

Acoustic Networking in MOOS using `pAcommsHandler`

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Acoustic waves are often the only practical carrier for sub-sea communications due to the short propagation distances of light and radio waves in sea water. Using acoustics, however, has its limitations. Due to the realities of sound propagation, the acoustic channel is severely limited in throughput and typically has high latency. These constraints require special treatment at all levels of the network from hardware to the application layer.

In this tutorial we will focus on the application `pAcommsHandler` [1], which is the MOOS interface to a suite of C++ acoustic networking libraries called `goby-acomms` [2]. Currently, the hardware supported is the WHOI Micro-Modem. We will learn how to

- Define structures for compact short messages suitable for sending over the acoustic channel using the Dynamic Compact Control Language (DCCL) (which extends XML). DCCL is implemented in `goby-acomms libdccl` and discussed in [3].
- Configure message queues for different types of messages to dynamically assign priorities to messages based on the overall value and time-sensitivity of the data using `goby-acomms libqueue`.
- Deal with medium access control (MAC) in the underwater channel using `goby-acomms libamac`.
- Discuss issues pertaining to using the WHOI Micro-Modem and how we can to extend `goby-acomms` to work with other hardware.

At the end of the tutorial, you will be able to configure and use `pAcommsHandler` to communicate seamlessly amongst MOOS-based undersea vehicles and other acoustic modem equipped nodes.

References

- [1] T. Schneider and H. Schmidt, “A compact control language for autonomous underwater vehicles,” MIT, Tech. Rep. LAMS-09-03, 2010. [Online]. Available: http://gobysoft.com/resources/docs/comms_stack.pdf
- [2] T. Schneider, “Goby underwater autonomy project.” [Online]. Available: <https://launchpad.net/goby>

- [3] T. Schneider and H. Schmidt, "The Dynamic Compact Control Language: A compact marshalling scheme for acoustic communications," in *Proceedings of the IEEE Oceans Conference 2010*, Sydney, Australia, 2010. [Online]. Available: <http://gobysoft.com/resources/dcclOceans10.pdf>