

Naval Postgraduate School



Calytrix CNR-Sim and DIS Voice Interoperability Improvements  
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### **Calytrix CNR-Sim and DIS Voice Interoperability Improvements**

**Purpose:** To explain the importance of reliable communications for training simulations and achieve a better understanding of the capabilities of distributed interactive simulation (DIS) voice found in Calytrix Comm Net Radio (CNR).

**Background:** The reliability of communications is paramount in training simulations, whether they are aircraft, infantry, or combat convoy simulators. Radio communication simulators perform two crucial tasks for military trainees. The primary task is that the simulators bolster the overall fidelity of the training simulation and make it more realistic to reality. An example would be using headsets for internal and external radio communications within a vehicle simulator such as an aircraft, tank, or amphibious assault vehicle (AAV) simulator. A secondary but equally important task of radio simulators is that they can provide an interface for infantry simulators that do not have the mechanical interfaces of the vehicle simulators. An infantryman interfaces directly with the real world except for his rifle scope or radio, which is difficult to replicate in a simulator such as an interactive synthetic environment (ISE). A radio simulator provides an interface to increase the realism and higher confidence in a scenario as the infantryman uses the radio to conduct tasks within the ISE.

There are many competitors in the area of radio communication simulators. Virtual Battlespace (VBS) by Bohemia Interactive, Advanced Simulation Technology Inc. (ASTi), and the Joint Network Emulator (JNE) in addition to Calytrix CNR are all contracted by the DoD to provide radio simulators and interoperability across various training simulators. There are also several commercial-off-the-shelf (COTS) applications available which largely serve the gaming community. Such COTS software includes Discord, TeamSpeak, Mumble, and Razer Comms, all of which are primarily dedicated to the gaming community and offer some extent of interoperability with games. Lastly, legacy programs like Skype and Zoom support radio communications for industry.

Many of the government contracted radio simulators use DIS-voice or high-level architecture (HLA) to achieve interoperability across platforms or even just between different users. The COTS software largely uses voice over IP (VoIP) to achieve radio communications. VoIP largely fails to provide the level of interoperability that can be achieved with DIS or HLA.

**Discussion:** The advantage of CNR is described as: “Real radios are expensive, difficult to obtain, need to be secured and require ongoing maintenance. CNR-Sim provides the alternative

solution to using real radios for communications training.” CNR offers a software development toolkit (SDK), a skin simulator for radio training, a log application to record radio transmissions, a monitor for training cadre, and several other tools to accommodate radio training as well as other simulation training. It can be used in conjunction with VBS, SWORD, VR-Forces and Calytrix’s proprietary ISE named Titan Vanguard, and is not limited to certain programs but can successfully run in the background and be used in any simulation with quick and simple setup. It greatly improved interoperability with VBS and proved more reliable and of higher radio quality than the internal VBS radio simulator. CNR’s flexibility across so many platforms makes it uniquely capable among all other radio simulators.

CNR is also exceptional in that it uses both DIS and HLA to achieve interoperability across platforms and within its own software. Prior to version 6.0.0, CNR only offered DIS interoperability, but with the release of 6.0.0, it offered in all of its applications native support for HLA and the Real-time Platform Reference Federation Object Model (RPR-FOM). Users were able to configure CNR to transmit/receive on either HLA or DIS. Such a system not only offers redundancy for increased reliability and quality but the ability to interoperate with many different simulations.

**Recommendation/Actions:** The Naval Postgraduate School (NPS) Next program can have tremendous outreach across the DoD with our findings:

1. Use NPS Modeling Virtual Environments and Simulation (MOVES) to explore redundancy on any simulation. Since the MOVES institute has access to many of the DoD’s simulations, try to recreate what CNR does with offering HLA and DIS in the same simulation. For radio simulations, explore redundancy with HLA, DIS, and VoIP.
2. There is an Orlando office for Calytrix and the potential for a partnership between Calytrix and NPS. The Marine Corps contracts Calytrix to provide CNR for its simulators, and a partnership can help to bolster not only Marine Corps simulations, but further research in the field.
3. One area of future research as possible thesis topics could be how radio communications affect the fidelity of simulations. A method to achieve this would be to operate an ISE with radio communications and without (simply talking to other participants in the room) to explore the possibility of a positive training effect when using interoperable communications such as CNR.