



Cyber Security for Underwater Communication

Organizer: Roe Diamant

Underwater acoustic communications are increasingly becoming a cost-effective means of ocean exploration and monitoring, and for command and control of sensitive military information such as location of units and communications. While carrying out these tasks, however, underwater communication devices may become vulnerable to external attacks. The recent introduction of the JANUS standard for underwater acoustic communications makes these attacks more probable. Currently, due to physical and performance limitations, underwater modems rarely include encryption, exposing the communications to external attacks faking legitimate messages. Furthermore, underwater networks are prone to a range of higher layer attacks such as denial of service, Sybil and Wormhole attacks. For this reason, there is a need to explore new ways to secure communication against various kinds of attacks from eavesdropping detection, to securing data packets to authentication - methods that avoid the need to change existing modems but rather provide a protective layer. Moreover, the specific underwater environment, with its features (in terms of propagation channel, but also of used equipment and specific application scenarios, often life-critical) requires a all-around analysis of security threat and solutions.

The aim of the workshop is to bring together novel research in the fields of applications for underwater security, physical layer security exploitation, and cyber protection for networks. Covered topics will include:

- Categorization of security attacks: Eavesdropping, Jamming, Sybil attack, Wormhole attack, etc)
- Authentication: source identification, friend or foe, message authentication
- Confidentiality: packet level encryption, end-to-end message protection
- Requirements for specific challenges of underwater communications cyber security and problem definition
- Surveillance of underwater environment
- Security related constraints of the underwater environment
- Limitations of current cyber security solutions for the underwater domain