

Augmented Reality for Shipboard Training and Operations



EXHIBIT FACT SHEET

Augmented Reality, or AR, is the digital overlay of information on the real world. This is typically accomplished with mobile computers (tablets) or head-mounted displays, though there are some fixed-system opportunities too—like the computer-generated yellow line marking the first down on a televised football game.

This technology has extraordinary implications for the consumption of information. AR enables people to interact with the world in a way that had never been possible before today. People using AR can look at an object—and the object can deliver training, operational instructions, part

information, maintenance information, safety warnings, and more.

NAWCTSD has begun investigating AR for use in training in collaboration with SPAWAR Systems Center Pacific, and under a Collaborative Research and Development Agreement (CRADA) with the Newport News Shipbuilding (NNS) AR Team and CVN 78 Engineering Program.

Exhibit Module

As the result of the NAWCTSD research effort, and with our collaboration partners, a full-scale mock-up of a CVN 78



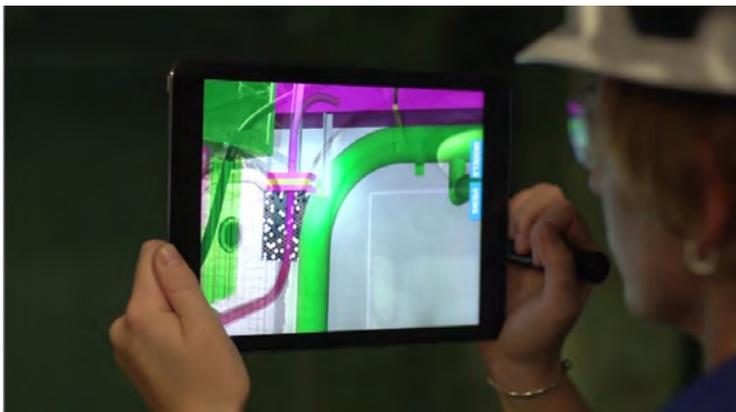
(aircraft carrier) bulkhead was built to demonstrate some of the opportunities that AR can bring to the Fleet. CVN 78 is the selected opportunity because of the unique digital data environment built into the design of the ship. That investment is being leveraged to provide the location information that is the foundation for a successful AR product. The AR shown in this exhibit is a prototype concept we call "HINDSIGHT", and the prototype was developed collaboratively with NNS. The exhibit shows several possible uses of AR, and also shows the capabilities of the technology. The eventual system design of HINDSIGHT is still a clean sheet.

Awareness

If information is digitally available, AR can provide intuitive awareness of a user's surroundings in the physical world—part numbers, paint types, circuit states, flow rates—any information that can be relevant or beneficial to a user can be tied to an object. This situational awareness has been demonstrated to save time and improve efficiency for many operations. It also has profound implications for damage control, training, maintenance, and safety.

Training

The training module in this exhibit provides a demonstration of the different ways a Sailor can receive on-demand training for a specific component (in this case, the AFFF fire fighting bottle and transformer) via video and system level interactions. AR gives Navy trainers a new way to communicate in the real world. In a classroom, virtual reality or textbooks work, but in a real world environment, AR can be both a differentiator



and a time saver. Beyond the situational relevance and opportunity to efficiently convey training instruction, AR is also a very engaging tool.

Maintenance

The Maintenance and Material Management (3M) module provides a demonstration of how the Sailor will interact with specific components in order to perform part identification and various maintenance activities (in this case, watertight door and battle lantern maintenance). The real power isn't that the instructions are on a mobile tablet, but that they are connected to the real world. It isn't just maintenance on a door, but *that* door.

And the overhead of providing all of the information on a single MRC card becomes transparent to the Sailor. She doesn't need to look up the specific information about *this* type of door and ignore the irrelevant information contained in the MRC for other doors—the AR component does that.

Safety

Inherently, AR provides better situational awareness, so one of the biggest opportunities for the Navy is improvements to personnel safety. AR can help a Sailor find the nearest exit or nearest AFFF fire fighting bottle. AR can help route Sailors around closed compartments and help them get from point A to point B faster in certain ship conditions where time is critical.

AR Technology

AR overlays digital information, and that information can take many forms. Tables of data, animations, videos, graphs, 3D digital models, and interactive touch points can all be used in a successful AR product, and are demonstrated in this exhibit. Today, this information is best delivered on a tablet computer, but head-mounted displays are also available and can be superior in some uses. AR is a technology of today — and will only get better tomorrow. NAWCTSD is taking a leadership role for the Navy in understanding AR, ensuring solid human experiences with the computer, and building the future of shipboard training.

