Call For Private Sector Participation in the Collaborative Radar Acquisition Field Test (CRAFT): The Distribution of WSR-88D (NEXRAD) Radar Level II Data in Near Real Time

Deadline for Response: 15 March 2003

1. Purpose

The University of Oklahoma (OU) invites all interested private companies to participate in the *Collaborative Radar Acquisition Field Test (CRAFT)* (http://kkd.ou.edu/craft.htm). Project CRAFT is an experiment involving the transmission of near real time WSR-88D (NEXRAD) Level II (base) data via the Internet, and during the next two years an operational system for Level II data delivery will be established by the National Weather Service. This call for participation seeks to encourage the continued development by private companies of products and services using the present CRAFT data stream, which involves 59 radars, with costs shared equally among all private sector participants (see below) and including substantial funding by the Federal government.

2. Background

In fall 1998, the Center for Analysis and Prediction of Storms (CAPS) at the University of Oklahoma, in collaboration with the NOAA National Severe Storms Laboratory, NOAA Radar Operations Center, and UCAR Unidata Program, launched the Collaborative Radar Acquisition Field Test (CRAFT) to demonstrate the viability of compressing and transmitting, via the Internet in real time, WSR-88D Level II (base) data (Droegemeier *et al*. 2002; http://kkd.ou.edu/craft.htm). Involvement of private companies began in mid-2001, with NOAA approval following termination of the NIDS agreement, as a means for stimulating the use of experimental near real time Level II data by the private sector and determining their associated data needs. At the present time, 59 WSR-88D radars participate (http://kkd.ou.edu/craftradars.htm).

3. Methodology of Data Delivery

Near real time Level II data from CRAFT radars are first compressed at the radar site using a loss-less public-domain algorithm (BZIP2) and then relayed, via the Internet, to the end-user site, where they are ingested by the UCAR Unidata Local Data Manager (LDM). LDM is a free software package, available from UCAR, that operates on Unix-based computers, including PCs and small workstations, and is used by academia, government, and industry to both disseminate and manage a wide variety of real time meteorological information. More information about LDM can be obtained at http://my.unidata.ucar.edu/content/software/ldm/index.html.

4. Restrictions on Data

Per guidance from the National Weather Service, no restrictions exist on the use or distribution of Level II data provided by Project CRAFT.

5. Reliability

As an experimental data dissemination infrastructure that does not yet provide 7x24 support, Project CRAFT cannot ensure continuous reliable data delivery. Further, data availability is subject to ongoing approval from the NEXRAD Tri-Agencies. However, data reliability is known to exceed 95%, and data latency, defined as the total time delay from the process of segments of volume scans at the radar site until such segments become available at the end-user site, averages 10 to 20 seconds.

6. Cost for and Mechanisms of Participation

Since its inception in fall 1998, CRAFT has been funded by a variety of research and development grants totaling $2.44M, the last $150K of which came directly from the private sector. In addition, about $450K per year has been provided by the FAA, NASA, and other organizations to bring radars into CRAFT and support associated data delivery to meet agency-specific needs.

The current rate of funding for CRAFT from the private sector is $3,402/month. A total of $355K is needed to continue supporting the existing CRAFT infrastructure for 12 months (1 December 2002, when previous Federal funding expired, through 30 November 2003). *New* federal funding from 1 December 2002 - 30 November 2003 totals $260K ($150K from the National Weather Service; $50K from the National Science Foundation, to broaden use by the academic sector; $10K from the Naval Research Laboratory, and $50K from the NOAA National Climatic Data Center). Thus, a total of $260K in Federal funds have been committed, **with the remaining obligation of $95K expected to come from private sector partners, *including funding they've already committed via existing Sponsored Research Agreements from 1 December 2002 to the present time*.** The concept of all users (government, academic, private sector) paying a fair share of the actual costs associated with making Level II data available in near real time is consistent with guidance provided to CRAFT by the National Weather Service and ensures a level playing field.

Participation in Project CRAFT is open to all private companies, and the specific provisions of participation are as follows:

- A decision regarding participation is needed by **15 March 2003**.
- **Those wishing to participate should contact Dr. Kelvin Droegemeier, University of Oklahoma, at 405-325-0453 or kkd@ou.edu.**
- The cost for each participant is identical and depends upon the total number of participants, as shown in Table 2 below.
- The University of Oklahoma will supply data only from all radars, as has been the case in the past. No special agreements at reduced cost will be offered for those who wish to receive only a subset of radars.
- Participants can join or leave the project subject to the conditions of the Sponsored Research Agreement (see below). If the number of participants changes, the cost for remaining participants will be adjusted accordingly, on a monthly basis.

Table 2. Monthly Cost for Private Companies to Participate in Project CRAFT from 1 April through 30 November 2003.

Number of Private Sector Participants	Monthly Cost to Each Private Sector Participant to Receive Level II Data from Present – 30 November 2003 (8.5 months)
1	$7,915
2	$3,958
3	$2,638
4	$1,979
5	$1,583
6	$1,319
7	$1,131
8	$989
9	$879
10	$792
11	$720
12	$660
13	$609
14	$565
15	$528

7. Contractual Methodology

Private companies wishing to participate in Project CRAFT will, as is now the case for existing corporate partners, execute a Sponsored Research Agreement (SRA) with the University of Oklahoma. This document outlines all legal provisions associated with participation such as payment scheduling, data availability, liability of the University of Oklahoma, quality of service, and termination. A sample SRA is available on the Web at http://kkd.ou.edu/sra.pdf.

8. Software Availability and User Support

The CRAFT web site at the Center For Analysis and Prediction of Storms at OU provides information about: obtaining, installing and configuring LDM for Level II data receipt; frequently asked questions; real time latency and radar status information; packages for viewing and reading Level II data. See http://caps.ou.edu/rtstats/craftfaq1.html. Expanded support beyond these basic capabilities is available for additional cost in a research and development context.

9. The Future of Near Real Time WSR-88D Level II Data Distribution

During the next 1-2 years, the National Weather Service will make the transition to an operational data delivery system for near real time WSR-88D Level II data. The funding requested herein is intended to ensure continued operation of CRAFT as that process

takes place. Additional radars likely will be added during the next few months as the NWS proceeds with this conversion.

10. References Cited

Droegemeier, K.K., K. Kelleher, T. Crum, J.J. Levit, S.A. Del Greco, L. Miller, C. Sinclair, M. Benner, D.W. Fulker, and H. Edmon, 2002: Project CRAFT: A test bed for demonstrating the real time acquisition and archival of WSR-88D Level II data. Preprints, *18th Int. Conf. on Interactive Information Processing Systems (IIPS) for Meteorology, Oceanography, and Hydrology*., 13-17 January, Amer. Meteor. Soc., Orlando, Florida, 136-139.

Droegemeier, K.K., 2002: Summary of the Second WSR-88D Level II-Data Stakeholders Workshop, held at the University of Oklahoma on 26-27 September 2002, 13pp. Available at http://kkd.ou.edu/craft.htm.