



MIMO-OFDM

Weekly Meeting: Week 3

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Literature Review Overview

- **Experimental Study of Cooperative MIMO at HF Band** was on the application of MIMO technology to HF and solutions to the problems inherent.
- **An Experimental Investigation Into the Feasibility of MIMO Techniques Within the HF Band** looked into potential methodologies for the application of MIMO with HF.
- **From Theory to Practice: An Overview of MIMO Space-Time Coded Wireless Systems** provides a general overview of MIMO technology and techniques as it currently stands
- **An Overview of MIMO Communications—A Key to Gigabit Wireless** details the current state of MIMO technologies in the context of 5G internet.
- **Cognitive engine implementation for wireless multicarrier transceivers** - presents a genetic-algorithm driven, cognitive radio decision engine that determines the optimal radio transmission parameters for single and multicarrier systems.



Literature Review Cont.

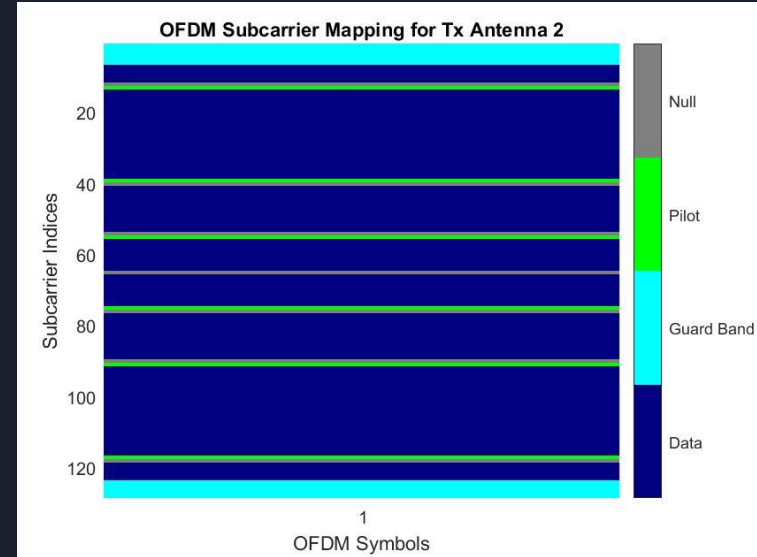
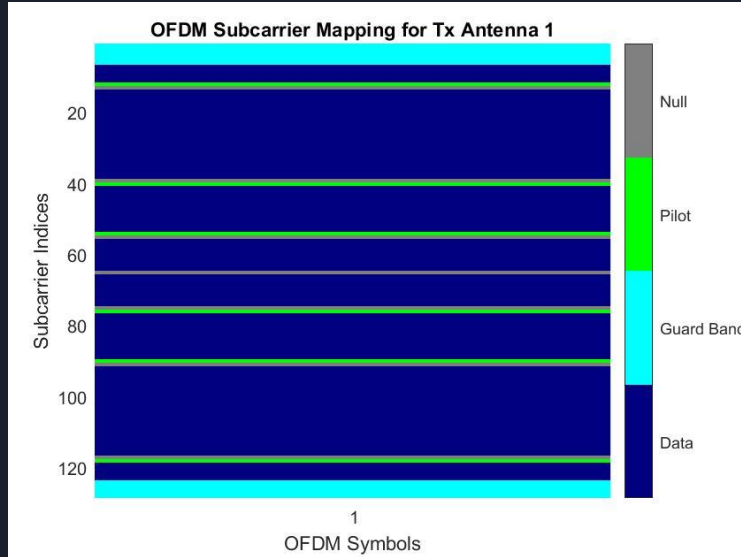
- **New Detection Schemes for Transmit Diversity with no Channel Estimation** entertains using two transmission antennas and one receiving antennas.
- **A New MIMO HF Data Link: Designing for High Data Rates and Backwards Compatibility** discusses compact cross-polarized arrays through measurements as a way to apply MIMO to HF.



Roadmap

- Week 3
 - Implement Waterson channel model (Rayleigh Fading) in MATLAB (with data outputs)
 - Implement traditional estimation algorithms like RLS and LMS
 - Initial CE baseline algorithm design
- Weeks 4-6
 - Design and implement CE algorithms (Genetic, Epsilon-greedy)
 - Test a variety of ML algorithms for improving the IO of our MIMO implementation
- Week 7-10
 - Other tasks
 - paper writing

Our First Simulations- Credit of at Mathworks for their OFDM with MIMO Simulation



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>> MIMO_OFDM_example
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Symbol error rate = 9.028846e-02 from 1878 errors in 20800 symbols
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Questions?

The background features a series of dark gray, three-dimensional rectangular planes that recede into the distance, creating a sense of depth. A light green parallelogram is positioned on one of the upper planes, and a blue parallelogram is on a lower plane, both adding a pop of color to the monochromatic scheme.



References

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5. T. R. Newman, B. R. Barker, A. M. Wyglinski, A. Agah, J. B. Evans, and G. Minden "Cognitive engine implementation for wireless multicarrier transceivers," in Cognitive engine implementation for wireless multicarrier transceivers, vol. 7, pp. 1129-1142, Nov. 2007.
6. V. Tarokh, S. M. Alamouti and P. Poon, "New detection schemes for transmit diversity with no channel estimation," ICUPC '98. IEEE 1998 International Conference on Universal Personal Communications. Conference Proceedings (Cat. No.98TH8384), Florence, Italy, 1998, pp. 917-920 vol.2.
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