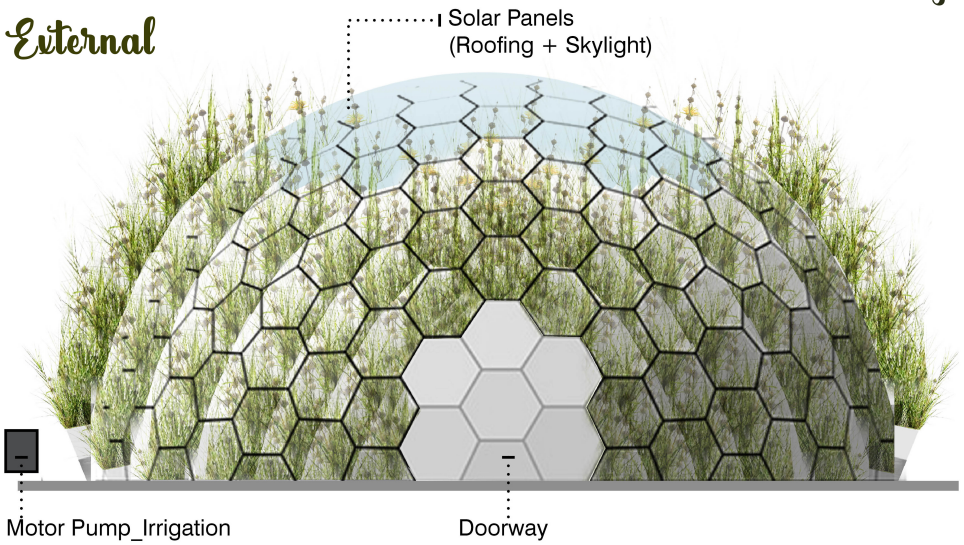
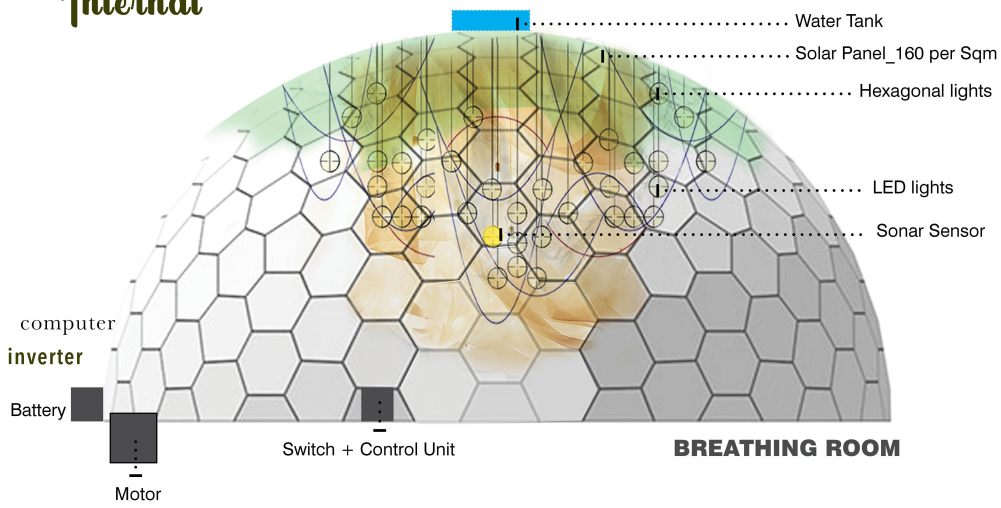
BreathingRoom
The Parts

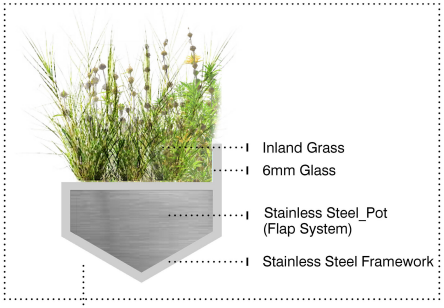
External



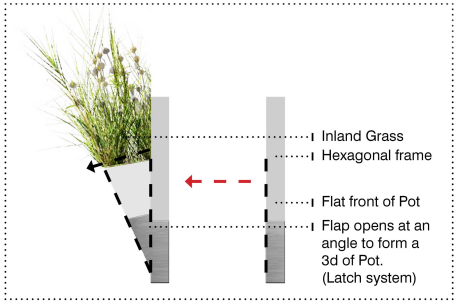
Internal



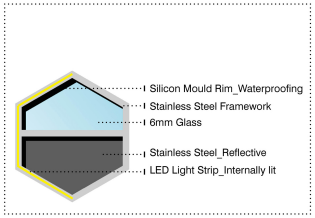
SKYLIGHT ROOF WITH SOLAR PANELS



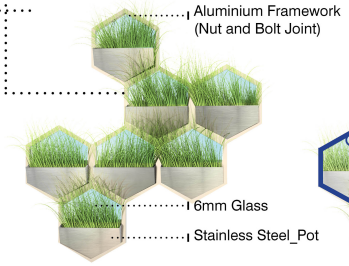
HEXAGONAL MODEL_EXTERIOR



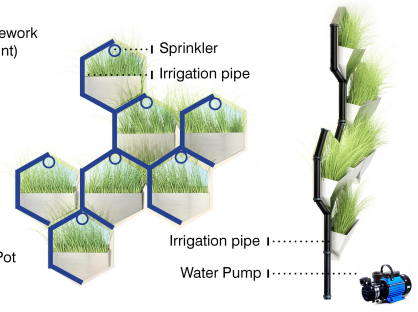
MODULAR FLAP POT



HEXAGONAL MODEL_INTERIOR



MODULAR PROTOTYPE



DRIP IRRIGATION SYSTEM

UWB

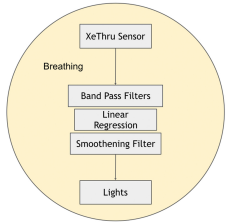
Ultra-wideband (also known as UWB, ultra-wide band and ultraband) is a radio technology that can use a very low energy level for short-range, high-bandwidth communications over a large portion of the radio spectrum. UWB has traditional applications in non-cooperative radar imaging. Most recent applications target sensor data collection, precision locating and tracking applications.

We are using ultraband for precision locating miniscule chest movements while breathing.

Digital Signal Processor

We use a DSP that gets the raw signal data from the XeThru sensor and then processes it in real time by passing it through various band pass filters to get rid of the noise. Once we get a 75-85% clean signal, we run it through linear regression filter to mathematically compute for the missing or out of range values.

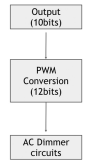
Finally we pass the entire signal through a smoothening filter and send the smooth graph to the lights.



Lights Control Hardware

We wanted to control incandescent lights using a digital signal hence we needed to create custom hardware to convert the digital signals back to analog.
We used 4 x 16-Channel 12-bit PWM Drivers then connected the signal to AC dimmer circuits specially designed to handle long time continuous dimming.

The signal from the DSP is fed into the PWM drivers which upscales the resolution of the 10bit (1024) signal to 12bit (4096) which makes the signal almost continuous.



*Size and theafore model of the dome is variable, as is the size of the lighting installation