

Proposal

The Celestial Office

THIS = THEN = THAT

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PROJECT DESCRIPTION

“The Celestial Office” will take place in an empty office room in a tall building in the middle of the city. The office room will be modern and neutral. It will not have any windows and therefore will be a hyperbolic example of how disconnected city-dwellers are from nature and the movements of the cosmos. Working in such an isolating environment day in and day out can cause a person to lose touch with a larger perspective. This type of lifestyle and environment can cause people to forget that they are beings that are a part of a greater cosmos.

The project will not be solely restricted to office workers, it will be designed for anyone who currently lives in an urban area, and who may not have access (either time, money, or mobility) to be able to drive to a rural area in order to experience the night sky. It is also for those who might be losing their vision and are visually-impaired, and would like to experience the same wonder of the night sky but through a medium they can perceive. In this project, one will be able to sense the night sky in the room through sound and vibrations. “The Celestial Office” is for anyone whose environment or lifestyle does not allow them the time or ability to connect with the celestial bodies, and therefore lack the essential rest and perspective that comes with this experience.

The idea with this project is to use elements that would not seem out of the ordinary in an urban workplace interior. I would like to repurpose the PIR motion sensors which turn on lights in city buildings. I will also make sure not to include any organic materials in this space. The room will be mostly sparse, except for a desk and a few conventional office supplies. The room will have enough space for a few people to lie on the ground, which is how this piece would be best experienced. This room will seem like an empty office space and this will prime the user to feel comfortable in the space, because it will feel familiar and predictable. The elements inside the room will seem to make sense within their setting.

However the real function of this space will be to connect the users with the world beyond their urban environment. The piece is about bringing elements of the outerworld, in the case specifically the outer-planetary universe into a typical city

setting. The room will be equipped with an Arduino which will connect to two of NASA's APIs which store data in real-time about the coordinates of the planets and satellites that move around in our night sky. These coordinates will be interpreted by the Arduino to trigger certain sounds played through speakers and subtle vibrating motors around the room. This will in essence serve as a way of translating the experience of star-gazing into an experience that is tactile and auditory. A tactile and auditory experience is one that is best suited for an office space.

This piece strives to mimic the experience of stargazing in a variety of ways. The motion sensor, located in a corner of the room will detect whether the users are moving or staying still. When it comes to the actual experience of stargazing, the longer you stay and observe the sky, the better your night vision becomes and you are able to see more stars and satellites, and galaxies. Therefore if there is too much movement in the space, the arduino will decrease the intensity of the vibrating motors and the volume of the speakers. When the user learns to be still and observant of the happenings in the office space -- which are direct reflections of celestial bodies moving in space, then they will be rewarded with a heightened experience. This encourages the user to abandon the rituals that normally take place in an office space, including: the constant busy work, and the need to be (or seem) productive.

This project is intended to be empowering for its users. At this stage it is a theoretical concept, but it would be empowering to have spaces like these in urban areas where people can go to feel connectedness to the celestial bodies around them, and to be able to experience that same wonder and awe in a setting that is non-religious and has no religious agenda. The space also encourages conscientiousness and mindfulness. It is designed to take place in a ordinary office building, and it is in similar seemingly bland and bureaucratic buildings that important political decisions are being made that impact entire societies and the planet. I think it is disempowering to have people make these decisions in buildings that are designed to cut out nature and spirituality. This is a way restore a sense of awe of nature and outerspace in a corporate urban environment. The electronic materials that compose this project will blend in with the workplace environment however it's purpose will be opposite of what the office space was originally designed for. Having a place to engage with the movement of celestial bodies will bring in a new perspective which may influence some of the greater decision making that takes place in cities.

"The Celestial Office" sneakily brings the greatest mysteries of our universe into a room that would otherwise feel so detached from anything natural. It brings with it a spiritual and of course, existential questions in a landscape that seems designed to squash any philosophical musings in favor of increased economic production

With the spread of urbanization, more and more people are becoming disconnected with nature and with the elements that allow us to live. City-dwellers are unable to experience the night sky due to light pollution. I worry that by losing the experience to observe the night sky, city-dwellers might lose the instant perspective that one feels when becoming aware of other stars, satellites, and planets. All of our society's greatest political institutions are located in cities or in highly-populated areas. Densely-populated areas are designed in such a way that they do not allow for much connection to nature. I think

that re-designing our cities to incorporate more nature is a difficult task that will take a lot of time. I think that instead, we can use data and electronic components to amplify the natural environment and bring that environment into the city.

It would be hard to bring in greenery into an indoor building. There are issues of sanitation, pests, etc. However if we translate the outside environment into a language that makes sense to the urban landscape (such as wires, circuits, electronics), we could create pockets in the city where people can listen and feel similar sensations than what they would feel looking up at the stars in a rural area. I believe this conscientiousness would be important for city-dwellers to experience on a regular basis, especially because they live in the place where important political decisions are being made. I want to help emulate the feeling of wonder and awe that the night sky evokes in an environment where this feeling of admiration for nature is not often produced.

EVALUATION OF SENSOR

The main sensor for this project will be a motion sensor. I decided to go with the PIR motion sensor because it is a cheaper more common sensor which does what I am looking for. The sensor works by being able to detect objects and people who emit infrared radiation. It takes a snapshot of the spaces and delays a customizable amount of time before taking another snapshot. It compares the two snapshots and depending on the amount of difference between the two images, it detects motion. The PIR motion sensor comes with two adjustable potentiometers, one ('Delay Time') which controls how long the PIR will trigger an output to be on for, the other which controls the sensitivity of the motion sensor. The sensitivity potentiometer can affect the range in which the PIR motion sensor can cover. For my project, I want a sensor that will allow many people to be in proximity but if they are all still and focused on the experience I want the sensor to trigger an increase in intensity of the environment.

The motion sensor in the project would trigger the volume of the speakers to increase and the vibrators on the floor to intensify when it perceives there to be less movement in the room. This is done to mimic the experience of having a



An office building essential

[Image Courtesy of HomeDepot.com]



Open PIR

[Image Courtesy of SparkFun.com]

person’s eyes adjust to the dark when they are stargazing. Once you stay for one space for a while in a rural area, you are able to observe even more stars, and the stars begin to appear brighter than before. I want to mimic and subtly reward users who are motionless by creating a more intense experience for them.

STORYBOARD

The project would take place in a windowless room. Although the users are free to interact with the project in any way they choose, the layout will be designed to encourage the user to sit or lie down in the middle of the space.

The project will be making use of data from NASA’s open data initiative (open.nasa.gov). I will be focused on using the two APIs found on the NASA website and shown below. The first one is able to give live coordinates or planets and other objects orbiting the sun, while the other gives more specific information regarding asteroids, comits, and satellites. These are all elements that one can typically observe in the night sky, which is why these two APIs will be useful when bringing the experience of stargazing to a city room.

TLE API

The TLE API provides up to date two line element set records, the data is updated daily from [CelesTrak](#) and served in JSON format. A two-line element set (TLE) is a data format encoding a list of orbital elements of an Earth-orbiting object for a given point in time. For more information on TLE data format visit [Definition of Two-Line Element Set Coordinate System](#).

Further documentation and response examples are available at: <http://data.ivanstanojevic.me/api/tle/docs>

Available endpoints

The TLE API consists of two endpoints GET `http://data.ivanstanojevic.me`

Endpoint	Description
GET /api/tle?search={q}	Performing a search by satellite name
GET /api/tle/{q}	Retrieving a single TLE record where query is satellite number

SSD/CNEOS

Welcome to JPL’s [SSD](#) (Solar System Dynamics) and [CNEOS](#) (Center for Near-Earth Object Studies) API (Application Program Interface) service. This service provides an interface to machine-readable data (JSON-format) related to [SSD](#) and [CNEOS](#). If you are looking for human-readable data, please go to the main websites for [SSD](#) and/or [CNEOS](#). For further information on this API and its component services, please visit the [JPL SSD/CNEOS API](#) main website or contact contact-ssd-api@jpl.nasa.gov.

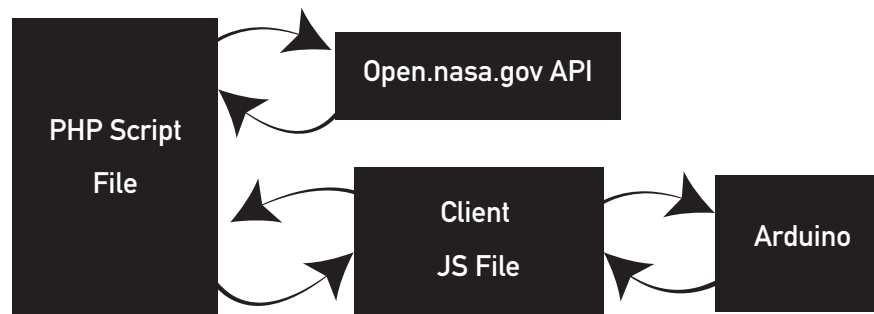
This API consists of the following component services:

API	Description
CAD	Asteroid and comet close approaches to the planets in the past and future
Fireball	Fireball atmospheric impact data reported by US Government sensors
Mission Design	Mission Design - Small-body mission design suite
NHATS	Human-accessible NEOs data
Scout	NEOCP orbits, ephemerides, and impact risk data

Originally I wanted to be able to use a sensor to measure a type of geological movement in the Earth and amplify the recorded data by recreating it in a room environment. I wanted to be able to measure and go beyond the scope of the Earth and introduce it into a smaller space. I did not want to create a piece that would use sensors that would only react to human movement or biometrics. The equipment I have is not sufficient to create a sensor that would capture large geo-related movements and caused by the earth and other planets. However, NASA does have such equipment and shares a great deal of their data to anyone who would be interested. Therefore NASA’s API’s, which are filled with real-time information about celestial bodies will serve as a subsistute for larger sensors in my project. The installation piece “The Celestial Office” will be influenced and triggered by the movements of objects orbiting our Earth and sun.

The way the physical installation will function will be to create a PHP script which will continuously ask for and retrieve data from these APIs. Then JS file will request the information from the PHP script. The JS file will then parse out the data and only keep what is relevant (the coordinates of the object). When the coordinates are located in a range that is

viewable from the location of the room of the physical installation (were it not for the urban light pollution), this will trigger one of the sound files or vibration motors attached to the Arduino.



The above diagram showing how the Arduino will request and retrieve data from the API through the JS Client File and the PHP script is courtesy of Sabine.



SIMILAR PROJECTS

POSITIONS OF THE UNKNOWN

This art installation was created by a German artist collective called Quadrature. The installation features a long table upon which are a series of motorized rotating thin metal rods that are move and point to various directions. The art project is influenced by US military program called “Operation Moonwatch” which started during the Cold War. This program trained amateur scientists to locate and keep track of moving satellites. The program ended in the 1970’s, however the desire to pay attention to the moving objects in the sky persisted.

There is to date a group of amateur scientists who constantly keep track of satellites, and take special interest in the satellites that they can see but can find in any official government database. These civilians have created an alternative catalog of all these unknown satellites. The installation uses 52 small machines to point at these unknown and unreported satellites as they orbit our Earth. (<http://quadrature.co/work/unknown/>)

CERES

This project was developed by artists Hellyn Teng and Yuchen Zhang for their company Wearable Media. The Ceres project is a wearable suit that is designed to make the user sense when asteroids are approaching the earth. It is said to elevate the human body into “celestial sensing body.” Vibrators throughout the textile suit allow for the user to sense the frequency and range of the nearby asteroids. There is also an LED component to the suit which enables anyone near the suit to visualize the velocity and brightness of the approaching asteroid. The brighter the LEDs are the closer the asteroids are to Earth. Similar to my proposal, this wearable textile makes use of one of NASA’s API. The one the artists are working with for this project is called: NASA’s Asteroid Neo-Ws RESTful API. This project achieves what I would also like to achieve, which is to allow humans to have a heightened sense of what happens in the cosmos, even if their environment or socio-economic status does not allow them the ability to travel to a place where they might be able to experience stargazing in its natural form. (<https://www.wearablemedia.co/ceres>)

COMPARISON

My proposal for “The Celestial Office” builds off of the previously mentioned projects. I like the amount of mystery that can be created by 52 small machines when you know what the significance of what the machines represent. It’s this kind of awe and wonder that I hope to create in part with the Celestial Office proposal. The asteroid suit has a similar purpose as my project: it aims to bring instances of celestial happenings closer to humans. However my installation will go a step further by creating an environment which will be able to host many people together, creating a shared experience of artificial skywatching.