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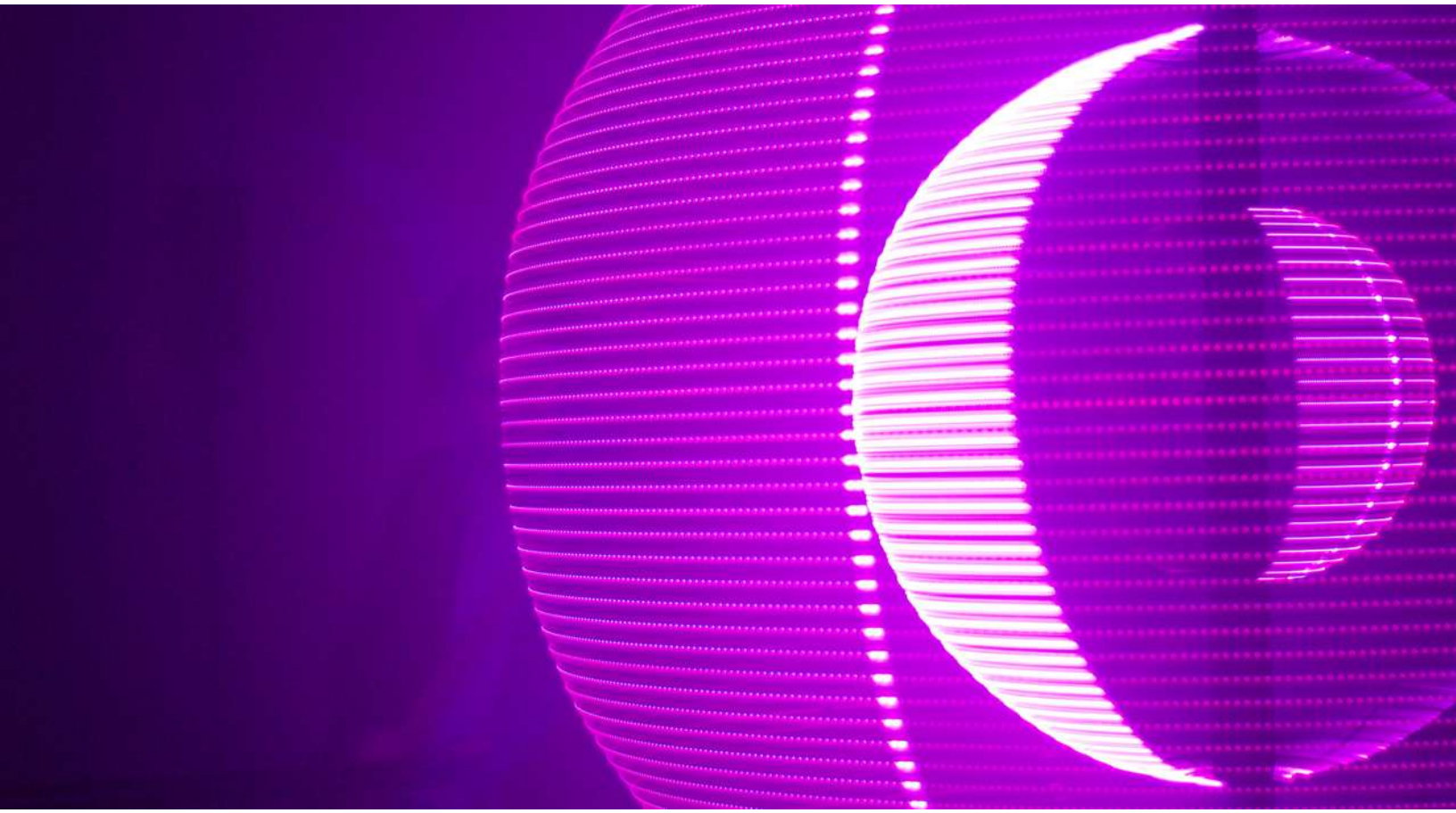
THE PARTICLE: Interactive kinetic sculpture Concept



Last four billion years the earth was a glowing sphere with the surface just covered with a thin crust continuously pounded by the frequent fall of meteorites that at the time still inhabited this solar system. Present in this continuing chaos were all the elements necessary for life to emerge. With the continuing input of energy from the sun The chemical reactions of atomic particles generated molecules of a substantial degree of complexity. Many other complex substances in much lower proportion appeared as well. Eventually the early atmosphere took shape, containing large amounts of molecular variationes. Shortly after the stock of atoms was transformed into a molecular soup, the planet's extreme weather conditions caused yet another transformation, shaping the next generation of molecules, even more complexed. Chance significantly influenced the creation of new molecules, shaping millions of new combinations every day throughout the planet. The unstable molecules disappeared quickly. the most stable molecules persisted long enough to find where way in to the further experiments in search to evolve. one after another, day after day, year after year, millennium after millennium. However complex the molecules were, the remained inert. It took hundreds of millions of years of natures experimenting to give birth by chance, to the first molecule capable of replicating it self.

"The particle" explores these processes of creation and elapsing. Evolving from randomness with external stimuli represented by the influx of visitors at the facility, creates a breeding ground leading to the emergence of new forms and behaviors, some complex, some simple. elapsing or enduring over the time.

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Concept

"The Particle" is a kinetic sculpture that experiments with color, sound and movement. The continuous rotation, speed and light create visual POV, effects that define the spatial structure of the object. The translucent skin created from the moving light becomes visible, creating shape and volume, both inside and outside the object. How light emerges from the limited movement of each of the rings when there is a change in external conditions (visitors) or there is a random mutation. The sculpture forms and reacts by generating events that modulate the sound and space, constantly changing atmosphere and perception. Given that the regulatory mechanism of the entire design is based on the decision making haphazard manner, the new models are emerging from the previous naturally. The vibration of sound, color and visual patterns evolve into chaos or order according to evolutionary algorithms that govern it. The structures generated in this process can not be anticipated and evolve through continual iterations involving alterations to the programs and exploring the changes through interaction with the visitor and the software. The object, at the same time is a space for sensory and kinesthetic experience, a body with its own internal resonance.

A surround sound system that reacts around the space occupied by the sculpture defines and becomes one with the movement and light.
The system can operate in different modes:

1- "stand alone" which generates a composition of light and sound under the parameters and the composition of the artist.
2- "reactive" where a sensor monitoring system analyzes the visitors movements in the exhibition space.
3- "touch" where the public can manipulate and play with different compositions according to the parameters of a touch interface on a screen or manipulate such portable devices able to send data using the OSC protocol (open sound protocol over iphone/itouch module or another devices).

Technically, the specially designed iron structure of the sculpture provides as much balance and safely as possible. The lighting system is supported on four semicircular hoops that rotate at high speed from a central hub connected to a three-phase motor. Each light ring is formed by a high number of RGB LEDs controlled by a specific and custom made hardware designed for this piece. Each of the four RGB controllers receive control information in real time wirelessly and each microcontroller generates PWM control signals for each channel. The system has 4,096 Brightness levels (12bit resolution) and each controller has a zero-cross reference on the axis given by a magnetic sensor that picks up the lap times creating the perfect timing for the refreshment of information. The software was programmed using MaxMSP platform that allows to compose a wide range of combinations of light and sound syncing and trying the parameters together from the same synthesis process.

The upshot is the creation of shapes and light patterns in three dimensions. This forms can stop, rotate and move faster or slower creating beautiful kinesthetic effects. The technique used is the apparent motion perception, namely that obtained from the observation of sequences of still images as projected successively on a movie screen or a televisior or a computer monitor. This visual effect also called persistence of vision (POV) is the theoretical capacity of the eye (or retina) to keep the last image that comes to him, making an object is perceived even when it's gone. Many experiments with this technique were popular in Victorian times. A familiar example is the drawing of the bird and the cage: a bird was sketched on one side of a sheet and a cage on the other side. Sticking a rod through the leaf. By turning the blade quickly rubbing a rod saw the image of a caged bird. Another example is a zoetrope. POV technique was discovered by the Belgian scientist Joseph Plateau as an image that showed the human retina remains in a split second before disappearing completely. This allows us to see reality as a continuous image sequence and we can easily calculate the speed and direction of a moving object, if there were, we would spend the reality as a quick succession of separate images and static. Plateau found that our eye sees at a rate of 10 frames per second, which we see not as independent thanks to the persistence of vision. Under this phenomenon superimposed images on the retina and the brain "binds" as moving a single continuous visual image. The film exploits this effect and causes the "link" projecting more than ten frames per second (usually 24), which in our brain generates the illusion of movement.

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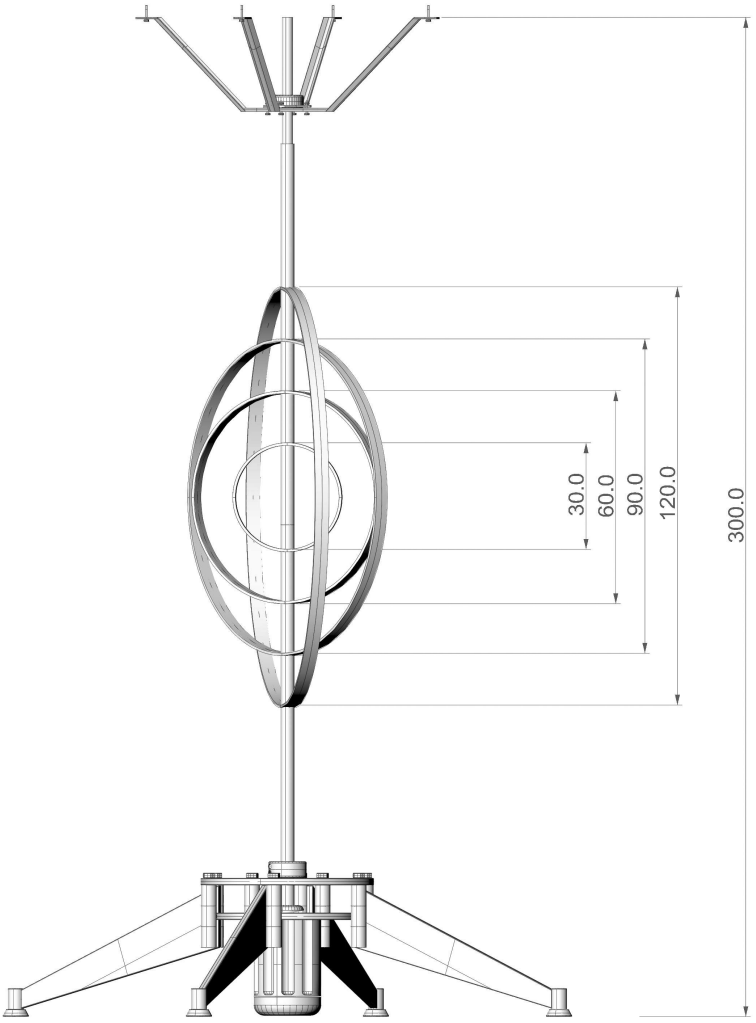
THE PARTICLE: Interactive kinetic sculpture
Technical document

"The Particle" is a kinetic sculpture that experiments with color, sound and movement. A sensor monitoring system analyzes the users movements in the exhibition space. Around the space occupied by the sculpture defines a surround sound system that reacts and becomes one with the movement and light. The piece uses RGB LED technology controlled wirelessly from a computer. A software manages all information and real time motion continuously sending data to sculpture to change its state.

Dimmensions



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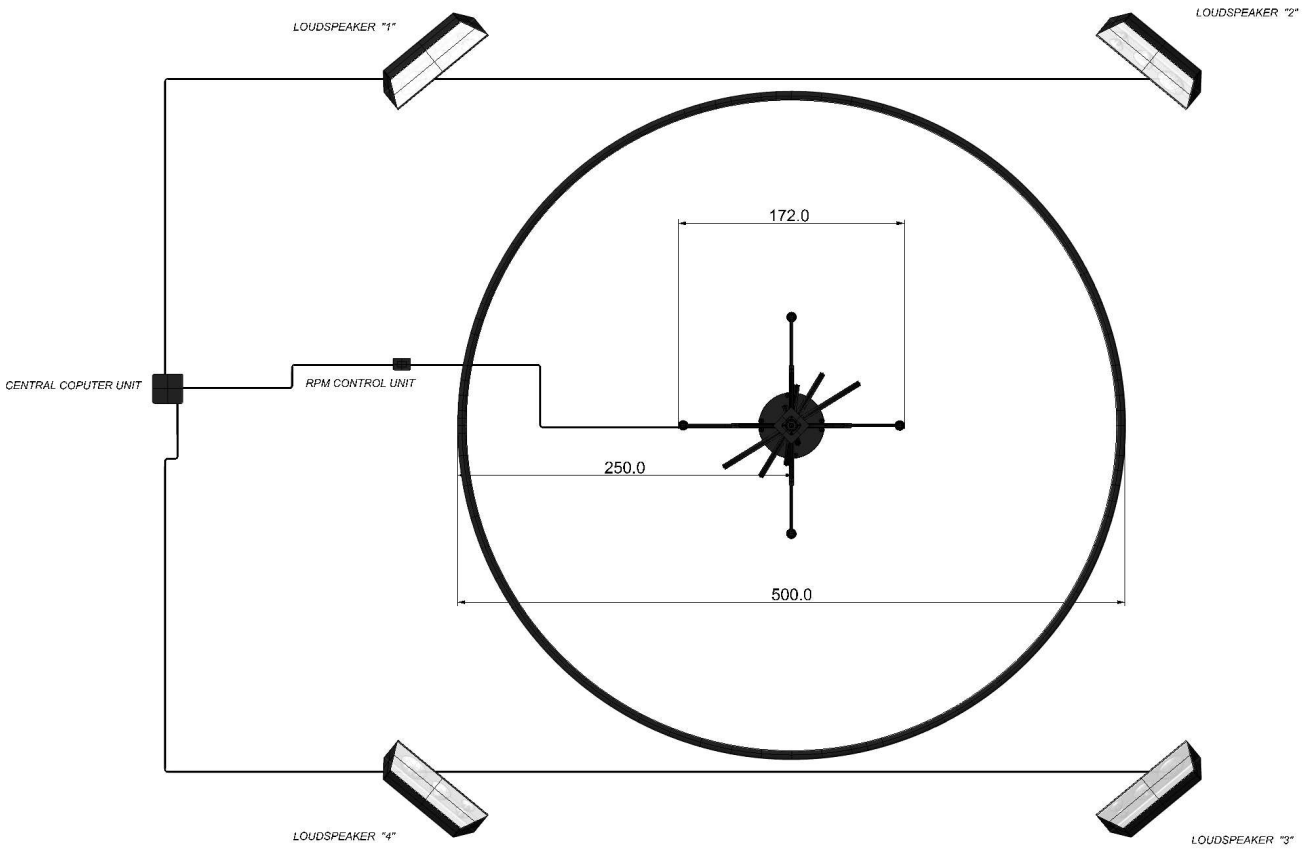
Specifications

Dimmensions



Real time control

Hardware / Soft	Minimac with OSX Application developped in MAXMSP Multioutput audio card (4 channels minimun)
Sound	4 monitors - 400W RMS minimun power. 1 subwoffer - 2000W ideally
Electronics	Custom electronics and sensors with wireless communication with the computer.

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Specifications

Physical

Size	Dimmensions of The Particle base is 140cm x140cm but it need 2.5m radius as a safety area. 3m high.
Weight	150kg
Lighting	4 rings of rgb led strips. Every ring has 16 millions of colours and every color has 4096 PWM levels.
Sensors (interactive version)	1 hall effect sensor sensor that measures rotation speed 4 IR movement sensors. Sensor distances: 4m
Construction	Structure made of iron. Rings made from aluminum.
Particular conditions	Dark space (black walls and floor) and security fence for the Public.

Electrical

Power	220 VAC for the three phase motor regulator. Motor 1.5kW 220 VAC for the RGB leds. Light and electronics: 650W
Communications	Zigbee protocol betwen the electronics and the computer. 2.4 Ghz wireless connection.

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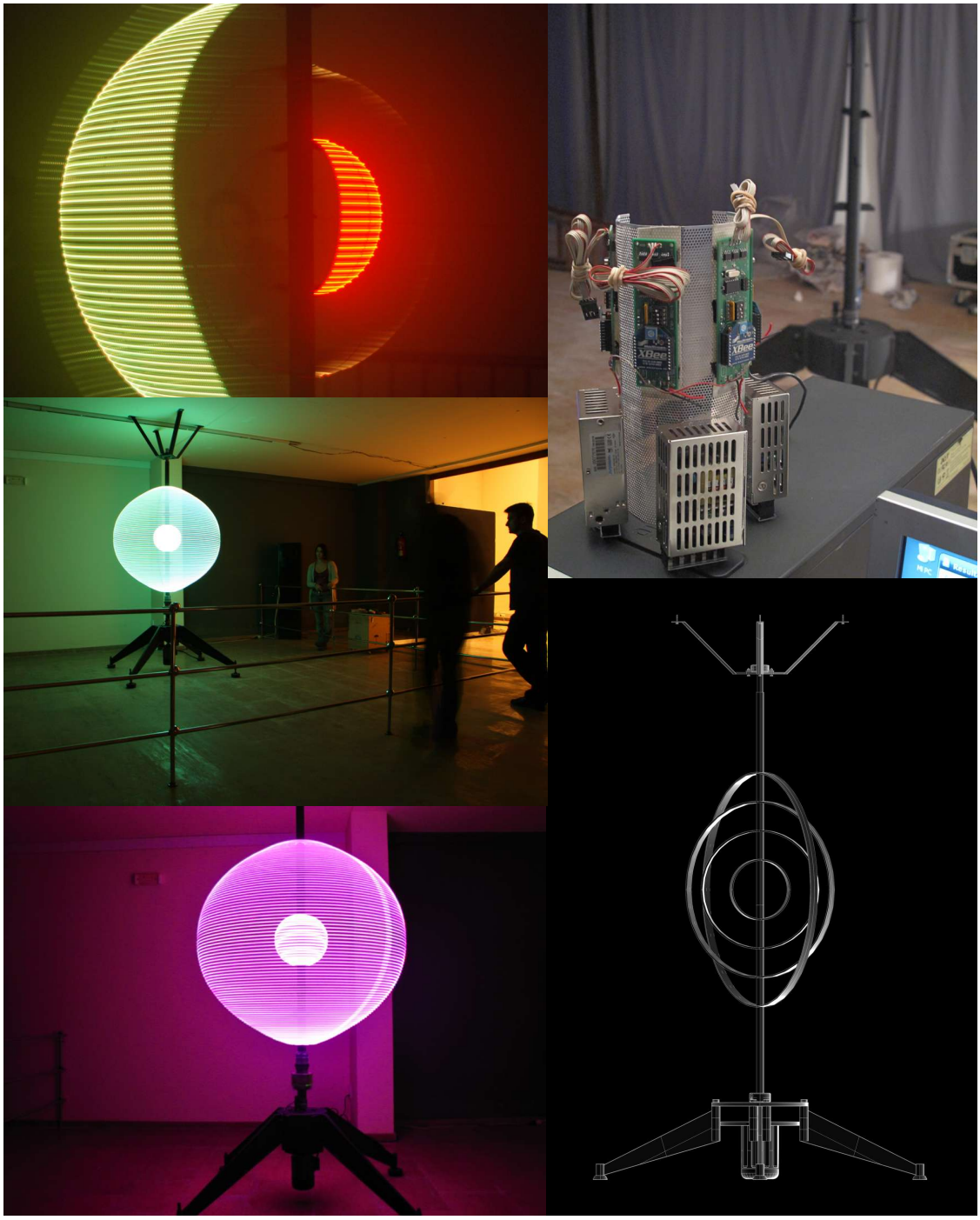
Specifications

Pictures



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Specifications

Cases