

Augmented Reality (AR) Enhanced Training and Enrichment for Shipyards

PROJECT INFORMATION

Prime/Lead: AURA Technologies

Team Members: AKT Optimize

Academic Member: N/A

Duration: 12 months

Financial/Cost: ~\$200,000 (TBD)

DELIVERABLES/BENEFITS/ROI

Deliverables:

The proposed design incorporates one laptop or tablet that serves as another user interface and to serve content to an AR device, as needed. In video-see-through AR embodiments, the AR device *is the tablet*, reducing system footprint. Each laptop and AR device (or devices) kit may be configured to be self-contained/stand-alone or to be networked-connected, according to the customers requirements. The kit will be equipped with one or more training, procedural, or instructional modules comprising interactive browser-based content augmented with interactive AR content. The kit will further demonstrate the capability to output data probative for CBM+ or other analytics applications.

Benefits: Accelerate learning, decrease or eliminate mistakes and repairs, automatically connect and update maintenance and repair documents between schoolhouse and front-line workers, provide options for reach back to tech support, augment CBM+, provide feedback loop for updating electronic documentation with new techniques, tools and ideas from the field.

ROI: Cost Avoidance to be Calculated TBD

Cost Share: TBD

ISSUE / OBJECTIVE

Description: The 2025 NSRP Research Announcement (RA) identifies multiple areas of need for enhanced, faster, more accessible, more effective, and more widely-applicable training programs and content for current and prospective shipyard workers and artisans. The RA and previous work in global shipyards have identified the potential for the use of augmented reality (AR), virtual reality (VR), mixed reality (MR), and/or extended reality (XR) modalities to enhance or enable workforce development, improve the accessibility of visual/graphical content, improve inspection processes, or enhance training programs (collectively, instructional content). In these applications, AR, which overlays virtual content on the user's view of the real world – typically using a head-mounted display (HMD) or the display on a mobile device – is, at least in our opinion, the most versatile and intuitive and the least intrusive/invasive of these modalities and modern AR devices are typically self-contained, stand-alone systems, providing the mobility and freedom-of-movement necessary in shipyards and other industrial environments.

Project Goals and Objectives: To use AR to *enhance* present and future shipyard instructional content by:

- Adding a new learning modality (e.g., see, read, and view the message),
- Connecting with new or younger workers (appeal to the types of video games they play now),
- Enabling rich three-dimensional (3D) content and visualization,
- Connecting the two-dimensional (2D) content of documents and videos with definite 3D objects in the users' environment,
- Providing cues visually-registered with the objects a user is manipulating,
- Making textual or video content available without the user having to turn his/her head, and
- Providing text or captions in situations where hearing protection or ambient noise make computer audio hard to hear.

Business Objectives: To exploit the technical engineering acumen that both AURA Technologies and AKT Optimize possess to provide cutting edge AR/VR capabilities for use in conducting manufacturing processes, inspection, and training.

Technology Objectives:

- To integrate the latest technologies in AR by providing a more immersive experience and stereoscopic views of the virtual objects,
- Provide virtual 3D content overlaid on the user's field-of-view and/or video-see-through AR on the screens of mobile devices, and
- Develop the reach back or stream video of the user's field of view to a remote party (SME).

ADDITIONAL INFORMATION

Additional Information:

Work Proposed:

- Identify several high-value training or procedural workflows,
- Develop instructional content for each workflow, possibly using existing content, curricula, etc., to be delivered using AKT Optimize's software platform ("training software"),
- Obtain (Government- or vendor-supplied data) or build 3D models of system components, tools, parts, etc. involved in the workflow,
- Couple training software to AURA AR enhancement system to control, display, and coordinate virtual content in concert with the training software, possibly including displaying other training content on an AR device,
- Trial of prototype system by workers in a shipyard or representative training environment; incorporate user feedback into prototype system,
- Finalize design, implement, and release production-quality software, as appropriate.

We intend for our implementation to be as AR-device-agnostic as is practicable such that customers may choose present-day or future devices appropriate for their requirements. The proposed design incorporates a laptop or tablet that serves as another user interface and to serve content to an AR device, as needed. In video-see-through AR embodiments, the AR device *is the tablet*, reducing system footprint. Each laptop and AR device (or devices) kit may be configured to be self-contained/stand-alone or to be network-connected, according to customer requirements. In use cases with higher cybersecurity requirements or restrictions on wireless networking, AURA's TrustedDM can provide secure data ingress and other supporting capabilities to comply with applicable requirements or restrictions (e.g., CMMC, NIST-171, etc.).

Related Work (ongoing project areas): U.S.. Army, Navy, Marine Corp, Commercial applications, & SOCOM (See related Links with variants of this technology but not all inclusive.

https://www.aktoptimize.com/demo/AKT_Demo_Links/

https://www.aktoptimize.com/demo/AKT_Demo/

https://www.aktoptimize.com/demo/GE_Concept_Laser_2_Printer/

https://www.aktoptimize.com/demo/FA-18_360.mp4 (AR Example)

https://www.aktoptimize.com/demo/WTD_using_Object_Recognition.mp4 (AR Example)

https://www.aktoptimize.com/demo/WTD_using_Image_Recognition.mp4 (AR Example)

https://www.aktoptimize.com/demo/SSPC_Carbon_Steel_Preservation_Process/ (Shipboard application)

https://www.aktoptimize.com/demo/Toyota_Clear_Protective_Film_2019-05-13/

<https://www.aktoptimize.com/demo/Automotive/>

<https://www.aktoptimize.com/demo/Industrial/>

https://www.aktoptimize.com/demo/AVDEC_Gasket_Installation/

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https://www.aktoptimize.com/demo/Cutting_Cores/