Objectives of Project

The Virginia Tech Outdoor Cognitive Radio Network (O-CORNET) testbed consists of 14 fixed nodes, one receive only monitor node and several portable or mobile nodes. All nodes are software-defined radio (SDR) and are spread over Virginia Tech's campus in Blacksburg, VA, providing outdoor testing capabilities for cognitive radio and related research, education and testing. The 14 fixed nodes are located on rooftops of various campus buildings. The mobile nodes can be deployed in cars, buses, carts or other motorized or non-motorized vehicles (with power supply). Each SDR node consists of an Ettus N210 radio front end and a laptop with a powerful general-purpose processor (GPPs) for implementing the waveforms and controlling the front ends.

All SDR nodes are equipped with a wide band antenna and a connection to the campus Ethernet system. The software that runs on the processors is Ubuntu Linux, GNU Radio, UHD, and remote desktop software. Each node is operated as a stand-alone system and is accessed remotely by authorized users. No local operation is provided except for setup and testing purposes.

Mobile and portable nodes use a portable laptop computers and Ettus B210 RF boards. These nodes may be checked out by system users for temporary tests.

The testbed will be used for (1) conducting innovative research experiments on new communications system technology and spectrum management and (2) educating students about these new technologies and spectrum management techniques. This includes 4G techniques, MIMO, cooperative multipoint transmission and reception, as well as spectrum sharing techniques. Authorized students and researcher will have the opportunity to investigate and advance theory and accomplish demonstrations and results to transfer knowledge. The wide-area distribution of nodes with GPS aligned transceivers allows contributing to research and education on these advanced communications concepts.