### MCEER RESEARCH TASK STATEMENT

<table>
<thead>
<tr>
<th>User Networks</th>
<th>Budget:</th>
<th>Yr 8 Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Task Title:** Networking of Computational, Experimental and Educational Facilities – Develop and coordinate the sharing infrastructure for center-wide products

**Investigator/Institution:**
- A. M. Reinhorn*, University at Buffalo
- E. Maragakis, University of Nevada, Reno
- A. Dargush, MCEER

* indicates task leader

**Statement of Project Goals:** *(Conceptually describe what the work is intended to accomplish, in 100 words or less. Do not provide detailed description here.)*

The objective of this task is to continue develop the networking infrastructure for sharing newly developed products of research and disseminate them through educational programs. The infrastructure includes equipment and software for communication and linking of physical facilities with software and databases produced by the research tasks. Moreover the development includes distribution of information via web-based operations to educational programs at MCEER institutions and its minority based universities. Further work in this task includes a functional integration of the information collected to develop an integrated platform.

**Problem Description and Research Approach of Proposed Work for Year 7:** *(Detailed description of research to be conducted and methodology to be used.)*

Following the achievements in previous years, the Networking Program is focusing on development of a distributed infrastructure of access to products created in the main research tasks. The infrastructure has grown by integrating individual software products and databases, developed for evaluation of structures and lifelines and for surveying damage. While the products integrated in the network are those, which became available in the previous research tasks, those products do not cover the overall center-wide mission as reflected in the system diagram.

The restructured networking program is intended to integrate products from the whole system to enable all tasks and approaches specified in the system diagram. The Networking Program identifies products developed in the research tasks, products missing in the “overall system platform” see diagram below - , and plans networking sub-tasks, which can complement and complete the platform.

The networked products cover evaluation procedures and databases, which are stored at institutions, which developed them and procedure to access and use them. The access is based on a series of web-access procedures developed as templates, - or example programs –, which facilitate use by researchers, industry partners and other users.
Moreover the networking program facilitates use of the center information by students and researchers for education purposes through web-based distribution. Webcast seminars and other lectures, video-teleconferences and other virtual meetings are supported with infrastructure developed in house using low budget communication systems through web and point-to-point connections.

The program in cooperation with the Education Program – Andrea Dargush - intends to develop a multidisciplinary seminar, which covers the integrated engineering and social science aspects. The Networking Program will provide the infrastructure for development of such seminar without displacing the speakers and the audience.

**Assessment of State-of-the-Art:** (Describe other relevant work being conducted within and outside of MCEER, and how this project is different.)

The work done in this program is generic and although elements are being developed in NEES initiative, through its CHEF and GLOBUS components, the current program provides both content and infrastructure, while testing its usefulness.
**Progress to date:** *(If applicable, a short description of achievements in previous years. Clearly distinguish progress achieved in the past year, i.e., accomplishments from April 1, 2003, to March 31, 2004.)*

The current program is a restructure of an initial development. The restructuring brought new subtasks, which are currently in latest stages of completion and integration in the network. Templates to facilitate integration, instruction to researchers on integration procedures and examples were developed.

An infrastructure of webcasting and recording educational activities and supported with personnel involving professionals from the Computer Science and Engineering, graduates and undergraduates.

The products of this networking can be accessed through the MCEER website Users Networks or [http://civil.eng.buffalo.edu/users_ntwk/](http://civil.eng.buffalo.edu/users_ntwk/)

**Role of Proposed Task in Support of Strategic Plan:** *(Describe how the effort will make a unique, useable contribution to the MCEER strategic plan.)*

The proposed task is intended to create an integral platform for the research task products, and make them available to the research, education and industry communities. The platform and its components are based on the system diagram and are aimed to provide the overall tools to achieve the strategic goals.

**Task Integration:** *(Describe how the work performed interfaces with other tasks and researchers funded by MCEER.)*

The nature of this task is integration of work done by all other center investigators. The system based platform shown in the diagram above show the tasks integration with the tools developed in this task. The tools developed here are providing the functional links, storages and access to the tasks in the diagram.

The development of the Multidisciplinary Seminar is done in cooperation with the Education Program

**Possible Technical Challenges:**

Technical challenges are numerous since the technology available although apparently simple is largely untested and the development of the tools requires a combined understanding of information technologies (IT) as well as earthquake engineering and socio-economic science issues. Immediate challenges are in the web integration of audio video with two-way interaction at multiple sites. This will be tested between the two coordinating institutions before the implementation to other institutions.
| **Anticipated Outcomes and deliverables:**  
(Also indicate those of particular benefit to IAB members and other end users.) | **Potential end-users beyond academic community:**  
(IAB members and others.) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Website with access to software and databases with self guided instructions for use.</td>
<td>Researchers at member institutions and at large.</td>
</tr>
<tr>
<td></td>
<td>Students and teachers in educational programs</td>
</tr>
<tr>
<td></td>
<td>Industry partners and others.</td>
</tr>
<tr>
<td></td>
<td>*Note: Some of the products are accessed restricted depending on the research teams</td>
</tr>
</tbody>
</table>

**Educational outcomes and deliverables, and intended audience:**

The infrastructure for delivery of web based information is already used in WEBCAST lectures an seminars and in virtual meetings over the web.

The development of the infrastructure for the multidisciplinary seminar along with its materials provided by the Education Program will produce also modules for education community-wide.

**Project Schedule and Expected Milestones for the Project:**  
*(Milestones and estimated time of achievement; e.g. Fall, Spring, Summer.)*

This task is based on completion of subtasks in the other research tasks. Therefore all the outcome of this task is expected at the end of Year 8. However, intermediary products such as templates, integration software, hardware for web connectivity are expected within six months after the start of the Year 8.

**Team Members:**  
*(If known, provide names of team members associated with project including project leader, other faculty and their departments, undergraduate students, graduate students, postdoctoral students, industrial participants.)*

The work is done in cooperation with Prof. Maragakis, University of Nevada Reno, A new Computer Science student and an undergraduate student (to be named) will be added to the crew. The local team will assist all other projects involved in the integration. In addition, the coordination will include the faculty at other institutions involved in the above task. The platform will be created using a visual shell similar to the SIMULINK concept.

**Possible Direction of Work in Subsequent Years:**

In the future years, efforts will be directed to provide a shell platform for integration of the computational information and the databases. Interface software (API’s) and automated integration procedures would be developed.