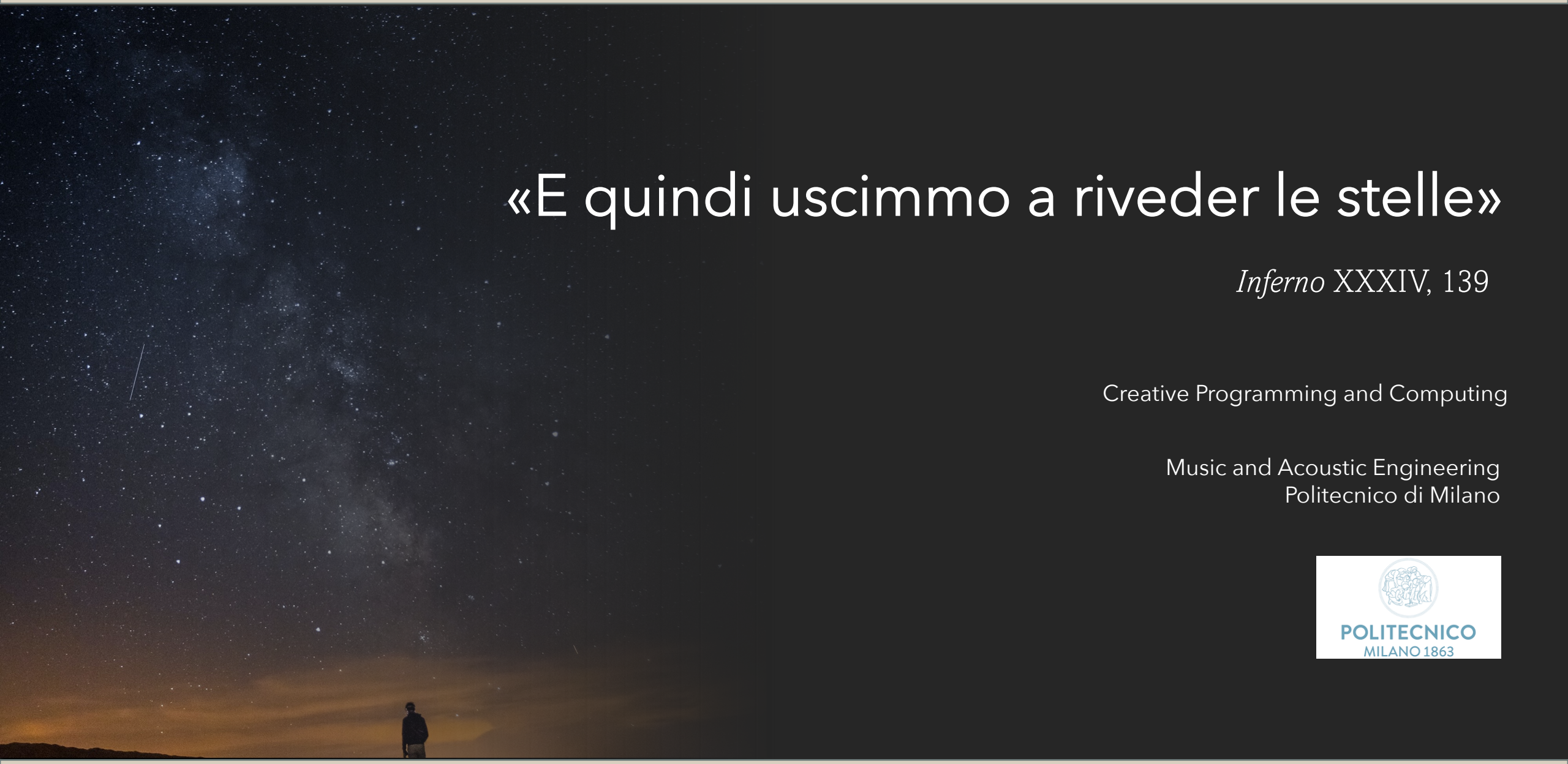


«E quindi uscimmo a riveder le stelle»

Inferno XXXIV, 139

Creative Programming and Computing

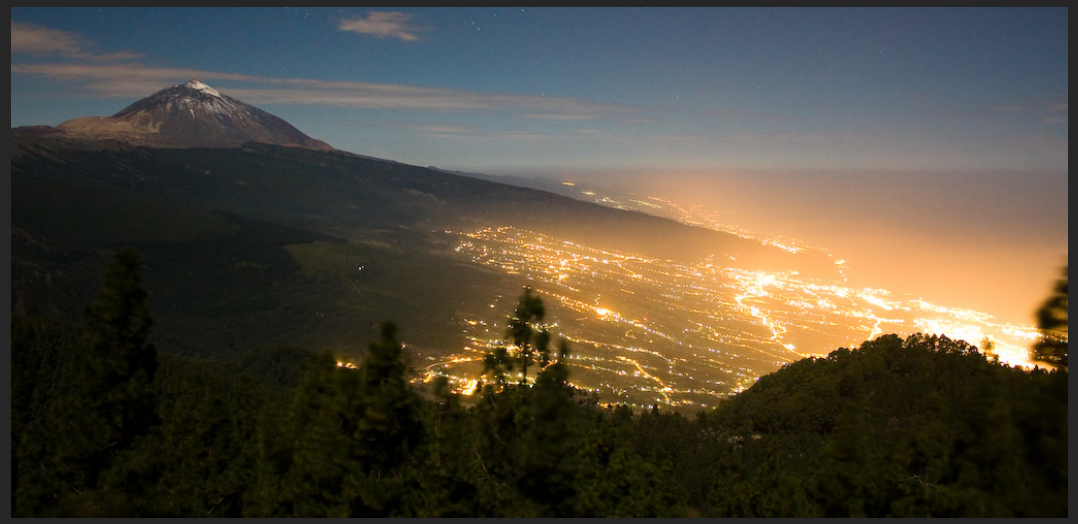
Music and Acoustic Engineering
Politecnico di Milano

POLITECNICO
MILANO 1863

Main Concept:

Lights pollution in the dark sky:

- Light Pollution unnecessarily contributes to climate change.
- Light pollution kills millions of birds a year.
- Artificial light at night disrupts the seasonal cycle of trees.
- Relevant number of people have never seen the real sky at night (the Milky Way).
- Exposure to artificial light at night puts your health at risk.



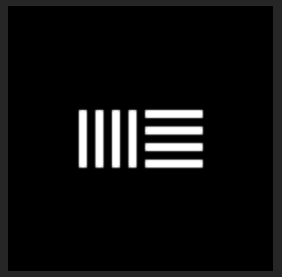
Our Story: → Interactive Installation

Imagine you could switch off all the artificial lights above your head.

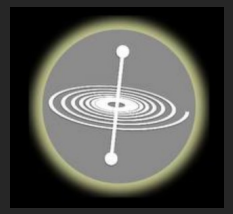
You would be able to see the real natural light of the dark sky.

It would be the same experience of a child discovering the world, with equal curiosity and astonishment.

Visual and sound discovering experience



SIGNAL ROUTING



GyrOSC

User's interaction

Auxiliary Audio Out

OSC messages

Audio signal

Video signal

Processing

Max4Live

Ableton Live

Video Out

Audio Out

Perception

Design - Overview

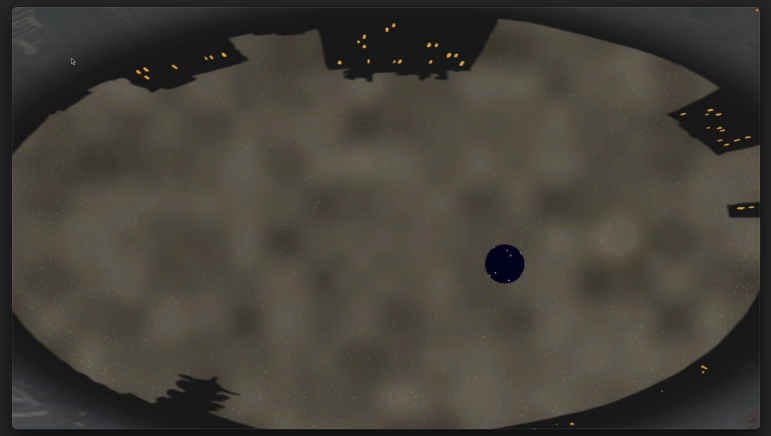
Two main scenarios with different elements

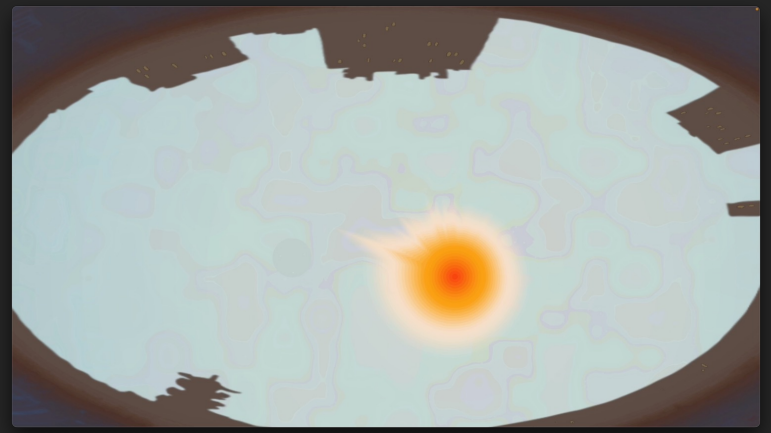
Night time:

- Interaction with the stars
- Presence of the Moon
- Visible pollution

Day time:

- Less intuitive interaction
- Presence of the Sun
- Immersive experience

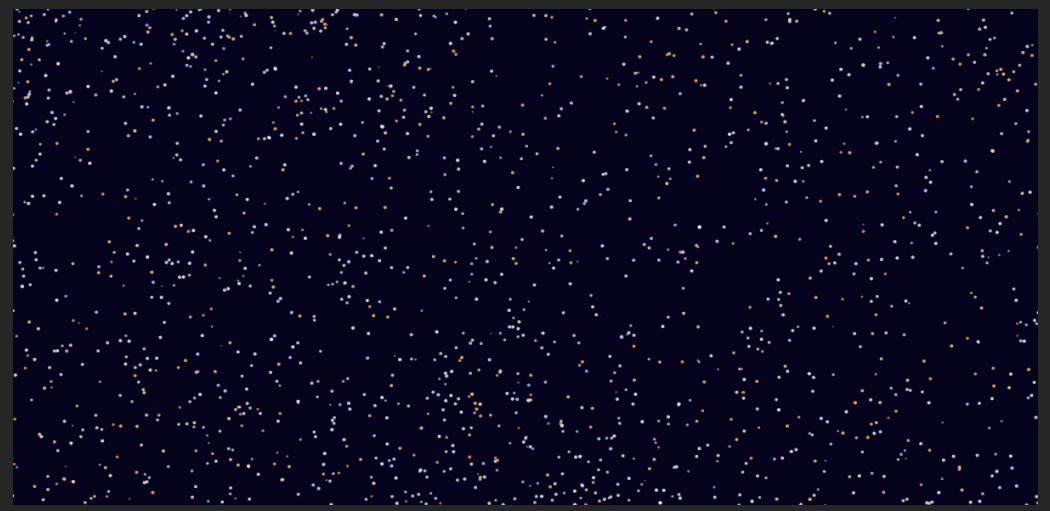




Stars

The star plot is based on:

- Real database with information about coordinates (J2000), temperature and visual magnitude
- Current time at application first launch
- GPS position of the user

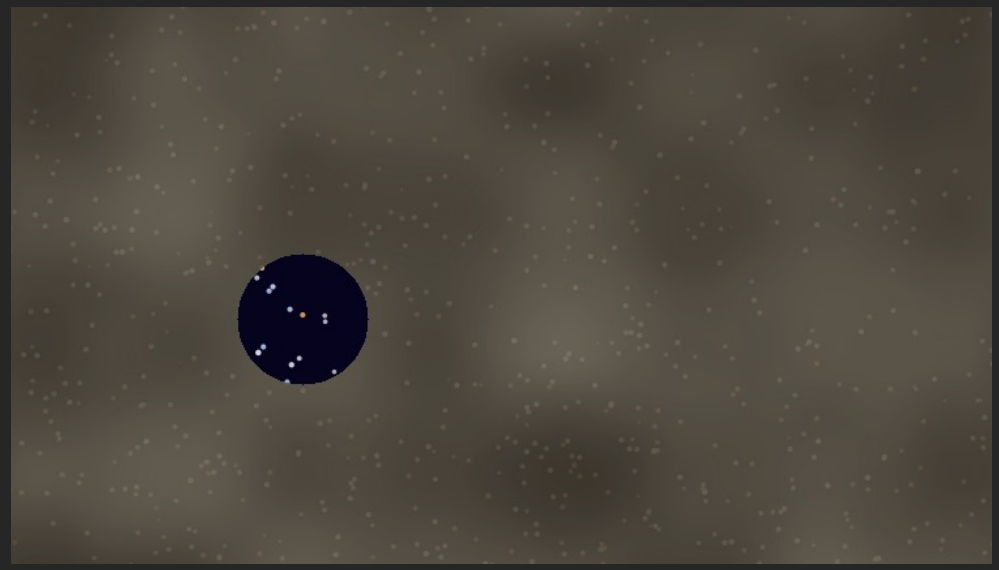


- Projection in cartesian coordinates
- Colour based on the temperature
- Dimension and Opacity based on visual magnitude

Pollution

The light pollution simulation is obtained with the 3D Perlin Noise technique.
The coordinates used are:

- x coordinate of the pixel
- y coordinate of the pixel
- time t

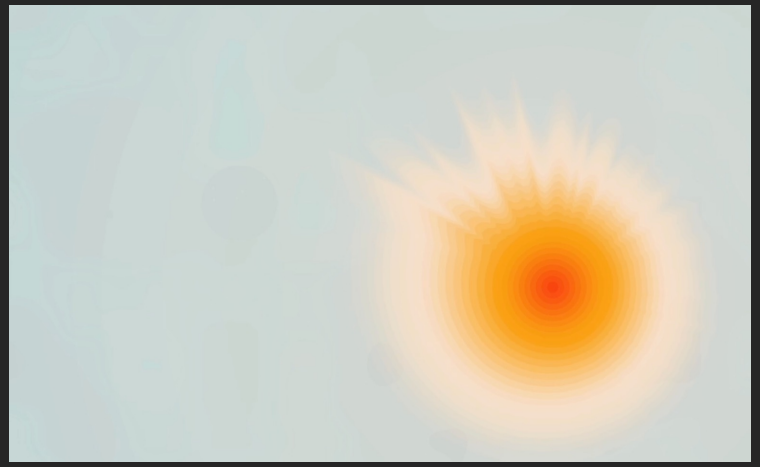


From the cone of visibility we gather information about:

- density of stars
- dominant colour

Sky

It is obtained with:
- colour interpolation
- opacity controlled by sound intensity



Moon

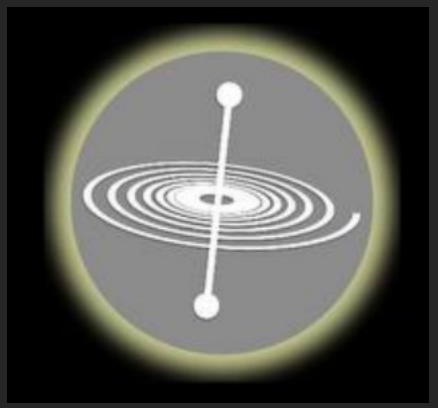
Rendered with the use of the 2D Perlin Noise

Sun

Built with concentric rays each representing a scaled version of the sound amplitude spectrum

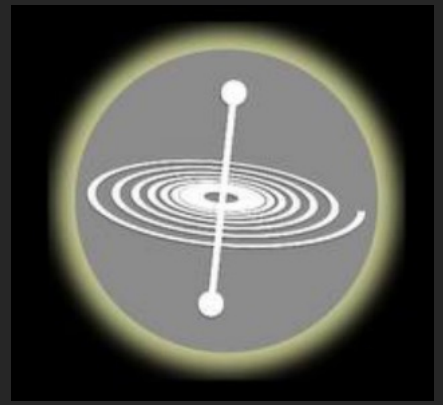
Interaction – Gyroscope

- The first address sent from GyrOSC is the gyroscope, with /gyrosc/gyro;
- Constitutes the most relevant parameter for the “moving” experience of the pointer
- The gyroscope has two relevant parameters, which constitute the moving direction and angles in the x and y axis.



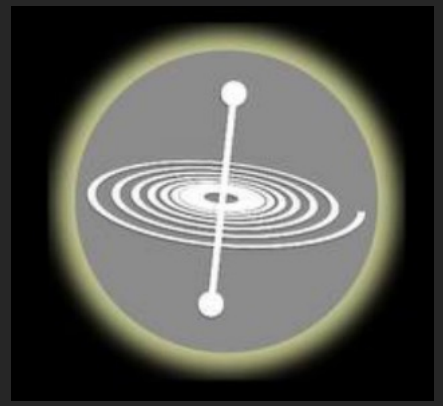
Interaction – Accelerometer

- The second parameter sent is the accelerometer, with /gyrosc/accel
- Contributes to the acceleration in the pointer movement, with is also processed with sound, using a filter.
- Send two values from GyrOSC, relative to the acceleration in the x and y axis and taken and processed by Processing.



Interaction – GPS

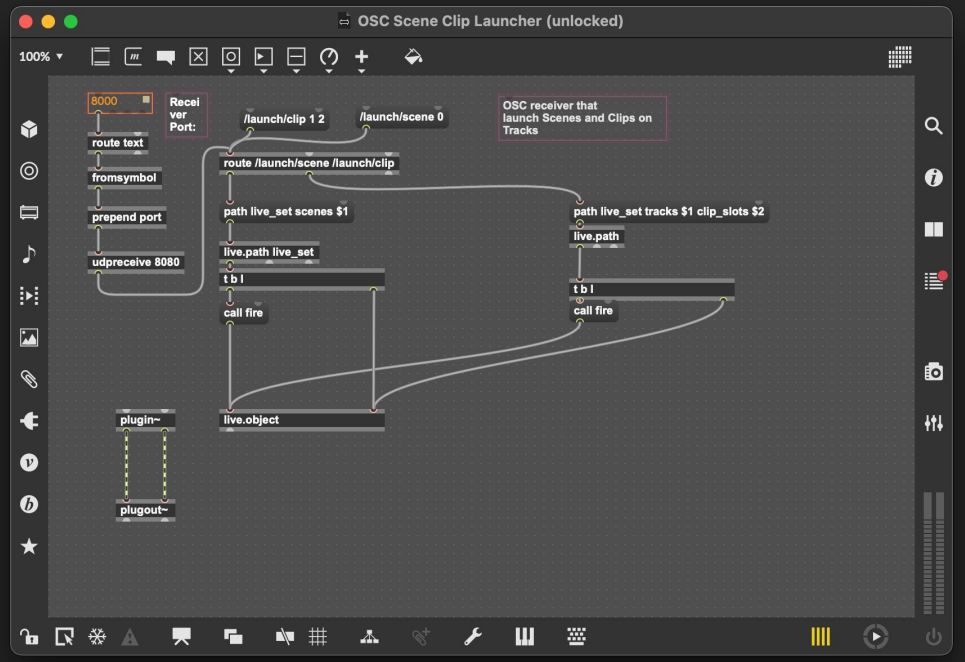
- GPS constitutes the last address sent from GyrOSC to Processing, with the address /gyrosc/gps.
- Send two values, latitude and longitude.
- These values are then used inside starsTable for the first reading of the database, to obtain a reference for horizontal coordinates of the star system.

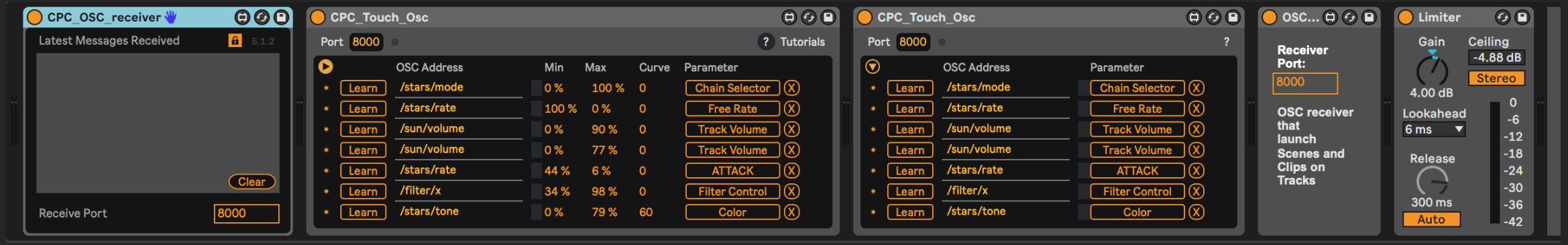


Sound Generation

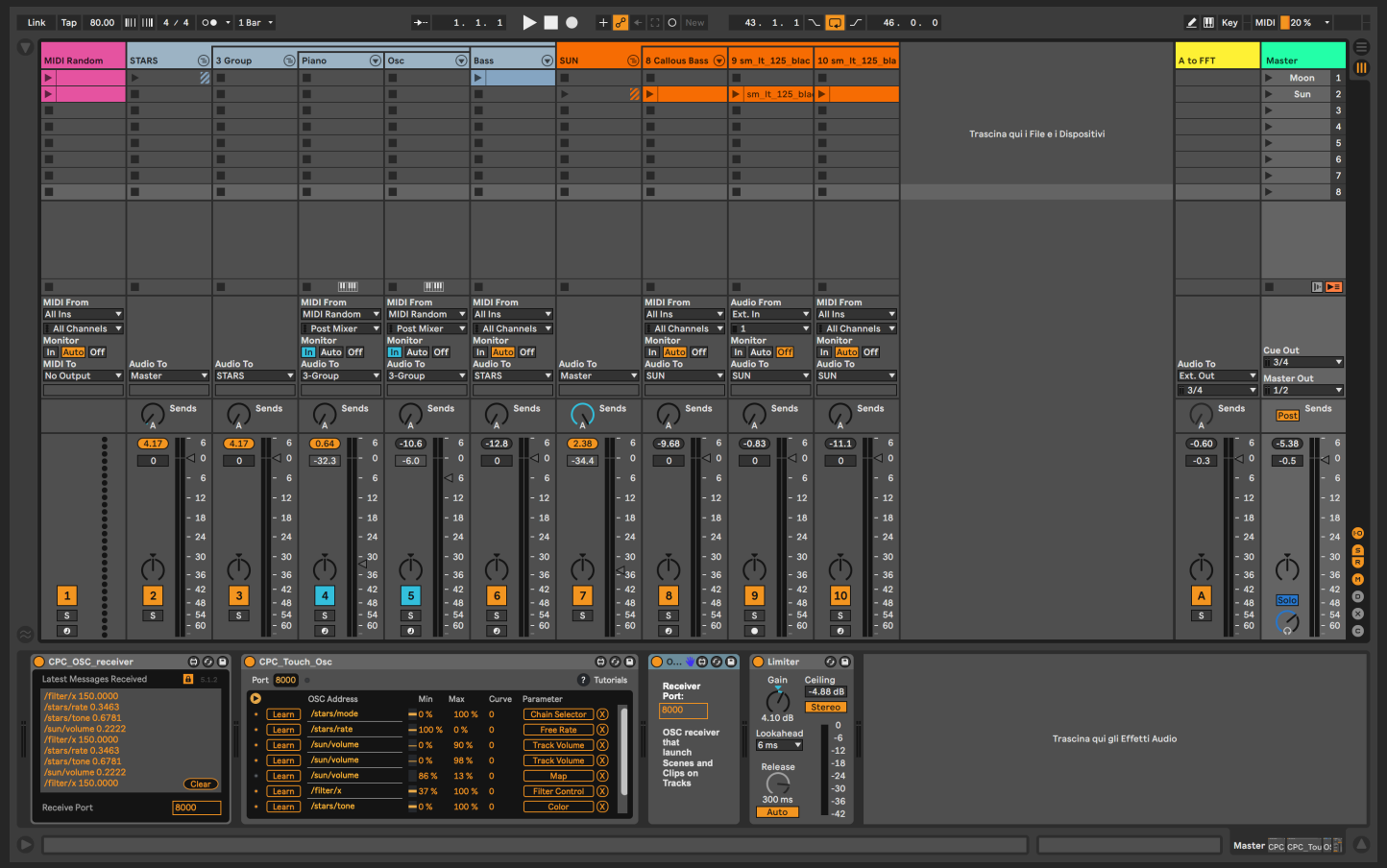
The OSC messages are received through the device of the Connection Kit.

The scene change is driven by a custom device built in M4L.





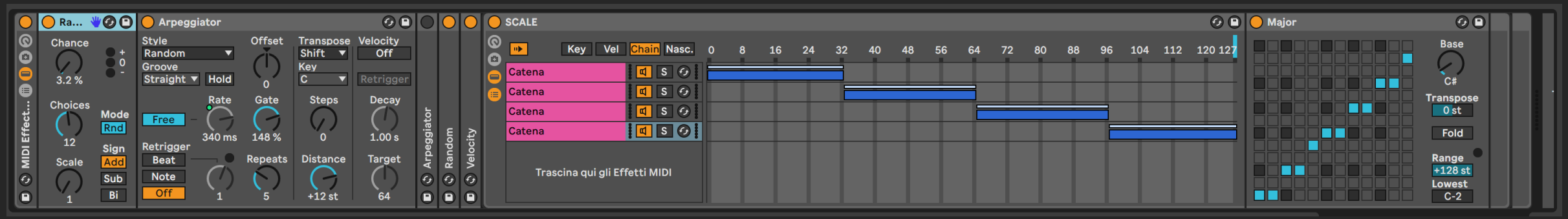
Sound Generation – Scene Overview



Sound Generation – MIDI notes

- Arpeggiator
- Random
- Velocity
- MIDI Chain Selector: Scale selector

The arpeggiator rate is driven by the value of the star's density



Sound Generation – STARS

- FM Oscillator - Night time
- Piano – Day time
- Bass Synth

The Filter of the Bass synth is controlled by the accelerometer on the user's device.

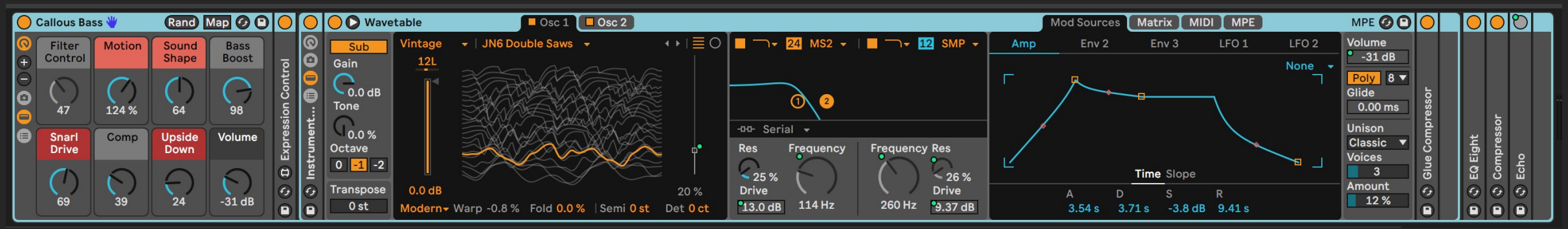
The note are generated by the MIDI notes generator.

Sound Generation – SUN

- Sonorization of the sun's electromagnetic waves
- Chopped sample of the electromagnetic waves (Simpler)
- Bass Synth made with wave table

The Filter of the Bass synth is controlled by the accelerometer on the user's device.

The section's volume is driven by the position of the sun, which is sent to the FFT visualization.



DEMO

Thanks for your attention

Special thanks to
Dr. Lorenzo Pizzuti
Cosmologist, Musician and Scientific Communicator