



“Intelligent Engineering for Intelligent Wireless Networks.”

CRT: Overview



Founded in 2007 by Dr. James Neel and Dr. Jeffrey Reed to hasten the transition of cognitive radio from the laboratory to the field, Cognitive Radio Technologies (CRT) is the leading small business for customized cognitive radio research and development, having received two cognitive-radio-focused SBIR awards and three paper awards for cognitive radio research.



CRT’s internal research focuses on developing algorithms for the distributed management and coexistence of cognitive radios networks. For example, by leveraging its ground-breaking research into game theoretic analysis and design of cognitive radio networks, CRT has developed a patents-pending suite of distributed non-collaborative spectrum management algorithms that manage a variety of radio resources (e.g., power, frequency, modulation, beam patterns) to optimize network performance and ensure network stability.

Because CRT’s algorithms work with instead of against network dynamics, there is no need to: coordinate adaptations between controllers, distribute observations between controllers, message a centralized controller, or distribute / synchronize clocks. Because of these features, the complexity of CRT’s spectrum management algorithms scale independently of network size (our basic ad-hoc suite) or scale linearly with network density (our traffic reactive and beamforming suites).

The end result is a solution that yields performance equivalent to an “omniscient” centralized local search algorithm, but without the overhead, complexity, or the single-point of failure of a centralized solution. Further since the algorithms operate with generally available measurements, e.g., RSS, node addresses, and time stamps, the algorithms can typically be applied to existing waveforms.

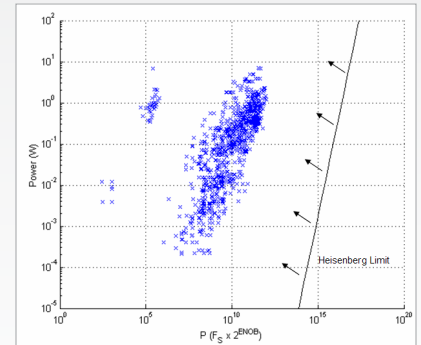
To help bring this research to the field, CRT’s business model is built on partnering with established companies to spin in our cognitive radio research into their existing product lines. For example our spectrum management research is being refined and integrated with L3-Nova JTRS product lines under a Navy SBIR and we are conducting initial integration studies with GDC4S on an Air Force SBIR on cognitive networking.

CRT: Engineering Services

CRT provides a variety of engineering services related to cognitive and software radio to help our customers move from concept to prototype. Our services include:

Analysis:

Our strong theoretical foundation in software and cognitive radio provides quick answers to fundamental design questions to maximize the productivity of our customers' efforts. We have provided theoretical performance limits of cognitive radio algorithms, estimates of MAC and network performance analysis, and traditional systems analysis (SWAP, feasibility analysis). We have also provided patent consulting services to determine infringement and essentialness of patents critical to cellular and WiFi infrastructure.

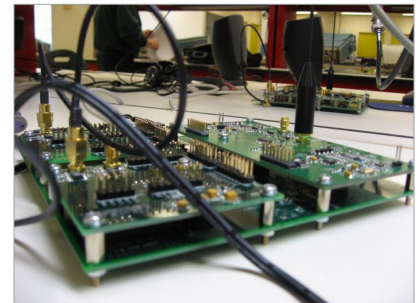


Algorithm Development:

We also develop customized algorithms to translate theory to practice. We support algorithm development for location services, signal classification/detection cognitive networking, coexistence and interoperability and more traditional waveform processing tasks.

Prototype Designs from Architecture to Implementation:

Leverage our experience building proof-of-concept radios to rapidly demonstrate your cognitive radio design. We're experienced with numerous DSP and FPGA tool chains and devices, most common prototyping boards such as the USRP / GNU radio package, common SDR software architectures (e.g., SCA, STRS), and implementation details of many commercial wireless standards.



Training & Tutorials

Founded by academics, the engineers at CRT still enjoy the opportunity to teach engineers foundational theory and to expose engineers to cutting-edge technologies. CRT has a number of "off-the-shelf" one- and two-day short courses that can be given with little notice, or with a little lead-time, we can rework the content and pace to match the background and needs of a specific audience. Some of our more popular past short-courses include: Cognitive Radio (standards, implementation techniques, trends), Emerging Wireless Standards (commercial standards - 802.11, WiBro, LTE - and the underlying communications theory), and Software Radio (components, software architectures, implementation).

Cognitive Radio Technologies
147 Mill Ridge Rd., Ste. 119
Lynchburg, VA 24502

Web: www.crtwireless.com
Ph: (540) 230-6012
E-mail: info@crtwireless.com