



JIFX

Joint Interagency Field Experimentation

JIFX 24 – 4

5 – 9 August 2024

NPS Field Laboratory at Camp Roberts

Event Focus Area: **Non-Standard Communication & Navigation**

The **Non-Standard Communication & Navigation** focus area delves into innovative and unconventional methods of communication and navigation, aiming to revolutionize how information is exchanged in diverse and challenging environments. This event centers on developing and growing cutting-edge technologies that transcend traditional communication and navigation paradigms, catering to scenarios where standard infrastructure is unavailable or compromised.

- **Emerging Frequency Bands:** Investigating the utilization of underutilized frequency bands, such as terahertz and millimeter waves, for communication and navigation. Research in this area focuses on spectrum availability, propagation characteristics, and modulation techniques.
- **Quantum Communication:** Exploring the potential of quantum technologies for secure communication and navigation. This involves quantum key distribution, quantum teleportation, and quantum entanglement for encrypted and instantaneous data exchange.
- **Visible Light Communication (VLC):** Advancing VLC techniques that employ light-emitting diodes (LEDs) for data transmission. Research includes improving data rates, range, and robustness in scenarios where traditional RF communication is impractical.
- **Biological Communication:** Investigating biological systems, such as using bioluminescence or bioacoustics, for communication and navigation. This area explores the adaptation of natural processes to develop resilient communication and navigation methods.
- **Cognitive Radio Networks:** Developing dynamic spectrum access techniques that enable devices to autonomously select available frequencies for communication, optimizing spectrum usage and minimizing interference.
- **Navigation in GPS-Denied Environments:** Exploring navigation solutions in areas where GPS signals are unreliable or unavailable. This involves sensor fusion, visual odometry, and celestial navigation techniques.
- **Swarm Communication:** Studying communication and navigation among swarms of autonomous vehicles or drones, where cooperative behaviors enable efficient data relay and navigation accuracy.
- **Underwater Communication:** Addressing the challenges of communication and navigation in underwater environments through techniques like acoustic communication, underwater optical communication, and autonomous underwater vehicles.

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