

Virtual and Constructive Representations on Live Avionics Displays

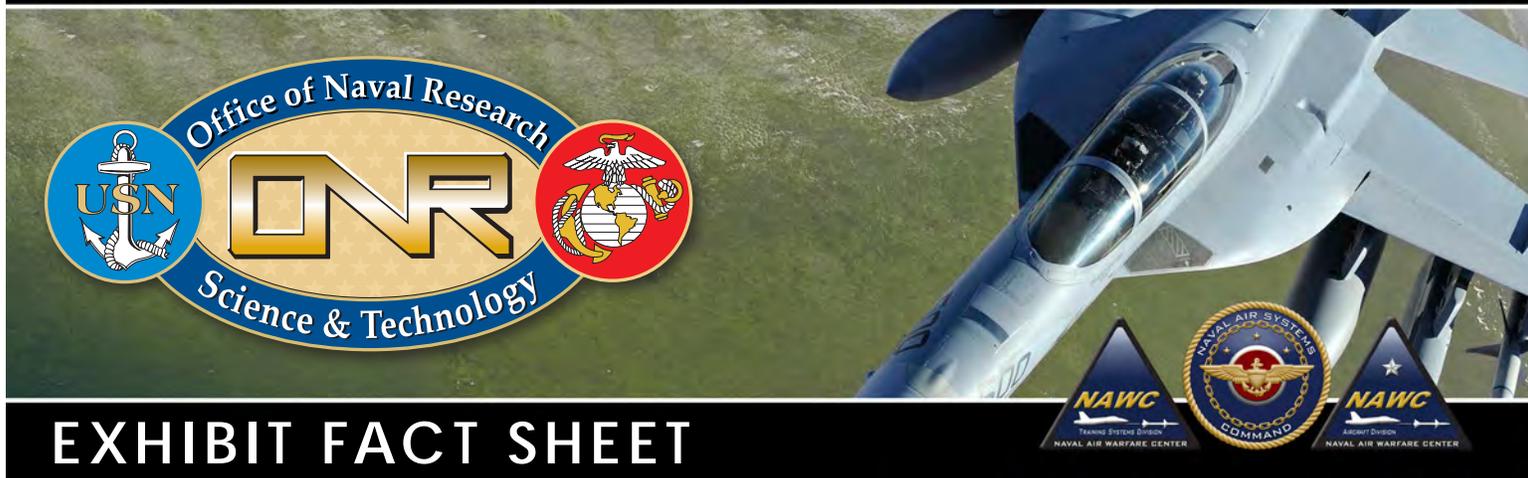


EXHIBIT FACT SHEET

Training aircrews for modern Concept of Operations (CONOPS) increases the scale and complexity of mission training requirements. This training capability gap is being addressed through Virtual and Constructive Representations on Live Avionics Displays (VCR-LAD). VCR-LAD provides augmentation of live aircraft displays with entities generated by virtual and constructive simulations.

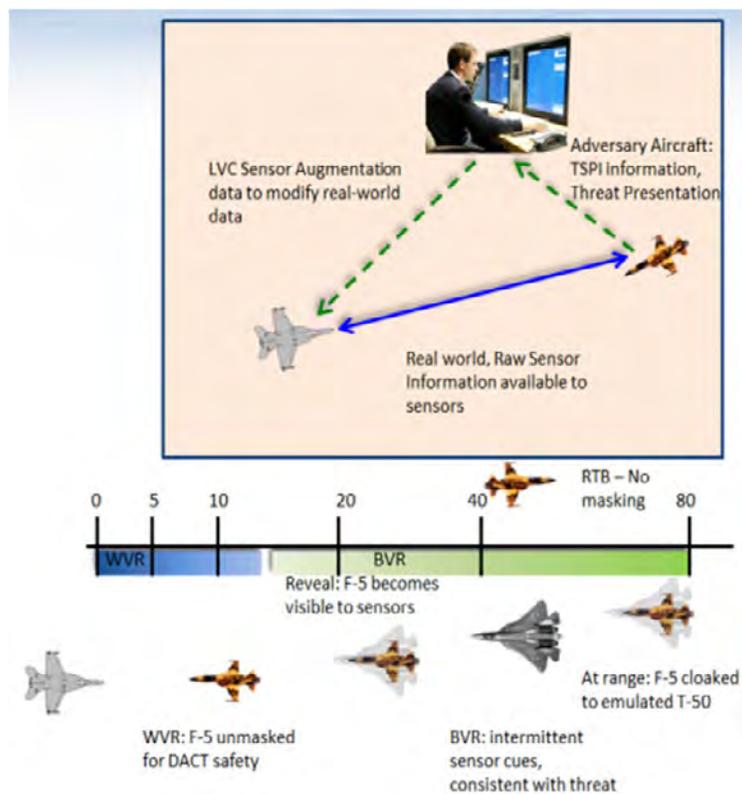
Although some technical aspects of this type of integration have been examined, the impact on aircrew (in terms of safety and training effectiveness) has not been studied in detail. The VCR-LAD project builds the needed Science and Technology (S&T) foundation for LVC integration into live aircraft avionics. The research relates current training events to LVC augmented capabilities in order to investigate training impacts such as added workload, possible confusion about LVC entities, and data link induced safety-of-flight artifacts. The VCR-LAD program will produce safety recommendations for integrating LVC into platforms and training ranges, guidelines for the physical integration onto avionics and aircraft simulators, and data link/networking guidelines for LVC-enabled training systems.

During FY16, the project will use the large-scale training scenario demonstrated at I/ITSEC 2014 as the backdrop for exploring the procedural and technical aspects of three advanced LVC capabilities involving complex tracks:

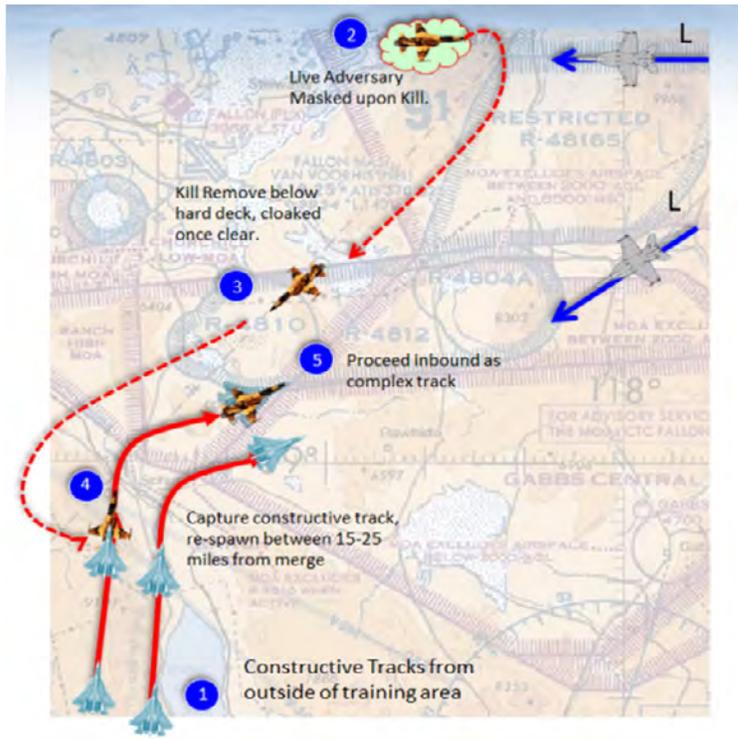
- 1) Cloaking
- 2) Virtual/Constructive Regeneration
- 3) Mixed Sections



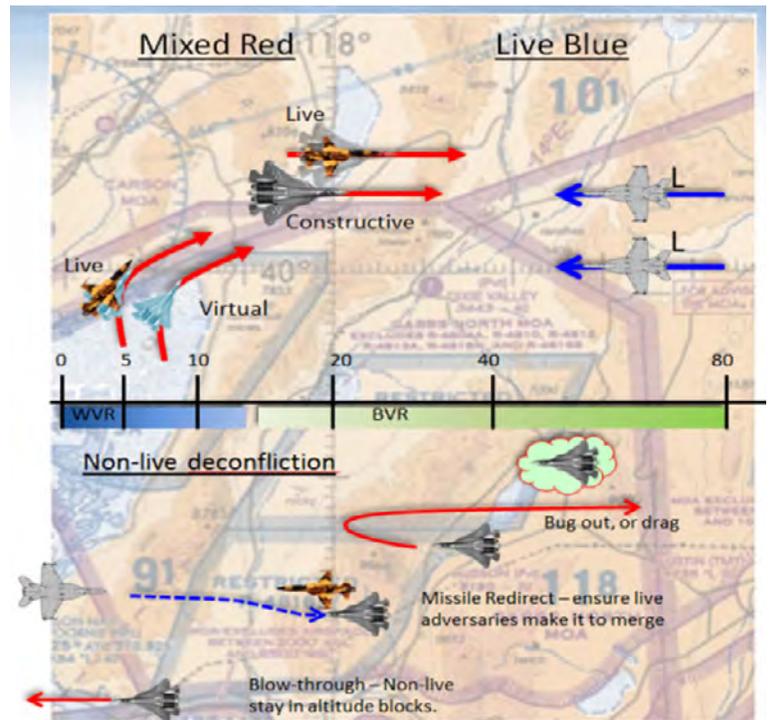
Using the Next Generation Threat System (NGTS) to model the behaviors of the non-live entities, and collecting data using a live L-29 LVC training platform, VCR-LAD will perform scenario-based analysis on both live and non-live entities employing these advanced capabilities. The operational impacts to safety and training fidelity, as well as the technical aspects relating to networking as well as platform and training range integration will be incorporated into our knowledge products being produced.



Cloaking focuses on masking actual sensor inputs



V/C Regeneration allows live adversary aircraft to respawn



Mixed Sections facilitates mixed Live and Non-live entities

What It Does

- VCR-LAD adds a critical element of LVC simulation to the training spectrum through a fully integrated representation of the LVC battlespace on live platforms
- VCR-LAD augments the information received from the aircraft avionics with synthetically generated information to present unified, consistent symbology
- VCR-LAD provides a set of guidelines and recommendations for safe, effective avionics and simulation integration, and a set of communications guidelines for maintaining consistency across the LVC environment

How It Works

- Initial considerations are based on Safety-of-Flight and T&R criteria
- Through prototyping, experimentation, and hypothesis testing, the program creates traceable, substantiated design guidance

- VCR-LAD limits platform-specific modifications leveraging existing LVC standards and aircraft interfaces such as the Navy Continuous Training Environment (NCTE)
- VCR-LAD knowledge products may influence future training range and cockpit upgrades

What It Will Achieve

- Quantifies safety and efficacy of augmented cockpit displays for T&R
- Allows for *Complex Tracks* that blend live aircraft and computer generated attributes to greatly improve the quality of the training produced with legacy adversary aircraft
- Enables *Virtual Range Extensions* that allow training to occur well beyond the physical constraints of the training ranges