Cognitive Radio Tutorial Outline
6 Hour Version

1. Introducing Cognitive Radio
- 1.1 What is a Cognitive Radio?
- 1.2 Relationship between CR and SDR
- 1.3 Typical Commercial CR Applications
- 1.4 How does CR Relate to WAAN and future military networks?

2. Implementing a Cognitive Radio
- 2.1.General Architectural Approaches
- 2.2.Observing the Environment
  - 2.2.1. Autonomous Sensing
  - 2.2.2. Collaborative Sensing
  - 2.2.3. Radio Environment Maps and Observation Databases
- 2.3.Recognizing Patterns
  - 2.3.1. Neural Nets
  - 2.3.2. Hidden Markov Models
  - 2.3.3. Ontological Reasoning
- 2.4.Making Decisions
  - 2.4.1. Common Heuristic Approaches
  - 2.4.2. Case-based Reasoning
- 2.5. Helping a Machine Learn
- 2.6.Representing Information
- 2.7.Current Implementations including VT's Prototypes

3. Networking Cognitive Radios
- 3.1 The Interactive Problem
- 3.2 The Role of Policy in Networked Cognitive Radios
- 3.3 Approaches to Designing Well-behaved Cognitive Radio Networks
- 3.4 Emerging Standards

4. Summary and Conclusions
- 4.1 Outstanding Research Issues
- 4.2 The Opportunities
- 4.3 Speculation on How the Future May Evolve