UxS Manned/Unmanned Secure Teaming

CRUSER
Consortium for Robotics and Unmanned Systems Education and Research

Multi-Connection UxS Communication Integration

Problem Statement

- This research addresses the need for secure yet interoperable C2 links across a variety of unmanned system platforms.
- In this work, we:
  1) perform a qualitative study of current UxS C2 link security needs and requirements across the DoN.
  2) Investigate a novel application of an emerging **multi-device, asynchronous** security protocol for messaging applications that is under standardization by the IETF. The protocol offers secure interoperability and pre-addresses the risk of a cyberattack; i.e. if a UxS's session key is compromised, the attacker cannot access data (targets, surveillance, etc.) under certain constraints, and group entities can be added/removed adaptively. The protocol has never before been aligned or customized for the UxS space, let alone tested, but is a standardized asset as potential for pre-approved use and international interoperability.

Impact

- This research provides insight on the current DoN policy and state-of-the-art on C2 link security protocols. It trials a new standardized protocol designed for efficient group communication.
- This research paves the way for 1) upgraded C2 link security guidance across DoN UxS devices, 2) international interoperability with allied partner devices based on mission need, and 3) efficient healing of UxS security links in the event of cyberattacks.
- This research provides the warfighter with improved UxS cyber security and more efficient connection establishment with UxS, as well as interoperability at the security layer.
- Success is defined by clear linkage of DoN policy to cryptographic protocol options, viability research on use of a new IETF protocol, and on-device UxS feasibility testing.

Transition:

- UxS platforms are being rapidly developed to extend to a variety of features and functionalities but lack a clear C2 link security layer to support these. This research develops C2 link security based on existent and developing needs of those leading UxS features and design. We anticipate a 3-year development cycle to mature this project from inception to deployment to the Fleet.
- NIWC-PAC and NSWC have expressed partnering interest, with NIWC-PAC as a committed collaborator in on-device testing and potential deployment. Future funding proposals to ONR in collaboration with NIWC-PAC are anticipated. The concept has been presented at the recent NavalX Agility Summit, receiving interesting from participants, including N7.

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