ACTIVITY REPORT 2013

SUMMARY

I. EHAS FOUNDATION

EHAS Foundation is a non-profit institution, with official address in Madrid, Spain (Escuela Técnica Superior de Ingenieros de Telecomunicaciones. Cuidad 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 2013 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 goal 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 2013, 4 cooperation projects have been performed. Three of them are focused on the application of ICT to improve some health issues related to maternal mortality reduction (two of them have been completed during the year); the fourth of the projects is addressing the management of eco-tourism sites through the application of ICTs and sustainable energies.

Title: "HEALTHY PREGNANCY": Environment for pregnant women control in rural areas from Alta Verapaz, through portable ultrasound scanner and quick tests (Guatemala).

Funded by: UPM (Polytechnic University of Madrid)

Grant: 40.000 Euro ($51,640)

Duration: 21 months

Target area: Alta Verapaz, Guatemala.

Beneficiaries: 1,000 pregnant women

Description:

The project aims to improve the maternal and perinatal assistance in 30 isolated communities in Alta Verapaz. In order to achieve it, technological tools specially designed to use them in rural areas have been given, which ensure quality diagnostics and allow controlling the health risk of pregnant women in this region. The health advising offered in the communities is being complemented by the monthly visit of health itinerant brigades of health technicians equipped with portable ultrasound scanner and a perinatal sift system based on the tests of blood samples collected on filter paper. The combination of these two techniques is relevant to do a proper control on pregnant women health status, similar to the control done in hospitals or in urban health centers.

The project started in June 2012 with the funds of 40.000€ provided by Polytechnic University of Madrid. During 2013 the project has been under execution, and the expected completion date is February 2014, reaching during that 21-month period to a target population of 1000 pregnant woman in Alta Verapaz.

Title: Improvement of the Children and Maternal Health in the Napo River Basis, through the proper use of Information and Communication Technologies (ICTs). Peru.

Funded by: AYUNTAMIENTO DE MADRID (Madrid City Hall)

Grant: 180,000 Euro ($232,380)

Duration: 2 years

Target area: Loreto Department, Maynas Province, Peru

Beneficiaries: 43,150 women and 42,307 men

Description:

This project aims to make the most of the telecommunication network in Napo River Basis (Province Maynas, Loreto Department) with the following goals:

- Improve the epidemiological vigilance system (so that all information is sent via e-mail and it arrives on time and without mistakes).

- Increase the decisive capacity of health technicians in the most remote areas (through the installation of web-cams in all the health points to provide direct communication between doctors and patients, the installation of portable stethoscope system which allows the doctor to listen to the pulmonary (IRA) and cardiac sounds of the patients who are in the health points. In this way, the web-cam can transmit images of the rural microscopes (EDA and malaria) and introduce a remote control system for the fetal heartbeat).

- Perform a better control of urgent transfers (avoiding unnecessary ones and decreasing the delay and the bad management in the necessary ones).

- Increase the income of the rural health points through the remote fulfilling of forms requested for assistances covered by the health insurances.

This project has started on February 2011 with the funds from the Madrid City Hall (180.000 Euro). The results have been very positive, generating a strong interest in DIRESA, GOREL and the responsible of Napo Heath micro-network. The project has strengthened health procedures of these organizations in isolated areas targeted by the intervention through the use of ICT. Its completion date was April 2013.

Title: Improvement of the Children and Maternal Health in the Napo River Basis through the proper use of ICT. Peru.

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

Grant: 80,000 Euro ($103,280)

Duration: 1.5 years

Target area: Loreto Department, Maynas Province, Peru

Beneficiaries: 43,150 women and 42,307 men

Description:

This project is an extension of the previous one, started in March 2012, with the aim to obtain a higher impact funded by AECID (80,000 Euro). With these funds 5 health points have been provided with an ultrasound scanner by UBS,

specially designed for this environment, and the proper training has been facilitated to use this equipment during the pregnancy control. Interconnection has been established between the topic ship Pastaza and the health network that provides ambulatory assistance to more than 80 localities in the Napo River Basis. Moreover it has been set a lab for the diagnosis of tuberculosis in Health Post in San Rafael. Its completion date was July 2013.

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

Funded by: CYTED (IBERO-AMERICAN PROGRAM FOR SCIENCE, TECHNOLOGY AND DEVELOPMENT)

Grant: 50,316 Euro ($64,958)

Duration: 4 years

Target area: Peru, Ecuador and Bolivia

Description:

This project started in June 2012 with an expected duration of 4 years. The overall cost of the project has been reduced so that the total budget to be managed by EHAS Foundation is 40.876€.

During 2013 the project continued analyzing the requirements of the energy service and telecommunications services for achieving a sustainable tourism and it will disseminate knowledge among stakeholders interested in ecotourism in Latin America. In addition, there exists a special attention to natural areas with some degree of protection that are managed by local communities.

From the beginning of this project, an in-deep study has been done about the current scene related to energies in the eco-tourism activities in Latin America. It will be followed by a group of actions focused on the improvement the sustainability in the economic sector:

- Catalog the best practices on sustainable energy and ITCs on eco-tourism infrastructures.
- Develop guides about the use of sustainable energies in this sector, useful for the local communities involved on the management of areas with natural or cultural interest, frequently isolated from markets and with short information about energetic new technologies.
- Provide technical assistance on energetic sustainable technologies and ICTs to community associations that are decided to develop sustainable tourism ventures.
- Disseminate the performance of the best practices on sustainable energies for eco-tourism among the local stakeholders, local and regional authorities, and other touristic sector companies, through seminars.

Develop four trial projects in Bolivia, Ecuador and Peru.

Goals and indicators

Goal	Indicator	Quantity
		Done
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	3
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
	Done	Done
Salaried personnel	2	2400
Volunteer personnel	3	1440

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

During 2013 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)

Grant: 102,880 Euro ($132,818)

Duration: 2,5 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 of 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 2013 EHAS has launched the first phase of the project with a description of the scenario where TUCAN3G will be developed, and setting the specifications and limits from both technological and commercial point of view. This work has supported the other partners at the start of the investigation into the gradual introduction of mobile and data services in isolated rural areas of developing countries through the use of new wireless technologies for access networks (based on 3G femtocells, and their evolution to 4G), and WiLD (WiFi for long distances), WiMAX and VSAT transport networks. These technologies are key to the development of a cheap, efficient, sustainable and self-sufficient long-term solution that results in a profitable business model. The project also proposes the installation of a demonstrative platform in the Peruvian jungle to verify the solution and the business model and become a sample for agents interested in developing a project of this type.

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)

Grant: 85,400 Euro ($110,251)

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. The expected completion date is September 2014, once the pilot project is implemented in Peru.

During 2013 the project has investigate into new procedures that allows the diagnose of some forgotten diseases (malaria, tuberculosis, leprosy) and other very prevalent in these areas (Parasitisms,human papillomavirus) remotely, through the definition of very simple protocols for the preparation of samples and remote diagnose of the specialist using low cost tele-microscophy (aimed to obtain and validate a tele-microscophy system under 150 Euro). The activities performed are: design and clinical validation of new health protocols to prepare samples, adapted to the situation of the health rural points (not qualified personnel, sites without electricity, refrigeration nor centrifugation), and development and clinical validation of a low cost tele-microscophy portable system. In 2014 the project will be validated in a real scenario (Peru). The last point to note is that there will be special emphasis on disseminating research results, in line with the commitment of the EHAS Foundation in favour of knowledge and free software.

Title: ICTs for Change (Dissemination Program).

Funded by: Botin Foundation

Grant: 45.000 Euro ($58,095)

Duration: 2 years

Target area: Spain

Beneficiaries: Spanish organizations involved in social projects and environment protection.

Description:

The program *Talento Solidario* (Solidarity Talent) of Botin Foundation has given to EHAS the possibility to extend the support to the technologies for the service of persons to other social organizations, with the project "ICT for Change". With this project, EHAS will disseminate the experience with ICT for development with other NGO that want to improve their functions and impact thanks to the advantages offered by these technologies, establishing alliances to guarantee

the sustainability of the foundation.

During the first year of development of "ICT for Change" (2012) a strategic action plan was designed and a representative group was chosen out of the Spanish NGO beneficiaries. During 2013 the relations between entities were strengthened, which allowed the creation of common projects that integrate ICT and health that can become in future collaborations if funding is available.

Title: Corporative Communication Tasks (Dissemination).

During 2013 we have done 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 has been active, publishing periodically news about the Foundation, showing its mission, increasing its social base and promoting synergies with other organizations.

Title: Conferences (Dissemination).

In 2013 EHAS participated in the 8th edition of European Development Days, the main European forum about cooperation for development with participation of international organizations, enterprises, political and academic leaders, as well as the civil society. The forum took place on 26 and 27 April 2013 in Brussels and aimed the exchange of experiences and solutions in order to create debate and knowledge between professionals and activists.

EHAS participated with FairWorld and UPC within the theme "Science and Innovation for Development", one of the perspectives proposed in the forum to address challenges and opportunities available for cooperation. Through the workshop "Wireless networks in rural areas: Supporting communication and telemedicine services", EHAS showed its researches in the deployment of telecommunication networks to connect isolated areas, like the project "TUCAN3G" that is within the 7th Framework Programme of the European Commission and that is focused on wireless technologies for rural areas. Moreover, EHAS shared its practical experience bringing health to isolated areas through ICTs. The aim of the workshop was to highlight the crucial role of these tools to meet challenges such as the right to health even in the most remote areas.

Title: Training

During 2013 EHAS has done the following training activities:
• Talk about free software in cooperation projects (Master in Polytechnic University of Madrid).

Talk about ICT application on health cooperation projects in developing countries (Telecommunications of Polytechnic University of Madrid).

Goals and indicators

Goal	Indicator	Quantity
		Done
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	3

Human resources

Type	Number	Hours per year
	Done	Done
Salaried personnel	2	2250
Volunteer personnel	3	1000

ACTIVITY 3.- MANAGEMENT AND ADMINISTRATION OF THE FOUNDATION

During 2013 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 (before 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
		Done
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	6

Human resources

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