



Underwater Livestream & Research Platform for Shoals Marine Lab

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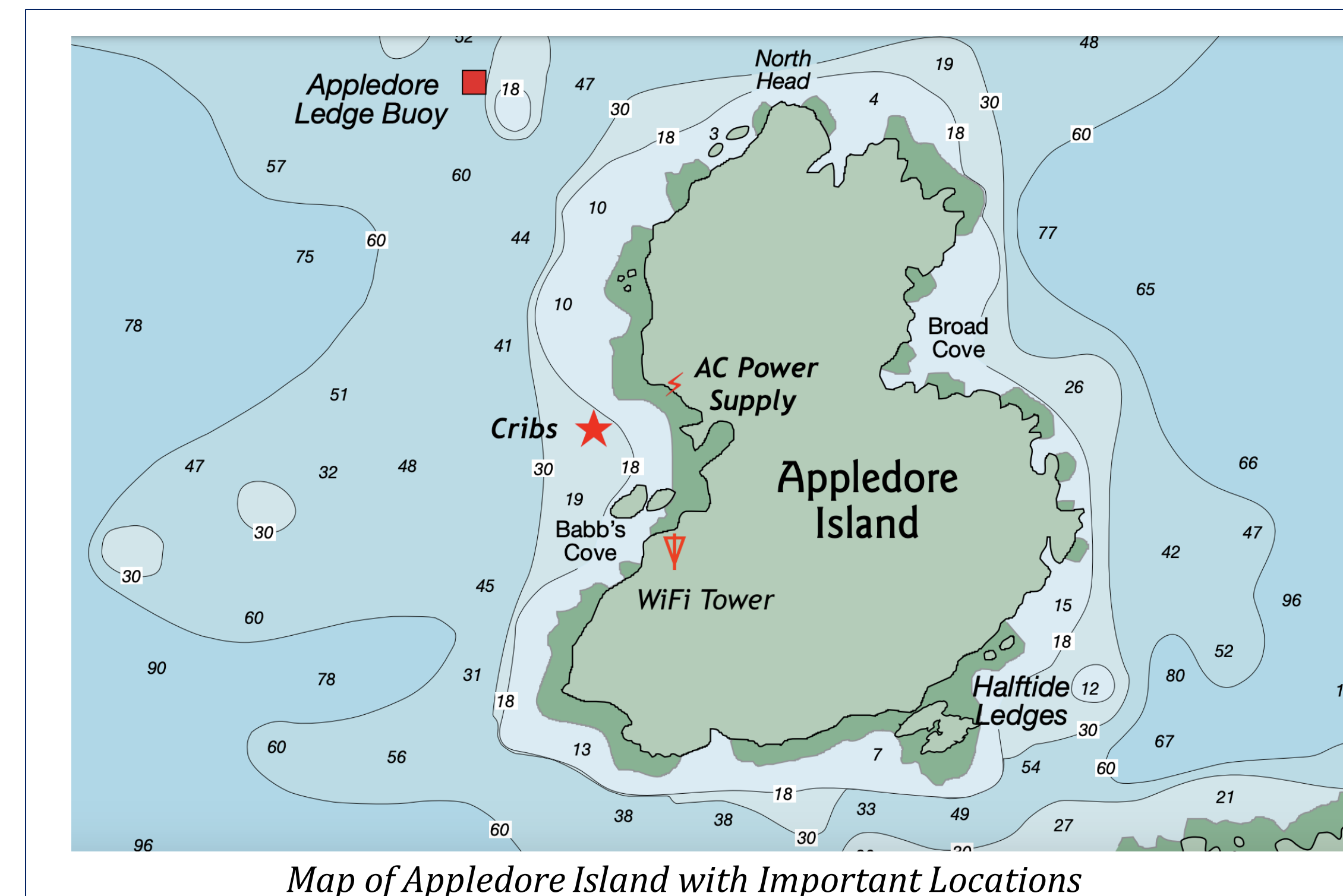
Abstract

The coastal waters of New England are home to a wide abundance of fish & invertebrate species. Researchers here at the University of New Hampshire are striving to gain trends for various marine life species. The implementation of a live-stream camera feed will provide researchers with continuous footage in real time that will be beneficial in assessing for fine-scale population changes. This will facilitate work on species phenology, population dynamics, and behavior. The camera will be deployed in a sub-tidal zone off the coast of Appledore Island to be maintained by Shoals Marine Laboratory.

Challenges

- The Platform needs to be able to withstand the harsh ocean conditions at the shore of the Isle of Shoals
- Power and internet are supplied on the island, but the distance from the camera to these resources needs to be considered
- The camera and platform need to be able to last for the entire summer season with a continuous video feed
- Future work on baiting systems and fish identification AI must be considered with the frames design

Location



Map of Appledore Island with Important Locations

Explanation:

Pinned on the map are the locations of the WiFi tower, AC shore power, and the cribs. The deployment location, the “Cribs” is a demolished pier with a railroad tie foundation remaining. It is located on the Northwestern side of the island where the waves are calm most of the time.

Camera Specifications

Barlus CCTV Underwater Camera

- 316L Stainless Steel with a maximum depth of 350 feet
- 1920x1080p Resolution with a 110-degree lens angle
- Embedded Lighting (White & Infrared) and comes with automatic photosensitive lighting control
- Works in temperature ranges from -20 to 55 degrees Celsius

Applied Research

Geophysical Parameters – The are various physical parameters in the Ocean which have a direct correlation of marine biological activity.

- Utilizing the modular design of the platform will allow for further understanding of these parameters and the role they play in driving population shifts of in marine life.

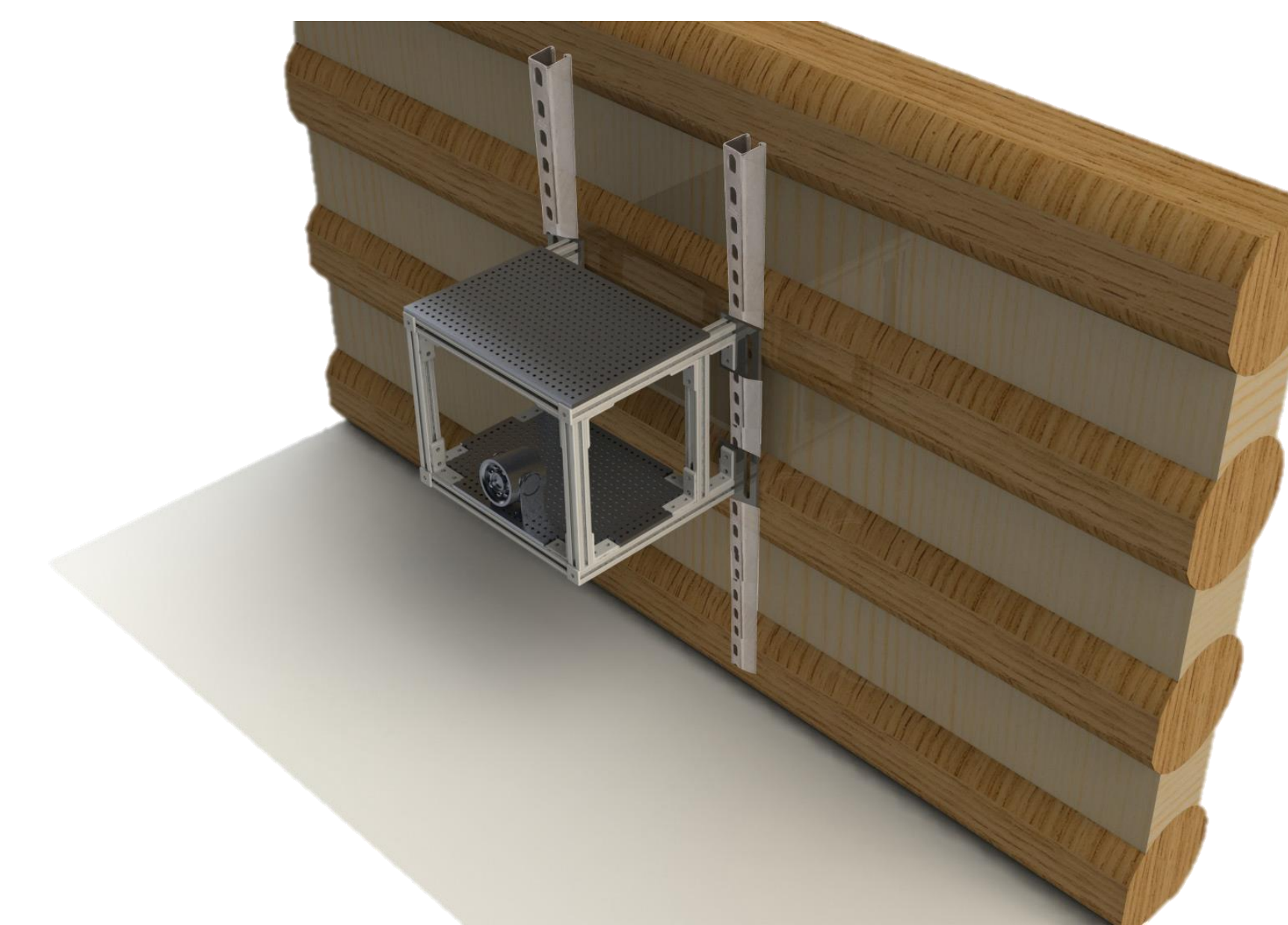
Fine Scale Assessment – The constant live feed of video allows for a higher frequency of data collection.

- This type of data can be used to record more fine-scaled shifts in a species abundance.

Platform

Platform Design:

The two-layer box shaped platform was designed around the attachment points available on the cribs. It is constructed out of 1 inch 80-20 aluminum and has an open window from the camera to face out. The supports also act as protection for the camera from floating debris.



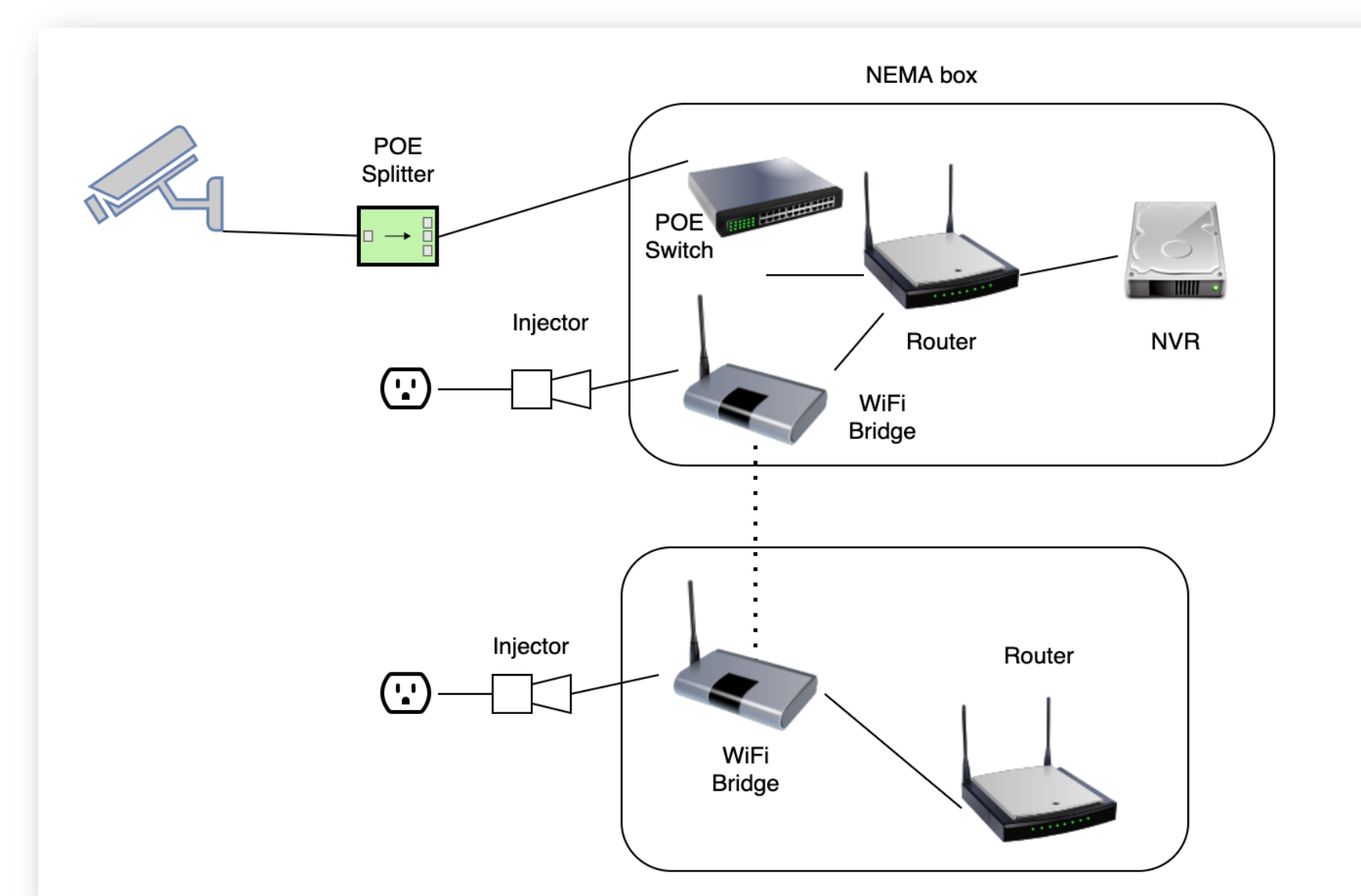
SolidWorks Rendering of Platform Design with Camera

Acknowledgements

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Network

Network Design:



Network Diagram

The network consists of the IP camera, a POE splitter, a POE switch, two routers, two PtP Wi-Fi bridges, two injectors, and a network video recorder. Over the 350 feet of cable, and multiple network components, there is less than 7 seconds of lag between the camera and the stream.

References

Shoals Marine Laboratory. William E. Bemis. *Isle of Shoals Archipelago*. Chart. 2007. Web. 12 Apr. 2022

To view the underwater livestream on your phone scan the QR code to the right and click “UNH Underwater Webcam Stream”

