Developing Form Factors for Rechargeable Sea Turtle Deterring Buoys

SenSIP Algorithms and Devices REU

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ABSTRACT

- Create a buoy that can withstand up to 6 atms
- Device does not get tangled in fishing nets
- Allows for convenient charging
- Translucent

MOTIVATION

- Fishermen in Baha catch 48 turtles per day
- Research shows that light can be used as a deterrent
- Current solutions produce excess waste and are too costly

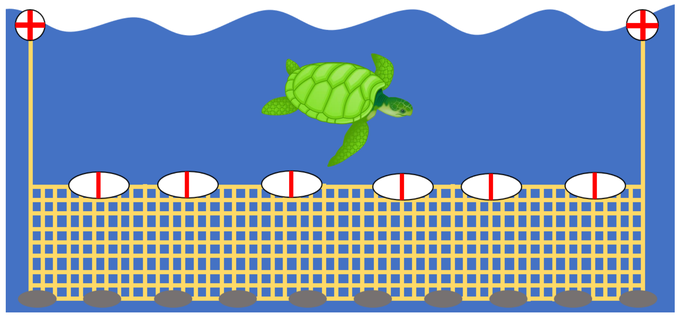
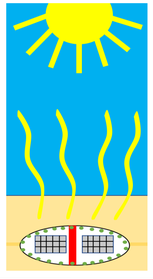


Figure 1: Typical net used by fishermen

PROBLEM STATEMENT

- Balancing pressure resistance with other criteria
- Buoy should utilize renewable energy
- Buoy should stay lit for up to 48 hours



TESTING THE DEVICE

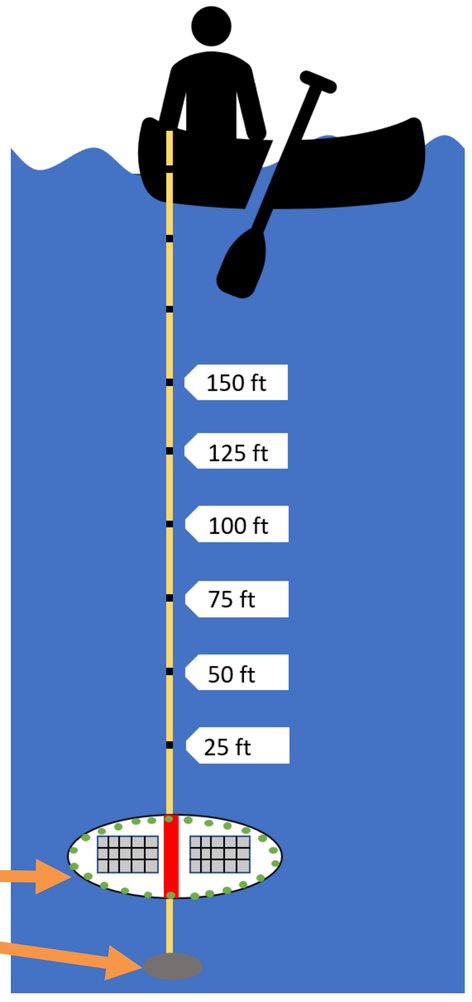
- Numerous prototypes will be 3D printed and resin coated
- Prototypes will then be depth tested
- 6 atms can be reached through strong material or via counter-pressurization

Related Equations

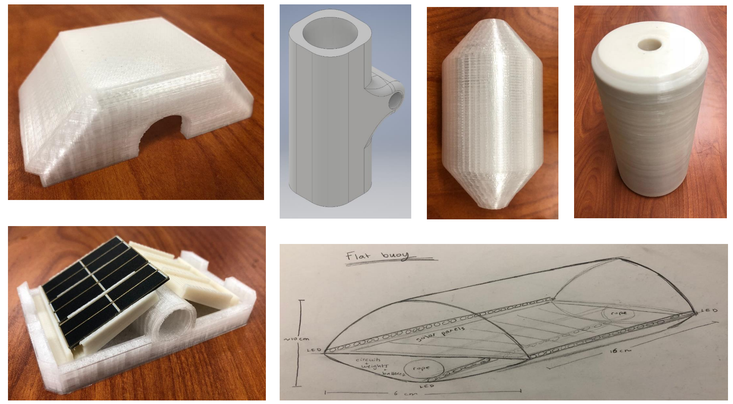
- P=1+0.1d
- PV=nRT
- F=P/A
- $F_B=\rho Vg$

Where…

P=Pressure (atm)
V=Volume (L)
n=moles of gas
d=depth (m)
T=Temp. (K)
F=Force (N)
A=Area (m^2)
F_B=Buoyant Force
P=Fluid Density
g=Force of Gravity



PRELIMINARY DESIGNS



	Polycarbonate	ABS	PETG	Nylon
Tensile Strength (psi)	1.45*10^4	7.00*10^3	7.70*10^3	1.2*10^4
Durometer	D80	D100	D85-95	D80
Density (g/cm^3)	1.21	1.05	1.27	1.15
Translucence	Yes	No	Yes	Sometimes

REFERENCES

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2. Reidenberg, Joy S. "Anatomical adaptations of aquatic mammals." *The Anatomical Record* 290.6 (2007): 507-513.

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