

## Technology Profile Fact Sheet

**Title:** Environmental Time Synchronization Protocol

**Aliases:** Cicada Protocol

**Technical Challenge:** Current network time synchronization protocols rely on the radio for communication of the time standard synchronization, and crystal clocks to obtain the time throughout the network. The usage of radio consumes large amounts of energy and can be used to detect or deny service to those using the network.

**Description:** The Cicada Protocol is a synchronization protocol that uses the environment as a means of ensuring nodes within the network are working in the same time domain. The Cicada Protocol uses a wake and check procedure to establish synchronization throughout the network, without radio communication. This method of synchronization dynamically sets the node's timer to awaken an individual 'sleeping' nodes at a frequency determined by an environmental sensor variable. The nodes sleep in order to reduce the amount of energy consumed, thereby increasing the longevity of the nodes within the network. These nodes can be programmed to perform a particular event when a predefined value of the environmental variable is reached. The environmental variable will determine the interval at which you activate and check the amount of time it will take for the network to synchronize when the predefined value is met, so the characteristics of the environmental variable must be examined carefully before it is selected. The Cicada Protocol is highly impervious to effects of node failure. It offers scalability, energy conservation, and time accuracy, while reducing detectability and susceptibility to denial of service attacks.

**Demonstration Capability:** This capability can be demonstrated upon request.

**Potential Commercial Application(s):** This technology is applicable to long duration, low profile sensor networks.

**Patent Status:** A patent application has been filed with the USPTO.

**Reference Number:** 1394