viion

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SUBMARINER TRAINING EXERCISE

DAMAGE CONTROL

OVERVIEW

As part of a larger engagement with Babcock International, Viion was brought on to help reduce the at sea training burden for Royal Navy submarine operators, by moving aspects of training into a synthetic environment. Our Viion Worlds allow participants to simulate real-life submarine activities, experience high risk events and rehearse complex scenarios in a synthetic, multi-player environment.

This virtual world experience was designed to target control room operations of the submarine. This document provides a basic overview of the background, purpose and design of the submarine environment and scenario.

FIELD WORK

Before designing the Viion World, customized for submariner training, we initiated a Discovery Phase that had several goals:

1. Understand and describe how Submarine Operators view and conduct the work they do, how they make sense of their operating environment, and how they mitigate risk.
2. Uncover the cognitive basis for expert decision making, pattern recognition, problem diagnosis, and response strategies during normal operations and non-routine scenarios.
3. Develop a customized assessment framework, based on our Deep LX assessment and learning model, that allows submarine operators to rehearse complex, non-routine event responses in a synthetic, multiplayer, virtual world environment.

We interviewed over 25 current and former submariners, across a range of experience levels, roles, and ranks, using key Knowledge Elicitation techniques and using a number of Cognitive Task Analysis tools.

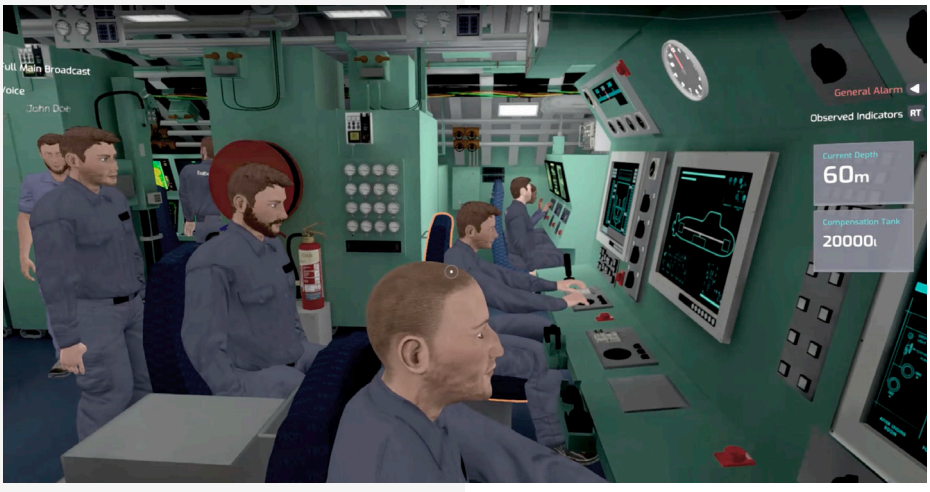
From the interviews, we uncovered several key goals that drove our design.

1. Create an "Intuitive Response" to incidents
    a. More opportunities for rehearsing events means an increasingly intuitive response to routine and standard emergency events.
2. Readiness
    a. The need for readiness beyond just knowing tactical procedures and EOPs.
3. Pause and Assess
    a. The rapid, intuitive response allows them to pause, and in that pause decision makers have time to iterate interpretations to atypical events.
4. Rapid Risk Management
    a. Move learners rapidly from an "unknown unknown" state to a "known unknown" state, to be able to manage, prioritize and assess risks.
5. Resilience
    a. The biggest risk in any chaotic situation is decision paralysis. Recovering from paralysis quickly, maintaining resilience, and mobilizing action quickly is a primary goal.

Client: Babcock
End User: Royal Navy – Flag Officer Sea Training (FOST)

Role: Control Room Operator
Material Goal: Reduce the Sea Training Burden
Learning Goal: Shift from "Proficient" to "Expert"

Mission: Reach target, gather information
Scenario: Collision Event, unknown source



Submarine Control Room

6. Reproducibility on Shore
    a. Ability to reproduce learning outcomes from evolutions and work-ups on shore unburdened by the requirement of a submarine.

"PROFICIENCY ASSURANCE" TO "ITERATIVE FAILURE"

To move from proficient to expert, an adaptive learning model must be employed that utilizes iterative failure over proficiency assurance. Our goal was to provide additional capability to rehearse extraordinary circumstances that reveal vulnerabilities in team performance. This is done through an "Iterative Failure" model that accelerates the transition of proficient operators to expert operators.

DISEQUILIBRATION

Achieving expert-level awareness requires a developmental process called "disequilibration," which is the primary cognitive mechanism that enables operators to move up levels of expertise. All operators have mental models by which they make sense of their task environment and form interpretations that guide decision making.

Disequilibration is what happens when operators encounter a situation that violates their existing mental models, leaving them unable to form an interpretation and choose a course of action. Routinely disequilibrating operators through complex scenarios allows them to break down and reorganize mental models to more easily adapt to evolving circumstances. This is the core of the adaptive learning process.

Submarine Compartment

THE FINAL PRODUCT

Several months after the field work, we produced a working submarine environment with a control room scenario that proved the ability to move the rehearsal of complex scenarios on shore. Specifically, we were able to drive proficient operators into a situation where standards EOPs were not applicable. They were challenged with making sense of the unanticipated event, while keeping the boat and its crew safe. —