

Real Time Monitoring System

The Real-Time Environmental Monitoring System (RTEMS) does exactly what the name implies. The RTEMS is a portable “box” that can capture environmental data (chemicals in the air or water, fluctuations of pH or oxygen, whatever – the existence or change of chemicals or other variables). It captures this data in “real time,” meaning it gives instantaneous feedback, and can give this feedback for each second or minute, or every third day – whatever parameters the user decides. The system can also work on a wide range of computer operating systems. Plus, you can attach just about any type of sensor that currently exists or that may be developed, allowing you to monitor whatever you like, as long as you have the right type of sensor. It also permits detection with alarms and outputs, and has incorporated computer-actuated responses to events.

Swamp wetland in
Cleveland Metroparks



The bench-scale RTEMS unit has been designed, built, and tested. This unit has been demonstrated to the NASA GRC Environmental Management Office (EMO). The next phase in the RTEMS project is to install a prototype RTEMS unit at GRC and test it. The results of the prototype study, along with access to a website and/or LAN access to RTEMS, will be made available to all NASA facilities. As each NASA facility evaluates this tool, they can provide insight to other NASA facilities regarding potential costs and benefits.

Grant money is needed to accomplish this. Some applications: Water monitoring, air monitoring, security and emergency response, wetland chemical cycling, etc. A \$2.5 million grant proposal written up by Walt Kocher was submitted to the National Science Foundation. Other possible applications are military personnel sensors (location, health), wetland inventory and restoration in the Cuyahoga Valley, hydrology monitoring, water table changes, and bispectral imagery (visible and infrared).

The RTEMS can also archive and report all necessary data at pre-determined intervals, and to perform system mass balances and other analyses needed to optimize system operations. Further down the road, the RTEMS can also be used as computerized simulation for ‘what if’ studies, using previously captured real data to test the potential

outcomes of any number of processes being considered for inclusion into the waste/resource management. These simulated results could be instrumental in evaluating possible system modifications, potential pollution prevention/waste minimization alternatives, or resource recovery processes.

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