

12TH ICCRTS

“Adapting C2 to the 21st Century”

Title: Green Movement Toward C3ISR Operations

Topics

Networks and Networking

Network-Centric Experimentation and Applications

C2 Technologies and Systems

Authors: John Buchheister and DeWayne Gray

Contact

John Buchheister

Synergistic Research, Inc.

6252 Rolling Spring Court

Springfield, VA 22152

703 371-3450

johnbuch@cox.net

ABSTRACT

Green Movement Toward C3ISR Operations

In the pristine regions of the Powder River Basin in Montana and Wyoming, energy companies are exploring and producing enormous quantities of natural gas. The gas comes from coal beds thousands of feet below the surface and is known as coal bed methane (CBM). The operation involves the production of large volumes of water the disposition of which must be managed after the gas is extracted. Effective methods of water management are being evaluated that are environmentally safe and cost less than those in common use today. Currently, excess water from gas wells are managed by direct downhole re-injection, impoundment, discharge into existing waterways and various irrigation methods. Irrigation with prescribed soil treatments provides an environmentally friendly means to manage the extracted water by turning otherwise barren land into rich crop-producing soil for alfalfa and other cattle feed. EnerCrest, an oilfield service company, and DataPath, a DoD contractor are conducting research into a knowledge based management system that will automate water irrigation systems to maximize water usage while minimizing negative soil impact caused by CBM water. The proposed solution will utilize a combination of atmospheric and soil sensors at multiple irrigation sites to monitor moisture levels, soil physical and chemical properties, soil drainage and water runoff. Wireless communications links consisting of localized Zigbee sensor mesh networks, wireless links, and satellite communications will allow data from remote sites to be collected and reported to operation centers. At these centers, operators can monitor and control site operations around the clock, communicate with personnel in the field, take decisive actions based on real time information, and keep an eye on water operation trends using automatic predictive analysis methods---a C3ISR operation to help preserve the environment. The objective of this research is to determine if current center pivot irrigation methods utilizing CMB produced water can be automated and scaled to increase water volume absorption in the soil and improve crop yield and quality while maintaining soil physical structure and chemical properties such that the environment will be returned to original condition after the gas production is completed.