

# Combat Identification Using an Augmented Reality Learning System

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**Abstract.** This research will examine training with an augmented reality learning system to identify combat vehicles. Due to the increase in use of unmanned vehicles (UVs) for missions, a question arises: How do we best train operators to perform well when presented with a combat identification task. More specifically: (a) Is training using canonical (front and side) views sufficient? (b) Due to UAV perspective surveillance, are non-canonical/birds eye views necessary for optimal combat identification performance? (c) Would training with either perspective yield sufficient performance?

## 1. Introduction

During the gulf war 16 of 21 M1A1 (64.2 million dollars) Abrams tanks were destroyed by allied infantry during the first gulf war [1]. In addition, most fratricide accidents are due to the decision making of individual soldiers [2]. Due to the quantity of fratricide accidents, it is reasonable to question the reliability of current CID training methods. More specifically CID tasks are difficult due to the discrete class of objects being identified. Those objects share the same core features, and are easy to confuse with one another; especially from a frontal view.



Fig. 1. First: German Leopard II, Second: Russian T-72.

With perceptual limitations associated with remote perception (i.e. the keyhole effect), and the increase in use of unmanned vehicles (UVs) for missions, a question arises: How do we best train operators to perform well when presented with a combat identification task? This study seeks to answer that question through the utilization of an augmented reality learning system. Augmented reality is defined as a direct or indirect view of a physical, real-world environment with elements augmented by computer-generated sensory input (Grier et al., 2012). That is, digital information that is supplementing the real world environment. For the purposes of this study, the researchers will utilize an indirect version of augmented reality called BuildAR software. BuildAR Offers an engaging experience that captures the users attention. CID research has shown that training with 1:35 models is superior to traditional methods (Keebler et al. 2007). Therefore, it is optimal to provide the participant with a three-dimensional experience. However, BuildAR software provides the ability to directly label critical cues. Therefore, users can be directed to key focal points.

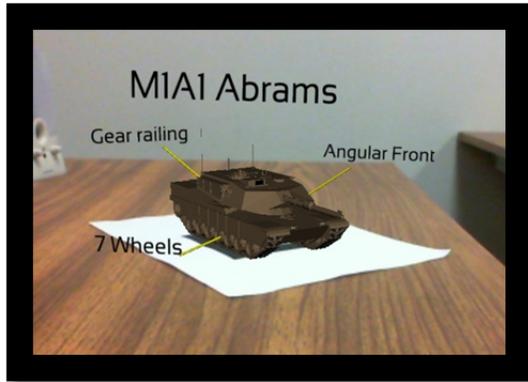


Fig. 2. Augmented M1A1 with labels.

## 2. Method

Before training, participants are administered a brief biographical data form, a measure of video game expertise, a mental rotation, a spatial visualization task, and an associative memory task. Participants will be trained to identify 12 tanks. Each tank will be presented via the augmented reality software. Participants will be randomly assigned to view those models from either a canonical or birds-eye perspective. When presented with an augmented tank model, the researcher will guide the participant through each critical cue and ask the participant to directly point to each feature.

After learning all 12 tanks, the training participants received will be assessed using a custom combat identification (CID) measure. That measure will consist of 186 tank images from various viewing perspectives. Those viewing perspectives are, canonical side views, frontal views, and birds-eye views from all four cardinal directions. Images will be presented individually for five seconds. When the image disappears the measure will prompt the participant with three questions: (1) Do you recognize the vehicle? (2) Is the vehicle an enemy or an ally? (3) What is the name of the vehicle? The images will be presented randomly until all 186 images have been shown to the participant.



Fig. 3. UK Challenger. An example of an image presented by the CID Measure.

## 3. Conclusions

The data for this study is currently being collected. The researchers are anticipating a sample of approximately 60 participants. This section will introduce the researchers' hypothesis.

First, participants trained using the birds-eye perspective models will yield superior performance on the birds-eye CID stimulus images, than participants trained using the canonical perspective models. Second, participants trained using the canonical perspective models will yield superior performance on the canonical CID stimulus images, than participants trained using the birds-eye perspective models. Third, participants who identify as videogame experts will score significantly higher on the CID measure than participants who do not. Fourth, participants who score well on the three cognitive measures will exhibit superior CID performance.

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- [2] Regan, G. (2003). Blue on blue: A history of friendly fire. *Revue militaire canadienne*
- [3] Keebler, J. R., Harper-Sciarini, M., Curtis, M. T., Schuster, D., Jentsch, F., & Bell-Carroll, M. (2007, October). Effects of 2-Dimensional and 3-Dimensional Media Exposure Training in a Tank Recognition Task. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 51, No. 25, pp. 1593-1597). SAGE Publications.