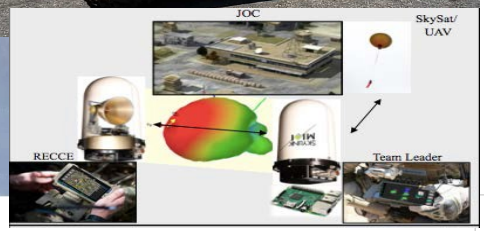
Short-Term Self-Moving Maritime-Land Mesh Networks

Naval Postgraduate School



How

- Utilize miniature directional antenna units in the maritime-land mesh networking testbed.
- Research current unmanned systems technologies that could carry on networking nodes, position them in the right locations, and adjust their positions as needed.
- Examine different types of communication links and protocols to determine which will provide the most reliable and secure communications.
- Evaluate which sensors are best-suited to be carried onboard unmanned systems to provide situation awareness data to key stakeholders.
- Conduct simulated tests within the CENETIX lab followed by field experiments focused on feasibility and constraints analysis for the proposed network integration combined with experimental studies of the self-aligning network control channels and network operation techniques.

What

- Enable a maritime-land mesh network of short-living nodes and links while integrating UxV in a multi-domain environment.
- Enable integration of miniature directional-antennas with littoral mesh nodes, and the elusive networking capability they bring.
- Minimize tactical operator interactions with directional antennas
- Design the Knowledge Base foundations for managing short-living nodes and short-living links autonomies.
- Identify the best-suited architectural requirements for the construction, deployment, and operations of autonomous short-lived networks using unmanned assets.
- Identify the architectural requirements for a network backbone infrastructure that could be deployed and operated using a long-distance control link.

Why

- Survivability of communications in austere environments. The Navy must communicate, but needs to exploit the potential of self-organizing networks of elusive unmanned systems to conduct cyber-physical maneuver in the maritime-land combat clutter to survive in the future operating environment.

We address significant key warfighting needs to:

- Introduce robust system of unmanned vehicles that can act in the role of humans in network deployment duties, while allowing human operators to direct, observe, and maintain situational awareness from a safe distance.
- Gain an asymmetric warfighting advantage through hard-to-detect networks.
- Increase survivability during C2 communications.
- Reduce detectable footprint of USN/USMC/USSOF tactical communications to counter near-peer communications direction-finding capabilities.
- Enable real-time collaborative mission planning and execution with seamless and continuous situational awareness in contested or denied.

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