



*VeriLab*  
**THE VERIZON  
MASS MARKET  
BROADBAND SERVICES  
RESEARCH CENTER**

**1. What is the nature of this request:**

***Instructions:***

***Describe your project and how it fits into the mission and goals of your proposal, being sure to include anticipated results. (No more than two brief paragraphs please.)***

The Advanced Data Management Group (ADMG) from the University of Puerto Rico, School of Engineering proposes the establishment of the Verizon Mass Market Broadband Services Research Center (VeriLab) at the University of Puerto Rico, Mayagüez. VeriLab R&D effort will focus on the development of next-generation Internet-based applications and services for traditionally overlooked, but nonetheless massive markets. Examples of such markets include: a) professional (e.g. medical, legal) services, b) small and home businesses, c) K-12 educational institutions and d) ordinary family homes. Such markets represent a profitable business opportunity that has not been exploited to its full potential by the relevant Internet Service Providers (e.g. Verizon), and third-party developers. The mission of the VeriLab is to become the primary broadband networking research, education and development center in Puerto Rico and the Caribbean. VeriLab will be dedicated to the exploration of new and exciting applications and services exploiting to their maximum capacity the potential for human interconnectivity and information sharing made possible by state-of-the-art broadband networking technologies. In particular, the mission of the center will focus on the application of those technologies to the improvement of the lives of ordinary citizens.

To fulfill its mission, VeriLab will serve the following roles:

- ? R&D Center for Mass Market Broadband Services and Applications.
- ? Educational Laboratory for advanced courses in Networking and Distributed Systems.
- ? Training Center for Networking Systems Professionals.
- ? Technology Awareness Center for K-12 students and the community at large.

## 2. Project Background

### *Instructions:*

*State any relevant experience your organization has with regard to the type of project being proposed. Include in this any previous projects your organization has done within the same geographic location and/or with a similar focus. Describe any work done in partnership with other organizations toward similar type of projects.*

The proponents are all professors from the Electrical and Computer Engineering (ECE) Department, specifically from the Computing group. The diversity of research interests among these proponent faculty members span areas such as networking, programming languages, database systems, algorithms, artificial intelligence, high performance computing, and computer architecture. The ECE Department is one of the most dynamic academic units within the School of Engineering at the University of Puerto Rico, Mayagüez Campus (UPRM), and one of the most successful obtaining external funds and resources within the University of Puerto Rico System. Currently, the ECE Department is carrying out projects with external funds totaling over \$14,000,000. Examples of external organizations collaborating with ECE include: National Science Foundation, US Office of Naval Research, IBM, Puerto Rico Industrial Development Company (PRIDCO), and Hewlett Packard, among others. These projects have brought significant benefits to several sectors of the UPRM as well as to the corresponding funding institutions.

The ECE Department currently has 48 faculty members and serves 2,110 students, out of which 850 are Electrical Engineering undergraduates, 530 are Computer Engineering undergraduates, and 80 are graduate students in Electrical and Computer Engineering. Virtually 100% of our ECE student population has a Hispanic ethnical background and roughly 50% are women. Thus, supporting the VeriLab effort will constitute a significant contribution to the effective involvement of women and underrepresented minorities in science and engineering careers, one of the most urgent US workforce development priorities.

The ECE Department faculty includes four National Science Foundation "Early CAREER Development Award" recipients, one of whom also obtained the "Presidential Early CAREER Award" (PECASE), the highest honor granted to outstanding engineers and scientists during the first stages of their career by the Government of the United States. Through the Industrial Affiliates Program (IAP), the Department has established links with 18 industries, resulting in more and better opportunities to enhance the education of the engineers of the future, in consonance with the new requirements of the work environment.

One the most influential collaborative projects currently active at the UPRM is the NSF-funded PRECISE ([www.precise.ece.uprm.edu](http://www.precise.ece.uprm.edu)) project entitled *A Program for Research in Computing and Information Sciences and Engineering*. PRECISE has been instrumental to the development of an infrastructure and culture capable of nurturing a competitive research and education environment in Computing at the UPRM. PRECISE currently supports research efforts by the Advanced Data Management Group. All the VeriLab proponent faculty members belong to this research group.

### **3. Additional Funding for the Project**

The University of Puerto Rico-Mayaguez will provide \$346,017 in three years. These are mostly expenses incurred by UPRM in the form of faculty release time granted to the researchers to work on this project during the two semesters of each academic year. Each faculty member will receive 3 credits of academic release time to work on the Verizon VeriLab project. This represents 25% of the academic load that a faculty must fulfill during the academic year. In addition, one of the Faculty members involved will be appointed project director on a yearly basis and will receive an additional 3 credit release time.

The University will also provide adequate physical facilities to host each the three units conforming VeriLab: Demo Center, Tech Center and Net Center.

The Network Center (Net Center) will accommodate designers and developers of the mass-market broadband applications and services invented at VeriLab. It is here that ideas born from the synergistic efforts of students, faculty and industry personnel will get translated into system prototypes. The Net Center facility will include development workstations and meeting facilities for researches to share and develop ideas. The Net Center will also house the networking equipment used to provide high-speed Internet connectivity to the Demo Center as well as the equipment implementing its internal networks. To this end, the Net Center will be equipped with the latest in networking technology. UPRM will invest approximately \$30,000 to support the establishment of the Net Center in conjunction with additional funds being requested in this proposal.

The Technology Center (Tech Center) will be an education and training classroom equipped with networked personal computers and projection equipment. The classroom will host all activities pertaining to education, training and technology transfer associated with VeriLab. It will also serve as a room where VeriLab visitors can meet to get briefed about VeriLab facilities and ongoing projects before they tour the rest of the facilities. The Tech Center will be located at the UPRM campus in a space allocated for this purpose within the School Engineering. The UPRM will provide the classroom facilities and \$10,000 to acquire computers, networking infrastructure, furniture and data display equipment for the Tech Center.

The Technology Assessment and Demonstration Center (Demo Center) will be used as a test-bed and showcase area for the broadband technology developed at VeriLab. This unit will feature portable computers, a series of intelligent Internet appliances, plasma displays, a high-speed Internet connection, and other multimedia equipment. The Demo Center will act as a technology awareness site for K-12 students, working professional and the public at large. We are currently pursuing an agreement with the UPRM administration to expand the Demo Center to include the UPR solar-powered house that competed in the Solar Decathlon ([www.eren.doe.gov/solar\\_decathlon](http://www.eren.doe.gov/solar_decathlon)) in the month of October of 2002. UPRM will provide physical space and \$15,000 to initiate the installation and furnishing of the VeriLab Demo Center.

Each of the three VeriLab units will be publicly identified as belonging to the VeriLab thanks to a generous donation from Verizon Wireless and Verizon Foundation.

#### **4. Critical Evaluation Process (2000 character maximum)**

***Instructions:***

***How will you measure the effectiveness of this program? What measures are in place to gauge your results? How will you quantify its success?***

For the critical evaluation progress we proposed the following indicators that pertain to the different VeriLab objectives:

1. The successful deployment of the Verizon Mass Market Broadband Services Research Center (VeriLab) physical facilities. This should be realized within the first semester of project initiation.
2. The VeriLab project is envisioned as a seed for seeking additional funds and partnerships with academia, government and industry. The success in achieving this goal will be measured by the number of successful proposals submitted per semester during the duration of the project and the number of partnerships established.
3. A third indicator is the number of prototypes of products and services developed in VeriLab per year. In the case of services, the quality evaluation of these services and the number of people served will be the progress indicator. The specification, design and development of a prototype of the DLAN (Dwelling Local Area Network) together with its usability assessment will be used as a particular progress indicator. The DLAN is considered a central component for the development of internet appliances and services since mass acceptance of broadband services depend on the remote and easy management and "self-configurability" of the network, appliances and services, which include programmatic interfaces, device-specific user interfaces and PDA-based programmatic interface.
4. An additional indicator will be the number of refereed publications per PI per year in internationally recognized journals and conferences on the different topics covered in the project. A related indicator is the number of seminars and short courses offered and delivered in the lab together with the course and instructor evaluations.
5. The impact of this project on our undergraduate and graduate courses will be measured by the number of new courses offered and the laboratory experiments and demonstrations associated with these courses. Also, the number of graduate and undergraduate students that participate in projects related to or originated in VeriLab.
6. The level of satisfaction of undergraduate and graduate student participants will be measured via surveys conducted at the time students disaffiliate from VeriLab.

7. Public perception as well as level of technology transfer and awareness obtained from the VeriLab will be measured via surveys conducted to all VeriLab visitors.

**5. Media Plan (2000 character maximum)**

***Instructions:***

***Grant requests of \$10,000 or more are required to include a breakdown of the project's budget.***

An effective media plan for the VeriLab project will be developed in coordination with Verizon Wireless Puerto Rico management.

For a detailed version of this proposal please visit:

<http://www.ece.uprm.edu/~bvelez/projects/verilab/verilab.htm>