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Environmental Sensors Linked to Cyber-Networks – a New Dimension for Hydroinformatics

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Novel application-specific microengineered sensors and instruments linked to optimization and simulation models will allow the development of 'real-time' intelligent decision-making systems. Processing the data from arrays of sensors that are currently under development will require access to faster, cheaper and more flexible 'real-time' data processing, transmission and storage systems. In many cases there will be a requirement to integrate and synchronize data from a large number of sources. Future advanced instrumentation will include intelligent control systems that adapt the behavior (location and frequency of transmission of sensed data) of the sensors in response to the values being measured of the sensed data. Hydroinformatics is an essential part of this major development in improved forecasting and management systems. This paper will discuss the results of a recent National Research Council study on the potential impacts of this new technology in the practice of environmental and water resources engineering and the role hydroinformatics must have if it is to be successful. The paper will also relate this work to the hydrologic, environmental and ecological observatories being planned and supported by the National Science Foundation in the US.