I. Abstract

Our future technology vision is to go scuba diving without the tank. The underwater breather will last for as long as you want to go because it filters the oxygen out of the water so you could go one day straight. It will also be able to detect and identify dangerous animals that can hurt you, and it will notify a lifeguard if you are in danger.

II. Description

1. Present Technology

Some equipment that exists today to breath underwater is scuba equipment which includes a scuba mask, oxygen tank and regulator, as shown below in the picture. There are lots of limitations to the standard scuba equipment such as the tank being heavy, having a limited amount of air, you could also run out of air under water, and you would have to fill the tank up multiple times so we are trying to find a way for the underwater breather to go deeper than any other scuba masks.



The Exolong is a way to breathe underwater by taking air from the surface and using your legs to power the device however, the limitations to this device is that you have to be in shallow waters and you can't go deep diving with it.

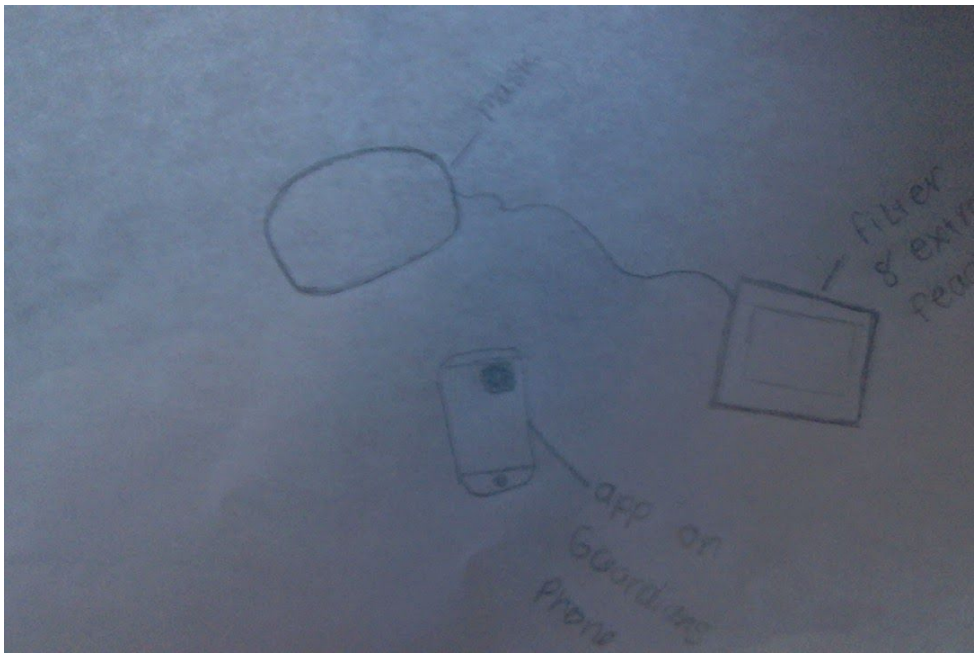
2. History

In 1942 during the German occupation of France, Jacques-Yves Cousteau and Emile Gagnen designed the first successful open-circuit scuba, a double hose system called the Aqua-Lung. Their system combined an improved demand regulator with high-pressure air tanks. This was patented in 1945**.** Before this you could either hold their breath or snorkel made out of a hollow reed.

3. Future Technology

The UB or “Underwater Breather” is a technology which is like a scuba tank but instead it uses electrolysis which will filter oxygen from the water, and will release any parts of the water except the oxygen which will go through the air tube that connects to the face and will make the person wearing the mask be able to breathe underwater for as long as they would like. Some extra features are that

when your heart rate goes up or you stop breathing it will notify a coast guard or a rescue team, there is also a tracker on the mask so they know where you are. Another feature is if you are close to an animal it will detect and identify it and will flash red if dangerous. It will do this by using a sensor that detects animals just like whales using echolocation. When the sound bounces back it will automatically be sent to a computer and the computer will quickly identify it and then flash red if dangerous. If somehow something happens with your mask and you are drowning you can press a button on the box strapped to your bathing suit and it has an inflatable floaty that will push you to the surface of the water.



This is a picture of the mask, and it has an app to go with it. If the app senses that the water pressure is too deep, the app can notify the guardian or lifeguard that the person needs help getting back to the shore. The mask can also detect if there is a dangerous animal nearby and it can filter all the oxygen from the ocean or a lake into the light weight mask so that the person wearing it can breath.

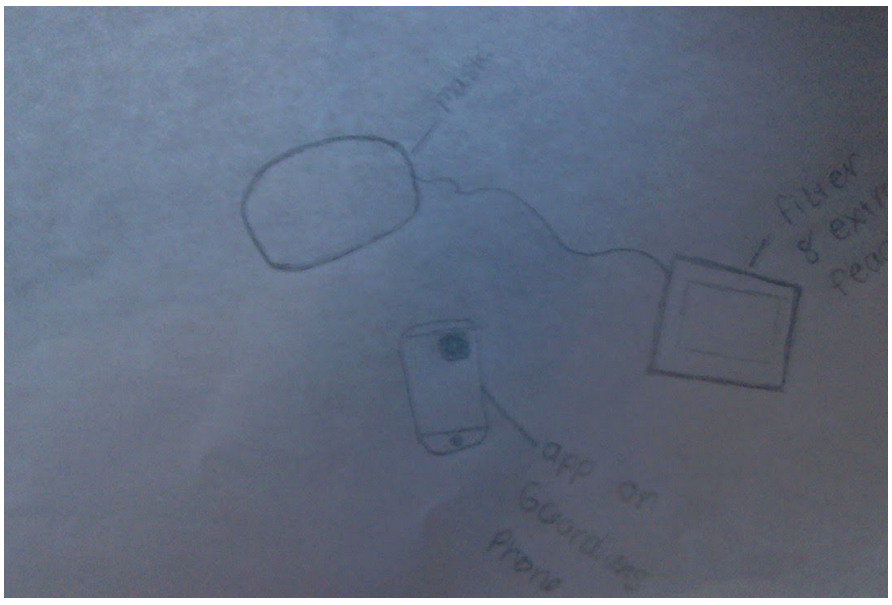
4. Breakthroughs

The tests might be putting normal scuba equipment and the underwater breather underwater to see which one would run out of air and needs to be refilled.

Some investigations might be taking apart part of a normal scuba mask and looking for extra features to see if they could make it any better.

5. Design Process

Our features include a longer time period for diving, a danger detector using echolocation and how it works if the sound will go up to a computer and flash red or green if there is a dangerous animal near you. There is also an app that will notify a coast guard. The coast guard can track the mask so they know where they are and if someone is wearing it. All of these features are part of the underwater breather; this is the picture of the mask:



6. Consequences

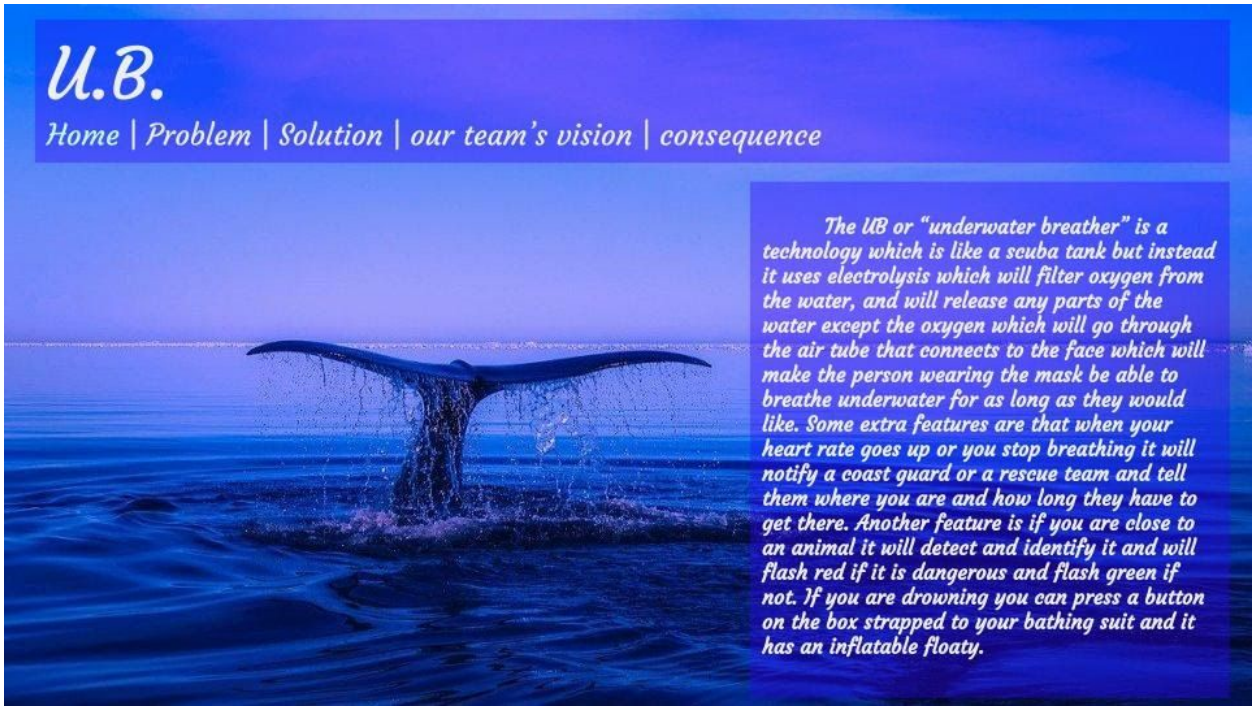
The UB will be a useful tool for scientists, being able to breath underwater will allow them to explore new depths and discover more about the ocean. However there may be certain downsides. The U.B. will allow people to breathe underwater and save people from dangerous situations but, it can't prevent things like nitrogen narcosis or decompression sickness. Some other downsides are that it can detect and identify animals but if it's a dangerous animal you don't have a defense. These are some of the downsides and the positive sides to the UB.

III. Bibliography;

"History of Scuba Diving." *Wikipedia*, Wikimedia Foundation, 28 Nov. 2020, en.wikipedia.org/wiki/History_of_scuba_diving#:~:text=In%201942%2C%20during%20the%20German,This%20was%20patented%20in%201945.

"Under Water Breathing Device." *Exolung*, www.exolung.com/.

IV. Sample Web Pages;**



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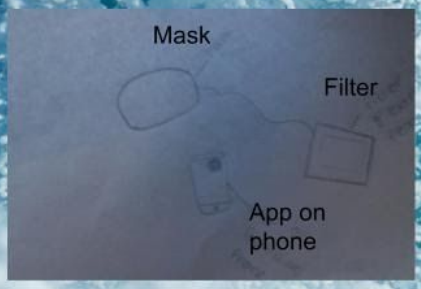
The underwater breather will help this problem because it can last for as long as you want to go because it filters the oxygen out of the water so you could go one day straight. It will also be able to detect and identify dangerous animals that can hurt you, and it will notify a lifeguard if you are in danger.



Our teams video about the UB.

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