College of Engineering Computer Advisory Committee
Final Report for Academic Year 1989-90

T. K. Miller, chairman

1 Committee Objectives

The primary charge of the College of Engineering Computer Committee for the 1989-90 academic year was to prepare for the anticipated implementation of the proposed $100/semester fee in the Fall 1990 semester. That charge has been the primary focus of the committee this year, and I believe we have made satisfactory progress toward that objective. A chronicle of the committee's efforts in meeting the charge is the subject of this report.

The first committee meeting was held 10/12/89, at which time a number of subcommittees were formed to deal with the many issues before the committee (see Attachment A). The two subcommittees with the most responsibility as related to the primary charge were the Technical Evaluation subcommittee (members: C. W. Malstrom, J. Mauney, T. K. Miller *chair*, R. P. Rohrbach, R. E. Young, and W. E. Willis), and the Fee Proposal Revision subcommittee (members: R. A. Douglas, J. K. Ferrell, T. K. Miller, W. E. Robbins, and H. Winston *chair*).

2 Technical Evaluation

The Technical Evaluation subcommittee was charged by the full committee to finalize hardware/software specifications, evaluate vendor proposals, and make a recommendation to the Dean for acquisition of the required hardware and software to put in place the proposed computing environment. This subcommittee went to work immediately, defining a set of requirements that would be needed to successfully implement the large scale distributed computing environment which was first described in the 1987 Computer Committee report. A summary description of the key requirements follows:

- must adhere to industry standards in the areas of operating systems, network communications, and windowing (user interface);

- must accommodate the existing academic workstation clusters in the College of Engineering (including systems from DEC, IBM, and Sun);

- must support a sufficient set of engineering application packages, languages and compilers, generic tools such as spreadsheets, graphics, word processing, etc., to meet the majority of the educational need in the College of Engineering;

- must operate as a unified system from both user and system management perspectives;

- must be scalable to at least 1,000 workstations.

It became apparent that a system to meet these basic requirements would not be obtainable "off the shelf", and that it would be necessary to meet with vendors and interactively consider the possible alternatives. It also became clear that this would not be an ordinary purchase, since it appeared that it would be necessary to ask the vendors to provide software and support beyond their standard offerings. Permission from State Purchasing to negotiate with vendors regarding this acquisition was obtained, and a variety of vendors including Data General, Digital Equipment Corporation, HP/Apollo, IBM, Next, Sun, and Zenith/Bull were immediately contacted and informed of our project. Meetings with these vendors took place numerous times during the period November, 1989 through February, 1990.

The Technical Evaluation subcommittee also identified MIT's Project Athena, co-sponsored by IBM and DEC, as being very similar to the technological requirements and academic objectives of the COE initiative. In mid-November, the subcommittee traveled to MIT to review the Athena project first hand. Several factors including the similarities noted above, the maturity of the Athena project, and the fact that all of the Athena technology is public domain and has been ported to a variety of workstations, convinced the committee that the Athena model should be adopted for our project.

In early January a working document outlining how vendor proposals would be evaluated was distributed to all vendors with whom negotiations had taken place (see Attachment E). All subsequent negotiations with vendors were held in the presence of an NCSU purchasing officer to ensure compliance with State regulations. At the same time, several committee members worked closely with the CSC Course and Curricula Committee to ensure that the software requirements of the Common Freshman Year courses would be met.

By the beginning of February the committee had received three technically acceptable proposals, from Data General, DEC, and Sun. The committee felt that due to the magnitude and complexity of the project being undertaken, a single vendor should be selected as a partner in its development for the initial years of its implementation. This sentiment was later reiterated in a resolution passed unanimously by the committee (see Attachment G).

After carefully weighing the tradeoffs, the subcommittee unanimously voted that the proposal from DEC was most technically sound, and that choosing DEC as the vendor partner in this project would yield the highest overall probability of success. W. E. Willis was charged by the committee and the Dean to carry out the mechanics of the acquisition once the committee's decision was made.

3   Fee Proposal Revision

The Fee Proposal Revision subcommittee produced several iterations of the fee proposal which was originally drafted in November, 1988. The revisions included an implementation plan which called for a two phase installation of the facilities. The first phase would cover freshmen, since the computing facilities played a central role in the Common Freshman Year Curriculum which will be implemented Fall, 1990. Phase one would also cover the problem of Sage system replacement in the Department of Computer Science. (The CSC Sage replacement project was merged with the COE computing project for practical reasons when CSC moved into the COE.) The second phase would cover all remaining students in the COE, starting in Fall, 1991. The final revision of the fee proposal is included with this report as Attachment F.

How and to whom the proposed fee should be levied, how the workstations should be used, and who should be in control of the facilities were subjects of much debate by the committee. The general philosophy adopted by the committee was that the workstations should be viewed as student owned, with the COE acting as steward of the facilities. This led to some debate as to the appropriateness of scheduling classes and laboratories on the workstation clusters. The committee passed a resolution which basically said that scheduled classes were inconsistent with the philosophy of student ownership (see Resolution 2, Attachment G). After substantially more debate, this resolution was superceded by the following (passed unanimously, 4/25/90):

> "The College of Engineering computing facilities are being installed as a resource for our students. The Common Freshman Year courses (E115, CSC110, and CSC112) are a necessary part of training students to utilize this resource[, in which case scheduled laboratories are not inconsistent with the philosophy of student ownership]. Other scheduled uses will be examined on a case-by-case basis."

The committee also unanimously passed the following resolution on 4/25/90:

> "We recommend that paying the $100 fee and obtaining an account on the College of Engineering computing facility be made optional for all graduate students who are registered for zero hours or for thesis preparation only. The ratio of students to workstations will still be maintained at 10 to 1 in any case."

On May 2, 1990, J. K. Ferrell, T. K. Miller, W. E. Willis, J. S. Rayfield and P. C. Wilkins met with representatives of the Office of Finance and Business to finalize plans for implementation of the computer fee this fall. The final plan was essentially that put forth in the fee proposal, with the modification that students enrolled in CSC courses which would utilize the workstations as Sage replacements would not be charged the $100 fee during Phase I; rather they would be assessed the standard University lab/computer fee. This was deemed necessary in order to minimize the inequities during the transition period.

4 Current Status and Conclusions

During the past week, the workstation equipment has arrived and is being stored in Withers Hall. Over the course of the summer, the workstations and servers will be installed in Leazar and Daniels. Several commercial software vendors have agreed to donate their software packages in support of this project, and negotiations with others will take place this summer. Some funds for minor renovations and software licenses will be required to have the facilities in top shape by the fall. (Dr. Willis is currently preparing an itemized list and time table.)

In conclusion, the combined efforts of the COE Computer Committee, the COE Course and Curricula Committee, and various committees in the Department of Computer Science have removed two of the three major factors identified by the 1984-85 Computer Committee as inhibitory to the incorporation of computing into the curricula (see Attachment I). This is still a fledgling project, however, and its ultimate success now depends on the dedication of the faculty and the continued support of the COE administration. More work must be done on the third major inhibitory factor, lack of faculty incentive. Many faculty and students have expressed much enthusiasm for the initiative we are undertaking. (A group of students has proposed the name "Eos" for the project. Eos is the Greek goddess of the dawn, symbolizing the dawn of a new era of academic computing at NCSU.) Much work remains to be done, and whether or not the fee proposal will be ultimately approved remains unresolved. It is sufficiently likely that the project will follow through to Phase II that departments should begin preparing for it. In addition to curricular changes, space is likely to be a major issue. If the COE continues to back and promote this initiative among its faculty and students, then the prognosis for long term success appears to be good.