Innovation Lab Update

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### Transition Ideas Review

**aka Quick Wins**

<table>
<thead>
<tr>
<th>Idea</th>
<th>Partners</th>
<th>Equipment</th>
<th>Funding</th>
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</thead>
<tbody>
<tr>
<td>High Risk Evolution Practice (9-11,19-20)</td>
<td>*</td>
<td>VR Headset</td>
<td>?</td>
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<tr>
<td>Maintenance Evolutions, Energized Gear, Weapons Handling, Engines, Compressors, Pumps, Valves, etc.</td>
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<tr>
<td>Virtual Augmented Tech Manuals (23)</td>
<td>*</td>
<td>Tablet</td>
<td>?</td>
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<tr>
<td>iPad recognizes actual equipment (or 3D printed version) and augments with instructional materials viewed via tablet</td>
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<tr>
<td>Maintenance/Damage Control Recording (2,3)</td>
<td>*</td>
<td>360 Recording</td>
<td>?</td>
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<tr>
<td>Mount camera at one or more key locations during critical maintenance/ship evolutions (weapons handling, line handling)</td>
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<tr>
<td>Surfaced Driving Recording (1)</td>
<td>*</td>
<td>360 Recording</td>
<td>?</td>
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<td>Mount camera on bridge during surfaced transits and piloting. Build video database for lessons learned/piloting briefs.</td>
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<tr>
<td>OceanLens TAC-O/COSOE Visualization (16,17,27)</td>
<td>*</td>
<td>OceanLens VR Headset</td>
<td>?</td>
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<tr>
<td>Visualize sound propagation in virtual OceanLens environment. Speed the process of Nav Plan review and approval.</td>
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<tr>
<td>VAACL Ship Control Trainer (12)</td>
<td>*</td>
<td>VR Headset</td>
<td>?</td>
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<tr>
<td>Lack of VA Pilot trainers and OBT drives need for more training opportunities through VR trainer. Available ashore and u/w.</td>
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High Risk Evolution Practice

Quick Win Idea #1

- Partnership with UH ARL
- HoloLens Skype demo conducted with Naval Submarine Training Command
- Pilot using Taqtile’s Manifest HoloLens to record maintenance and create checklists
Virtual Augmented Tech Manuals
Quick Win Idea #2

• Heidi Buck of BEMR Lab in development of 3” Launcher space & torpedo tube interlocks to demonstrate concept

• Established partnership between N4 & Shipyard
• Positive feedback from sailors on 360 “Piloting Brief” demos from Pearl Harbor and Groton
OceanLens
Quick Win Idea #5

- Development sprint has made significant progress
  - High resolution bathymetry
  - METOC data accessed
  - 3D SVP, complex multi-sub exercise areas, sound clouds, moving havens, IAs, etc. modeled
VACL Ship Control Trainer
Quick Win Idea #6

- Escape trainer demo
  - Possibilities for full escape trainer demo to complement physical trainer
AIS HoloLens for OOD

Partnership with UH ARL

Operational Need

**Problem:** Frequently vessel confusion occurs between control and the bridge necessitating long verbal descriptions of contacts which takes time and could be dangerous in close aboard situations. Efficiently resolving vessel identification is necessary to remove confusion between watchstanders in the control room of a submarine and the OOD.

**Benefits of Solution:** Pairing a HoloLens with a Bluetooth enabled AIS unit attached to a small portable antenna on the bridge will enable real time AIS and GPS positional data displayed directly on the headset. When the OOD looks at a contact, he will see the name, course, speed, and destination displayed directly above the contact using the HoloLens AR technology. Additional information from the AIS unit would provide ownship information like course and speed over ground.

Solution

**Technology:** HoloLens is a self contained, holographic headset computer based on Windows 10 with Bluetooth capabilities. HoloLens presents the Augmented Reality (AR) capability to see real world objects with virtual overlays. Commercial portable Bluetooth enabled AIS data units are available designed to beam data to laptops/iPads. Software would need to be developed for the HoloLens to interpret and display this data.

**Approach:** This effort would need software developed specifically to be able to display the data as desired in the HoloLens. Testing could then occur on small surface boats for continued system refinement. Finally, goal would be to get real feedback from an actual submarine by giving the equipment to the crew and letting a senior Junior Officer observer use it for an underway to get real world feedback.
• This concept would enable Unmanned Aerial Vehicles (UAVs) to be used as FP assets for underway naval vessels (not just submarines).

• Properly equipped UAV could serve as a contact interrogation tool and a nonlethal deterrent.

• While hovering over a contact, audibly broadcast standard naval vessel exclusion warnings (which is currently part of naval TTPs but with bullhorns that have extremely limited range).