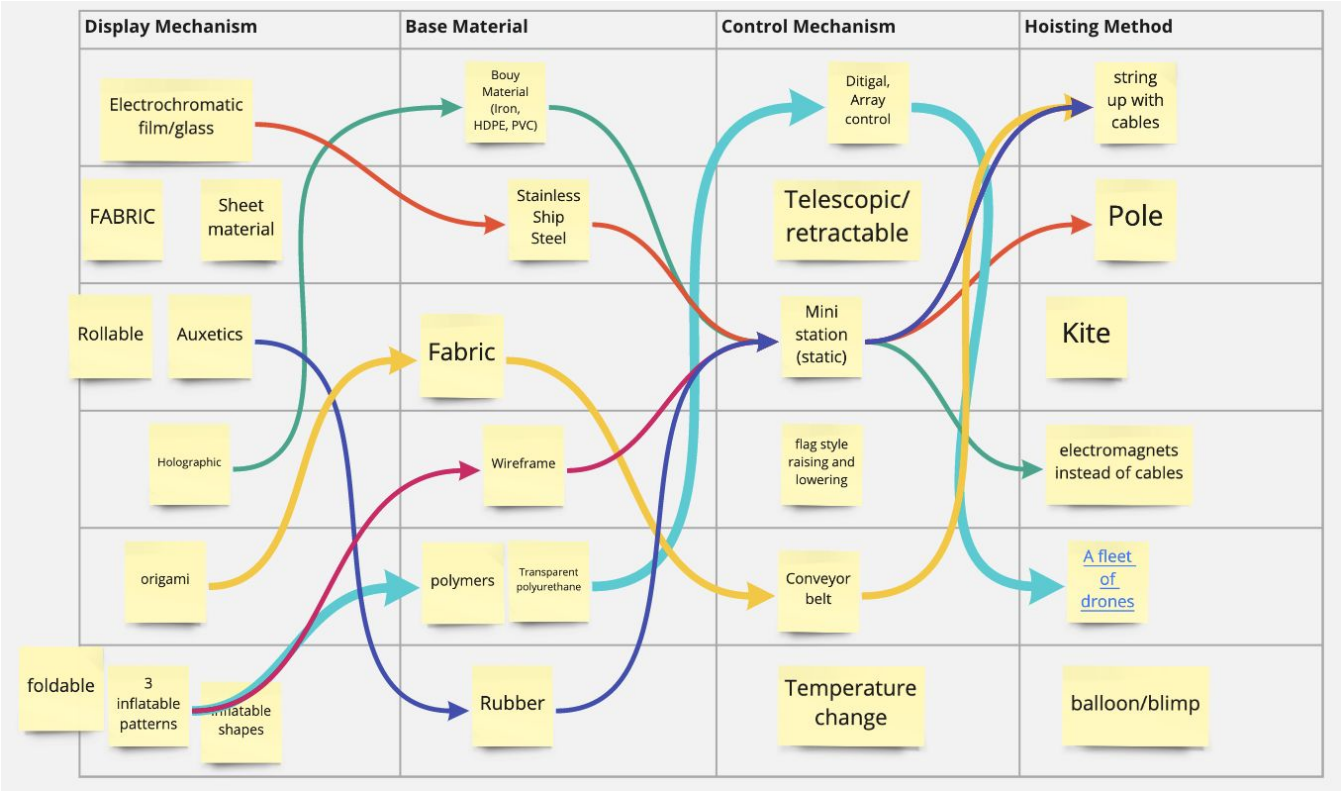
Electrochromic

Team 5: Brandon Tan, Harvey Wong, Xinyu Bai, Jonathan Tang, Andy Ferdinand

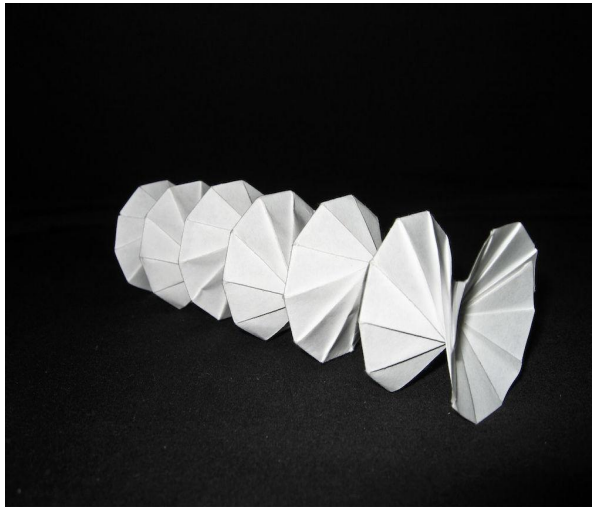
IDEATIONS

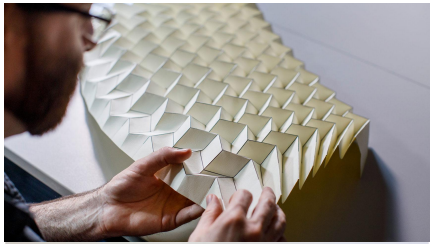
Morphological Analysis

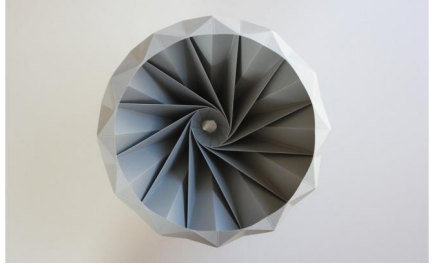


IDEA 1

// Origami

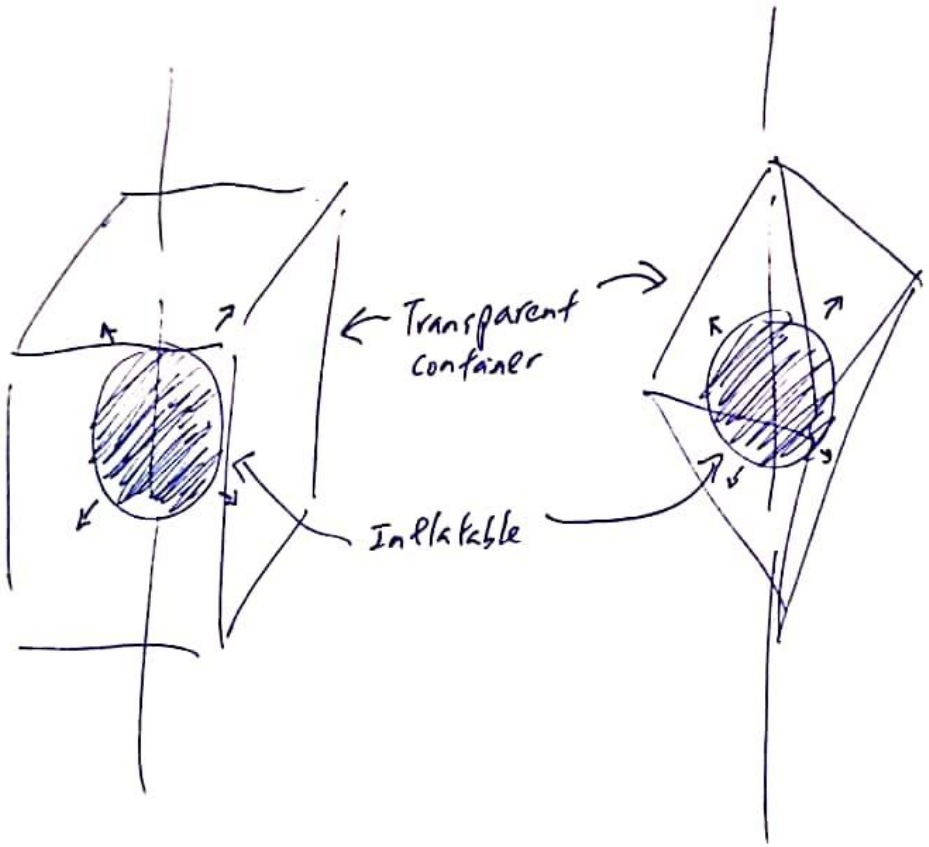






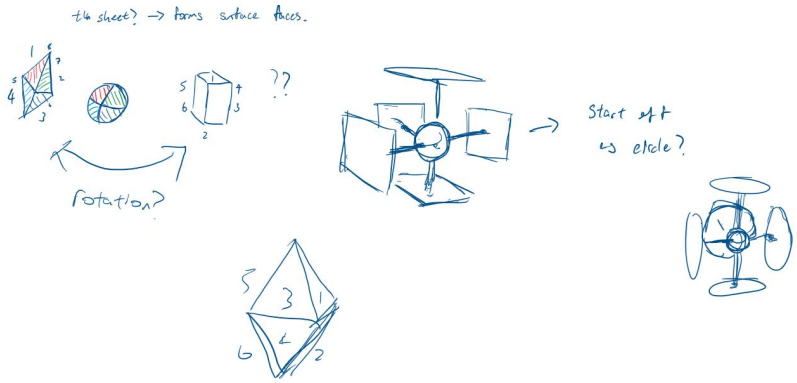
IDEA 2

// Inflatable



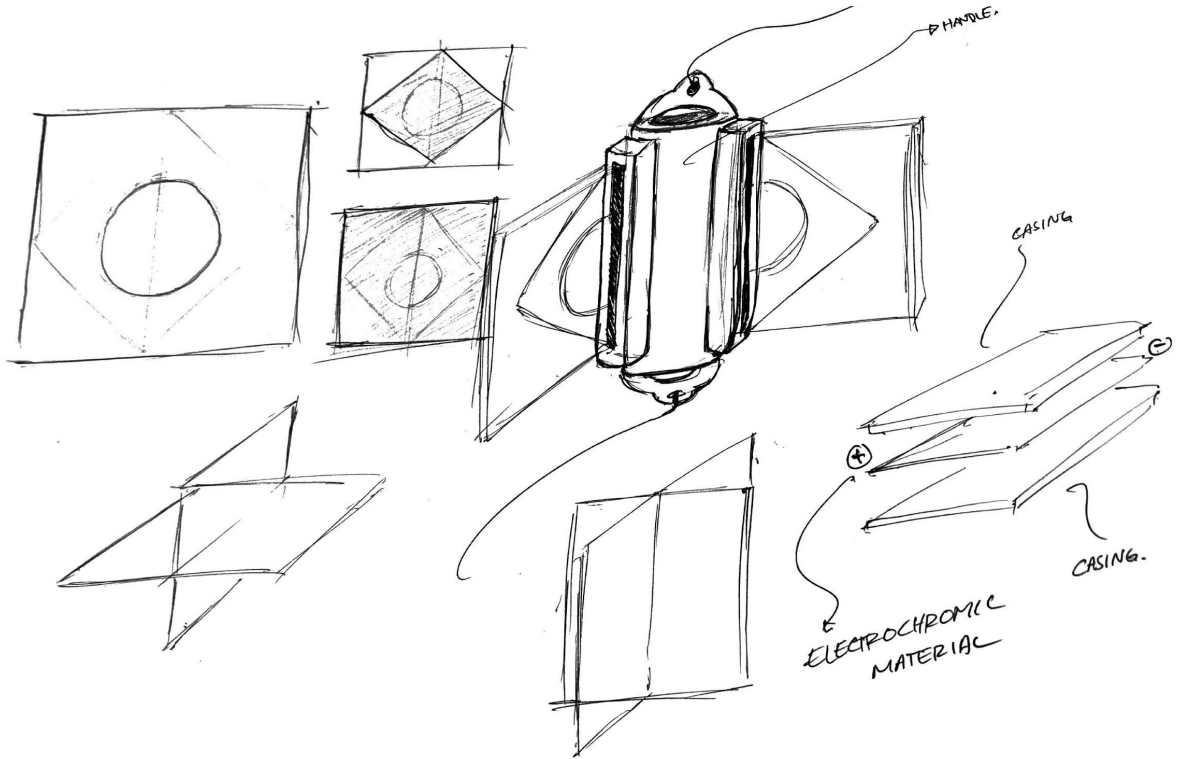
IDEA 3

// Auxetics



FINAL IDEA

// Electrochromic



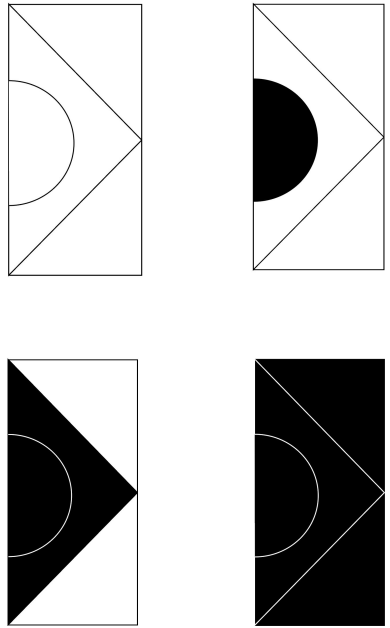
Current Applications

Shape Control

```
def getPattern(dayshape):
    if dayshape = "Towing":
        pattern = ['empty','diamond','empty']
    if dayshape = "RAM":
        pattern = ['circle','diamond','circle']
    if dayshape = "CBD":
        pattern = ['empty','rectangle','empty']
    if dayshape = "NUC":
        pattern = ['circle','circle','empty']
    if dayshape = "Aground":
        pattern = ['circle','circle','circle']
    if dayshape = "Anchor":
        pattern = ['circle','empty','empty']
    return(pattern)
```

```
def getCircle():
def getDiamond():
def getRectangular():
def getEmpty():
```

```
def detectShape(pattern):
    for item in pattern:
        if item == 'circle':
            getCircle()
        if item == 'diamond':
            getDiamond()
        if item == 'rectangle':
            getRectangle()
        if item == 'empty':
            getEmpty()
```



Opacity

Transmission Rate
55%

Sheet Thickness
0.4mm

Optical Transmission Rate (3 Sheets)
16.6%

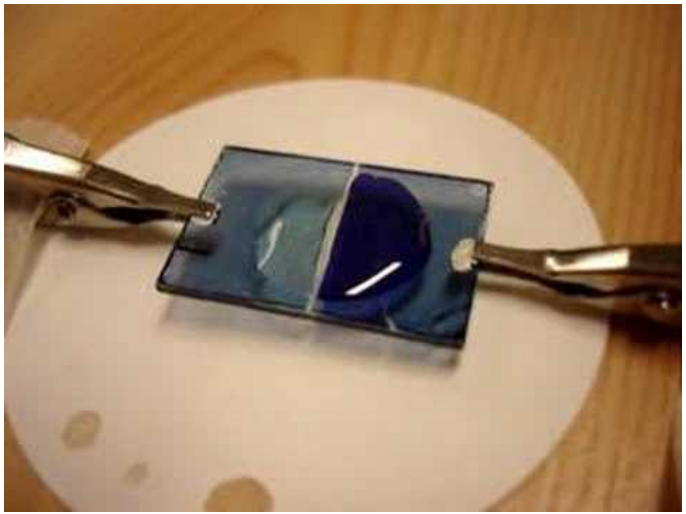
Opaque State
<5%

Clear Rate
80%

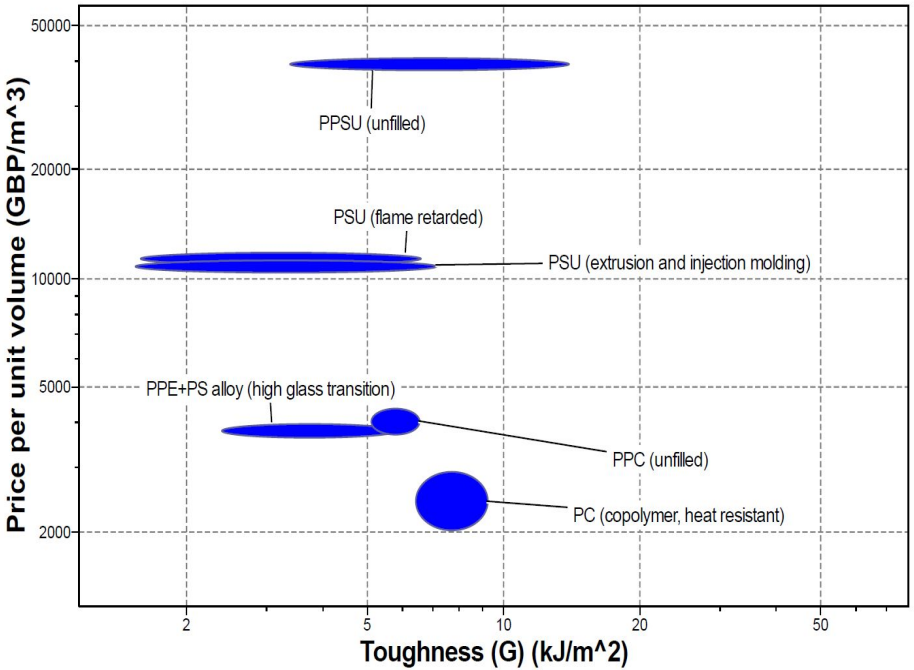
Specifications

According to a report from Office of Scientific and Technical Information (OSTI):

- Peak power consumption = 0.260- 0.320 W/ft^2
- Each panel is 2.10 m^2 = 22.6 ft^2
- Power for each panel = 7.23 W
- Average Voltage required = 1.50 V
- Current required = 4.82 A



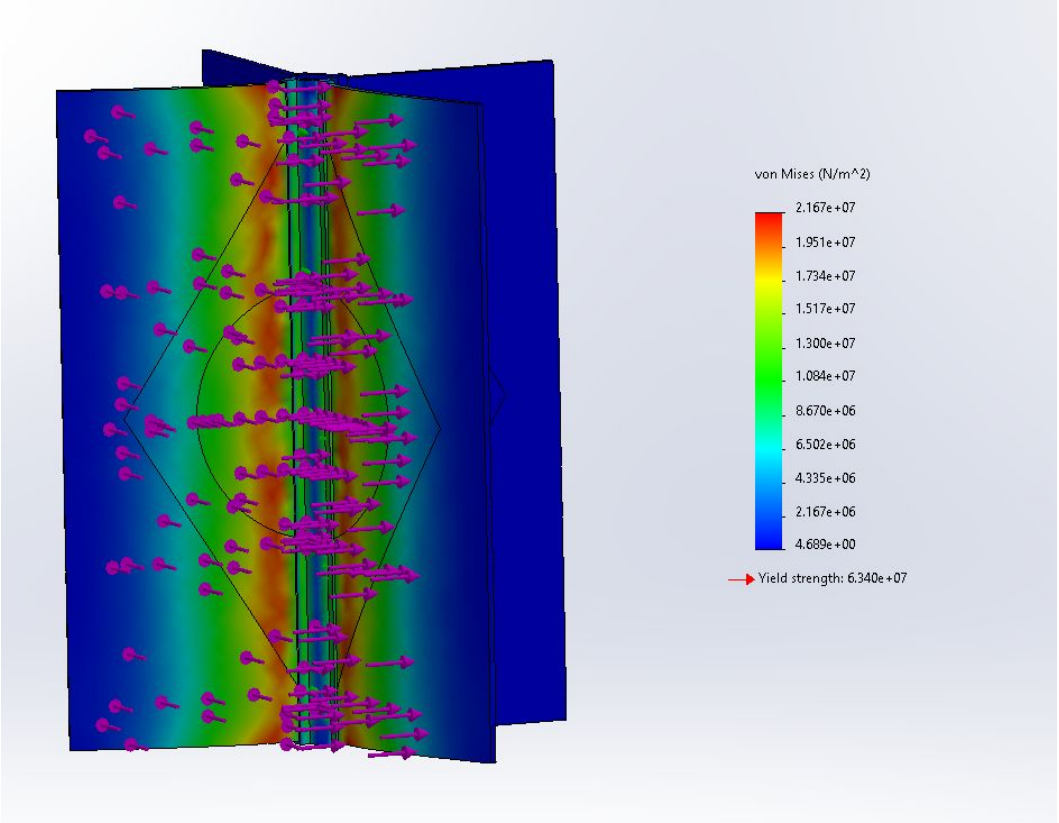
Casing Material

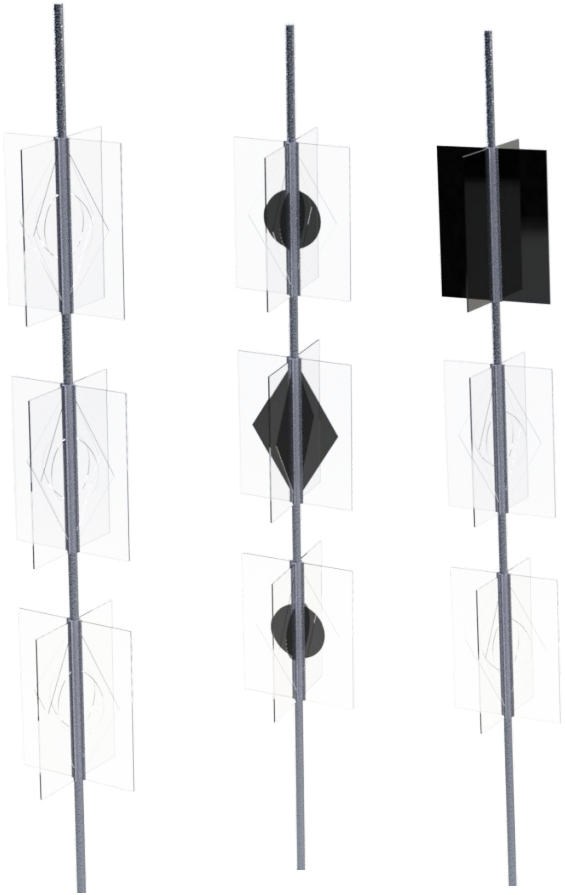


- Transparent
- Cost and commercial availability
- Durability

Finite Element Analysis

With a safety factor of **10** the maximum stress is **3 x less than the maximum yield strength** of the material





Electrochromic

Versatility

One device can create 3 different patterns by varying the opacity of glass using electric current. 3D patterns are formed using 4 plates at 90º angle.

Protective Casing

Casing is made out of Polycarbonate which protects the electrochromic sheets from natural hazards and extreme climates in the oceans.

Low Energy

1.5 V Battery supply
7.23 W is required per panel

OCEAN INFINITY

Seabed Intelligence