



EHAS

ENLACE HISPANO AMERICANO DE SALUD

ACTIVITY REPORT 2014

EXECUTIVE SUMMARY

In spite of the uncertainty and economic crisis that have been extended to 2014, EHAS Foundation has continued working on its cooperation and research projects throughout this period successfully. As in previous years, EHAS have been strengthening its collaboration networks to carry out its projects in Latin America and looking for new international funding sources.

The biggest effort in 2014 was dedicated to a project focused on the improvement of maternal and neonatal health in Guatemala using **innovative tools for health**. This project is called “Healthy Pregnancy” and has the financial support of 4 international funders: Spanish Agency of International Cooperation for Development (AECID); United States Agency for International Development (USAID); Inter-American Development Bank (IDB) and Polytechnic University of Madrid (UPM). Last June 2014 was the beginning of the activities and prenatal controls have been offering to 10.500 pregnant women in Alta Verapaz and San Marcos, using portable ultrasound scan and blood and urine analysis with rapid strips. This project will continue until August 2016.

Throughout 2014 EHAS has also been working on a research and cooperation **Telemedicine** project in Peru, started in April 2013. The aim of this project is to diagnosed neglected diseases with a tele-microscopy system. During 2014, the activities of this project have been focused on the pilot implemented in Napo River to test the telemedicine system that has been designed in Spain previously.

Regarding **mobile communications**, EHAS has also focused on the project TUCAN3G. TUCAN3G project is a consortium of 11 members included in the 7th program of the European Commission Frame. The objective is to research on new technologies and business models capable of providing 3G services in remote areas of developing countries (Peru and Colombia). During 2014 EHAS has focused its contribution to the project in the research for the potential market of 3G services in rural areas of Peru.

Finally, the activities of the research the project “Renewable energy and ICT for green tourism in protected areas of Latin America” have continued during 2014. With this project EHAS has been exploring **new fields to use ICTs**, always aiming to improve the live conditions of inhabitants of remote regions in developing countries (Bolivia and Ecuador).

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I. EHAS FOUNDATION

EHAS Foundation is a non-profit institution, with official address in Madrid, Spain (Escuela Técnica Superior de Ingenieros de Telecomunicaciones. Ciudad Universitaria s/n. 28040), which aims at improving public Health care systems in remote areas through the application of appropriate information and communication technologies (ICT). EHAS started its activities in 1999 as a result of the collaboration between the Polytechnic University of Madrid and Engineers Without Borders (EWB), and since then, it has interconnected more than 200 Health-care facilities (both Health posts HPs, and centers HCs) with their reference hospitals in Peru, Colombia, Ecuador and Cuba. Along this time, the group of collaborators has broadened and nowadays, the EHAS Board of Directors includes also representatives from Rey Juan Carlos University, Catholic University of Peru and Cauca University in Colombia.

EHAS has worked specifically with primary care facilities of the public Health systems in developing countries. In rural instances, EHAS has operated in relatively well-equipped and well-staffed HCs, as well as remote and less-resourced rural HPs. These HPs are located in areas without roads nor fixed or mobile phone systems, and with very limited medical capabilities. EHAS has strained and succeed to create more effective communications systems between HCs and HPs, specially focusing on connecting medical staff in the most isolated HPs with their better-resourced counterparts in the HCs, in order to achieve four main results:

- Improved the epidemiological surveillance system, since the previous system relied on late or erroneous reports;
- Increased the diagnostic and treatment capacity in the most isolated HPs, allowing a quick and costless consultation with a proper doctor and better coordination of essential medicinal stocks;
- Reduced the need to travel of patients and medical personnel, and thereby, reduced the costs (river travels are expensive) which offset the costs to deploy the infrastructure; and
- Reduced the average time for the emergency transfer of patients, when the transfer is necessary.

In order to achieve these results, EHAS has supported the design, execution and maintenance of telecommunications infrastructures appropriate for each deployment context, which usually is unfriendly, like a forest or a mountains range. These telecommunications networks are based on alternative radio technologies, like HF (High Frequency), VHF (Very High Frequency) or WiLD (WiFi over Long Distances) that are adapted through FOSS (Free and Open Software Source) to the requirements of every Health 'micro-network'. Thanks to this solution, EHAS has extended voice and data connectivity to the most isolated environments. Access to Internet and PSTN (Public Switched Telephone Network) was achieved by distributing satellite or land-line connections available in cities located in a range up to 3500Km. Along the whole process, EHAS has always worked closely with local partners in every target country, like the Rural Telecommunication Group of Catholic University of Peru or the Telematics Department of Cauca University in Colombia.

Besides providing telecommunications' infrastructure and voice and data communications services between Health care centers, EHAS is now implementing projects working on tele-medicine services for remote consultations and diagnostic through the application of specific tools, such as the remote ultrasound tests and epidemic vigilance systems and also the training of Health technicians on the use of this tools and the diagnostic concepts.

Once the network is properly functioning, EHAS transfers to the local and regional Health-care authorities the network control, which means training the users of the systems and preparing all constituents for the network's transfer. EHAS Foundation experience exhibits that using FOSS and open knowledge throughout the process of designing, constructing and maintaining tele-medicine networks, allows such regional Health authorities to optimize their limited budgets and make the networks sustainable. FOSS also allows network administrators to reduce problems with viruses and licenses, and focus on many other kinds of hardware-network problems, like protecting communication devices in the areas where lightning storms are frequent and the humidity level is very high.

EHAS activity in this scope has already had a positive and relevant impact in the Health care process, specially related to the following achievements:

- Before EHAS implementation, the 93% of the Health-care personnel said that was impossible to make consultations, being the 95% of them who now says that making consultations in case of hesitation is quick and easy. And the number of consultations has increased on a 700%.
- The number of trips to deliver medical reports has been reduced to a quarter part of the number of trips needed before.
- The average time for transportation of urgent patients has been a 60% reduced.
- The children and maternal mortality ratio has decreased considerably in the intervention areas.

EHAS Foundation also works on research, training and dissemination projects about the ICTs application in the Health sector, using technologies to fight the inequity of access to Health-care services in remote areas from Latin America and other developing countries.

In the previous years, EHAS has been collaborating with Spanish and Argentinian universities and hospitals, working on the development tools for diagnostic systems to fight prevalent diseases suffered by children (respiratory illness and diarrhea) and to provide assistance to pregnant women.

A sample of those systems, is the wireless stethoscope on real time for areas without doctor, which permits that a remote doctor (usually the reference doctor) can listen to the breath and cardiac sounds of the patient, while watching at him/her, and being able to guide to the Health technician about the correct position of the stethoscope. It has also been developed a system for sending microscopy images (diarrhea), ultrasounds and fetal control. At the same time is being developed an ECG with the proper technology adapted to the rural environment.

Additionally, Rey Juan Carlos University, collaborating with EHAS Foundation, has created a Masters Course, including Doctorate program, on Telecommunication Network for Developing Countries, aiming to provide high qualification training to engineers from developing countries. The main goals of the master course are to achieve the multiplier effect through the trainings. The developed technology is all based in FOSS and the students can, this way, use it to solve problems in the remote rural areas in their countries.

EHAS Foundation also works on several publications and raising awareness activities about the importance of ICTs applied for the development of the Health sector.

II. FOUNDATION ACTIVITY

GOALS AND ACTIVITIES ESTABLISHED IN THE FOUNDATION STATUTES:

A) International Cooperation for the Development of the Information and Communication Technologies sector, applied to Health issues in countries from Latin America or other developing countries.

B) Investigation and development of information society in order to improve the Health sector in countries from Latin America or other developing countries.

In order to achieve these goals, the Foundation can develop, according to the report and the yearly action plan, approved by the Board, general and specific activities that just in a descriptive way and without exhaustive pretension, are mentioned below.

GENERAL ACTIVITIES:

1. The scientific investigation and technological development in the information and communication technologies sector, applied to Health issues in countries from Latin America and other developing countries.
2. Training to technical and sanitary personnel on information and communication technologies, or on Health, using these information and communication technologies.
3. Promotion of exchange, creation of networks and cooperation agreements between universities, research centers, Health institutions and private or public institutions that share the Foundation goals.
4. Dissemination of results, and successful or not successful experiences about information and communication technologies applied to Health issues.

SPECIFIC ACTIVITIES:

- I. Innovative projects on information and communications infrastructure on developing countries.
- II. Innovative projects on tele-medicine services.
- III. Equipment resources for Health institutions.
- IV. Resources for communication and computer labs.
- V. Equipment development and applications on tele-medicine.
- VI. Development of trainings, conferences, congresses, seminars, symposium, discussion, trips, and study sessions.
- VII. Resources for scholarships and trips for students and teachers.
- VIII. Redaction, edition and distribution of leaflets, monographs and every type of publication, regular or not, for the information, training and dissemination.

- IX. Dissemination of experiences in congresses, conferences, seminars, meetings and scientific or cultural events.
- X. Dissemination of results to experts, in technical and sanitary publications, through traditional and electronic communication ways.
- XI. Awareness for people and institutions about the importance of information and communication technologies applied to Health issues in developing countries.
- XII. Any other activities that the Board considers convenient to achieve the goals.

(Article 3. Foundation Statutes)

III. ACTIVITY AREAS OF INTERVENTION

EHAS Foundation has been developing activities in 2014 inside of the following diverse target area:

Region	Country	Partner
Latin America	Guatemala	TulaSalud
	Peru	Pontifical University Catholic Peru
	Bolivia	Energética. Energía para el Desarrollo
	Ecuador	University Private Technical Loja
	Colombia	University of Cauca
Europe	Spain	University Rey Juan Carlos

IV. ACTIVITY REPORT

ACTIVITY 1.- COORDINATION, MONITORING AND EXECUTION OF COOPERATION FOR DEVELOPMENT PROJECTS.

The objective of the cooperation projects of EHAS in different countries is to demonstrate the capacity if improvement of the public health system for primary assistance in rural areas of countries in Latin America through the use of appropriate communication technologies and information access services.

During 2014, 2 cooperation projects have been performed. The first is centered in the application of innovative tools for the improvement of maternal health in isolated areas; the second addresses the management of eco-tourism through the application if ICTs and renewable energies.

Title: “HEALTHY PREGNANCY”

Funded by: AECID (Spanish Agency of International Cooperation for Development); USAID (United States Agency for International Development); IDB (Inter-American Development Bank) and UPM (Polytechnic University of Madrid).

Duration: 24 months

Target area: Alta Verapaz and San Marcos (Guatemala)

Beneficiaries: 10,500 pregnant women

Description:

In June 2014 the second phase of the pilot began, achieved with the help of UPM between 2012 and the beginning of 2014 whose objective was to improve the maternal health of 1,000 pregnant women in rural areas of Guatemala. The initiative is based in the use of technological tools specially designed for use in rural areas that ensure quality diagnoses and enable health risk control of pregnant women in this area. The health counselling that we offer in these communities is complete with monthly visits by traveling brigades of nurses equipped with portable ultrasounds and a prenatal screening system based on analysis of blood recovered from test strips. The combination of these techniques enables a good level of control over pregnancies, similar to what one could receive in an urban hospital or health center.

The good results that this pilot shed (reduction to 0 of mother mortality and a 65% reduction of neonatal) has raised the interest of other international cooperation institutions in the amplification of the initiative. So, in June we started to expand the initiative with help from our local counterpart TulaSalud. The first funds came from the 2013 Calling of AECID Projects (Agency of Spanish International Cooperation for Development), which financed the improvement of health visits of 4,500 pregnancies in the department of San Marcos over 18 months. They were joined in July by 3,000 more women that reside in rural areas of Alta Verapaz with financing from the Development Innovation Venture program at the United States Agency for International Development, USAID. UPM continues helping this phase of the initiative, contributing financing to strengthen the purchase of equipment thanks to the 2013 Calling of Support for Action of University Cooperation for Development. Finally, the MIF (Multilateral Investment Fund) of the IDB (Inter-American Development Bank) has joined in the amplification of the project, helping improve the health visits of 3,000 more women in Alta Verapaz and San Marcos, thus achieving a total of 10,500 beneficiaries.

The amplification of the project with AECID started June 1st, 2014 and is anticipated to finish by the 30th of November 2015 with the support of 160,000€. USAID began their support July 1st, 2014 and continues until the 31st of December, 2015 with funding of 100,000USD. UPM has provided a sum of 18,000€ that began its use the June 1st, 2014 and will finish before November 30th, 2015. Finally, the MIF-IDB has made a contribution of 149,816 USD that they have been executing since August 29th, 2014 and will for two years.

It is important to highlight that we are currently working in the scaling of this project to new Latin American countries through new financing models. Effectively, the initiative will be deployed in 2015 in Peru by means of converting it into a social business that offers prenatal diagnostic services for rural areas to health institutions. This business, property of the EHAS Foundation, was registered in 2014 and put in motion with the help from the 2014 Calling for Innovative Actions for Development of AECID and from MIF with their concession of a new contribution in 2015.

Title: Sustainable energies and ICTs for Ecotourism in protected areas from Latin America (Peru, Ecuador y Bolivia).

Funded by: CYTED (Ibero-American Program For Science, Technology And Development)

Duration: 4 years

Target area: Peru, Ecuador and Bolivia

Description:

During 2014, EHAS made a trip to Bolivia with the objective of identifying eco-lodges interested in taking part with the project and to analyze the energy and communication needs that they have. The identification process focused on eco-lodges that are situated in natural areas with some degree of protection and are managed by local communities. The trip yielded in EHAS drafting a report analyzing not only the needs but also possible technical solutions that could be employed in the visited eco-lodges.

The demonstrative pilot in Bolivia is already functioning in the eco-lodge of San Miguel del Bala (next to Rurrenabaque) and EHAS hopes to extend the initiative to another eco-lodge during 2015. In addition, during 2014 EHAS continued offering technical assistance on renewable energy technologies and ICTs to community associations dedicated to the development of businesses in sustainable eco-tourism.

Over 2015 the project will start its activities in Peru, beginning new with the identification of eco-lodges that are interested in this initiative.

Goals and indicators

Goal	Indicator	Quantity
Demonstrate the improvement capacity of the public health system in rural areas of developing countries through the use of appropriate ICTs.	Projects executed in developing countries	1
Research and application of ICTs to sustainable tourism ventures and establishment of orientation guide for the management by local communities.	Projects executed in developing countries	1

Human resources needed

Type	Number	Hours per year
Salaried personnel	0	0
Volunteer personnel	4	2500

ACTIVITY 2.- COORDINATION, MONITORING AND EXECUTION OF RESEARCH, TRAINING AND DISSEMINATION PROJECTS.

During 2014 the following research and dissemination projects have been coordinated:

Title: TUCAN3G: Wireless technologies for isolated rural communities in developing countries, based on the deployment of cellular femtocells 3G (Peru-Colombia).

Funded by: EU (European Union)

Duration: 3 years

Target area: Latin America (and trial project in Peru)

Description:

This project was started in February 2013. TUCAN3G project is included in the 7th program of the European Commission Frame. It is a consortium of 11 members, including EHAS Foundation, which is administrated by the Polytechnic University of Catalonia and coordinated technically by the University Rey Juan Carlos. It has started on February 2013 and has a total duration of 24 months with a budget of 1.677.670 Euro (out of them, EHAS foundation has assigned the amount of 102.880 Euro).

TUCAN3G is a research project that aims to provide solutions for sustainable and low cost telecommunications to rural communities in developing countries, basing the study in the Latin America reality. The past years have been witness to a massive introduction of mobile telephones in developing countries. Nevertheless, the isolated rural areas (with low income population) have been ignored because the classic access does not ensure the worth of the investment to the telecommunications operators. As communications is essential in the human development, the research on innovative solutions to connect these areas is a prime.

During 2014 EHAS had focused its contribution to the project in the development of research for the potential market of 3G services in rural areas of Peru. Once the information was collected and conclusions extracted with the rest of the partners, EHAS began the design of a business model and a strategy that will sustain the start-up of the initiative following the conditions of the context. All of the information has been contributed by EHAS for the installation of a demonstration platform in the Peruvian jungle (forecasted for August 2015), that verifies the solution as well the hypothesis of the business model and to serve as an example for interested agents in the development of a project of this kind.

Title: New procedures for the diagnostic of forgotten diseases using low cost tele-microscopy (Research).

Funded by: AECID (Spanish Agency of International Cooperation for Development)

Duration: 1.5 years

Target area: Spain-Peru (Napo River Basis)

Description:

This research project started in April 2013 and is funded by AECID (Spanish Agency of International Cooperation for Development) with a budget of 85.400€. The research phase started in 2013 and was conducted entirely in Spain. In 2014, EHAS executed the start-up in Peru and the expected date of completion is July 2015.

During 2014 EHAS studied the viability and sustainability of the Tele-microscopy system developed in a real world application in Peru. We carried out trips for its start-up, trainings of health personnel and monitoring of its use. In addition, in line with EHAS Foundation's principles on open knowledge and software, we carried out diverse activities for the dissemination of the

results of the investigation (i.e. attending international conferences and publication of articles).

Title: Corporative Communication Tasks (Dissemination).

During 2014 we completed activities related to the dissemination of EHAS work on ICTs for development, to strengthen the visibility and make it closer to more people. The external communication via web and social networks have been active, publishing periodic news about the Foundation, showing its mission, increasing its social base and promoting synergies with other organizations.

Title: Conferences (Dissemination).

In July 2014 EHAS participated in the 6th “International Conference on E-Health” in Lisboa, where we presented our Tele-microscopy project which utilizes a telemedicine application as a solution for the diagnosis of forgotten diseases in areas without resources. Similarly, the project was also presented in the Latin-American FPGA School on Advanced Instrumentation in December in Costa Rica.

Moreover, we participated again in the 2nd edition of the “Latin America DHIS2 Academy” in Bogotá (Colombia) in November, 2014. Under the title “Training and Experiences of a open Software for the Management of Health Information,” EHAS endorsed the organization and celebration of the event for giving knowledge on possibilities of DHIS2 as a health information system.

Finally, the project “Healthy Pregnancy” has been disseminated at diverse events, making an emphasis as much on the amplification of the current project in Guatemala as the new dimension and the creation of a social business in Peru. The most important conferences in which we participated in were the Ashoka Globalizer (“Accelerating Impact WorldWide”) and the ABC Continuity Forum, hosted in November of 2014 in Bogotá and Miami respectively. The objective was to provide knowledge and motivate social entrepreneurs with innovative projects that reduce poverty in Latin America.

Title: Training

During 2014 EHAS has done the following training activities:

- Presentation on open software for cooperation projects (Masters UPM).
- Presentation on the application of ICTs in health projects in developing countries (Bachelors Telecommunications UPM).

Goals and indicators

Goal	Indicator	Quantity
Research on the use if ICT and free software applications in developing countries to improve the living conditions in remote isolated areas.	Research and dissemination projects	2
Have influence on social stakeholders to take rural tele-medicine as an alternative to improve the assistance processes and the isolated rural communities' health.	Dissemination activities	5

Human resources

Type	Number	Hours per year
	Done	Done
Salaried personnel	2	2500
Volunteer personnel	3	1000

ACTIVITY 3.- MANAGEMENT AND ADMINISTRATION OF THE FOUNDATION

During 2014 EHAS continued working on the management of the daily work of the Foundation, coordinating and establishing synergies with institutions that belong to the Board of the Foundation; Polytechnic University of Madrid, ONGAWA (previously Engineers Without Borders), Pontifical University Catholic of Peru, University of Cauca in Colombia and University Rey Juan Carlos in Spain. In the same way, it has been continued the establishment of networks with other institutions that have been partners in cooperation projects that EHAS has developed since it started (Technical Particular University of Loja, Fundatel, TulaSalud, GOREL, etc.).

In order to guarantee the sustainability of the Foundation activities, a follow up of the national and international calls has kept going on (UE, USAID, AECID, Official School of Medicine in Madrid, etc.) for those that are interesting and according to the goals of the Foundation, trying to search new financial sources.

Goals and indicators

Goal	Indicator	Quantity
Manage and administrate efficiently the Foundation, strengthening the relations with other institutions to achieve EHAS mission.	Activity Annual Report	1
Search and application for calls that are according to goals of the Foundation and give continuation to its projects.	Proposals to calls	5

Human resources

Type	Number	Hours per year
	Done	Done
Salaried personnel	1	600
Volunteer personnel	1	200