

PROJECT ATHENA PROSPECTUS

*Now in its second phase,
Project Athena is a boon to education and industry.*

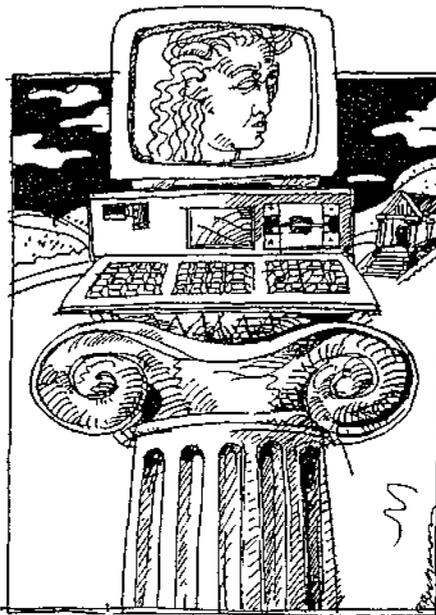
THE TRIP TO MIT from DEC's Artificial Intelligence Technology Center in Hudson, Massachusetts, is a short commute in the company helicopter. Edward E. Balkovich, formerly a consulting engineer for DEC and now head of Project Athena (part of DEC's External Research program), has been making the commute almost daily, it seems, since the project began in 1983. He will probably maintain that schedule through the end of the 1987 academic school year.

A \$70 million, five-year experiment at MIT that involves a cooperative agreement between DEC and IBM, Project Athena has entered its second phase of exploring the uses of computers in education, and will inevitably establish some trends for the futures of both industrial and educational computing (see Spotlight on DEC, *Digital Review*, September 1985).

"We have a large international audience," Balkovich says of the project. "A good part of it is from Europe and a smaller percentage is from the Far East. DEC clients—major corporations, industrialists, educators and government—are visiting the campus not just to learn what Project Athena is all about, but so they can go back home and make intelligent decisions on their computing problems.

"I think there is a certain amount of confusion on [the clients'] part as to what sorts of technology to select, how to put a network together, what sorts of tasks workstations are best suited for, what the larger VAXes are well suited for, the importance of graphics, the importance of management systems and what the role of ULTRIX ought to be," Balkovich says.

Still, the project recognizes the importance of an academic setting for this work. "MIT is providing the perfect setting for an early prototype of future campus computer networks of advanced personal computers and workstations," says Balkovich. "The MIT community and its visitors are evaluating product and system concepts. Faculty and student uses of the system are giving us insight into future applications.



"The campus network," Balkovich continues, "will ultimately reach every individual on the MIT campus and provide computing power to all of those individuals on demand. Athena is going to have a major impact on the educational process and the way universities run."

DEC views Project Athena as an off-site laboratory where it can experiment with its equipment. "One of the goals of the Project Athena laboratory," says Balkovich, "is to understand the changes taking place and reflect the needs raised by these changes for future DEC products. MIT and DEC are taking risks with Project Athena. We're trying out technologies on a scale that hasn't been exercised before. A lot of people will benefit from our experiences with Project Athena, and I think there's a direct payoff to DEC customers." Another goal of the laboratory setting, Balkovich says, is to provide an environment whereby realistic workloads are imposed on the systems. By doing this, he says, "We can get outstanding criticisms of the products and recommendations on how they can be improved."

A third goal of Project Athena, Balkovich

says, is "to accomplish an understanding of what future applications might be. It's important to emphasize that we didn't go into Project Athena with the expectation that we could generate new software products in six to 12 months that could be distributed and sold. If that happens it will be welcomed, but it is not what we set out to do."

The majority of DEC's equipment is located in the School of Engineering and, as a result, most of the software applications emanating from Project Athena are related to the field of engineering. One of the most significant is an interactive videodisk-based program for undergraduates in mechanical engineering. The project's objective is to produce a videodisk/computer program that will operate on an Interactive Video Instruction System (IVIS). Current topics chosen for mechanical design instruction center around bearing design: definition of bearing design, types, physics of each type, failure modes, selection, design itself and systems design. The program is written in the VAX Producer/Interpreter language and translated with the PRO Interpreter language to run under P/OS on the PRO/350.

Another program, called *Computation as a Conceptual Framework for Learning Linear Algebra*, is aimed at the MIT community at large. The primary purpose of this project is to develop the Scheme dialect of LISP for use on Project Athena VAXes to reformulate courses dealing with linear algebra and linear systems. An upgraded version of VAX Scheme is currently being completed and an Athena-supported version of Scheme is about to be released for general use by the MIT community.

Balkovich expects that the future campus computing infrastructure at MIT will change considerably. Organizations that now provide central computing support will evolve into organizations that operate mainframes or superminicomputers and deliver services such as file management, mail, printing and archiving. The university will provide and maintain public workstations in classrooms and laboratories, and campus computer

ILLUSTRATION: YVONNE BUCHANAN

stores and computer repair centers will provide hardware and software support.

These changes, Balkovich says, will force universities to resolve such long-term issues as who should own software developed by faculty, students and staff and how site licenses, backup copies and alumni rights should be dealt with. Security and privacy is another issue; universities must deal with the physical security of portable equipment and the privacy of data. Cost recovery is a third issue; universities are grappling with the question of who should pay for

equipment and maintenance. "Will each incoming student be asked to supply his or her own personal computer?" Balkovich muses.

Balkovich says he believes that, thanks to Project Athena, "DEC's products will be refined in a way that suits a university's needs, particularly in engineering. Engineering and education are driving the evaluation of how well suited DEC's products are to certain applications."

According to Balkovich, working on Project Athena with IBM (which is involved

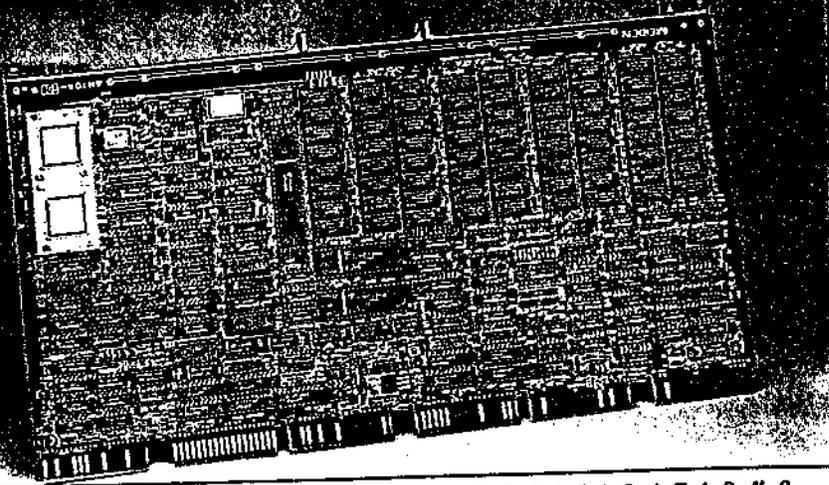
in the project in much the same way as DEC is) has been a rewarding community effort. "To an extent, we blur the distinction between [the DEC and IBM] staffs," says Balkovich. "When we have a task to be performed, the best people get to do it, independent of whom they happen to work for. This has worked out reasonably well and we're pleased with it."

The DEC engineers who are working on Project Athena with Balkovich—Steve Miller, Jim Gettys and Tony Della Fera—are all MIT graduates. These engineers maintain close technical ties with one or more organizations within DEC.

"Our resident engineers play an important role in Project Athena," says Balkovich. "They identify and manage the interactions with DEC organizations that respond to MIT's needs. Conversely, they can also identify and manage the interactions with

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"For example," Balkovich points out, "since UNIX is used extensively in Project Athena, Jim Gettys once a week or every two weeks will spend a day in Merrimack, New Hampshire, with DEC's ULTRIX people. Through Jim, they advise us on how to solve some of our local UNIX problems and Jim, in turn, provides them with feedback on our experiences with ULTRIX."

"Two of [DEC's] principal marketing groups, Laboratory Data Products and Educational Computing Systems, whose products are marketed to universities, want critiques from us on how their products are being used in Project Athena. They also want feedback from us on the changes taking place in the educational process as a result of Project Athena making all this computer power available."

Looking to the future, Balkovich says that when Project Athena is completed in 1987, DEC will have a much deeper appreciation of university computing needs and daily university operating conditions. "I personally feel that the payoff will be a long-term one," he says. "We will get a very good understanding of what will be coming in the future and we will have this information in a timely way to be used later on. The key idea is that Project Athena is a long-term investment—long-term and lasting in significance." ■

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