



## COORDINATION OF STRONG MOTION PROGRAMS AND STRONG MOTION DATA DISSEMINATION

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### INTRODUCTION

Developments in strong motion monitoring technologies together with equally important developments in data base management and data dissemination technologies have created the opportunity to significantly advance acquisition and exchange of strong motion information locally, regionally, and world-wide. In order to fully realize the benefits of this very significant opportunity, infrastructure and mechanisms are needed for coordinating both monitoring and data dissemination programs. These needs have long been recognized. During the past twenty years assessments of key needs to significantly advance earthquake engineering practice and earthquake hazard definition and mitigation - the combination of which equate to earthquake safety - have consistently recommended the establishment of an organizational entity to overview and provide continuing broad perspective of needs for strong-motion recordings and information dissemination (Iwan, 1981; NAS, 1982, 1985, 1987, 1989). Acting on these recommendations, a workshop: Research needs for Strong-Motion Data to Support Earthquake Engineering, was held in Albuquerque, NM in 1993 (Higgins, 1993). That workshop recommended development and effective implementation of a strategic plan for strong motion programs and developed the following mission statement as a focus for developing such a plan.

**"The mission of the U. S. Strong-Motion Programs is to increase public safety by providing users of earthquake strong ground motion information, i. e.,**

- engineering and scientific community**
- public agencies**
- industry**
- media**
- others,**

**with data and analyses on strong earthquake shaking for the purpose of:**

- improving engineering evaluations and design methods for facilities and systems;**
- providing timely information for post-earthquake alerting and assessment;**
- contributing to a greater understanding of the mechanics of earthquake generation and ground motion characteristics."**

This mission statement expands the conceptual purpose of strong motion programs in several important ways. It first expands the vision of strong motion programs with a broad focus on meeting public safety needs in earthquakes. It opens to the concept that public safety needs can best be met through coordination of strong motion programs and a consilience of knowledge - scientific, engineering, social, and political and public policy. Finally, it conceives that significant advances in earthquake safety must involve active ongoing coordination at all levels coupled with a reliable infrastructure for dissemination of strong motion data and information.

The first step toward advancing strong motion programs in the United States toward this mission was taken with the formation of the U. S. Committee for Advancement of Strong-Motion Programs (CASMP) in 1996. The chartered purpose of the CASMP is to foster the mission of the U. S. Strong-Motion Programs by encouraging advancements in the collection, dissemination, and utilization of strong motion data as a tool for advancing public safety in earthquakes. To accomplish its goal the Committee identified a number of workshops to address

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specific elements of the strong motion programs mission. The first of these workshops, held in April 1997, resulted in the strategic planning document: "Vision 2005: An Action Plan for Strong-Motion Programs to Mitigate Earthquake Losses in Urbanized Areas". The workshop defined a number of important actions, discussed below.

### **VISION FOR STRONG MOTION PROGRAMS**

Vision 2005 established a number of strategic goals and defined general technical and implementation requirements to advance strong motion programs and enhance public safety in earthquakes. The strategic goals state strong motion program requirements to meet the needs for earthquake hazards evaluation and mapping, structural engineering, geotechnical engineering, lifeline earthquake engineering, bridge engineering, disaster preparedness and response, and structural health monitoring following major damaging earthquakes. The defined technical and implementation requirements clearly establish the need for substantial enhancement of strong motion data acquisition and dissemination capabilities in order to advance earthquake safety in a reasonable time frame. The workshop recognized that important advances have been made in information retrieval and dissemination capabilities using the INTERNET and related advances in data dissemination technologies. Participants recognized that in order to realize significant advances in the mitigation of potentially catastrophic losses from future earthquakes very real and significant advances in strong motion data acquisition and dissemination are required in the next decade.

Vision 2005 articulated the strong need for a consortium comprised of member organizations represented by individuals responsible for strong motion programs, various related engineering and scientific research programs, private and public earthquake engineering organizations and firms, and federal, state and local emergency response and recovery organizations. Such a consortium was identified as a critical need to facilitate effective and efficient use of available resources for critical strong motion measurement and information dissemination. Such an entity was identified as an effective means to interface and coordinate strong motion programs with regional and national earthquake monitoring programs in order to integrate these traditionally separate monitoring programs to the extent practicable.

Specifically, the workshop recognized that the shared goal of all earthquake monitoring and research programs must be to provide tools for the management of earthquake risk in order to achieve acceptable public safety in earthquakes. Recognizing this shared responsibility, the Consortium of Organizations for Strong-Motion Observation Systems (COSMOS) has formed to: 1) develop policies and foster innovative ideas for improving strong-motion measurement and application, 2) promote advancement of strong-motion measurements in densely urbanized areas and other locations of special significance to society likely to be struck by damaging earthquakes in the future, 3) encourage and assist the rapid, convenient, and effective distribution of strong-motion data consistent with consensus standards, 4) support strengthening and expansion of strong-motion programs, 5) provide coordination to address cross-program concerns with instrumentation, data acquisition and dissemination, and data use, and 6) provide for ongoing, systematic user input to strong-motion programs with respect to data acquisition, dissemination and utilization.

Membership in the COSMOS is open to all agencies, organizations, private companies and consultants, professional institutions, professional societies, and universities. The Charter provides for two categories of membership: Regular Members, and Affiliate Members. Regular Members may be admitted either as Strong-Motion Program members or Strong-Motion User Members. Organizations that operate and maintain five or more strong-motion seismographs stations on a permanent basis or maintain primary strong-motion data storage and dissemination facilities may be admitted as Strong-Motion Program members. Earthquake engineering research centers, universities, research institutions, government agencies, private companies and consultants that use strong-motion data either in research or in the professional practice of earthquake engineering or emergency response and recovery may be admitted as Strong-Motion User Members. Two types of Affiliate Membership also are provided. Companies whose primary business is providing products and services to strong-motion programs may be admitted as Strong-Motion Services Members. Professional societies public agencies that use strong-motion information or are otherwise actively concerned with strong-motion data acquisition and dissemination, and organizations actively engaged with earthquake and seismicity recording or data dissemination may be admitted as Liaison Members.

## COSMOS ORGANIZATION AND FACILITIES

The COSMOS has been established as a State of California non-profit corporation. Officers of the corporation are:

George W. Housner, Honorary President  
**Bruce A. Bolt, President & Chairman**

W. U. Savage, Secretary  
Chris D. Poland, Treasurer.

Other leadership roles are as follows:

Anthony F. Shakal, Chairman, Strong Motion Programs Board  
Bruce Bolt, Chairman, General Membership  
Ralph Archuleta, Chairman, Senior Advisory Council

Administrative staff:

J. Carl Stepp, Executive Director  
Claire Johnson, Administrator

Administrative offices have been established at the Pacific Earthquake Engineering Research Center. Communications may be made to:

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Correspondence relative to the COSMOS, with its officers, or the Executive Director should be directed to this address.

### NEAR-TERM ACTIONS

The 1st Annual Meeting of the COSMOS is scheduled for September 15 - 16, 1999.

Five near-term COSMOS implementation tasks have been identified to address: 1) strong-motion data format standards, 2) data dissemination structure and technology, 3) special strong-motion data formats and conversions to a standard format 4) near real-time use of strong-motion information, and 5) compilation of a master listing of strong-motion seismographs, instrumentation characteristics, and site geotechnical properties.

### FUTURE DIRECTION

There is clearly strong interest in the COSMOS and a high expectation that the organization will provide a strong focus for advancing strong motion programs to meet the needs for public safety in earthquakes. The organization provides a mechanism for strong motion programs to develop common data processing and formatting standards that greatly enhance the exchange and use of strong motion data. Electronic data dissemination technologies are generally available now and can be adopted to accomplish effective and efficient world-wide dissemination of data and information for the benefit of all researchers, practitioners, and the public. While the COSMOS has been established as a non-profit corporation in the State of California, the benefits of the organization clearly have international scope. Public safety in earthquakes is clearly a commonly shared international goal. Acquisition of the necessary data, advancing understanding of earthquake processes, and development of earthquake safety measures and actions clearly transcend international borders. Finally,

technologies exist to implement effective and cost efficient international exchange of strong motion data and information. The COSMOS is dedicated to providing the coordination needed to establish effective national and international exchange of strong motion information.

#### REFERENCES

- Higgins, Cornelius J., Editor, 1993. Research Needs for Strong-Motion Data to Support Earthquake Engineering. Proceedings of the Workshop Held in Albuquerque, New Mexico, June 25 - 26, 1993, Under the sponsorship of the National Science Foundation, Arlington, VA.
- Iwan, W. D., Editor, 1981. U. S. Strong-Motion Earthquake Instrumentation. Proceedings of the U. S. National Workshop on Strong-Motion Earthquake Instrumentation, April 12 - 14, 1981, at Santa Barbara, California: California Institute of Technology, Pasadena, CA.
- NAS, 1985. Liquefaction of Soils During Earthquakes. Committee on Earthquake Engineering, George W. Housner, Chairman, National Research Council, National Academy of Sciences, Washington, DC.
- NAS, 1987. Recommendations for the Strong-Motion Program in the United States. Panel on Strong-Motion Instrumentation, Otto W. Nuttli, Chairman, National Research Council, National Academy of Sciences, Washington, DC.
- NAS, 1989. Estimating Losses from Future Earthquakes. Panel on Earthquake Loss Estimation Methodology, Robert V. Whitman, Chairman, National Academy of Sciences, Washington, DC.
- Stepp, J. Carl, Editor, 1997. Vision 2005: An Action Plan for Strong-Motion Programs to Mitigate Earthquake Losses in Urbanized Areas. Proceedings of the held in Monterey, California, April 2 - 4, 1997, U. S. Committee for Advancement of Strong-Motion Programs, National Science Foundation, Arlington, VA.