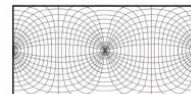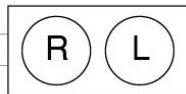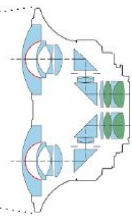# Collected Scenes Format

Method used for collection and production

Canon RF 5.2m F2.8L
Dual Fisheye lens
+

Canon EOS R5
+

EOS VR Utility
Adobe Premiere Pro

R L

Equirectangular
Projection
+

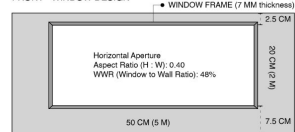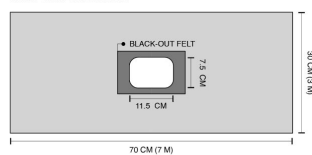Pico Neo 3 Pro Eye
VR HMD

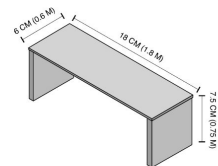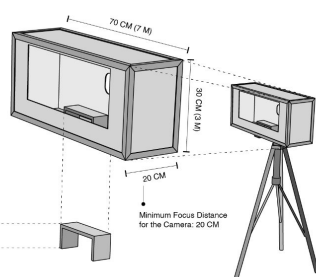**FRONT - WINDOW DESIGN**

WINDOW FRAME (7 MM thickness)
2.5 CM
Horizontal Aperture
Aspect Ratio (H : W): 0.40
WWR (Window to Wall Ratio): 48%
20 CM (2 M)
50 CM (5 M)
7.5 CM

BACK - CAMERA OPENING

BLACK-OUT FELT
7.5 CM
30 CM (3 M)
11.5 CM
70 CM (7 M)

PERSPECTIVE - DESK DESIGN

6 CM (0.6 M)
18 CM (1.8 M)
7.5 CM (0.75 M)

PERSPECTIVE - OVERALL DESIGN

70 CM (7 M)
30 CM (3 M)
20 CM
Minimum Focus Distance for the Camera: 20 CM

PLAN - DESK PLACEMENT

FRONT
DESK
BACK
5 CM (0.5 M)
20 CM (2 M)
70 CM (7 M)
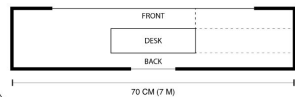
SCALE MODEL MATERIALS AND ASSEMBLY PLAN

Camera is Detachable
Aluminum Panel (5 MM thickness)
Attached to the Scale Model
Aluminum Panels (5 MM thickness)
To Fixate the Scale Model to the Tripod
Polycarbonate Panels (4.5 MM thickness)
Double Miter Joint System, L-Shaped Aluminum Frames (2 CM * 2 CM, 1.5 MM thickness)
Scale Model of an Office Window View-Out
Canon EOS R5 Camera with Dual Fisheye Lens
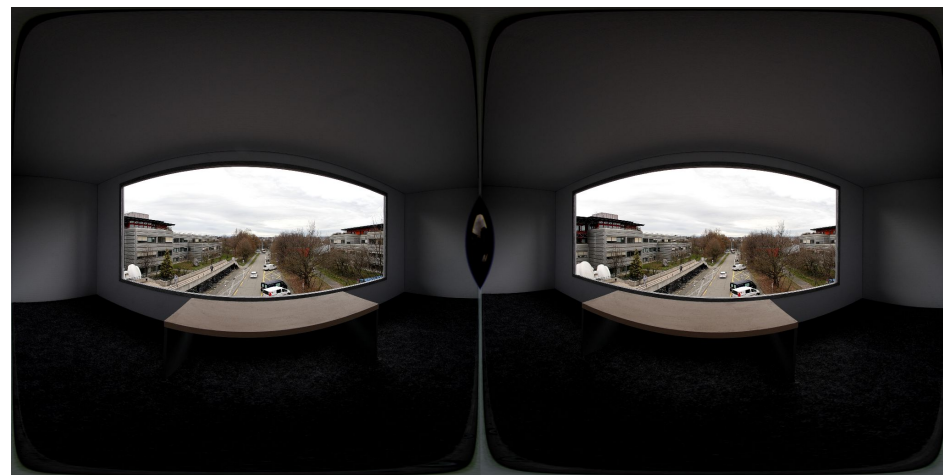Camera Attachment
Scale Model Attachment
Camera Tripod

Camera Attachment Detail

Wall Materials Assembly
White Wallpaper
Polycarbonate Panel
Black Light-blocking tape

Focus - manual, no changes throughout the recording
Left: raw (dual fisheyes), Right: processed (6K, equirectangular)

Potential approach:
an example of how to
start the project
(do not need to follow this)

(1) Preprocessing

Clean and normalize image sequences to ensure consistent
exposure and color balance to mitigate potential artifacts

(2) Cloud motion estimation

Apply optical flow algorithms to the image sequences,
identifying cloud movement and direction over time (can be
used to calculate cloud speed and motion patterns)

(3) Sky condition analysis

Extract histograms of brightness or color values from the
images, representing the distribution of daylight in different
regions of the sky (use EMD to compare histograms and
quantify the magnitude of changes in sky conditions)

(4) Correlation analysis

Investigate correlations between the motion of clouds
(optical flow) and changes in sky conditions (EMD) to
determine the impact of cloud movement on daylight
dynamics and understand the relationship between the two
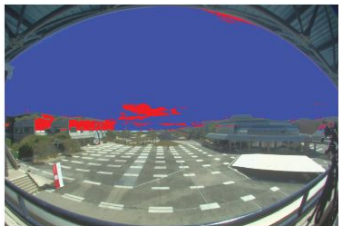
Semester Project Structure
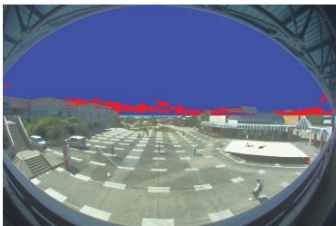
Timeline and Phases

Part 1: 3-min

PRELIMINARY ANALYSIS: Cloud Percentage Calculation (10 Scenes)
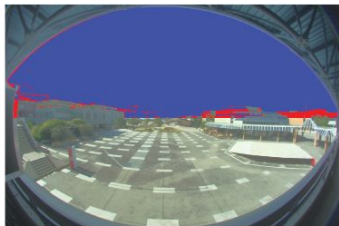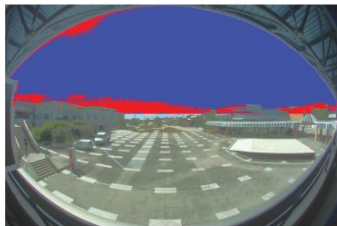

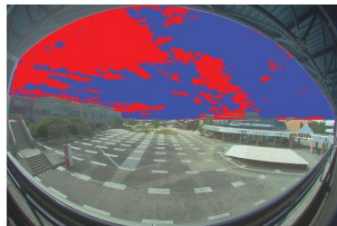**SCENE 1.** 4% clouds
July 7th, 2023 09:48 - 09:53

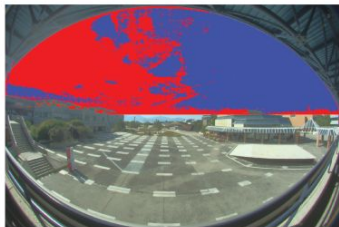**SCENE 2.** 5% clouds
August 18th, 2023 15:29 - 15:34

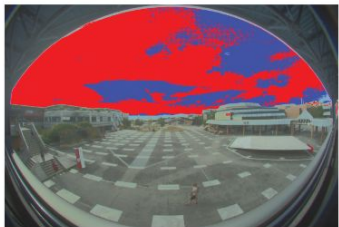**SCENE 3.** 5% clouds
July 6th, 2023 10:53 - 10:58

SCENE 4. 10% clouds
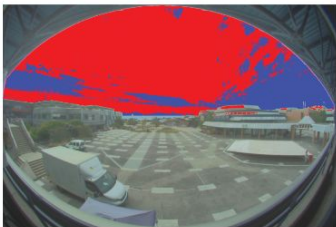July 18th, 2023 11:03 - 11:08

SCENE 5. 42% clouds
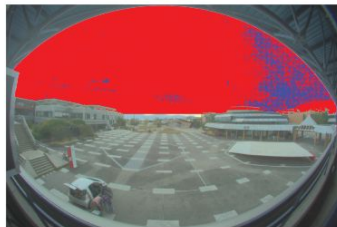August 9th, 2023 10:36 - 10:40

SCENE 6. 45% clouds
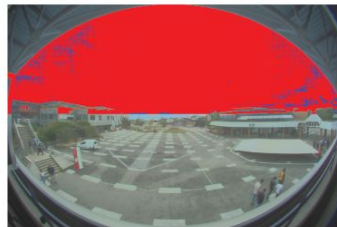August 16th, 2023 10:22 - 10:26

SCENE 7. 70% clouds
August 25th, 2023 09:51 - 09:56

SCENE 8. 75% clouds
July 17th, 2023 10:57 - 11:01

**SCENE 9.** 91% clouds
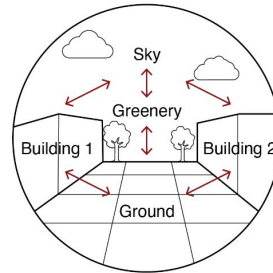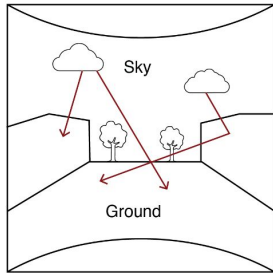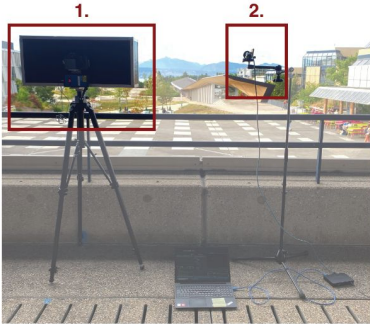July 24th, 2023 14:20 - 14:25

SCENE 10. 96.5% clouds
July 26th, 2023 12:32 - 12:36

Part 1 (September 22nd - October 11th):

Initial development of luminous changes analysis focusing on **1 location** (10 recordings - diff. cloud percentage, clear to overcast)

→ at the end we will compare the accuracy of the results with the HDR recordings analysis (done by a post-doc from LIPID)
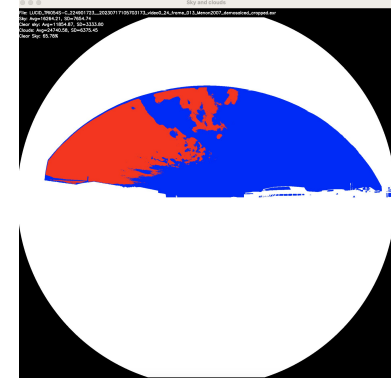
Preliminary cloud % analysis
Filtering:
- *Luminance > 3000 lux*
- *Image segmentation to the upper half region*

1) K-mean analysis (high luminance variation)
- *Number of clusters = 2*
- *Parameter condition = std 1500*

OR 2) Selecting pixels based on color information (low luminance variation)
Output:
- *Sky layer of the image color coded to clear sky vs. clouds*
- *Calculated % of cloud vs. clear sky*

Part 2
2-min

Only passive movement (daylight and wind)

Overview of the 10 Captured Scenes Overview (Clear vs. Overcast)

Clear Sky

less than 30% cloud cover

July 9th, 2023 08:51

July 22nd, 2023 18:15

July 9th, 2023 07:41

July 16th, 2023 17:44

July 15th, 2023 07:41

July 9th, 2023 07:30

July 9th, 2023 08:34

July 9th, 2023 08:08

July 9th, 2023 08:14

July 15th, 2023 18:15

Overcast Sky

more than 95% cloud cover

July 24th, 2023 07:54

July 29th, 2023 18:42

August 1st, 2023 08:18

July 29th, 18:56

July 24th, 2023 08:06

July 24th, 2023 07:42

July 29th, 2023 10:38

July 29th, 2023 10:16

July 29th, 2023 10:23

July 29th, 2023 18:28

Part 2 (October 11th - November 3rd):

Testing and modifying the analysis method by applying the method onto views from **10 locations** (20 recordings - each location has two recordings under clear and overcast sky, <u>no other movement is present</u>)

Part 3

2-min

Captured Scenes Overview (15)

Passive Movement	Daylight, clouds, wind	Daylight, clouds, wind	Daylight, clouds, wind	Daylight, clouds, wind	Daylight, clouds, wind
Passive Movement + People and Animals	People + cyclists (high density), birds, clouds	People + cyclists (medium density), birds, clouds	People (medium density), wind, birds	People + cyclists (medium density), birds, clouds	People + cyclists (medium density), wind, clouds
Passive Movement + People and Animals + Road traffic	People + cyclists, cars (low density), bus, metro, clouds	People + cyclists, cars (high density), motorcycles	People + cyclists, cars (low density), bus, metro, clouds	People + cyclists, cars (high density), metro, bus	People + cyclists, cars (medium density), clouds

Part 3 (November 3rd - 30th):

Testing and modifying the analysis method by applying the method onto views from **15 locations** with the ability to simultaneously quantify other types of movement (15 recordings - with <u>different type of movements</u>)

Meeting Schedules

Proposed Dates (can be modified)

1st meeting: General overview, file transfer, introduction
September 22nd afternoon
2nd meeting: Results from part 1, introduction to part 2
October 13th 14:00
3rd meeting: Results from part 2, introduction to part 3
November 3rd 14:00
4th meeting: Midterm presentation (Progress on part 3, Q & A)
November 10th 14:00
5th meeting: Results from part 3, general discussion
December 1st 14:00

… Final presentation in January (TBD)

In between these dates,
we can schedule biweekly meetings and have Q&A via emails if needed.

Assessment and Grading:

- A midterm presentation (10 min): November 13th (informal, not graded, more for check-in and progress update)

  - Yunni, Soumava

- A final presentation (20 min): January (TBD)

  - Yunni, Soumava (zoom), Mathieu (TBD), Marilyne

- A written report (2/3 of the final grade): due January 14th (can be modified)

  - Read by Yunni, Pascal, Marilyne