ICT-601102 STP TUCAN3G

Wireless technologies for isolated rural communities in developing countries based on cellular 3G femtocell deployments

3rd Quarterly Management Report

Reference Period ***(from 01.08.2013 to 31.10.2013)***

Project coordinator

Organisation name : *UPC*
Contact person : *Josep Vidal*
Address: *Campus Nord UPC, c/ Jordi Girona, 1-3, 08034 Barcelona*
Phone: *+34 934 016 457*
Fax: *+34 934 016 447*
E-mail: *josep.vidal@upc.edu*

Consortium composition

1 *UPC*
2 *URJC*
3 *PUCP*
4 *UCAU*
5 *FITEL*
6 *IPA*
7 *TdP*
8 *EHAS*
9 *TIWS*
10 *CREP*
11 *KINNO*

1 – Project status: Technical plan and corresponding achievements

WP1: Management

1A1: Administrative management

- UPC has participated in the ICT 2013 conference in Vilnius (6-8 Nov) with a presentation of TUCAN3G activities within the networking session on ICT for Societal Challenges (http://ec.europa.eu/digital-agenda/events/cf/ict2013/item-display.cfm?id=11544).
- EHAS and UPC organized a lab at the European Development Days in Brussels (27 Nov) on science and innovation for development (http://eudevdays.eu/topics/science-and-innovation-development, http://eudevdays.eu/topics/ict-4-social-change)

1A2: Technical management

- UPC launched technical coordination of activities in 4A3 and continued the coordination of 4A1.
- URJC reviewed and commented milestone M712, deliverables D51 and D41 on technical management perspective. Additionally, as a part of standard procedure of technical coordination, URJC accomplished monthly activity tracking through Redmine tool, milestone and deliverable tracking, risk analysis for this quarter.
- PUCP has participated in the administrative coordination and technical coordination of WP6.
- UCAU has coordinated activities in WP7.
- FITEL.
- EHAS has continued with WP2 coordination.

WP2: Requirements and specifications

2A1: Technical and socio-economic scenarios

- UPC.
- URJC.
- PUCP.
- FITEL.
- TdP. Continued in this task supporting EHAS in the definition of operational scenario models, supplying concrete data of Peruvian socio-economical evolution and main rural areas characteristics.
- EHAS has performed the description of scenarios of remote rural areas in developing countries for D21.

2A2: Requirements and specifications for transport and access networks

- UPC.
- URJC reviewed and commented the WP2 deliverables.
- EHAS has continued working with TdP to have a first insight of the expected traffic in the network.
- TIWS.

2A3: Parameters and scope of market research and business models

- UCAU.
- FITEL.
- TdP. Continued to contribute in this task providing the operator´s perspective of Peruvian rural jungle in this days and its possible evolution, describing socio-economical characteristics of business and private users based on existing studies and its own know-how.
- EHAS kept performing a review of similar experiences worldwide.
- CREP.

- KINNO.
- IPA.

2A4: Architecture for the demonstration platform

- PUCP.
- IPA facilitated a conference call with a potential new partner that might provide LIPA technology and responded to various requests for information by other partners on product capabilities
- TdP.
- EHAS.

WP3: Business case study

3A1: Market study

- UCAU. Final translation and localization of research questions.
- FITEL.
- TdP. Continued to contribute to the research questions and application of the research method to supply side stakeholders and business users.
- CREP contributed to the research questions for market study and business model. Conducting interviews in the company APROPESCA in the municipality of Silvia to different members of that organization. The second task to be performed at this time was the analysis of the interviews to build the report.
- IPA assisted TdP in the getting the questionnaire completed by supplier companies, and modified the supplier questions to be suitable for satellite service providers included in the responders. It also assisted with certain aspects of Spanish/English communication.
- KINNO. Coordination of research efforts in order to manage the collection and analysis of the results.
- EHAS has contributed to the review of research questions per target group. EHAS has also started the execution of the market research by contacting with Peruvian Operators and doing the interviews with those responsible of rural areas. Besides, EHAS has started the analysis of the results of these interviews to include them in the business model.

3A2: Product definition

- FITEL.
- TdP.
- EHAS.

3A3: Models for funding and return on investment

- UCAU.
- FITEL.
- TdP.
- EHAS.

3A4: Business model design and verification

- UCAU.
- FITEL.
- IPA worked with TdP on gathering the collection of the market study results for subsequent business model design, and completed its own supplier questionnaire for input
- TdP.

- EHAS.
- CREP.
- KINNO.

WP4: Access network optimization

4A1: Network dimensioning

- UPC has reviewed different traffic and energy consumption models described in the FP7-Earth project. In addition, UPC has collaborated with TdP with the objective of providing voice and traffic models patterns that describe how the traffic is changing over the day. UPC has completed the dimensioning of the 3G-based access network for the five villages considered in the platform in WP6. Also, recommendations for WP5 and WP6 have been issued. The main objective is to generate a set of accurate recommendations for the deployment of the access network. This activity has concluded with the delivery of document D41.
- TdP. Contribution to this task was in assessing coverage and service to the target areas based on TdP tools. These are compliant with those obtained independently by UPC.

4A2: Femtocell network optimization and monitoring

- UPC has been reviewing the literature to define the existing mechanisms and protocols that might be useful for performing a network monitoring. Initial research plans have been setup to support a possible cell range extension, possibly varying the fraction of power devoted to the pilot signal and switch on/off HNBs when needed.
- URJC has concluded the review of the literature. Discussions with the teams responsible for the activities closely related to this one were held. Different technical alternatives have been analyzed, but the design of the algorithms is still at a preliminary stage. Simulations have not been implemented yet.
- IPA has continued to develop its plans for M42. Some delays due to the holiday period.

4A3: Access and transport network interoperability

- UPC continued to work on the problem of power and code allocation for mixed users in a multicell environment. These techniques will also be used to derive procedures for admission and congestion control. A workplan has been defined till the end of the activity.
- URJC has analyzed different technical solutions for local traffic offloading. SITPO-based solutions have been discarded. Preliminary simulations have been carried out. The simulations account for voice and data traffic and the actual topology of the Tucan3G backhaul network. Simple probabilistic models have been used, while the values of the parameters have been set to those proposed in 4A1.
- IPA has provided some more details of external interfaces from the picocells and considered further the options for a LIPA/SIPTO architecture that might be included as a result of bringing in an additional partner, including a phone conference between that company and the coordinating partner.
- TdP. Has analized the proposed LIPA/SIPTO techniques in our core network and it´s not applied. TdP is also analyzing the possibility to use voice over 2G network and data over 3G network in the same locality with both services.

4A4: Beyong 3G-based access

- UPC.
- URJC.

WP5: Transport network optimization

5A1: Usage terms of WiFi, WiMAX and VSAT links

- URJC reviewed and completed the results on long-distance WiFi links during August and September. Results on WiMAX have been obtained and some experimental tests with WiFi and NV2 have been run both in

laboratory and in real links in Peru. This activity has concluded with the production of deliverable D51, closed and published in October 2013.

- PUCP has prepared technical report for WP6 and a non-technical report for WP3 members and has colaborated with URJC in order to measure real PtP links.
- UCAU has contributed with the Chapter 6 “Added functionality at the IP layer” of D51.
- TIWS has contributed with information from standardization bodies and scientific literature to help to foresee the performance, and with expected performance in satellite communications systems. Also, TIWS has contributed with the general review of the deliverable D51 and also completing the information about Satellite Services.

5A2: Heterogeneous transport network architecture for the backhaul

- URJC has advanced significantly on this activity in the production of the laboratory environment in URJC location. URJC continues to work on the installation of a satellite link and a couple of femtocells are left. For the theoretical part of the activity, the template and Table of Contents for milestone M52 has been generated and shared, and the detailed planning has been agreed with all the participants.
- PUCP has made coordination with UPC in order to define the type of femtocell for URJC laboratory.
- UCAU. A test bed was installed for evaluating end-to-end QoS support in a WiMAX+IP plus WiFi-EDCA+IP link configuration, scripts for traffic injection were developed, and evaluation tests were started.
- TIWS.

5A3: Transport network optimization

- URJC.
- PUCP.
- UCAU.
- TIWS.

WP6: Demonstration platform

6A1: Technical and operational design

- PUCP has completed the systematization of the activities about coordination with local actors (6A1.1) sensitization (6A1.2) and gathering information (6A1.3). Also, has made a first version of modifications to be made in target networks.
- FITEL.
- IPA.
- TdP.
- EHAS has submitted its contribution to D61, that includes a description and technical characterization of the services already deployed in the Napo network (that would share the backhaul with the femtocells).

6A2: Compatibility tests

- UPC.
- URJC's participation in this activity is subject to the access network planning included in D41. As this deliverable has been finished with some delay and finally shared on the third week of October, nothing has been done yet with the transport network planning. Our contribution to this activity is now foreseen for the next weeks.
- PUCP has continued a series of coordination with FITEL in relation to the concretion of the funding agreement and has started the elaboration of detailed list of equipment for demonstration platform.
- FITEL.

- IPA has continued to work on the necessary requirements for shipping, lead times and other logistical work relating to equipment purchase and deployment. Some of this work has been delayed because of uncertainties in precise requirements and corresponding purchase timing.
- TdP. Contributed in this task providing the compatibility test for operation, manage and configuration to connect IP Access RNC to TdP´s voice and data core network and the integration guide to install and integrate IP Access Equipment in TdP´s Node in Lima for the validation of the model designed by TUCAN 3G in a real scenario.
- TIWS. Study and definition of compatibility protocols transport network – VSAT (initiated but delayed).

6A3: Pilot network deployment

- PUCP.
- FITEL.
- IPA.
- TdP.
- EHAS.
- TIWS.

6A4: Interconnection to the operator's network

- PUCP.
- FITEL.
- IPA.
- TdP.
- EHAS.
- TIWS.

6A5: Validation

- PUCP.
- UCAU.
- FITEL.
- TdP.
- EHAS.
- TIWS.

WP7: Dissemination and knowledge utilisation

7A1: Dissemination

- UPC has disseminated TUCAN3G activities at the ICT 2013 conference in Vilnius. UPC participated to ITU Study Group-1 meetings in Geneva in Sept 2013.
- URJC contributed M712 with URJC project dissemination strategy. Additionally, URJC participated to ITU Study Group-2 Q10-3/2 ("Telecommunications/ICT for rural and remote areas") and Q25/2 ("Access technologies for broadband telecommunications including IMT for developing countries") meetings in Geneva in Sept 2013.
- PUCP.
- UCAU: Contributed to M712 "Dissemination and standardisation plan".
- FITEL.

- IPA discussed the existence of the TUCAN3G project with the Chair of the Small Cell Forum Rural Special Interest Group which has so far focused on deployments that are rural by European standards. There is now interest in expanding the scope of the group to consider more remote deployments such as conceived by TUCAN3G. We hope to be able to present to this group once the demonstration TUCAN3G network is deployed.
- TdP.
- EHAS.
- TIWS.
- CREP worked in dialogues structure and a characters definition to present by the mode of comics the project TUCAN 3G implementation. It is defined a banner and content of the project TUCAN 3G, for its template in the CREPIC's web site. It is defined informative contents of the project TUCAN 3G for its promotion on the web.
- KINNO.

7A2: Standardisation

- UPC redefined the standardization strategy and proposed a roadmap to contribute to ETSI-BRAN and discard 3GPP due to the lack of an opportunity window. The proposal was accepted at the plenary meeting held in Madrid.
- UCAU continued with actions for keeping track the activities of the IEEE 802.11 Working Group.
- IPA has had a preliminary discussion with the intended subcontractor of the standardization activities to discuss options.

7A3: Use of knowledge

- FITEL.
- IPA.
- TdP.
- TIWS.
- KiNNO.

2 – Unattained planning items and rationale

Item description	Action Items
Changes in schedule of deliverables	Deliverable D41 scheduled in M6 (Jul 2013) has been delayed to M10 Deliverable D31 scheduled in M8 (Aug 2013) has been delayed to M12 Deliverable D61 scheduled in M8 (Aug 2013) has been delayed to M12
Changes in schedule of milestones	Milestone M32 scheduled in M11 (Dec 2013) has been delayed to M14 Milestone M42 scheduled in M8 (Sep 2013) has been delayed to M12 Milestone M43 scheduled in M11 (Dec 2013) has been delayed to M13
Red flags	
Any other issues or problems that might affect achievement.	Delays in the delivery of funding by FITEL are putting off the purchase of equipment and hence activities in WP6

3 – Deliverables and milestones finished as planned

Deliverables and Milestones in the reporting period		
Document code and title	Originally planned	Actual delivery month
D51 Technical requirements and evaluation of WiLD, WIMAX and VSAT for backhauling rural femtocells networks	M8	M9
M712 Dissemination and standardisation plan	M6	M9

4 – Dissemination

4.1 Articles published, presentations at conferences, TV broadcasts, etc.

- **Submitted papers**
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- **Accepted papers**
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- **Presentations**
  - The project activities were presented at the ICT 2013 conference in Vilnius (6-8 Nov) within the networking session on ICT for Societal Challenges.

- **Press releases (use the links on text to access the documents)**

4.2 Web Sites

The project website (www.ict-tucan3g.eu) was setup in Dec 2012 and has been continuously updated since then. An RSS channel has been included.

4.3 Other relevant information: Patent applications, guidelines standards, Masters, PhDs….

- Master Thesis at UPC by Jaume del Olmo, defense in November 2013.

5 – Meetings Held

Meetings, Phone Conferences, Conferences or Workshops attended

Partner	Dates	Meeting place	N° of persons	WP/Task/expected results/details
UPC, TdP	Sep 2013	Conference Call	4	WP4, 4A1. Internal discussion on topics related with network planning.
UPC, IPA, URJC	Oct 2013	Conference Call	6	WP4, 4A2 & 4A3. Internal discussion to define a set of concrete tasks to be developed within activities 4A2 and 4A3
URJC, PUCP, UNICA, TIWS	26 September 2013	Distrito Telefónica (Madrid)	6	WP5 – General review of the deliverable D51

6 – Resources Employed/Expenditures

Reference Period: "1 Aug 2013" to "31 Oct 2013"

Effort for the reference period per WP and per Participant (Person-Months): planned vs. actual spent

	WP1		WP2		WP3		WP4		WP5		WP6		WP7		Total per participant		Total Cumulative from start of the project		Justification (if needed)
Participant	plan	spent	plan	spent	plan	spent	plan	spent	plan	spent	plan	spent	plan	spent	plan	spent	plan	spent	
1 – UPC	0,84	0,84					2,58	2,58			0,00	0,00	0,45	0,45	3,87	3,87	10,07	10,50	
2 – URJC	1,30	1,83	0,00	0,00	0,00	0,00	1,59	1,70	2,88	3,55	0,63	1,00	0,15	0,48	6,55	8,55	14,11	16,11	Activities in WP6 are slighty delayed
3 – PUCP	0,09	0,09							1,00	0,90	5,38	1,80	0,15	0,15	6,62	2,94	15,07	9,89	
4 – UCAU	0,10	0,10			0,10	0,10			0,38	0,38			0,42	0,42	1,00	1,00	2,86	2,86	
5 – FITEL															0,00	0,00	2,50	1,90	
6 – IPA					0,25	0,25	0,25	0,15			0,25	0,13			0,75	0,53	3,11	2,52	
7 – TdP					0,70	0,60	0,27	0,27	0,00	0,00	0,50	0,50	0,05	0,05	1,52	1,42	5,18	5,08	
8 – EHAS					1,00	0,50					0,25	0,50			1,25	1,00	11,25	8,00	Activities in WP3 and WP6 are slighty delayed
9 – TIWS									0,50	0,50	0,25	0,05			0,75	0,55	2,00	1,80	
10 – CREP					0,90	0,90							0,15	0,15	1,05	1,05	1,96	1,96	
11 – KINNO						1,00									0,00	1,00	1,70	3,20	
Total per WP	2,33	2,86	0,00	0,00	2,95	3,35	4,69	4,70	4,76	5,33	7,26	3,98	1,37	1,70	23,35	21,91	Grand total for the ref. period		
Total Cumulative from start of the project	7,31	7,59	16,52	14,80	5,95	5,75	11,80	11,99	11,32	11,39	12,25	7,33	4,66	4,99	69,81	63,82	Grand total from start		

Expenditures for the reference period per Participant (k€, EURO*1000): planned vs. actual spent

	Durable equipment		Subcontracting		Travel and subsistence		Consumables		Protection of knowledge		Other Specific Costs		Total per participant		Total Cumulative from start of the project		Justification (if needed)
Participant	plan	spent	plan	spent	plan	spent	plan	spent	plan	spent	plan	spent	plan	spent	plan	spent	
1 – UPC					1,80	1,80							1,80	1,80	10,53	10,53	
2 – URJC					0,50	0,45							0,50	0,45	2,26	2,21	
3 – PUCP													0,00	0,00	16,75	16,75	
4 – UCAU													0,00	0,00	3,80	4,97	
5 – FITEL													0,00	0,00	0,00	0,00	
6 – IPA													0,00	0,00	0,00	0,00	
7 – TdP													0,00	0,00	0,00	0,00	
8 – EHAS													0,00	0,00	3,80	2,64	
9 – TIWS													0,00	0,00	0,00	0,00	
10 – CREP													0,00	0,00	6,26	6,26	
11 – KINNO													0,00	0,00	0,80	6,16	
Total per cost item	0,00	0,00	0,00	0,00	2,30	2,25	0,00	0,00	0,00	0,00	0,00	0,00	2,30	2,25	Grand total for the ref. period		
Total Cumulative from start of the project	8,9	8,7	0,0	0,0	30,7	36,1	4,6	4,6	0,0	0,0	0,0	0,0	44,2	49,5	Grand total from start		

7 – Changes in personnel

Personnel leaving the project		
Name	Partner	WPs involved

Personnel joining the project			
Name	Partner	WPs involved	Expected participation (in months)
David Brock	IPA	WP4, WP6	
Robert Dulson	IPA	WP3, WP6	

David Brock is Director of Product Marketing, and joined ip.access in 2003 as Product Manager. Since then he has had deep technical involvement with ip.access' whole range of 2G and 3G products. David's current focus is on nano3G solution design, educating customers in the capabilities of the nano3G product range and facilitating their deployment design. David has a 1st class M.Eng in Electrical & Electronic Engineering from Loughborough University of Technology.

Robert Dulson is QA Manager at IP.access. He has responsibility for managing quality standards, including IP.Access ISO9001 quality registration and has particular responsibility for matters considering Export Controls, Export licences,and duties/imports. He is a Lead Assessor for ISO9001 compliance and a Chartered Engineer.