

# Demonstration of PC-based and DSP-based Implementations of a MIMO-OFDM Acoustic Modem

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MIMO-OFDM is one high-data-rate solution for underwater acoustic communications. In this workshop, we would like to demonstrate two modem prototypes that have been developed at University of Connecticut on the implementations of a MIMO-OFDM acoustic modem, whose receiver algorithms are developed in [1], [2].

- PC-based implementation. This implementation is based on Matlab programming on two laptops, as shown in Fig. 1. Two laptops can communicate with each other via two-way acoustic links.
- DSP-based implementation. This implementation is based on a TMS320C6713 DSP board, as shown in Fig. 2.
- The demo setup in WUWNet08 is shown in Fig. 3.

The key parameters of these prototypes are:

- QPSK modulation
- 2 transmitters and 2 receivers
- rate 1/2 channel coding
- Bandwidth of 5.5 kHz. Data rates of 6.2 kb/s.

These prototypes work well for in-air acoustic channels and are expected to work well for underwater acoustic channels with stationary transceivers.

Space requirement:	two desks
Equipment requirement:	none

## REFERENCES

- [1] B. Li, S. Zhou, M. Stojanovic, L. Freitag, J. Huang, and P. Willett, "MIMO-OFDM over an underwater acoustic channel," in *Proc. of MTS/IEEE OCEANS conference*, Vancouver, BC, Canada, Sept. 29 - Oct. 4, 2007.
- [2] B. Li, J. Huang, S. Zhou, K. Ball, M. Stojanovic, L. Freitag, and P. Willett, "Further results on high-rate MIMO-OFDM underwater acoustic communications," in *Proc. of MTS/IEEE OCEANS conference*, Quebec City, Canada, Sept. 15-18, 2008.



Fig. 1. The PC-based prototype with two-way communication



Fig. 2. The DSP-based prototype for real-time one-way communication



Fig. 3. The demo setup at WUWNet, Sept. 15, 2008.