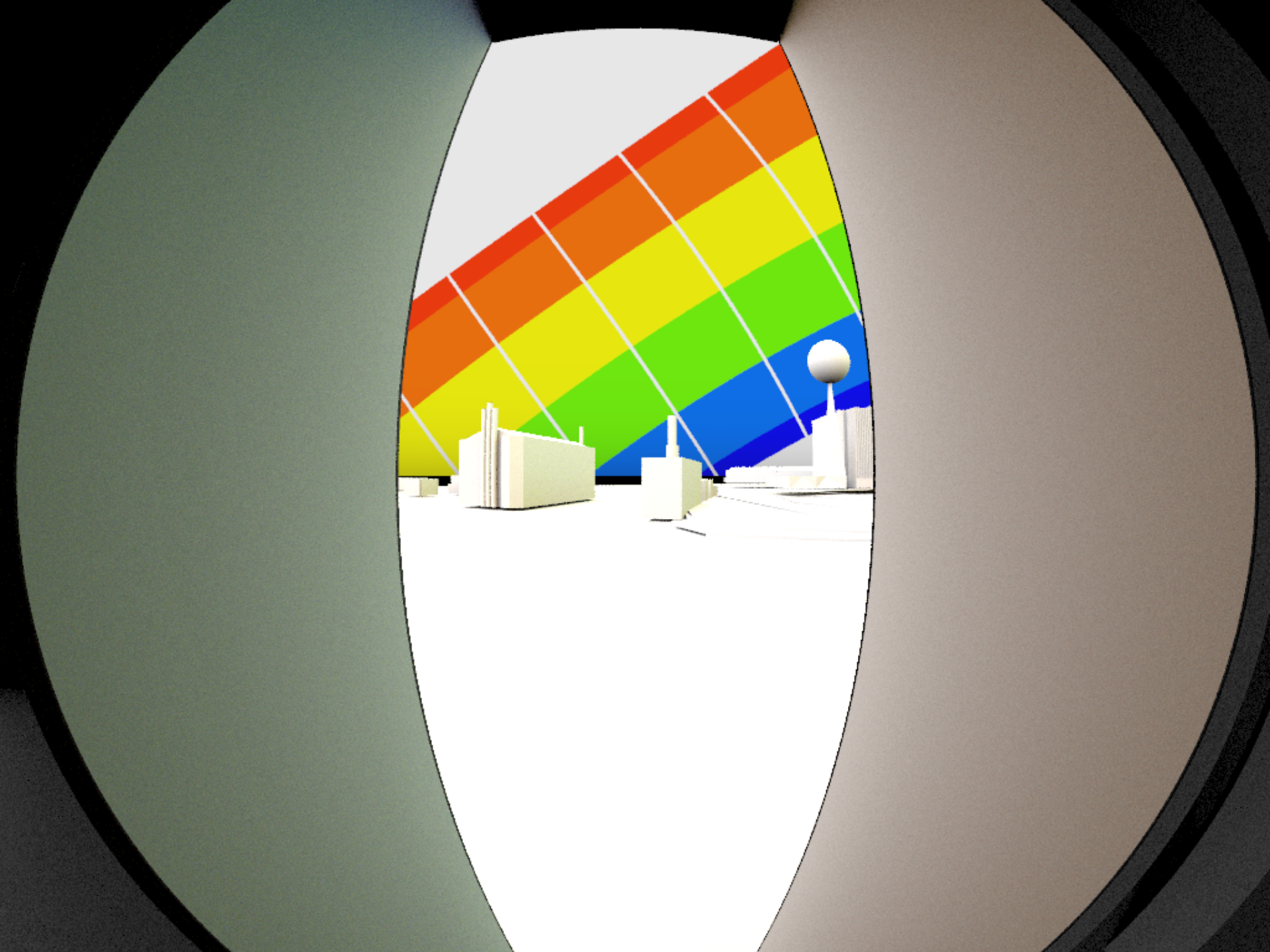

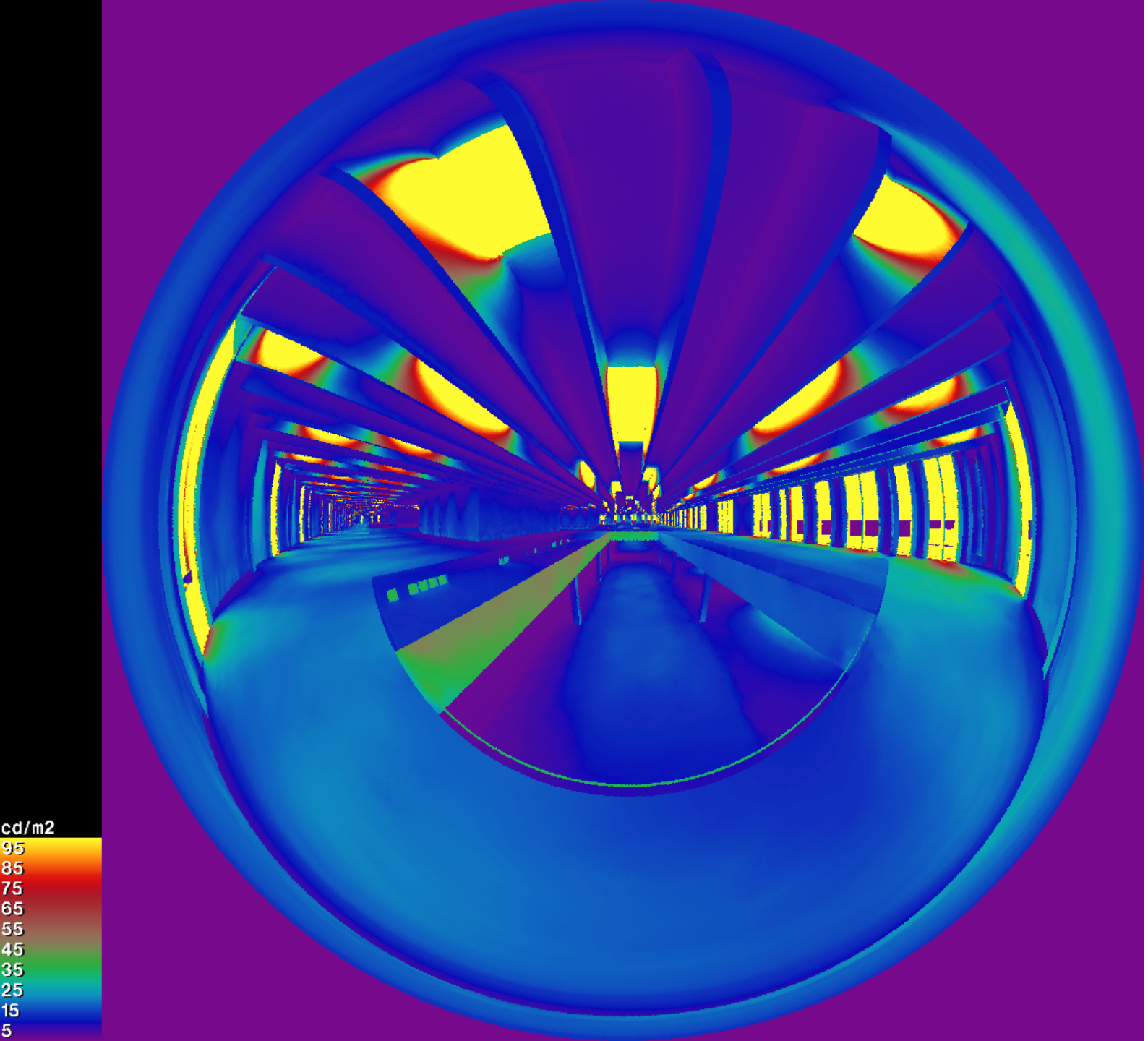

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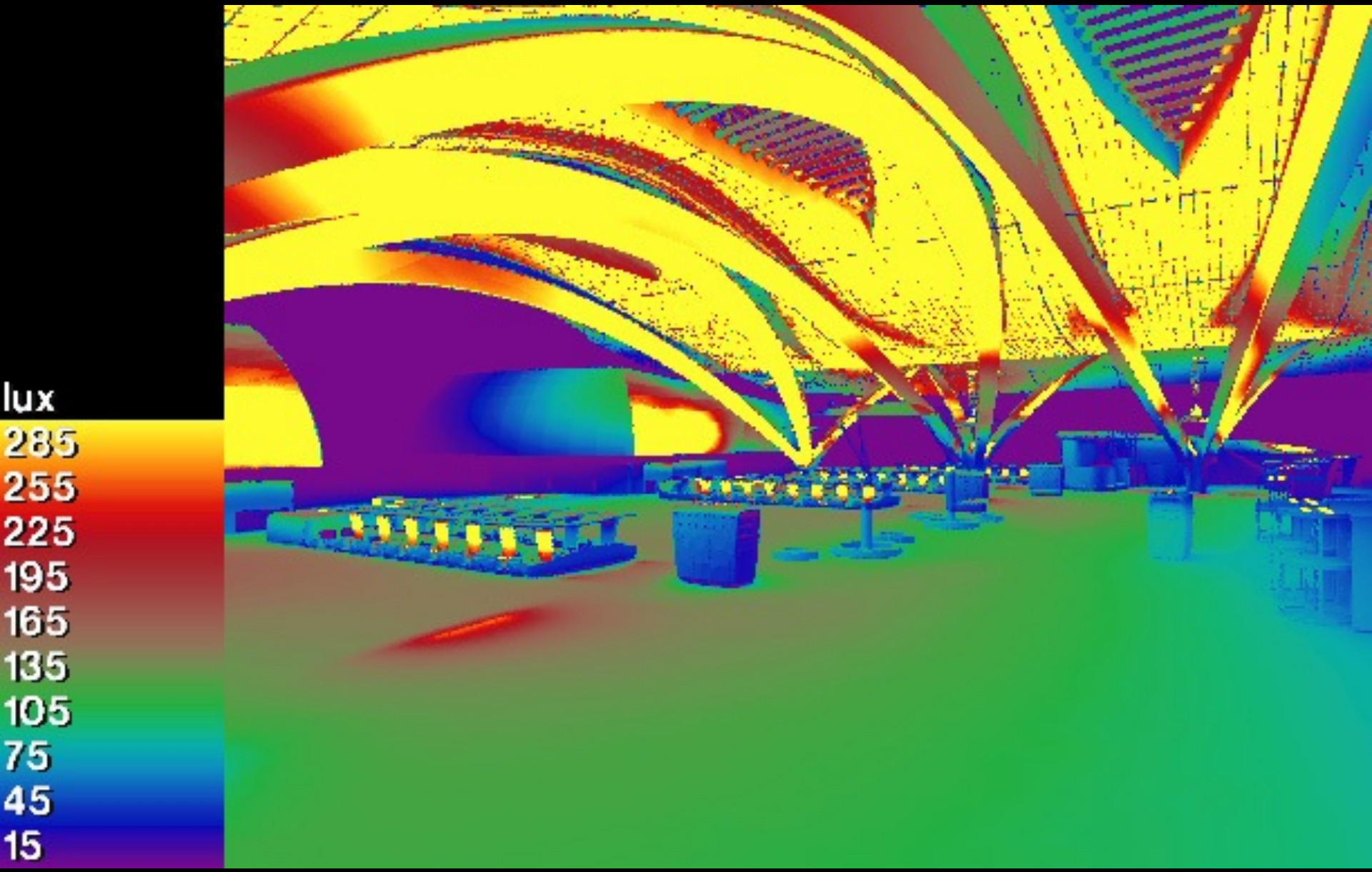

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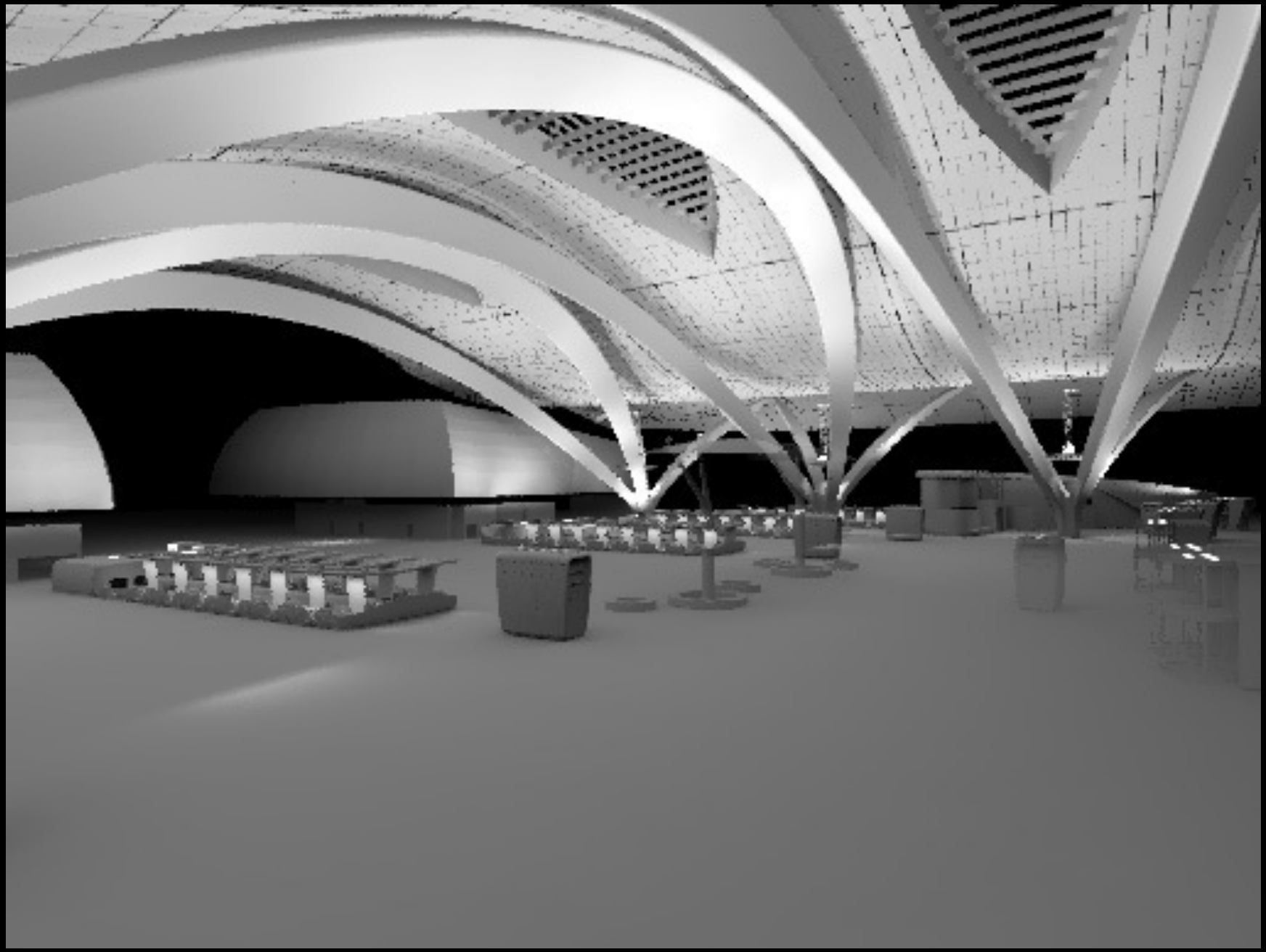

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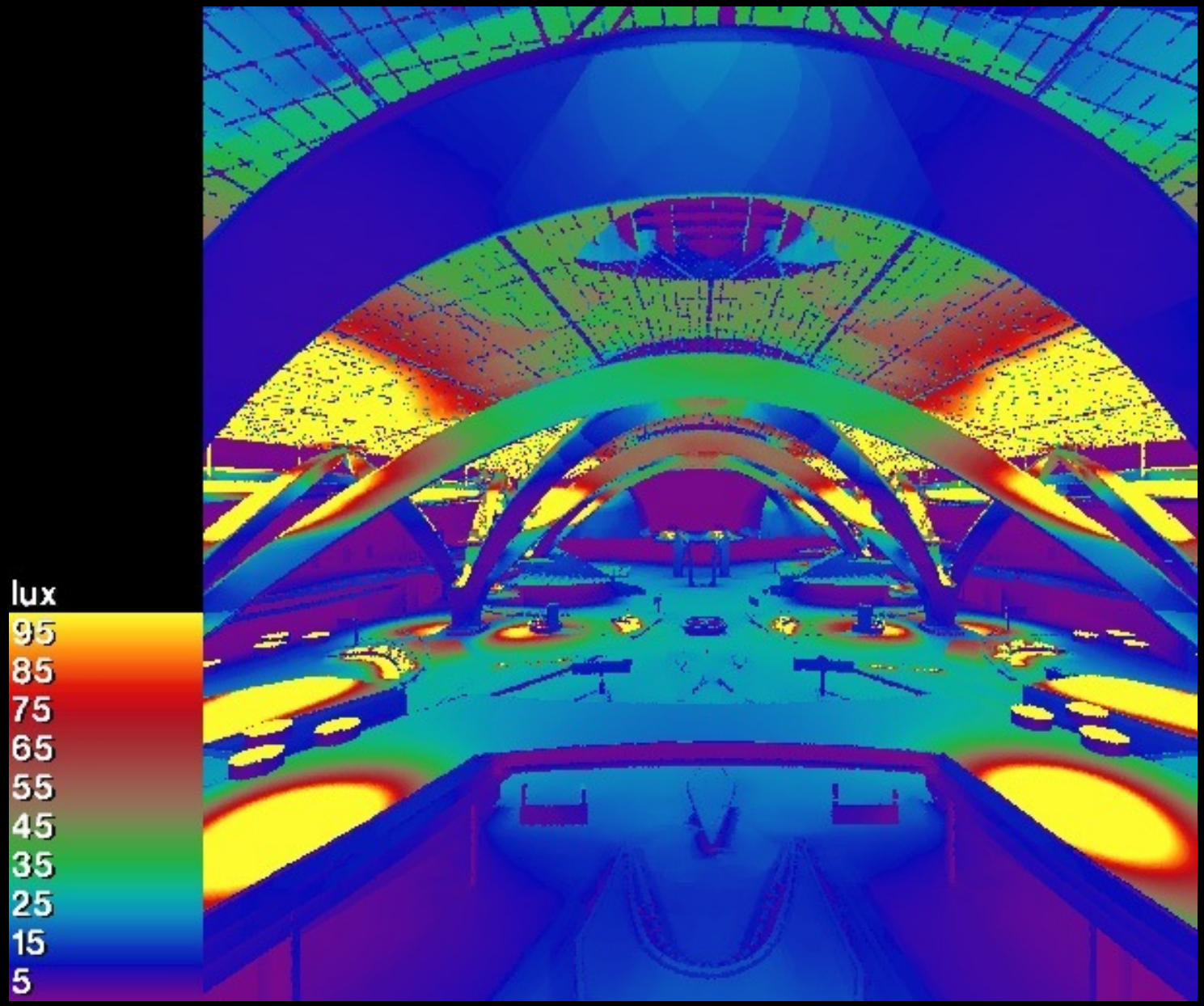

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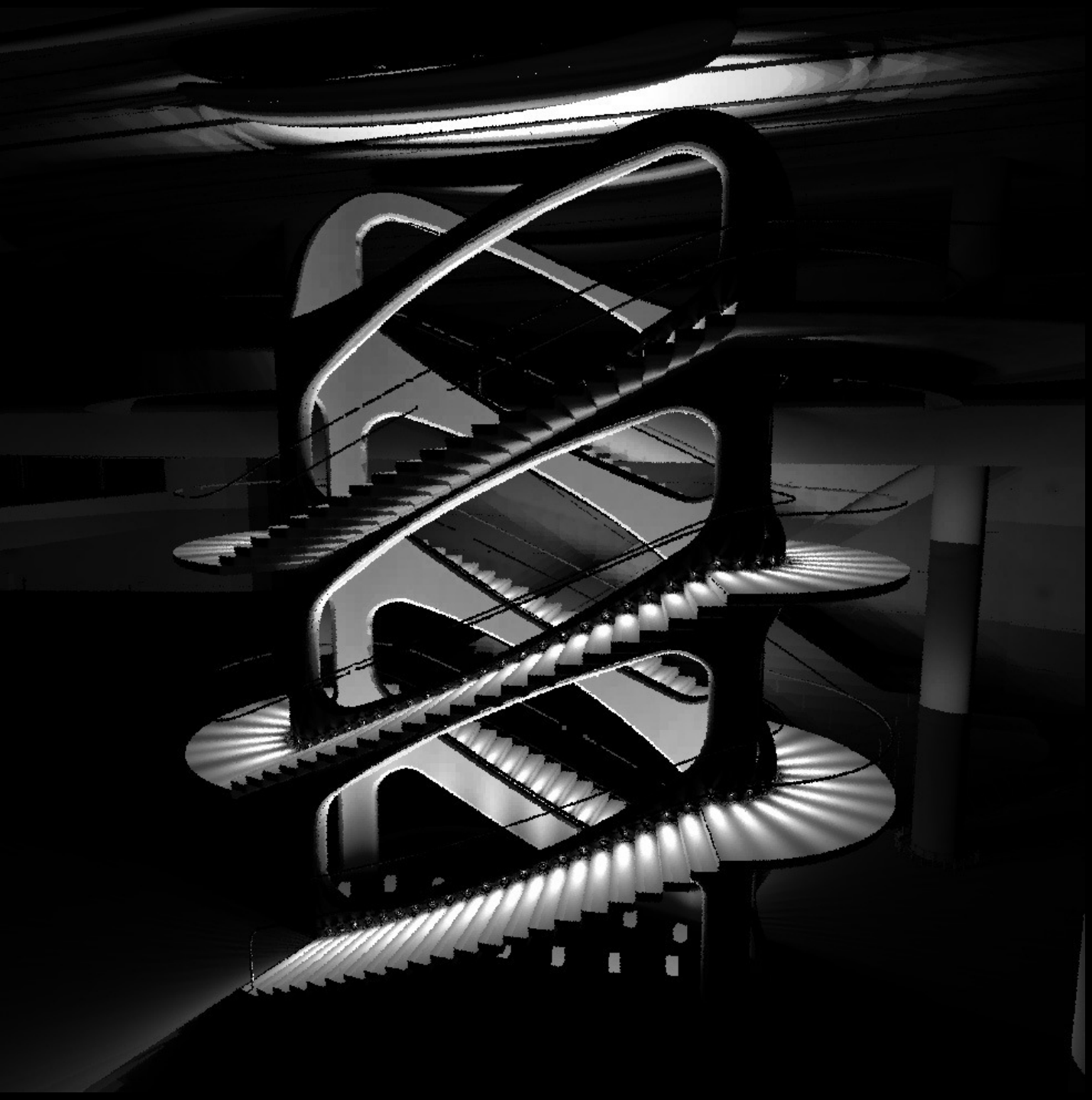

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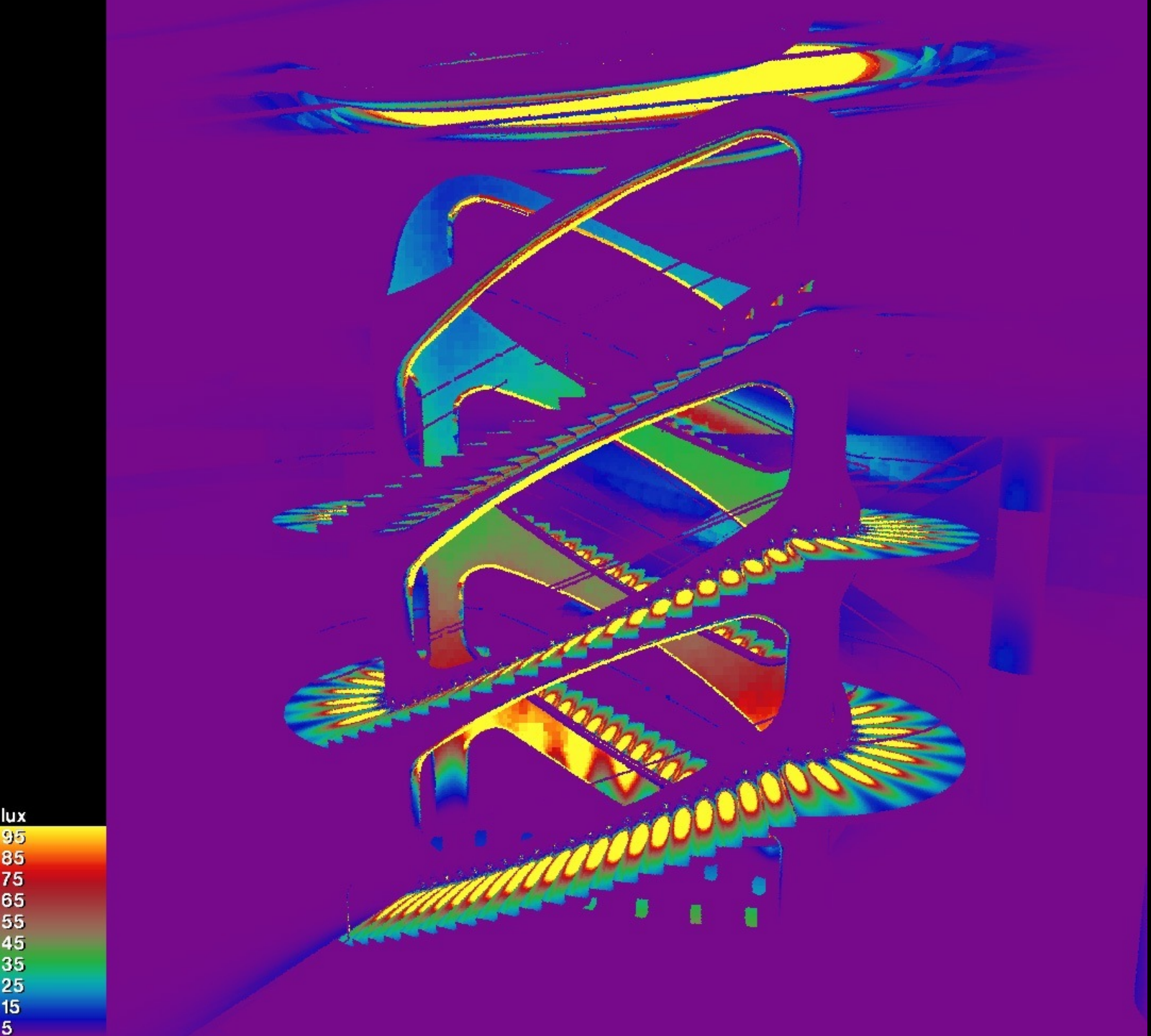

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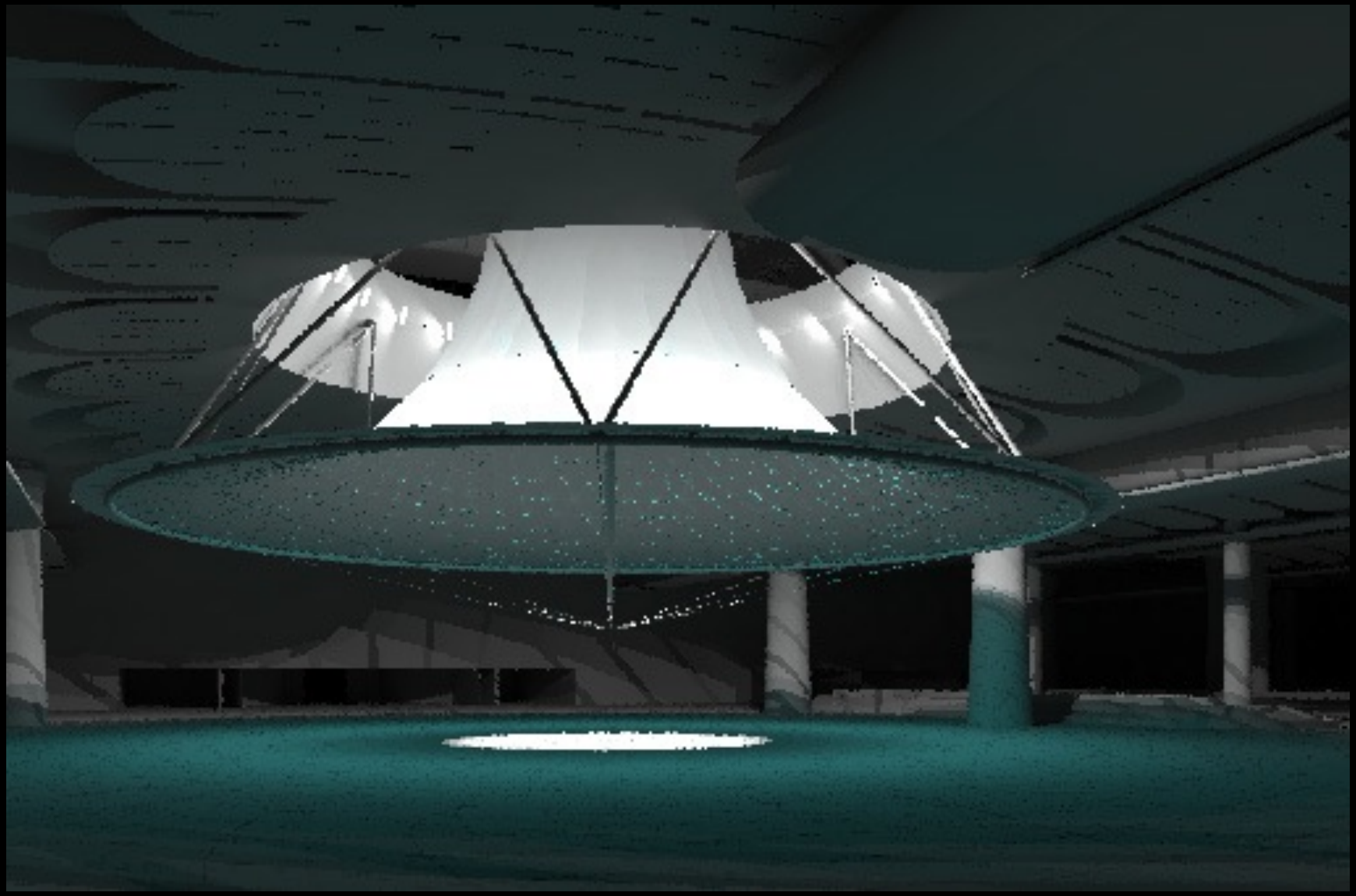

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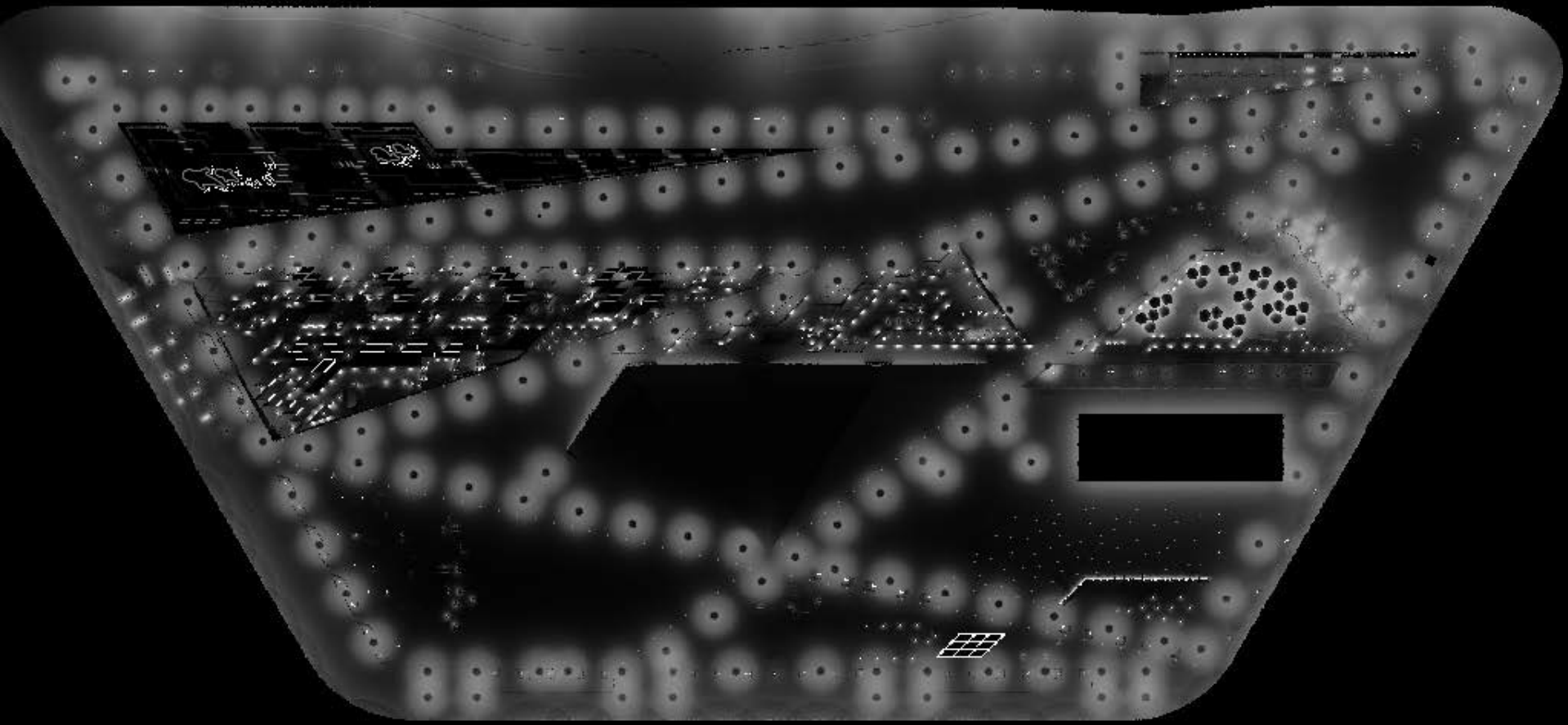

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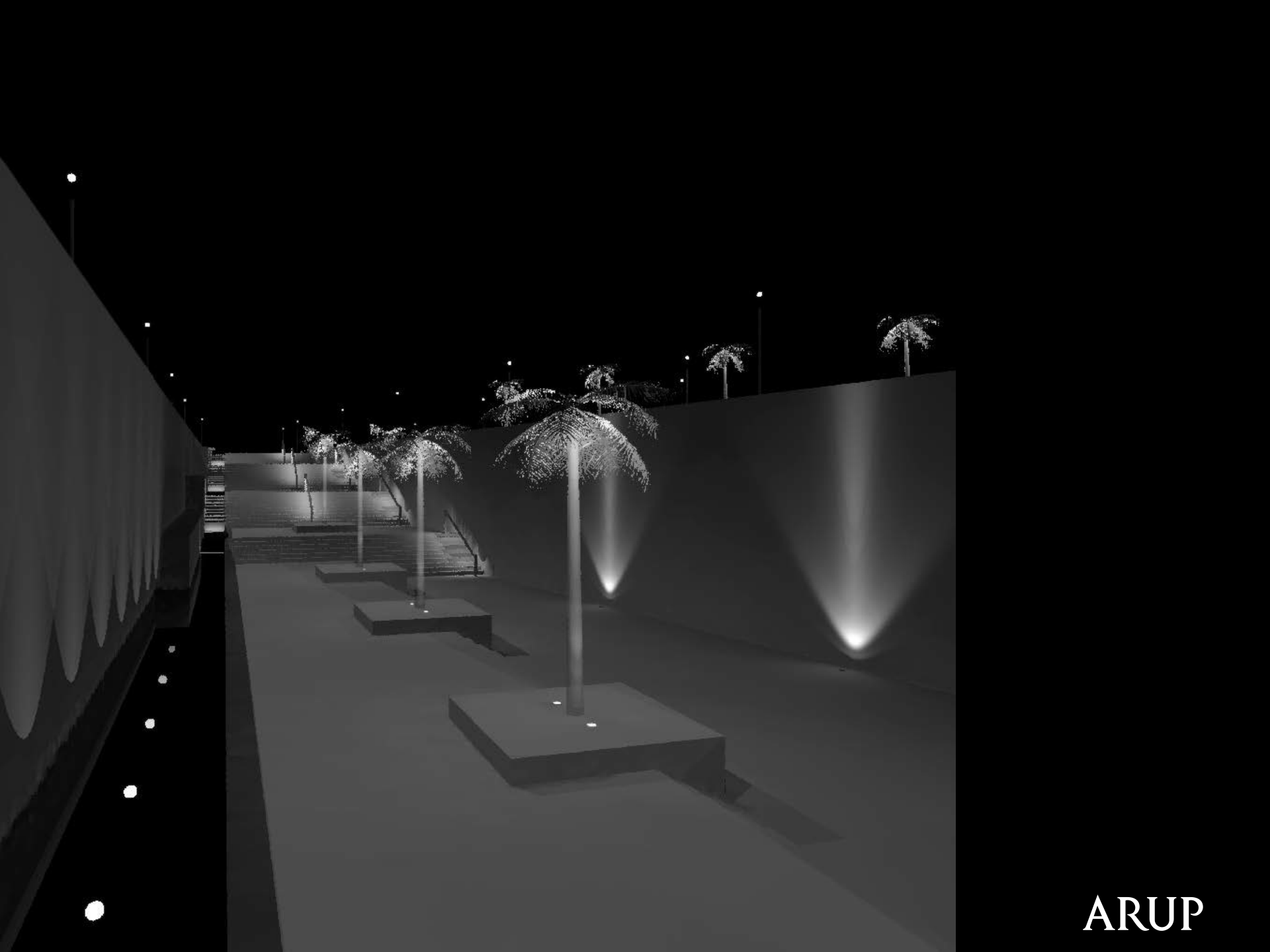
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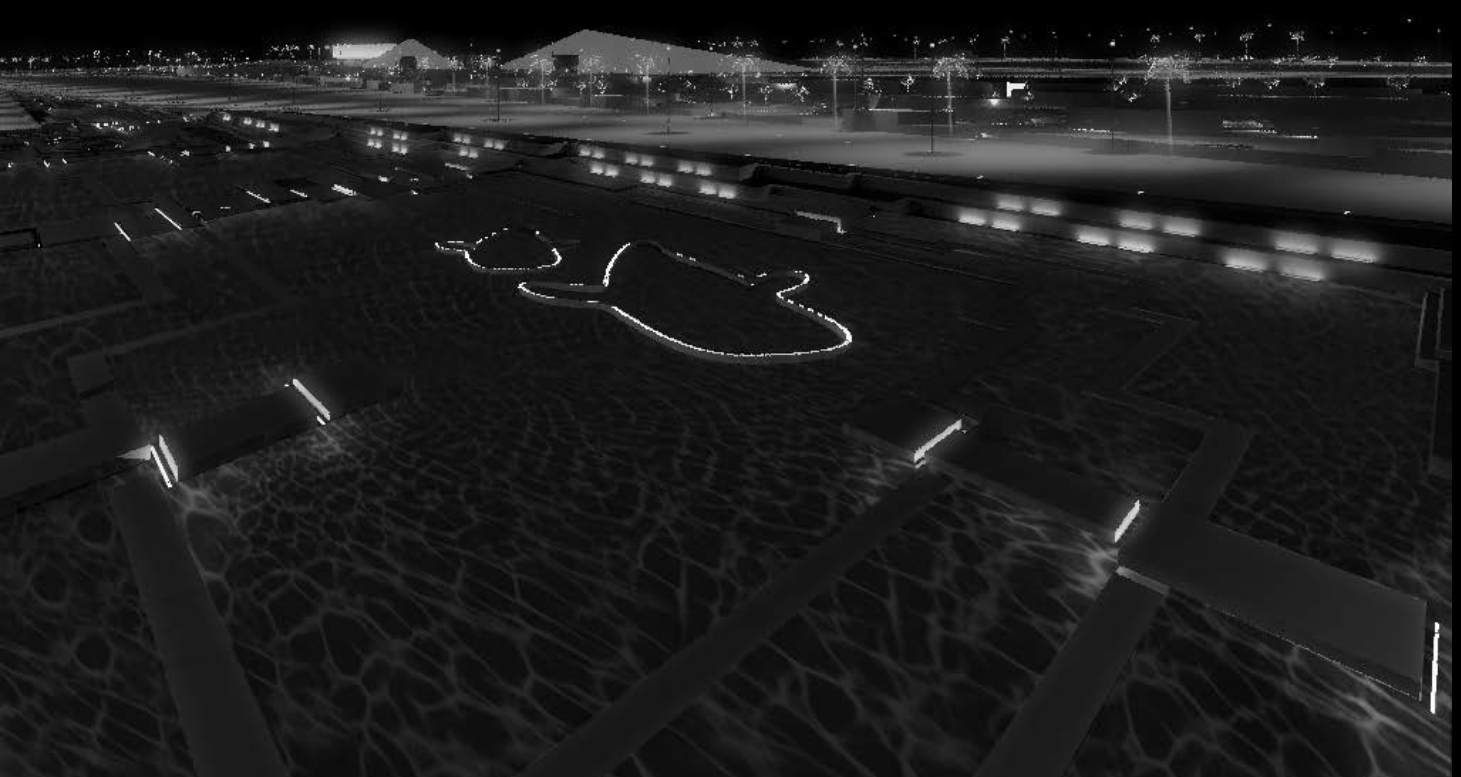

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Thank you!

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