

## **Extending Research and Education Connectivity to Pakistan A Science Diplomacy Activity between the US, the EC and Pakistan**

**James G. Williams**  
**Principal Investigator**  
**SCI-0441096**  
**Indiana University**

“An investment in knowledge always pays the best interest” Benjamin Franklin.

“With faith, discipline and selfless devotion to duty, there is nothing worthwhile that you cannot achieve” Muhammad Ali Jinnah.

### **Introduction**

Science diplomacy is a key strategy in bridging deep political and religious divides and in aiding oft-troubled US-Pakistan diplomatic relations. The activities involved in the planning and implementation of high-performance network infrastructure between the Pakistan Education and Research Network (PERN) and the US research and education networks (e.g. Internet2, NLR, ESnet and others) and in using this network to enhance research and education collaborations between the US and Pakistan support new science diplomacy activities between the US, the European Commission (EC), and Pakistan.

### **Background: Science Diplomacy**

Science diplomacy can loosely be defined as cross-border cooperation and exchange of information to encourage and enhance scientific interaction and collaboration. In this case, the cooperation and exchange of information was infrastructure—a high-performance network connection between the US and Pakistan.

On April 2, 2008, the House Science Subcommittee of Research and Science Education held hearings on Science Diplomacy. Nina V. Fedoroff, Science and Technology advisor to the Secretary of State and the Administrator of USAID said “Science is also a common global language, able to bridge deep political and religious divides. Scientists share a common language. Scientific interactions serve to keep open lines of communication and cultural understanding.”

In additional testimony, Arden L. Bement, Director of the National Science Foundation said, “Scientists have played an important role on the front-lines of US diplomacy since the end of World War II. They have been the enablers of larger international diplomacy efforts, from the robust scientific exchange with China to renewed and strengthened relations with Egypt, India, and Pakistan—all started with the peaceful beachhead of scientific diplomacy.”

### **Background: Research and Education Networking within Pakistan**

The Pakistan and Education Research Network (PERN) interconnects the research and education community within Pakistan. Today approximately 60 public and private universities and institutes in Pakistan are connected via PERN. A new generation network, PERN2, is planned to replace PERN in 2009. PERN2 will provide gigabit-level connectivity to connected institutions, and extend the reach of the network to additional public institutions, including libraries, health centers and schools.

### **Technically Extending Pakistan–US Research Network Connectivity**

To complement and enhance the planned network upgrade of the PERN network, the US National Science Foundation (NSF) and the Pakistan Higher Education Commission (HEC) have divided the costs of providing high speed international research and education network connectivity between the US, Pakistan, and the global Internet.

A circuit (155Mbps) was delivered between PERN2 at Karachi and the EC point of presence in Singapore in August 2008. This connection provides researchers in Pakistan with connectivity to their US colleagues, to colleagues in the South Asia region, and to the global Internet. The two diagrams below illustrate this network connection.

The first diagram shows the TransPAC2 connection from the US to Tokyo, Japan, from Tokyo to Singapore via the EC-funded TEIN2 network, and then to Karachi via the HEC-NSF partnership. The second diagram illustrates how this R/E network connects Pakistan to the cluster of global network connections in Asia.

### **Establishing Science Infrastructure: EC, US, and Pakistan Cooperation**

Development of high-performance network infrastructure to Pakistan would have been impossible without the close cooperation of the EC, the US, and Pakistan. Each partner had its part to play. The EC provided an established landing point in Singapore and transit to Tokyo. The US provided funding for one-half of the oceanic circuit from Singapore to Karachi. Pakistan provided the landing site in Karachi and the other one-half of the oceanic circuit.

Amazingly, even with three partners involved, the negotiations and all aspects of establishing the infrastructure were without significant dispute. One reason for this was the understanding by all parties that the establishment of this infrastructure was critical and fundamental to Pakistan's ability to interact with the science and technology community on a global basis. All parties hope that this science and technology interaction will develop into more constructive overall interactions at all levels.

### **Pakistan-US Science Applications**

The fundamental goal of this project is increasing science cooperation between the US and Pakistan. The establishment of high performance network connectivity between the US and Pakistan is only a first step. Immediately following the establishment of US-Pakistan connectivity, discussions have begun regarding specific science collaborations—ranging from high energy physics data analysis to better distribution of and access to biological/genomic databases.

Among planned events is a US-Pakistan science collaboration seminar in the US. This seminar will bring together three to four sets of discipline researchers from the US and Pakistan to discuss in detail how this network connection can enhance their research. Based on feedback and success of this first seminar a companion seminar will be held in Pakistan six to nine months following the first seminar.

In the wide scope of US-Pakistan relations, this is a small but significant step toward more closely linked science and technology interaction between the US and Pakistan and a small step forward for science diplomacy.

**Official Publicity**

Dr. Nina V. Fedoroff testimony: <http://legislative.nasa.gov/hearings/4-2-08%20Fedoroff.pdf>

Dr. Arden L. Bement testimony: <http://legislative.nasa.gov/hearings/4-2-08%20Bement.pdf>

A web site for this project can be found at <http://pakistan.indiana.edu> .

Official publicity release from the National Science Foundation:

[http://nsf.gov/news/news\\_summ.jsp?cntn\\_id=112503&org=NSF&from=news](http://nsf.gov/news/news_summ.jsp?cntn_id=112503&org=NSF&from=news)

Official publicity from the European Commission:

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1590&format=HTML&aged=0&language=EN&guiLanguage=de>

