# NAVSEA: SEA++

Fall Demo Presentation

# OUR TEAM

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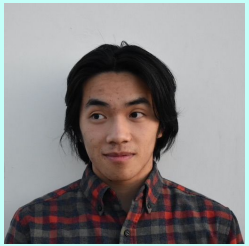

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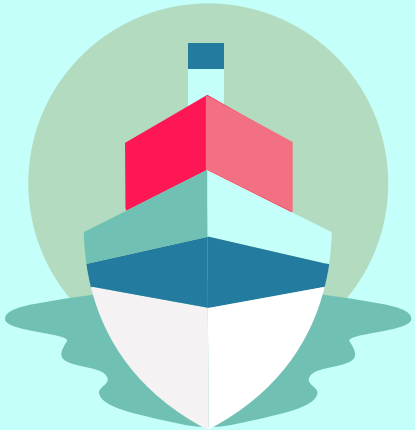
Sponsor: NAVSEA

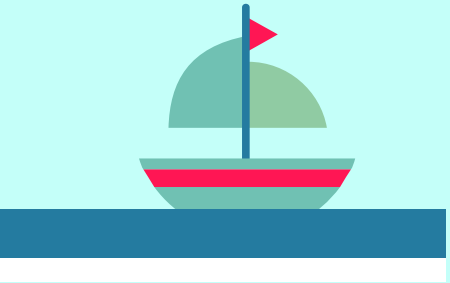
Mentors: Alan Jaeger, Christopher Leslie, Clay Greunke

# Problem



- Navy ships contain many systems that are in need of repair and maintenance
- Right now, it is necessary for a trained expert to be flown to a ship in order to perform maintenance
    - Resource intensive and inefficient
- Solution: use augmented reality with a HoloLens 2 in order to allow untrained users to perform maintenance

# Original Approach



01

Untrained user logs into HoloLens app

02

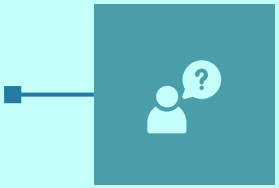
Expert connects to HoloLens user's video stream

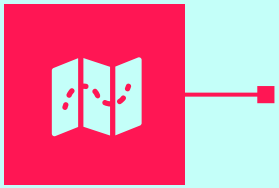
03

Expert walks user through system maintenance, providing augmented reality annotations for the user to see

# Problems with Original Approach

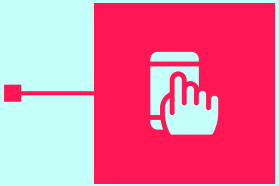
**Repetition**
Similar applications have already been implemented by multiple companies

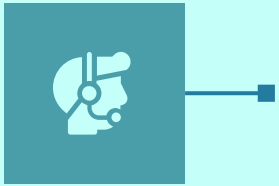




**Environment**
Complex environment of Navy ship may make annotations less effective

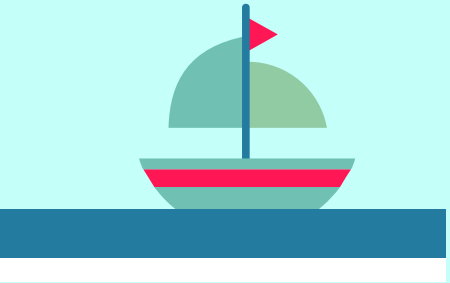
**Network**
Navy ships have limited bandwidth, may not support HoloLens video streaming





**Verification**
Experts have no way of confirming that the HoloLens users are performing the maintenance steps accurately

# New Approach



01

Untrained user launches HoloLens app

02

User loads up CAD model and start following the preprogrammed tutorial instructions

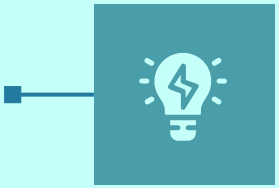
03

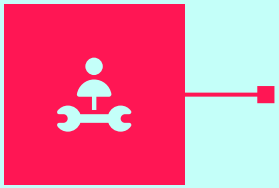
The application monitors their hand movements to ensure that actions are being performed correctly

# Benefits to New Approach

## Novelty

No existing technology exists to verify that these actions are being performed correctly



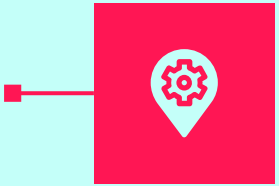


## Confidence

Gesture tracking provides greater confidence that maintenance/repair has been performed correctly

## Offline

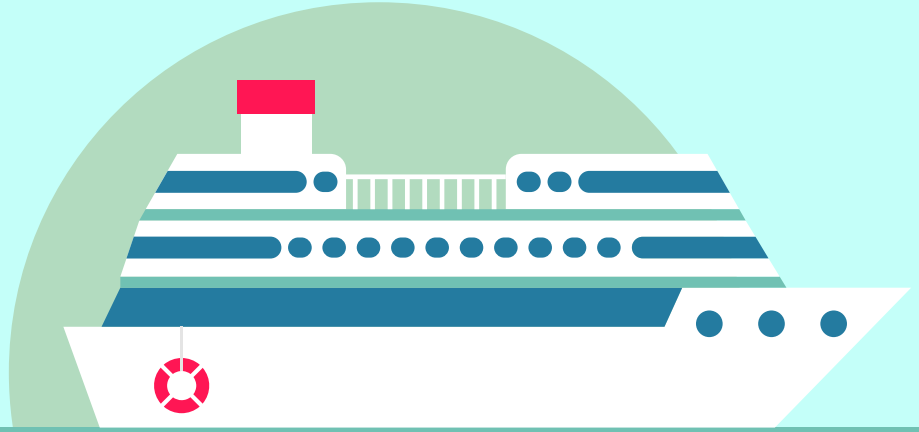
There is no need for Internet with a premade CAD model, which removes bandwidth requirements



## Efficiency

Experts do not need to take the time to visit the ship or go on a call. Their expertise is used to create the instructions and models

# Demo



# Improvements

01

## Maintenance Steps

Add animated steps for user to follow in order to “repair” system

02

## Eye/Hand movement/Gesture Tracking

Track gaze, hand movement, and gestures to ensure correct action is performed at each step

03

## Data Logs

Steps performed by the user will be sent to an expert for verification once device is online

# Challenges

**EQUIPMENT:**

- Delay in getting computers and HoloLenses for development
- HoloLens requires extensive configuration

**EXPERIENCE:**

- Little to no experience with developing in Unity / for HoloLens

**PROJECT SCOPE:**

- Adjustments to project goals
- Concerns with intellectual property

# THANKS!

Questions?