COSMOS
Annual Meeting of the General Membership
October 2, 2001

Pacific Engineering Research Center
Richmond, California

President Bolt Called the meeting to order at 9:00 AM. The meeting agenda is attached.

President's Remarks:

President Bolt thanked PEER and its director Jack Moehle for their ongoing support. He noted the overall success of COSMOS.

President Bolt summarized the COSMOS Bylaws with respect to procedures for elections of officers. He evaluated that a quorum of voting members was present. Claire Johnson noted that copies of several documents are provided at the back of the room, and include the White Paper submitted to the USGS on establishing a strong motion data base in the US, the COSMOS guidelines document on strong motion reference stations prepared by Bob Nigbor for the USGS, the latest COSMOS Newsletter, and the minutes from the previous General Membership meeting.

President Bolt noted that both EERI and FEMA have joined as institutional members, along with the California Division of Safety of Dams and the Golden Gate Bridge District. These memberships are important in demonstrating support of COSMOS when making presentations to other groups. There have been notable meetings of the COSMOS committees during the past year, particularly those held at the time of the EERI Meeting in Monterey. Copies of the Instrumental Systems for Diagnostics for Seismic Response of Bridges and Dams, based on the COSMOS-sponsored workshop, were distributed to all members. He noted that there are two workshops coming up, addressing building instrumentation and geotechnical databases.

President Bolt has been particularly interested in trying to extend the data sets of foreign groups on the COSMOS Virtual Data Center. Recent earthquakes from Guatemala, Turkey, and Taiwan are now available. These include the Chi-Chi earthquake recordings recently processed by representatives from Taiwan working at SMIP.

Minutes from 2000 Annual Meeting

The minutes from the September 15, 2000, Annual Meeting of the General Membership on were reviewed. The minutes were approved by unanimous vote.

Report of the Executive Director

Executive Director Carl Stepp reported on the upcoming workshops:

- Archiving and Web Dissemination of Geotechnical Data on October 4, which addresses the need to bring the many sources of existing and future geotechnical data into a rapidly accessible framework of structured and virtually linked resources. The workshop is cosponsored by the PEER Lifelines Program.
- Building Instrumentation Workshop on November 14 and 15 at the Marriott Hotel in Emeryville. The workshop was developed from ideas generated by the Senior Advisory Council at their meeting last February, and is cosponsored by the Advanced National Seismic System, the National Science Foundation, and COSMOS. It is expected that this workshop will provide results that will be useful for the planning for structural instrumentation that is part of the ANSS Implementation Plan.

Executive Director Stepp also noted other activities of COSMOS. The USGS National Strong Motion Program and SMIP are funding the development of mirror sites for the COSMOS Virtual Data Center. Three issues of the COSMOS Newsletter have been published, and that number per year seems about right. The intent of the newsletter is to provide information about strong motion programs. He also noted that in a discussion later in the meeting, Roger Borcherdt would be discussing the SAFER Cities project, a joint activity of COSMOS and the World Seismic Safety Initiative to redistribute unused strong-motion instruments to educational institutions worldwide in urban areas of frequent earthquakes that currently do not have strong-motion instrumentation.

Report of the Treasurer

Treasurer Maury Power reported that COSMOS is in excellent financial condition, and provided a brief written report. Core members and other members have been supportive, and the projects and contributed efforts have also helped the financial status. As a result, the organization is in a position to initiate new activities and strengthen existing ones. He especially acknowledged Executive Director Stepp, who has not charged COSMOS for his work this year; PEER for their support of the facilities COSMOS uses; and EERI for their provision of accounting services.

Treasurer Power reviewed the core and other memberships and their contributions. An error was noted in the total of the corporate and agency member contributions ($16,000 instead of $11,000). He also reviewed the status of revenues and expenses, noting a current balance of about $89,000 in the bank.

C. B. Crouse noted the low number of individual members, and suggested that a greater outreach effort be undertaken to get more members. Others commented that they had not been solicited for individual memberships. Claire noted that she had sent out 200 and 150 letters over the past two years respectively, and received zero response. I. M. Idriss urged that targeted solicitations should be direct to

likely interested individuals.

Secretary Savage noted the importance of institutional members, but that from the standpoint of COSMOS being able to speak as a representative organization, 26 individual members was not sufficient. A credible number of members would be more like 500, covering the geotechnical and structural engilower-cost joint membership arrangement with EERI and other organizations, or reducing the membership cost to something like $25 or even $5. It is also important to clarify the relationship between individuals and corporate memberships for which the individuals work. President Bolt noted that the organization was crafted to project the voting power of the organizational members, something along the lines of the United Nations and its Security Council. In this model, individual members would not have voting rights; there could be two classes of membership. The Board needs to take up this matter. Vice President Davis noted that one of the benefits of membership is the ability to propose policy. Secretary Savage noted that having two classes of membership (e. g., voting and advisory) could be handled electronically, but all could be counted as COSMOS memberships. President Bolt mentioned that the category of Affiliate Member was created to allow for participation by instrument vendors so as to avoid a conflict of interest situation; this may not need to be so elaborate, but COSMOS does have it.

It may be timely to reactivate the membership committee. All current members should contact their colleagues to get them to increase the COSMOS membership. New memberships can be taken today.

Report from the Strong Motion Programs Board

Chairman Shakal described the biggest activity of the SMPB since the last meeting, namely the completion of the COSMOS strong-motion data format. It is available from the COSMOS web site. It is a major activity, taking over 2 years. The purpose is to reduce the difficulty of getting data from a variety of sources. The format had user input and input from people who have wide experience in data formatting. The format does not need to change when tables (instrument characteristics, data characteristics) do not change. Station codes were established to uniquely separate networks. The goal is to provide a multiyear lifetime for the format.

The SMPB also completed the reference station guide, as noted previously.

Additional activities that are not yet completed include guidelines for processing. A working group that represents users and processors is needed.

Comments were offered on the format product. Ahern noted that there was another format that is a standard for weak motions. What mechanism can be used to get the two groups to work together? CISN has adopted the COSMOS format to convert between the agencies and the public. The conversion between SEED and COSMOS is being established. However, the FDSN should be involved. Stepp suggested setting up a formal activity to accomplish this. This would be useful in assuring a continuum between weak and strong motion. Tim Ahern discussed several of the format issues to be addressed. Shakal noted that the COSMOS parameters are more extensive than the SEED parameters. Ahern emphasized the benefits of having good coordination among the interested organizations. Additions to the tables can be handled by COSMOS.

Bolt noted the need to have simple formats for engineering users. Idriss would like to have a selection of formats that could meet the needs of ranges of users. He has to spend time getting rid of data in the

format that he does not use. Steidl noted that the PEER database is attractive because there is no header information, just the data. Idriss felt that more than "just the data" is needed, so the key identifying information is not lost. Steidl supported the idea of having a workshop on this subject, to discuss the differences between uniform processing (PEER database) and the processing used by different agencies. Shakal reiterated that the COSMOS format is intended to cover the spectrum of available data, even though some users don't need all of the information. Mindy noted that it is easy to build filters to meet the needs of various groups of users, and to post them on the COSMOS VDC.

Report of the Senior Advisory Council

Chairman Allin Cornell noted that the SAC is not "Senior" but merely "Scientific" Advisory Council, although the members do have a lot of gray hair. The SAC is focused on policy issues, rather than the technical issues that the SMPB addresses. He reported on the SAC meeting that took place following the COSMOS meeting in early February 2001. It served to facilitate policy discussions. Three topics were brought up for consideration: building measurements and what they should look like in the context of performance-based engineering; the role of COSMOS vis-à-vis ANSS; and the issue of international versus nation data sets.

1. The question was raised of measuring displacements in structures as perhaps being more interesting with respect to predicting non-linear behavior in a region where forces and displacements are no longer proportional. What kinds of instrumentation could be used? What should ANSS be looking at? The desire for a high density of instruments in a few buildings was discussed versus instrumenting a larger number of buildings. The need for enabling the recording of new types of instruments was identified.
2. The issue for ANSS of national versus regional priorities was considered. COSMOS could better serve ANSS by bringing these issues to better focus and fruition. The planned building instrumentation workshop in November is one outcome of the discussion.
3. If the focus of COSMOS is application by US engineers of foreign data, the role of international data needs to be further considered.

The discussions at the February SAC meeting were documented in notes by Woody Savage, and are posted on the COSMOS web site.

Topics of pertinence to SAC should be brought to the attention of SAC members or the COSMOS Board, so they can be addressed in a timely and effective manner.

Mary Lou Zoback encouraged COSMOS to help consider, in a broad fashion, what instrumentation is needed.

President Bolt verified that the SAC is, according to the COSMOS By-Laws, the "Senior" Advisory Council. He further encouraged the membership to bring forth topics for SAC meeting agendas.

Report on the COSMOS Virtual Data Center

Dr. Ralph Archuleta summarized what has taken place during the past year with the COSMOS VDC, and what is planned for the future. In the last year the number of accelerograms has increased by more

than 100%, including the recent earthquakes in Taiwan, Turkey, Guatemala, and Nisqually (Washington). International data are being included; the question of quality control is pertinent. Search parameters have been included and expanded to meet both seismological and engineering interests. Ftp access and links to spectra, velocity, and displacement files now exist. Tab-delimited text can be used to download parameters into an Excel file. This is the only complete data center that is trying to include all strong-motion data.

Future developments:

- Links to additional metadata, such as building information, dam configuration.
- Have upgraded to Windows 2000 and a new server, and are looking at a new web page.
- Need some guidance from the SMPB on formats for response spectra plots, can have options accessed via buttons.
- Use XML to transfer between data bases
- Three-year NSF proposal is being submitted to secure funding, with thanks to Carl Stepp, Roger Borcherdt, Tony Shakal, C. B. Crouse, Mindy Squibb, and Jamie Steidl. The proposal covers a number of points: Trying to make sure that COSMOS VDC is in concert with ANSS and other organizations that are being in new data. It is vital to have the metadata, describing site characteristics, data processing, etc. Considering scanning original documents to make them available. An efficient and fast user interface is a goal. Links to geotechnical databases are needed. Replication sites are needed to handle big and important earthquakes. The COSMOS format is very useful in translating from more than 16 other formats. Jamie Steidl is proposed for 2 months in the proposal to check the data. The oversight committee provided by COSMOS is a key of the proposal; can an accepted scheme for categorizing data quality be developed?

Use of the VDC is generally increasing with time, and future growth is expected.

Discussion:

If an agency wants to maintain their own data on-line, then links are used to access those data. For other data, they can be stored on the local VDC server. Bolt asked about the capacity of the COSMOS VDC for receiving and storing data. The capacity for data is very high. When the data are held by the responsible agency, and if errors are corrected or updated, then there is no problem in COSMOS VDC providing access to the most current data. Steidl noted that again there is a need to establish data quality flags. COSMOS can really help with recording and serving data that have a documented history.

The COSMOS VDC is focusing on larger events.

Bolt requested that the Nisqually data be provided by USGS to the COSMOS VDC, which was done. But is there a procedure whereby data can be available from ANSS stations? Savage noted that the plan for ANSS is to provide all of the data to multiple access points as quickly as possible; data are not to be held back. Stepp felt that the attractiveness of the COSMOS VDC stimulated people to submit their data willingly. Savage noted that the issue of authentication is important, and that ANSS will be

structured to house data in a national repository for up-to-date versions. COSMOS VDC should go to that repository for up-to-date versions. This issue is coming up with respect to the Engineering Strong Motion Data Center for the California Integrated Seismic Network.

Is there a way to find out who is processing data? Generally not; it is recorded at the VDC who is downloading the data, but that should not be made public.

Claire Johnson asked if there is a mechanism to sell publications to members, possibly using a members-only section? Paper publications are expensive to produce and print. Members would get documents free, but others would have to pay the cost of production. This could be a motivation to be a member. Bolt noted that the Board should consider this.

Shakal noted that it is important for the Core Members to be able to report the quality control of the data as part of customer service being provided to the public. How can these numbers be tracked, and how can the users be assured of quality of what they are getting? Archuleta noted that the reputation of the source is important. He also said that the very low amplitude data are a problem. He wants an explicit field that describes the quality. Shakal also asked for statistics on the documentation of the usage of the data. Archuleta observed that the benefit of accessing virtual data is that the source can do this tracking; the COSMOS VDC can also do this tracking.

Nishenko wondered if building damage data were linked to the COSMOS VDC. Archuleta noted that this is not currently done, and that the data from buildings are not being tracked in the COSMOS VDC. There has been some discussion of the possibility of setting up another database to handle building data.

Report from the Bureau of Reclamation

Jerry Wright reported that his 70 instruments are mostly on dams, and about 30% are still analog. They are in the process of converting them to digital. System status of the digital instruments is polled nightly. They are also operating three microearthquake networks in Wyoming (Jackson fault) and southwestern Colorado (reservoir-induced and injection-induced seismicity). Funding for strong motion monitoring comes from the Safety of Dams Program in the Bureau of Reclamation. The strong-motion program underwent a value engineering study of the investment versus the value. The rationale for new installations, real-time notification systems, action-response items, and use of strong-motion data by the engineering staff were reviewed. Base-line funding continues to be a challenge. They are continuing to evaluate alternatives to dedicated phone lines to digital instruments, with the goal of reducing a $35,000 phone bill. Changes in the funding source within the Bureau are also being considered. The role of strong motion monitoring as a part of good stewardship is continuing to be evaluated. Some instruments may be taken out of service to reduce costs.

Report from the Corps of Engineers

Bob Ballard summarized the Corps' program. He also noted that he had reviewed the Bureau's very thorough study, which identified the Bureau program as being of "extreme value." The Corps has about 500 instruments on critical COE structures like dams. Currently about 70% are analog, and they are replacing them. For example, the Nisqually earthquake was recorded at Hansen Dam, but it

took about 10 days to retrieve and process the film records. These instruments are being replaced by the Seattle District, working with the USGS NSMP.

Funding is based on COE regulations for instrumentation for all facilities in Zone 2 or higher since the 1970s. The Districts pay for the program, and the Vicksburg group maintains oversight of quality control and instrumentation design. The USGS and the COE share instrument maintenance in the country. The Corps is hoping to turn the network over to ANSS (i. e., incorporate the data stream in ANSS), and work together to decide on which instruments are to be kept, thus incorporating the Corps instruments into a single national network under a cooperative plan. Many of the installations are excellent, but some need to be upgraded. There is a legal obligation to maintain instruments, which the Corps must keep oversight of. Zoback noted that there might be opportunities to leverage the conversion to digital instruments through the involvement of ANSS. The Districts want to convert to save money. Ake has made the case that the conversion to digital results in greater reliability and reduced field time, and pays for itself pretty quickly. Ballard is offering an incentive to the Districts of reducing their service costs by 2/3 if they will convert to digital and use telemetry to check instrument status. Savage noted that the USGS is beginning to look into national service contracts that would be implemented regionally to maintain ANSS; this is a way that ANSS could be involved with the Corps. Bolt noted that COSMOS could be helpful with such arrangements, and would be pleased to.

Elections

Elections for the various slates and offices were held. The elected slate is attached

On the current Board of Directors, Peter Yanev has relinquished his position due to time conflicts. The USGS Core Member position had been filled by Bob Page, but Board Secretary Woody Savage recently became employed by the USGS and was asked by the USGS to become the USGS representative on the Board, thus opening a slot for this election. The Board officers proposed two candidates for these two openings, Norman Abrahamson of PG&E and John Anderson of the Seismological Laboratory of the University of Nevada at Reno. There were no nominations from the floor, and the nominations were closed unanimously. The written ballots were counted by Claire Johnson and checked by Woody Savage, and the proposed slate was elected.

The Strong-Motion Programs Board consists of four Core Member nominees, the chairs of the Senior Advisory Council and the General Membership, and four elected members. The Board officers proposed Ralph Archuleta, C. B. Crouse, Greg Fenves, and Bill Holmes for election. There were no nominations from the floor, and the proposed slate was elected unanimously.

The Senior Advisory Council consists of four Core Member representatives, the chairs of the SMPB and General Membership, three members appointed by the SMPB, and five elected members. The five proposed elected members were Allin Cornell, Ralph Archuleta, Lloyd Cluff, I. M. Idriss, Bob Nigbor, and Haresh Shah. No further nominations were made from the floor, and the slate was elected unanimously.

Nominations for the Chairman of the General Membership were opened. The only name put into

nomination was that of the President, Bruce Bolt. The nominations were unanimously closed, and the candidate was unanimously elected.

Report from the California Department of Mines and Geology, Strong Motion Instrumentation Program

Tony Shakal reported on the development of the Engineering Strong-Motion Data Center as part of the California Integrated Seismic Network. The EDC will be a feed to COSMOS. A description of the EDC is included in the SMIP 2001 conference proceedings. The purpose of the EDC is to provide data in the V.0 format as Internet Quick Reports, which will be analogous to the data provided via ShakeMap. There will be links from the Internet Quick Report to ShakeMap, downloadable data files, station information such as station layouts, and the COSMOS VDC. The Internet Quick Reports would be provided in minutes after an earthquake and would be updated continuously. The Quick Reports will be served from two servers for backup. This is a significant upgrade of the printed Quick Reports that users are used to. The purpose of the EDC is to meet the rapid post-earthquake needs of the engineering community. The EDC will continue to be developed as a partnership between SMIP and the USGS in California. The web site for the Internet Quick Reports is found on a link from the SMIP web site. The Internet Quick Report is in preliminary form on the web, although it is functioning and will report future earthquakes.

Question: What are plans for providing structural data needed for engineering analyses? Some of the information is in the station data. Blueprints are on file in Sacramento, but are still the owner's property. Perhaps the SAC should consider this matter of availability of building data. Public buildings and other structures should be available. Security issues will be a factor in availability. This is a general problem that needs to be addressed.

The specific meaning of "peak acceleration" is the maximum of the two measured components, not the vector maximum. The Internet Quick Report has a downloadable table of all the data, and more explanations.

Report from the U. S. Geological Survey

Woody Savage, who recently joined the USGS in Menlo Park as National Strong Motion Coordinator and Lifelines Coordinator, reported on the current status of ANSS, and included information on the National Strong Motion Program. ANSS is in evolution, and has a big impact on the current and future strong-motion community. ANSS has models to build on in California (CISN, SMIP). Since Congress has not yet provided the main funding for ANSS, the current efforts in ANSS are focused on planning and on installation of initial instrumentation allotments. The current annual funding is $3M to $4M. The basic information on ANSS is provided in USGS Circular 1188 and on the anss.org web site. The ANSS program includes 3000 free-field strong-motion instruments and instrumentation for several hundred buildings and other structures.

NSMP handles about 1000 instruments (at 650 locations), including more than 200 instruments installed under ANSS. Ron Porcella and his field personnel provide well-respected expertise in installing and maintaining strong-motion instrumentation. There are still several hundred analog instruments that are a target for replacement.

The Technical Integration Committee (TIC) developed a comprehensive (and somewhat detailed) plan for ANSS implementation. Some of the detailed guidance includes that provided by COSMOS for reference station installation and strong motion data formatting. The COSMOS geotechnical database workshop is working toward a powerful repository for strong-motion site characterization data. The COSMOS building instrumentation workshop is also an important contribution to filling in the details of the TIC Plan. The TIC Plan outlined the flow of data through ANSS, from field stations to processing to archiving. The ANSS structure allows for additional stations to contribute their data to be recorded by ANSS. An essential new feature is the complex interconnection among networks, so that data are immediately distributed to multiple locations, and are available to all.

The COSMOS VDC is an excellent example of an information outlet box that reaches into the ANSS system to provide user access to the data being collected. It is critical that proper processing of strong-motion data be carried out, and this can be a function overseen by NSMP. There needs to be well-defined authoritative sources for data that are collected through ANSS. ANSS takes primary responsibility for the national facilities and the modernization of the regional facilities.

It would be desirable to have strong-motion users be able to use the same interface; perhaps the COSMOS VDC interface could be replicated in many locations.

The ANSS planning has not placed much emphasis to date on the details of national archives for data, and would be funded and supported by the USGS. There is much planning and analysis left to do on this. COSMOS is well represented in the planning process.

Closing points: The strategy for reference and building sites needs to be developed at the national level, but is implemented locally. This is an unfulfilled need at present. Geotechnical and site-response issues for site selection have not been addressed at the national level. Data should be collected locally and be applicable nationally. Also, all the data on site and instrumentation characteristics are necessary and vital, but the details on what those data are and how they should be collected and stored have not been specified. Finally, the entire ANSS data flow must be operated under a robust quality control oversight. SMIP provides experience for such an effort.

COSMOS Initiatives

Carl Stepp summarized initiatives for the COSMOS VDC

- Improve web-based interfaces and links to ANSS data management system
- Improve methods for acquiring associated metadata
- Improve web-based user interface methods for expanded and more efficient data retrieval
- Develop web-based methods to permit user-selectable data format and processing standards
- Provide for enhanced metadata on earthquakes contained in the database
- Develop links to web-based geotechnical data
- Establish mirror sites at the USGS and CDMG

Additional COSMOS initiatives are:

- Develop COSMOS Standard for processing strong-motion data
- Establish COSMOC VDC Working Group
- Publish guidelines and workshop proceedings
- Obtain funding and initiate processing of strong-motions recordings of the Izmit Turkey earthquakes
- Develop and implement a plan to expand COSMOC membership, particularly among the practicing engineering community

Roger Borcherdt summarized the SAFER Cities Initiative and its implementation. This has evolved into a joint seismic safety initiative of COSMOS and the World Seismic Safety Initiative (WSSI). Measurements in damaging earthquakes are important in rebuilding damaged cities, and in many cities of high seismic risk there is limited or no capability for making these measurements. The tasks of the project are to redistribute previously owned strong-motion instruments (largely analog instruments) to non-profit organizations for educational and other non-profit purposes in urbanized areas with little or no means to record the next damaging earthquake. The need is to stimulate awareness of the need, provide a seed for future advances in instrumentation and mitigation, and help provide resources to make the initial measurements. Recent earthquakes in Turkey and India provide examples of the need. Current planning involves responsibilities for providing instruments, refurbishing instruments, storing field-ready instruments, preparing recipients to receive and effectively deploy the instruments, transferring ownership to COSMOS, shipping, and recovering data. COSMOS has administrative responsibilities in making all this work. WSSI has responsibilities in international coordination and liaison. This initiative is not a substitute for a modern strong-motion program, but serves to stimulate interest and plant seeds for more modern instrumentation programs.

A special fund in COSMOS is needed to fund shipping, but clearly startup funding is needed. Perhaps WSSI could help. WSSI has helped Myanmar install a network, and has gained valuable experience. Bill Iwan thinks that there are a variety of public and private sources within interested countries or internationally who could help. USAID could be one. NSSP in Armenia expressed interest, and felt that shipping costs were no problem.

The question about restricting reselling of instruments was discussed. It's probably better to stay out of being a policeman overseas. But the federal government needs that restriction to effect the transfer to COSMOS.

Geohazards International is a good agency to contact for leads in finding interested countries.

Closing Comments for the Meeting

Jim Davis commended President Bruce Bolt in his efforts to involve COSMOS in many circumstances that are beneficial to the broad earthquake community and helpful to the organization. A hearty round of applause was offered.

The meeting was adjourned at 1:50 PM.