Reneal International Education Outreach Incorporated

2015 Philippines Project Plan
June 2014

Contents

1. PLAN SUMMARY

Reneal International Education Outreach (Reneal IEO) installs low-cost computer labs at schools in the Philippines and Tanzania. Ten schools in the Philippines were evaluated via on-site visits in March through May of 2014, and five schools that were judged to meet or exceed Reneal IEO criteria for project involvement have been approved for implementation.

The Reneal IEO mission statement is provided in Section 2. Section 3 includes a summary of estimated costs and required resources for Reneal IEO to complete the projects. <u>Project completion is contingent upon those resources being available</u>.

Section 4 outlines expectations for the beneficiary schools. School Heads must read and agree with these expectations before the project will be implemented at their school. Project implementation will begin in early January of 2015, and schools must have their IT labs fully prepared per expectations by that time.

2. RENEAL INTERNATIONAL EDUCATION OUTREACH MISSION STATEMENT

Our purpose:

The paradox in many developing countries is that education is the path to improve lives, but schools are underfunded and many young people can't afford to attend. The specific purpose of Reneal International Education Outreach (Reneal IEO) is to provide support for students, their parents, teachers, and school administrators to enhance education opportunities in schools in developing countries. Recognizing the power of technology in particular to change lives, the primary focus of this organization is to provide Information Technology expertise and assets (computer hardware, computer software, and learning resources) to these schools.

What we do:

Our goal is to give students and teachers in developing countries better resources for learning. Key Reneal IEO activities are:

- Developing and installing low-cost computer systems for schools
- Developing the Philippines School Information System (SIS)
- Providing teacher training in IT
- Serving as a conduit to get educational materials to schools
- Providing funding for scholarships and microfinance programs

How we do it:

To support these activities, Reneal IEO will:

- Develop hardware and software solutions and associated trainings that are tailored for developing countries
- Freely share these solutions and trainings with other individuals, agencies, and corporations
- Perform on-site installation, consultation, and training in developing countries
- Capitalize on connections and cultural skills built through the founders' United States Peace Corps experiences
- Leverage multiple decades of experience in software and technology
- Seek corporate support for projects and provide tax deductions for donations

Why we do it:

Information Technology has the potential to ignite the love of learning in students and teachers and to open doors for new opportunities for those in developing countries. We wish to share our passion for IT

with others in order to help them achieve a better life. The ultimate reward is seeing the spark in someone's eyes as they realize this potential themselves.

3. PROJECT DESCRIPTION

3.1. Beneficiary Organizations

With inputs from Department of Education officials (Cebu Province Division, Bogo City Division, and Mandaue City Division) and local team members at Compostela National High School and Aboitiz Equity Ventures, ten schools in the Philippines were identified as candidates for 2015 projects. These schools were evaluated via on-site visits in March through May of 2014. The following five schools have been approved by the Reneal IEO Board of Directors for implementation of the Reneal IEO low-cost computer infrastructure in 2015. Each of these schools meets or exceeds the Reneal IEO criteria for selection.

- Arcelo National High School, Liloan Cebu
- Jagobiao National High School, Mandaue City Cebu
- Kawit National High School, Medillin Cebu
- Labogon National High School, Mandaue City Cebu
- Liloan National High School, Liloan Cebu

A summary of the evaluation criteria as well as the selected schools is included in Appendix A.

3.2. Technical Details

The Reneal IEO low-cost computer infrastructure was initially developed to support a high school in the Philippines. This approach allows a school to connect many (10-20) less powerful computers ("clients") to a single powerful computer (the "server"). Each of the clients looks like a capable unit to the user, but programs are actually running on the server. More powerful clients allow for local load-sharing as well.

Key features of the Reneal IEO low-cost computer infrastructure include the following:

- Centralized file storage and management
- Use of a client/server architecture
- Use of Open Source software (Linux, Libre Office, other applications)
- Integrated software environment, customized for secondary schools

A description of the advantages of this approach and details of the software environment are provided in Appendix B.

The original implementation of the Reneal IEO low-cost computer infrastructure used much less capable machines as clients (Pentium 1 and Pentium 2 desktop computers). However experience has demonstrated that there are significant advantages of acquiring more capable used equipment from a single source:

- Supported by newer versions of the Xubuntu operating system
- Sufficient power to run selected applications locally, reducing server load
- Can have other operating system present for stand-alone operation
- Homogeneity greatly speeds lab set-up

3.3. Estimated Resources Required

Estimated Reneal IEO costs and the donated hardware required to complete these projects are summarized in Figure 1.

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Figure 1: 2015 Philippines Projects Estimated Costs and Hardware Needs

School	Proposed Implementation	Estimated Reneal IEO Costs*	Donated Hardware Needed**,***	Contingent Upon…
Arcelo National High School, Liloan Cebu	Add server, 2 1-Gbit NW switches, plus 16 additional clients	1135 USD	16 units + server monitor + keyboard	**School must provide additional tables**
Jagobiao National High School, Mandaue City Cebu	Add server, 2 1-Gbit NW switches, plus 6 additional clients	1042 USD	6 units + server monitor + keyboard	
Kawit National High School, Medillin Cebu	Add server, 2 1-Gbit NW switches, plus 15 additional clients	1104 USD	15 units + server monitor + keyboard	**School must provide additional tables**
Labogon National High School, Mandaue City Cebu	Add server, 2 1-Gbit NW switches, plus 8 additional clients	1048 USD	8 units + server monitor + keyboard	**School must provide additional tables**
Liloan National High School, Liloan Cebu	Add server, 2 1-Gbit NW switches	1027 USD	Server monitor + keyboard	
TOTALS		*5356 USD*	*45 units, 5 monitors, 5 keyboards*	

* Does not include the value of the donated used computer hardware
** A "unit" is either a laptop or a desktop+monitor+keyboard
*** PLEASE NOTE THAT THESE QUANTITIES ARE CONTINGENT UPON RENEAL IEO RECEIVING SUFFICIENT HARDWARE DONATIONS – THEY ARE NOT GUARANTEED.

A comprehensive, detailed list of computer equipment required to stand up the five laboratories is provided in Figure 2. Donated items are shaded with light blue. Reneal IEO will supply all other project hardware. These are the costs noted in Figure 1 in the column marked "Estimated Reneal IEO Costs".

The main expense is the server, which requires a multi-core processor, a large amount of RAM, two high capacity hard disks, and two Gigabit network cards. Servers are typically custom built and the software image is then copied to the disk. Donated units will also require one mouse per seat. A network switch is required for connectivity between the server and clients. Ethernet cables are fabricated to reduce cost and to give maximum flexibility for room set-up. It is also essential to provide voltage regulation and surge suppression for the server, all clients, and the network switches due to variations in power that are sometimes experienced. Quantities for these will be estimated once the specific computer layout is determined at each school.

The rationale for the column in Figure 1 entitled "donated hardware needed" is summarized in Figure 3. A total of 45 laptops or desktop/monitor/keyboard sets is desired. Sixteen laptops are already prepositioned in the Philippines for 2015 projects, so an additional 29 units are needed. **If this hardware is not obtained, then the number of computer units that can be provided to each school will be reduced**. Twenty monitors and 15 keyboards were recently donated that are already allocated for Philippines 2015 projects.

Note that this estimate does not include shipping costs of $75 per large box. Desktops shipped from the US would obviously cost more than laptops to ship, but even with laptops it would probably take at least six boxes (10 laptops per box, 3 monitors per box, plus network switches, keyboards, and smaller server parts). Some of those funds are recouped by the lower cost of parts here in America.

Figure 2: Detailed Estimated Costs for Reneal IEO 2015 Philippines Projects (as of 6/12/14)

Item	Unit Cost (PhP)	Unit Cost (USD)	Arcelo MNHS	Arcelo MNHS Total	Jagobiao NHS	Jagobiao NHS Total	Kawit NHS	Kawit NHS Total	Labogon NHS	Labogon NHS Total	Liloan NHS	Liloan NHS Total	ESTIMATED TOTAL, 2015
Server computer	26500	602.27	1	602	1	602	1	602	1	602	1	602	3011
Ubuntu Operating System, applications, custom software for schools, installation, and training	0	0	1	0	1	0	1	0	1	0	1	0	0
Uninterruptible power supply (UPS)	6000	136.36	1	136	1	136	1	136	1	136	1	136	682
Network switch Gigabit 24-port	4400	100.00	1	100	1	100	1	100	1	100	1	100	500
Network switch Gigabit 16-port	4250	96.59	1	97	1	97	1	97	1	97	1	97	483
USB optical mouse	150	3.41	17	58	7	24	16	55	9	31	1	3	170
Surge protector, 6-outlet	580	13.18	4	53	2	26		0	2	26		0	105
Cat 5e Ethernet cable (per meter)	5	0.11	150	17	150	17	150	17	150	17	150	17	85
Metal hump	700	15.91	1	16	1	16	1	16	1	16	1	16	80
Surge protecter, 4-outlet	365	8.30		0		0	7	58		0		0	58
Voltage regulator for network switch	220	5.00	2	10	2	10	2	10	2	10	2	10	50
KVM switch	840	19.09	1	19		0		0		0	1	19	38
Ethernet card	600	13.64	1	14		0		0		0	1	14	27
CMOS batteries	20	0.45	10	5	10	5	10	5	10	5	10	5	23
Cable tacks (box)	160	3.64	1	4	1	4	1	4	1	4	1	4	18
Kit bag items (cable ties, clamps, tape, labels, pens, etc)	88	2.00	1	2	1	2	1	2	1	2	1	2	10
RJ45 connectors	1	0.02	80	2	80	2	80	2	80	2	80	2	9
USB cable for UPS	50	1.14	1	1	1	1	1	1	1	1	1	1	6
Laptops (used, donated)*	4400	100.00	16	1600	6	600	15	1500	8	800		0	4500
Monitor (used, donated)	2200	50.00	1	50	1	50	1	50	1	50	1	50	250
USB Keyboard (used, donated)	220	5.00	1	5	1	5	1	5	1	5	1	5	25
TOTAL (USD)				2790		1697		2659		1903		1082	10131
Donated equipment (USD)				1655		655		1555		855		55	4775
Estimated Reneal IEO Costs (USD)				1135		1042		1104		1048		1027	5356

* As noted in Figure 1, this could be either a laptop or a desktop+monitor+keyboard. Estimated value for the latter is 155 USD.

Exchange rate 44 PhP/USD

Figure 3: Summary of Schools' Student-to-Computer Ratio

School	No. Students	Current No. of Computers	Current No. of Ncomputing Nodes	BEFORE: Ratio	BEFORE: Ratio w/ Ncomputing	Desired No. of Seats to Add	AFTER: Ratio	AFTER: Ratio w/ Ncomputing	Comments
Arcelo National High School	1750	10	10	175	88	16	67	49	Has a lot of room for additional units but would need tables – could split into two labs
Jagobiao National High School	800	18	0	44	-	6	33	-	Has room for about 6 more units
Kawit National High School	900	7	0	129	-	15	41	-	Has room for 10-15 more units – needs tables
Labogon National High School	950	16	0	59	-	8	40	-	Has a lot of room for additional units but would need tables
Liloan National High School	2200	25	42	88	33	0	88	33	Does not have room for additional units unless another lab is created

If IT lab space becomes available, Compostela National High School-Night would also be a viable candidate for 2015. The main server that was replaced this year at CNHS could be used for the Night school, but at least 15 additional client computers would be required along with additional parts costing approximately 400 USD.

Expectations for beneficiary schools are summarized in the next section. Please read this section carefully. These expectations must be agreed to by the school and met in order for the project to proceed.

4. EXPECTATIONS

Beneficiary schools are expected to provide space and security for the IT lab. Tables for the computers and chairs for users must also be supplied. As noted in Figure 1, Arcelo NHS, Kawit NHS, and Labogon NHS must provide additional tables and chairs if sufficient units are obtained from donors to Reneal IEO for these projects.

Beneficiary schools are expected to provide resources for maintenance and for expendable items as needed. Optional items that have been proven to be useful to schools (a projector or large refurbished TV for projection, a printer, and cooling) are also suggested if not already available.

IT coordinators at the beneficiary schools will be expected to spend time with Reneal IEO volunteers to learn about the system and to assist with teacher trainings. Training sessions will be provided by Reneal IEO for teachers at the selected schools. These trainings will be scheduled in cooperation with the school heads to minimize disruption to classes.

School heads and IT coordinators at the schools will be expected to commit to use of Open Source software with the installed system. In addition, it is expected that United States copyright laws will be respected in the use of this equipment. Installation of pirated software on any computer hardware provided by Reneal IEO is strictly prohibited. However software that is already installed on existing computers at the school does not have to be erased and the existing computers can be used in dual boot mode if desired.

Equipment donated by Reneal IEO to schools cannot be sold, removed, or used for purposes other than education without the express written consent of the Board of Directors of Reneal IEO. Donated equipment should never be taken from the IT lab, even for temporary use. Experience has shown that it frequently is not returned.

This donation is made solely to assist the students and teachers of these schools in their pursuit of quality education. It is expected that the computers provided by Reneal IEO will be used by students to learn about IT and for projects and research in other subject areas. It is expected that the computers will be used by teachers to prepare for classes, complete school reports, compute grades, and other school-related tasks. Because of limited Internet bandwidth, video streaming (even for educational purposes) is discouraged. Computers provided by Reneal IEO should be treated as a learning resource for students and teachers, not as an Internet café.

5. PROJECT MONITORING

Each of the selected schools will be asked to track two measures of success to monitor the project and evaluate its effectiveness. The first is computer usage rate in the IT lab. This will be tracked monthly by the IT coordinators. The second metric is based on teacher self-assessments of computer skills, conducted over time. This will be done by the IT coordinator in conjunction with Reneal IEO.

6. PROJECT RISKS AND MITIGATION

Below are listed the project risks:

- A key risk is hardware failure. The server is configured with two hard disks and daily backup so that single disk failure is not catastrophic. Clients can be removed or added to the configuration seamlessly in case of failure. However other hardware failures (e.g., a network switch) would be catastrophic, at least until they can be replaced during the Reneal IEO visit the following year.
- While provisions for security have been discussed with the schools, IT laboratory security is a concern. Site visits were encouraging in that a room dedicated to IT lab use was available. Laptops are advantageous in that they can be easily secured elsewhere.
- Reneal IEO experience has been that once computers arrive on campus, there will be intense competition for use, including IT classes for students, teacher administrative tasks, and use by teachers of all subject areas for research and teaching. A process must be in place for IT lab scheduling to minimize conflicts in use.
- The Linux user interface has been customized to look like Microsoft Windows®. However teachers that have some familiarity with Microsoft OS and applications will need to learn new skills. This risk will be mitigated by training sessions conducted by Reneal IEO for the teachers that will be done coincident with the installations.
- IT teachers are usually not familiar with Linux and Open Source software when the system is first installed. System administration training is provided, along with a detailed system administration manual. For schools with internet, Reneal IEO volunteers can log in to the server remotely to assist with troubleshooting. There is also a local expert in Compostela to help with any issues that arise.

7. ORGANIZATIONAL QUALIFICATIONS

Reneal IEO is a 501(c)(3) organization, incorporated in April of 2012. The co-founders have planned, designed, and executed multiple similar projects since they served as United States Peace Corps Volunteers in the Republic of the Philippines (2006-2008). The co-founders each have almost three decades of experience in technology-related fields. Brief background information is included as Appendix C. A history of their work is provided on the Reneal IEO website at http://reneal.org/content/history.

8. CONTACT INFORMATION

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Reneal International Education Outreach Incorporated is a 501(c)(3) public charity. All donations are tax deductible to the full extent allowed by law.

For Reneal IEO computerization projects, the following criteria are used to determine suitability for a recipient organization:

- Basic infrastructure to support school computerization (e.g., secure space for computers, source of electricity, tables and chairs, internet desired but not required)
- A designated school Information Technology point-of-contact, such as an IT teacher or IT lab head
- Existing basic computer skills among the teacher population
- School is accessible from a main road with reasonable proximity to a city
- Potential to get internet
- Priority given to secondary school level
- Interested, enthusiastic principal and IT teacher, supportive parents and community
- A vision and passion for using IT in education

Selected schools for 2015 are listed below, along with comments from their evaluation visits.

1. Arcelo Memorial National High School, Liloan, Cebu

Evaluation visit comments: AMNHS has about 1750 students; we did not ask how many teachers. IT is offered as a major for 3rd and 4th year students only, and there was one section of IT majors for each year level. Computer literacy is also taught to all 3rd and 4th year students.

There are approximately 20 working computers in the AMNHS lab, including 10 NComputing nodes donated by Aboitiz Foundation. There are five nonfunctioning units but the hard disks are the problem, so these units would be usable as clients. The IT lab is housing 10 computers for the night high school right now, but those will be moved to another room by June. Thus there is space for additional units. There is an internet connection at the school. The school is 1-2 km from the main road but there is abundant public transportation from the corner.

Facilities in the lab (tables, chairs, wiring) are already in place. The lab is quite large, and we talked about the possibility of dividing it into two labs, or a lab and an audio-visual room. They are very open to that suggestion. There was already a laptop and projector in place in the lab, along with the big TV for conducting classes in other subject areas using IT. Security seems adequate and there is a guard on duty.

The Aboitiz Foundation has been a strong supporter of the school for many years now. They have also provided the school with a science lab, rewiring, a large TV, and funding of an IT teacher. Our contact at Aboitiz, Rogie Abala, noted that we can perhaps write a letter of intention to the Aboitiz Foundation requesting their joint support of this project. We will pursue that suggestion to request funding assistance for the server.

2. Jagobiao National High School, Mandaue City, Cebu

Evaluation visit comments: Jagobiao NHS has about 800 students. We did not ask the number of teachers. Last year there were 160 students specializing in IT. That number is limited due to the limited number of computers.

Jagobiao NHS has an IT lab with 18 computers. They are older computers, similar to those that we have seen at the other high schools in Cebu. It is an exceptionally well-maintained lab, and Rogie pointed out that the computers that he used as a student are still functioning there.

Facilities in the lab (tables, chairs, wiring) are already in place. There are existing empty tables that could support roughly six more units with no additional changes needed in the lab. There is

an internet connection. Security seems adequate, and there is a school guard. The school is very easy to access since it is right by the National Road.

3. Kawit National High School, Medillin, Cebu

Evaluation visit comments: KNHS has about 900 students and 33 teachers. Between 150 and 200 students major in IT. KNHS suffered extensive damage from Yolanda with numerous classrooms still roofless. The IT lab was mostly spared even though the roof was blown off, although there was some ceiling damage.

The IT lab has seven working units, most of which are from the early-2000's donation that we've worked with at the other schools. There are four units that are not operational (three hard disk problems and one video card problem); most of these should be usable in the Reneal IEO system. The IT room was orderly and well-organized. There is an internet connection.

The current lab setup is not very space-efficient and would not support additional units, so the project would require that the school provide new computer tables. The principal and IT teacher requested specifications and ideas for room layout. Security seems adequate, and there is a school guard. The bus line passes the school, so it is easily accessible.

4. Labogon National High School, Mandaue City, Cebu

Evaluation visit comments: Labogon NHS has about 950 students and 40 teachers. Last year there were about 200 students specializing in IT in the four year levels. The school limits the number of students who can major in IT to preserve a reasonable student-to-computer ratio.

The IT lab has 16 working units, ten of which are from the early-2000's donation that we've worked with at the other schools. The IT room was closed due to the October 2013 earthquake, but is now open again. (A large percentage of the school classrooms were damaged in the earthquake.) There is an internet connection. It is a very large room and could perhaps even be split into two lab areas. Many additional units could be supported if tables and chairs were available.

Security seems adequate, and there is a school guard. The school is off the National Road a few kilometers but trikes are readily available. There is a short walk from where the trike route ends and the school gate.

5. Liloan National High School, Liloan, Cebu

Evaluation visit comments: LNHS has about 2200 students; we did not ask how many teachers. Last year there were 242 students majoring in IT in the four year levels. The school limits the number of students who can major in IT to preserve a reasonable student-to-computer ratio.

The IT lab has 25 working units, most of which are from the early-2000's donation that we've worked with at the other schools. All appear to be operational. The school also just received the NComputing package identical to that at Carmen NHS and Compostela NHS, but it has not yet been installed. The IT room was orderly and well-organized. There is an internet connection.

The current lab setup is quite crowded with the new NComputing setup in addition to the original 25 units. The principal noted that they wish to create a second IT lab, but they do not yet have the space for this on campus. Security seems adequate, and there is a school guard. The school is easily reached by public transportation.

Advantages of the server/client architecture and open source software environment:

- Easy maintenance – software is only on the server
- Clients can be added or removed easily
- Clients can be less capable computers (original implementation used obsolete P1/P2 machines as clients)
- Modular, extendable architecture: can run multiple servers in a large school
- Open source software is free, with no concerns about piracy
- No problems with viruses – this is a significant issue for schools
- All access to Internet is controlled through a single computer to provide filtering of content
- Users can access their own files from any computer
- Files are centralized for easy backup

Software is integrated and customized for a school environment:

- Internet filtering and caching
- Automatic backup
- Teachers
  - Individual password-protected accounts
  - Individual user profile information
  - Personal file storage space for each account
  - Shared file storage space for all teachers
- Students
  - Common look-and-feel for all student accounts
  - Folders for each student for individual file storage

Software elements:

- Linux Ubuntu operating system
  - Linux XFCE user interface created to look like Windows
- Libre Office (word processor, spreadsheet, presentations)
  - Can save/read Microsoft Office format
- Other standard applications (Mozilla Firefox and Google Chromium web browser, Adobe Reader, VLC movie viewer, Gimp photo editor, Bluefish web page design, CUPS printer manager)
- GCompris, TuxType, and TuxMath educational software

School resources configured for immediate use:

- WordPress blog
- School Wiki
- Moodle
- Squid internet filtering and caching with filters in place and set up for weekly update
- Internal Apache web server, home page with links to internal services and key external sites
- Firewall configured to protect all internal resources
- VPN for remote trouble-shooting and maintenance
- Prebuilt student and teacher accounts and file management structure
- Individual file storage area for each student
- Student accounts that are automatically rebuilt upon student logout to remove unwanted student changes
- Teaching and training resource repository, including 4000+ Khan Academy videos and Rachel educational materials

Complete documentation available at
http://reneal.org/sites/default/files/documents/ComputerInfrastructureForSchools.pdf

Neal R. Bierbaum, Reneal IEO Board President

Work Experience

April 2012 – Present, President and Full-time Volunteer for Reneal IEO
Continued projects in the Philippines and Tanzania. Primary focus is on software development.

January 2009 – April 2012, Full-Time Volunteer
Continued work in Philippines. Developed Philippines Student Information System, provided low-cost integrated software system to Aboitiz Foundation. Began work in Tanzania.

March 2006 – December 2008, United States Peace Corps Volunteer
Served as Volunteer at Compostela National High School, Compostela, Cebu, Philippines. Created low-cost distributed computer infrastructure on campus.

June 2001 – March 2006, Consultant - PACE, Inc.
Engineering consultant for Sandia National Laboratories. Developed simulation models of specialized network applications, a new network protocol, and remote high performance file systems. Designed and implemented major integrated multi-host software general test package.

September 1999 – February 2002, Consultant - PACE, Inc.
Continued consulting with Hybrid Networks. Performed significant redesign of numerous system elements for reliability and ease of use. Ported entire system to Solaris, Linux, and a new version of FreeBSD. Developed software architecture for Hybrid's next generation hardware.

May 1999 – August 1999, Transcontinental tandem bicycle ride with wife

October 1998 – May 1999, Consultant - PACE, Inc.
Chose to become consultant. Continued work with Hybrid Networks.

May 1995 – October 1998, Senior Engineer - Hybrid Networks
Primary engineer for "Head End" system. Designed and implemented all GUI Configuration, Monitoring, and Subscriber Database applications. Designed all control for 2-way cable system.

July 1991 – May 1995, Senior Engineer - Make Systems
Chief engineer for NetMaker Internetworking Simulation and Design tool. Created new conceptual model for simulation; personally designed and wrote all internetworking simulation software.

February 1989 – June 1991, Staff Engineer - Vitalink Communications
Senior software engineer in product engineering department. Developed software for wide area network bridge/routers. Created integrated software development environment.

September 1986 – January 1989, Systems Development Engineer - General Electric
Development engineer under contract to NASA Ames National Aeronautics Simulation (NAS) supercomputer center. Primary work in computer network communications.

June 1983 – August 1983, Transcontinental bicycle ride

August 1974 – June 1983, US Air Force
Commissioned officer (highest rank Captain). Experiences included instructing advanced students in the T-38 supersonic jet trainer and serving as C-130 Aircraft Commander.

Education

- Engineers' Degree Electrical Engineering, Stanford University, Stanford, CA, August 1986 (Thesis: "Space Station Experimental Control by a Remote Control Center". Same academic load as a Ph.D.)

- Master of Science in Electrical Engineering, Stanford University, Stanford, CA, December 1984

- Bachelor of Science in Electrical Engineering, US Air Force Academy , Colorado Springs, CO, June 1974 (double major in Electrical Engineering and Computer Science)

Rene L. Bierbaum, Reneal IEO Board Treasurer

Work Experience

November 2013 – Present, Treasurer and Full-time Volunteer for Reneal IEO
Continued projects in the Philippines and Tanzania. Primary focus is on Reneal IEO operations and teacher training.

June 2014-Present, Part-Time Consultant - Sandia National Laboratories

January 2009 – November 2013, Reliability Analyst - Sandia National Laboratories
Resumed career as reliability analyst following U.S. Peace Corps service. Received Individual 2012 Defense Programs Award of Excellence for work in surveillance metrics and sampling rationale.

March 2006 – December 2008, United States Peace Corps Volunteer
Served as Volunteer at Compostela National High School, Compostela, Cebu, Philippines. Conducted 41 training classes and modules for the teachers of CNHS and other municipal high schools, downloaded web resources for teachers, developed admin tools for teachers.

September 1999 – March 2006, Reliability Analyst - Sandia National Laboratories
Responsible for reliability analysis of various Sandia hardware and methodology development. Appointed Distinguished Member of Technical Staff (top 10% of technical staff) in 2000.

May 1999 – September 1999, Transcontinental Tandem Bicycle Ride with husband

January 1998 – May 1999, Reliability Analyst - Sandia National Laboratories
Because of desire to make greater technical contribution, returned to technical staff position following 5-1/2 years of management experience. Was responsible for reliability analysis of various Sandia hardware.

August 1992 – January 1998, Manager - Sandia National Laboratories
Managed a group of ten technical staff and a budget of approximately 3M$. Department mission included reliability analyses and use of electrical simulation tools to support Sandia products.

December 1988 – August 1992, Project Leader - Sandia National Laboratories
Led multi-agency system integration effort involving system and component designers and production engineers. Responsible for liaison and requirements negotiation with external customers.

December 1986 – December 1988, Systems Analyst - Sandia National Laboratories
Developed computer software to analyze the effectiveness of various sensor technologies in tactical battlefield applications using high-resolution war gaming models.
June 1984 – December 1986, Electrical Engineer - Sandia National Laboratories
Part of a team responsible for developing an infrared imaging system. Specific tasks included acquiring and configuring test instrumentation and characterizing imaging system performance.

Education

- Master of Science in Electrical Engineering, Stanford University, Stanford, CA, June 1984.

- Bachelor of Science in Electrical Engineering, University of Nebraska, Lincoln, NE, May 1983 (also completed all requirements for a major in Mathematics, plus extensive coursework in chemical engineering and computer science)