**8.3.10 W-W   Subtopic: Development of Open Source Initiative (OSI)
                              Model Application Layer for Hydrologic Radio
                              Telemetry Data**

The purpose of this subtopic is to develop a technical standard known as an OSI application layer to replace the existing Automated Local Evaluation in Real Time (ALERT) format. ALERT is a de facto standard for transmitting rain and stream gage data from remote locations by VHF/UHF radio transmissions. ALERT radio gage reports are indispensable to the National Weather Service and other federal, state, and local agencies responsible for emergency planning and water resource management. Timely and accurate ALERT gage reports save lives and reduce property damage, and contribute to NOAA's weather and water mission by improving flash flood forecasting lead times. The ALERT gage data format, however, is based on 1970's technology that severely restricts its reliability and data content. A new, non-proprietary standard that takes advantage of newer technologies and user requirements is needed. The creation of a non-proprietary domain OSI application layer for ALERT data will guarantee interoperability among manufacturers. This will, in turn, encourage development of new transmitters by many potential manufacturers, and enable creation of versatile and innovative hydrometeorologic hardware and software that meet the needs of today's users. Such equipment is very likely to have applications beyond hydrometeorology, including environmental protection, highway safety, and homeland security.

In 2005 NOAA issued an SBIR solicitation to develop a new ALERT protocol, and awarded a 2005 Phase I SBIR contract to Blue Water Design, Inc (BWD). BWD focused its efforts on the first 4 OSI layers (physical, link, network, and transport), and proposed a technique using non-proprietary, 4 level orthogonal direct Frequency Shift Key (FSK) encoding, raised cosine response data filtering, with a NASA standard concatenated channel code, interfaced to a standard, off-the-shelf VHF/UHF transceiver. BWD's research, however, disproved the 4 level encoding method and therefore no Phase II SBIR was proposed. The research, however, proved that a 2 level encoding method holds great promise, and research in the public domain is continuing. The research conducted by BWD and others to date, however, did not address the OSI application layer as it applies to hydrometeorologic data collection, which this solicitation seeks to independently develop. The objective is to create a viable OSI application layer that is compatible with BWD's 2 level encoding method, building upon the body of research already established in the public domain by BWD and others. The application layer specification that the SBIR awardee will propose must consider, at a minimum, what types of information should be transmitted that are not being sent in the current ALERT format, how such messages will be encoded, how frequently messages should be reported, how content errors should be identified and processed by receiving software, what ranges and resolutions of data should be transmitted, and any additional factors that will broaden the current ALERT format's functionality.

References:

ALERT Physical Layer Feasibility Study,
    http://www.afws.net/supportsite/iflows/index.html

ALERT Format Introduction http://www.afws.net/supportsite/iflows/index.html

Blue Water Design New ALERT Protocol SBIR Technical Report,
    http://www.afws.net/supportsite/iflows/index.html

NOAA/NWS Flood Warning Systems Manual
    http://www.nws.noaa.gov/directives/sym/pd01009042curr.pdf, Appendix F, PDF
    page 76.