

## UMOBILE QUARTERLY REPORT

**Action full title:** *Universal, mobile-centric and opportunistic communications architecture*

**Action acronym:** *UMOBILE*

**Grant Agreement number:** *645124*

**Period covered:** *M10 – M12 (November 2015-January 2016)*

### **A) UMOBILE achievements of the last reporting period:**

WP1:

- UMOBILE 3<sup>rd</sup> internal management report was prepared and submitted to the Project Officer.
- 2<sup>nd</sup> physical meeting preparation and conduction on 09-10/12/15 – agenda and minutes are available.
- 28/01/16 Technical teleconference & Project Coordination Committee meeting - agenda and minutes preparation.
- Contact with the Project Officer regarding DUTH internal overhead issues. The consortium was also informed about this matter at the teleconference in January.
- Contact with the Project Officer in order to ask permission to submit D4.1 on Month 18.
- Guidelines to the consortium for review, equipment purchase, person month deviations etc.
- UMOBILE team update.
- Mailing lists maintenance.

WP2:

- Work on tasks T2.2 and T2.3 and preparation of deliverable D2.2:
  - Discussion on the high level design of the architecture.
  - Identification of related work and definition of UMOBILE networking requirements, paying special attention to the networking services UMOBILE should support.
  - Research on the various components that will be combined to form UMOBILE architecture in order to support the applicability scenarios that have been selected by the consortium.
  - Discussion on the implications of UAV use and interface.
  - Specification of the PerSense mobile application in the context of UMOBILE; validation of some initial aspects of this tool (scientific paper under submission); traces to be provided between M13-M15.
  - Analysis of potential deployability issues (interconnection towards NDN).

WP3:

- Preparation and submission of D3.3 “UMOBILE ICN layer abstraction initial specification”.

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- Preparation of presentation slides for the UMOBILE meeting in London in December 2015.
- Research on Tasks 3.1, 3.2 and 3.3:
  - In-depth study of existing DTN implementations.
  - Definition of the various ways to incorporate DTN characteristics in the UMOBILE architecture based on the consensus reached during UMOBILE meeting in London.
  - Initial work on the PUSH API for NDN.
  - Study and initial survey on computational power and memory of available on commercial WiFi access points; study on Wi-Fi and Wi-Fi direct support based on the same AP.
  - Initial study on “docker” software component, in the UMOBILE usage perspective.
  - Preparation and submission of a joint research paper between DUTH and UCL to the IEEE Communications Magazine on data naming (submitted to IEEE Communications Magazine).
  - Preparation and submission of a research paper from UCL to the IEEE Communications Magazine on an Information-Centric Connectivity solution.
  - Study of data forwarding methods in ICN and definition of the data forwarding strategies that will be supported by UMOBILE architecture.
  - Proposal for the integration of social aspects in the UMOBILE architecture - sociability software module.
  - Work on routing in UMOBILE.
  - Preparation of an Internet draft (ICNRG) describing SCORP routing protocol.
  - Development of the Oi! Application (short-messaging app) based on dLife, to exchange information opportunistically, in large-scale scenarios.
  - Beginning of the development of the News@ application (local news app) based on SCORP, to disseminate local news opportunistically.

#### WP4:

- D4.1 has been moved to month 18.
- Research on Tasks 4.1, 4.2, 4.3:
  - Study of related work on QoS and flow control.
  - Work on an NFV service-chaining framework, acronymed DRENCH.
  - In-Network Resource Pooling Principle (INRRP) has been implemented.
  - Continuation of the work started in the prior period for data collection and inference of affinity networks based on digital networking footprint.
  - Scientific paper “A Characterization Study of Human Wireless Footprints based on non-intrusive Pervasive Sensing”, submitted in December 2015 to Elsevier Pervasive and Mobile Computing, special issue on Social Mobile Networks.
  - Traces collected for the period of 1 month, in Lisbon, 7 users / traces to be available via CRAWDAD on the next reporting period.
  - Definition of a light application to assist in collecting traces concerning roaming patterns and affinity networks to be used in the context of the

project with the purpose of providing a better understanding of human-centric mobility.

- Discussion on the integration of contextual data in the different planes (content, context, routing) of the UMOBILE system.

WP5: - (not started yet)

WP6:

- D6.6 “Standardisation plan” has been prepared and submitted to the EC.
- Educational material preparation.
- Participation and presentation of a research paper to ICSNC 2015 (The Tenth International Conference on Systems and Networks Communications).
- Presentation of a research paper at CCNC.
- Participation in the ACM DEV conference.
- Participation in the IRTF GAIA meeting.
- UCL has participated in the Interim meeting of the 23rd ICNRG in Paris, France, last January. Dr Vassilis Sourlas participated in the meeting and presented the work related with the UMOBILE project about Information-Centric Connectivity.
- COPELABS submitted the following four papers:
  - Waldir Moreira, Rute Sofia, Paulo Mendes, Luis Lopes "Oi!: An Opportunistic Data Transmission Tool Based on Social-Aware Routing", IEEE Communications Magazine, Feature Topic ON Wireless Technologies for Development.
  - Rute Sofia, Paulo Mendes "Characterization of Human Wireless Footprints based on non-intrusive Pervasive Sensing", Elsevier Pervasive and Mobile Computing, Special Issue on Pervasive Social Computing.
  - Rute Sofia, Saeik Firdose , Luis Lopes , Waldir Moreira , Pallavali Reddy, Paulo Mendes, "USense: A People-centric, non-intrusive Opportunistic Sensing Tool for Contextualizing Social Interaction", Elsevier -Pervasive and Mobile Computing, Special Issue on Pervasive Social Computing
  - Luis Lopes, Rute Sofia, Paulo Mendes, Waldir Moreira, "Oi! - Opportunistic Data Transmission based on Wi-Fi Direct", IEEE INFOCOM 2016 (demo paper)
  - Luis Lopes, Saeik Firdose, Rute Sofia, Paulo Mendes, "USense: A People-Centric Opportunistic Sensing Tool", IEEE INFOCOM 2016 (demo paper)
- Continuous dissemination of the project via webinars and the partners' websites and via social networks.
- The project's Facebook account and the UMOBILE website have been updated with news of interest.

## **B) UMOBILE actions planned for the next 3 months:**

WP1:

- Organisation of regular teleconferences on February, March and April.
- Arrangement of the 3<sup>d</sup> physical meeting (coordination & participation).

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- Consortium coordination.
- Maintenance of the project's mailing list.
- Setup of an SVN for the project documents.

#### WP2:

- Preparation and submission of the Deliverable D2.2.
- Initial work on D2.3 to highlight the system and network deployability design issues.
- Preparation of a new version of the D2.4 concerning the results of task 2.3.
- Continue gathering data for the system deployability design.
- Work on the demonstration plans.
- Collection of traces in different locations worldwide, with the purpose of characterizing affinity networks and human mobility (based on Wi-Fi direct and Bluetooth).

#### WP3:

- Work on the incorporation of DTN characteristics in the UMOBILE architecture.
- Detailed definition of UMOBILE architecture.
- Preparation of D3.1.
- Focus on the push implementation in NDN.
- Implementation of the keyword-based mobile application sharing solution (KEBAB-COM/NET).
- Technical design and implementation of UMOBILE architecture aspects, such as the UMOBILE naming scheme and the data packet format, and the metadata definition.
- Research and study on the access point implementation.
- Analysis of work on Task3.1, related to the usage of the DTN and ICN architectures on the UMOBILE abstraction layer.
- Work on Task 3.3 related to the specification of the first version of the UMOBILE smart routing proposal.
- Continuation of the development of the Oi! And News@ applications aiming to support short messages and dissemination of local news in an opportunistic networking scenario.
- Collaborative implementation, in order to develop a mid-term version of the required forwarding engine for the services and topologies envisaged within UMOBILE.
- Work on the UAV integration.
- Development of a light API capable of tracking affinity networks and correlating such networks with a social routine behavior (integration of user context and usage context).
- Networking definition and integration of the social routine module (UMOBILE context plane).

#### WP4:

- Work on QoS and flow control.

- Design of service placement algorithms.
- Evaluation of INRPP, based on the detailed implementation and collection of results for the related deliverables.
- Initial results on the NFV Service Chaining framework, DRENCH.
- Work on Task 4.3, focused on name-based replication priorities.
- Validation of some aspects of context derived from the PerSense tool; adjust it as required by UMOBILE.

WP5: -

WP6:

- Project results dissemination. Several talks are already planned for the coming period including a presentation at the Berlin IETF in July 2016.
- Work on D6.4.
- Potential submission of an Internet draft about SCORP to ICNRG.
- Potential submission of five scientific papers to international conferences and journals by COPELABS.
- Dissemination of UMOBILE on COPELABS Scientific Advisory Board meeting (planned to middle March, Lisbon).
- Submission of a scientific paper concerning trust circles and affinity networks by SENCEPTION.
- Potential contributions to Internet drafts: GAIA, ANIMA.
- Dissemination of the project via the website and social networks.
- Dissemination of the project via the national Italian journal “La Protezione Civile Italiana”.

**C) Problem/risk arose during this period, or any risk foreseen on the future and decisions taken to handle them:**

DUTH team faces currently and temporarily internal administrative issues, regarding the lack of supportive funding for the Laboratory which runs the project due to high overhead withheld, and extraordinary procedure for granting travel permissions. The decision of the Research Committee which is responsible for the matter is favorable for the Lab – however, this decision has not yet been implemented. Ministry will also be involved immediately in order to resolve the travel permission issue. In particular, the current instruction to grant travel permission requires whole faculty physical meetings to decide for the matter – practically this cannot be easily implemented. The consortium was informed on this potential risk and decided to await for the decision of the University since all indications are positive. Otherwise, an amendment request will follow. The project officer was also informed.

**D) Resources used during the period in a project level:**

(Double-click on the following table to edit cells in Excel)

WP	No of pms	Personnel Cost	Travel	Equipment	Other	Subcontracting	Subtotal	Indirect costs	Total costs
1	1,53	5913,54	2592,4	0	0	0			
2	7,61	32090,71	0	0	0	0			
3	17,62	56755,77	1372,78	0	0	0			
4	3,22	17527,03	0	0	0	0			
5	0	0	0	0	0	0			
6	3,01	11239,85	3276,42	0	0	0			
	<b>32,99</b>	<b>123526,9</b>	<b>7241,6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>130768,5</b>	<b>32692,13</b>	<b>163460,6</b>

**E) Short description for other direct costs:**

Travel costs for the 2<sup>nd</sup> consortium physical meeting.

DUTH Participation to ICSNC 2015.

UCAM travel costs for ACM DEV, ACM AINTEC and CCNC workshop.

**F) Deviation from Annex 2 and/or paragraph 2.3.5 including subcontracting:**

Minor deviations in project months (1-2 personmonths).

**G) Evaluation of the implementation of the project workplan: Gantt chart control, milestones and indicators:**

The Project is implemented according to the plan. Specifically:

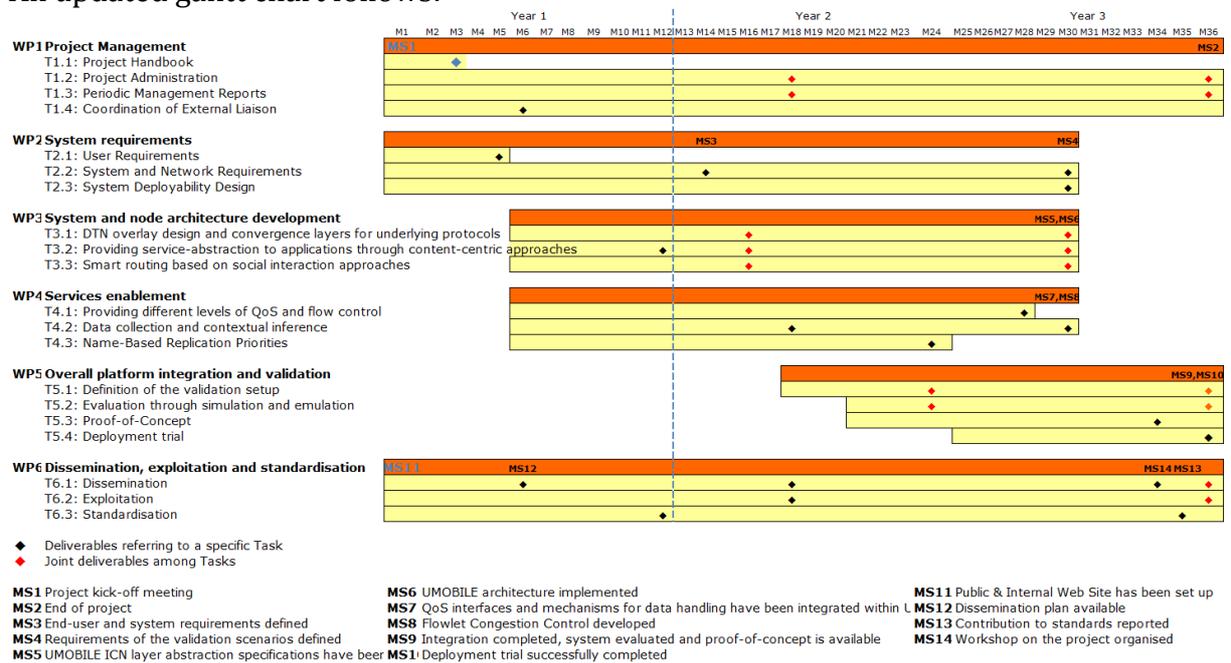
**Period Milestones:** MS1, MS11 and MS12 are accomplished according to the plan. MS3 is expected on Month 14 according to the plan.

**Period Deliverables:** All deliverables are submitted according to the grant agreement timetable. D4.1 will be submitted on M18 (UMOBILE Coordinator asked permission on the behalf of the consortium to submit "D4.1 Flowlet Congestion -Initial Report" on month 18, as described in page 22 of the grant agreement instead of Month 12 included in the deliverables tables. The change has been accepted).

The table below summarizes the UMOBILE activities for the period November 2015-January 2016:

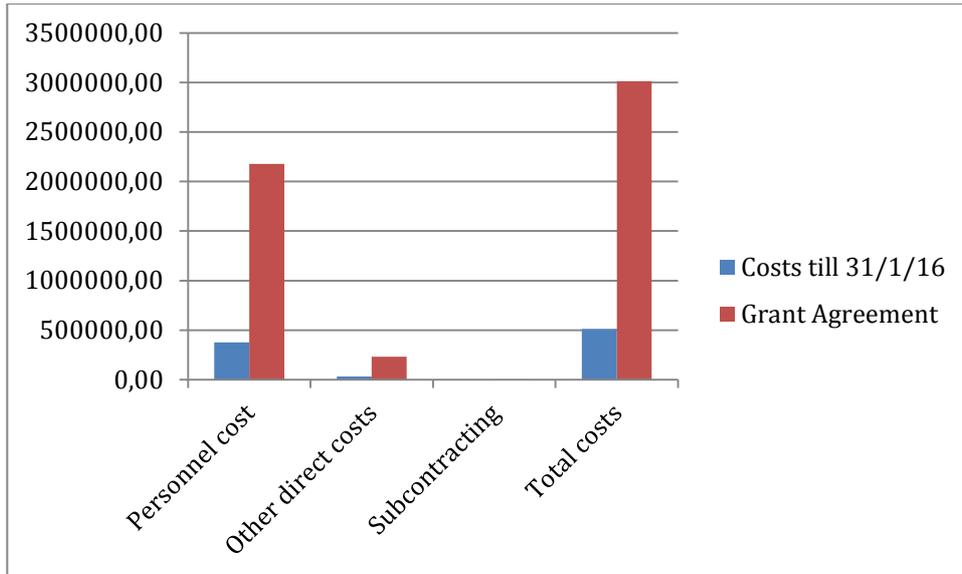
M..	Project Month	Meeting	Deliverable	Milestone	Report	Additional events
M10	November 2015	-	-	-	3monthly report for: M7 to M9	ICSNC 2015, IRTF GAIA meeting
M11	December 2015	UMOBILE architecture meeting: 09-10/12/15	-	-	-	ACM DEV 2015
M12	January 2016	Teleconference: 28/01/16	D3.3 D6.6	-	-	CCNC 2016, IRTF ICNRG meeting

An updated gantt chart follows:

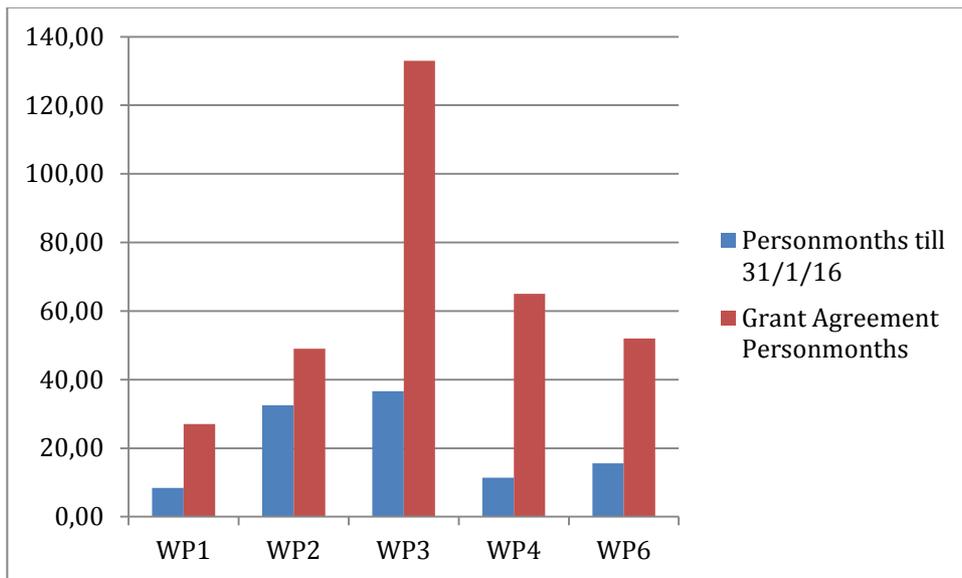


17.04% of total budget has been consumed for the activities described above (17.34% of the personnel costs, 14.25% of the other direct costs, 17.04% of the indirect costs), as presented in the following graph:

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23.07% of the personmonths have been consumed for the activities described above:



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**This report was written by DUTH on the behalf of the UMOBILE consortium**