Periodic Report

1 October 2015 – 30 September 2016

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Contents

Summary

The following document provides a summary of the work carried out during the last twelve months of the project. It describes the final work on the technical development which was completed within the project at M45. During this period the phase 2 evaluation was completed, in M47, and is fully described in the evaluation deliverables. As well as this deliverable highlighting the successful outcomes within the project's lifetime, much of the technical work has led to outcomes which are being pursued beyond the lifetime of the project. Including the sensors developed by the SMEs and software developed by the academic partners. For example, the USFD activity monitoring (used in the MoreMove project: https://www.movemoresheffield.com/) and the social media information extraction technology (being commercially exploited in the FootballWhispers project: http://www.footballwhispers.com/). In addition, much of the WP5 (Architecture) and WP6 (Governance) outcomes are being directly transferred to further EU Citizen Observatory related projects, e.g. SETA (http://setamobility.eu/) and Ground Truth 2.0 (http://www.gt20.eu/).

Specifically the document describes:

i. the major achievements in scientific terms;
ii. deliverables and milestones;
iii. the work carried out by the different work packages; and
iv. actions for dissemination and exploitation. Including the publication of 7 journal articles and some 25 conference and workshop papers, during this period.

Milestones

The following milestones were completed during this 12 month period:

MS4 End of R&D of Technology development was reached on schedule

MS5 End of Evaluation Phase 2 evaluation was reached on schedule

Deliverables

The following deliverables were completed during this 12 month period.

No.	Deliverable name	Nature	Type	Delivery Month
1.31	Validation of technical sensor functionality	Report	CO	45
1.32	Evaluation of Information Extraction from social streams	Report	PU	45
2.22	Mathematical and algorithmic framework for dynamic network optimisation	Prototype	PU	45
3.13	Modelling procedures incorporating heterogeneous data	Prototype	CO	45
3.20	Models and ABM framework for development and calibration of social models	Prototype	PU	45

3.30	Integrated social and physical models	Prototype	PU	45
4.32	Methodologies and technologies for decision-support	Prototype	PU	45
4.40	Citizens Participation Support and feedback mechanisms	Prototype	CO	45
4.50	Conceptual Integration with GMES and GEOSS	Report	PU	45
5.32	WeSenseIt Platform (final)	Prototype	PU	45
6.24	Opportunities and barrier analysis	Report	PU	45
6.30	Social innovation & impact of citizen observatory-based knowledge exchange & participation	Report	PU	45
7.20	Doncaster Case Study Evaluation	Report	PU	47
7.30	Netherlands Case Study Evaluation	Report	PU	47
7.40	Alto Adriatico Case Study Evaluation	Report	PU	47
8.12	Dissemination report	Report	PU	48
8.22	Exploitation report	Report	PU	48
8.32	Showcasing report	Report	PU	48

Work Progress and Achievements

Work package 1: Social and Physical Sensors

T1.1 Data capture from physical sensors (M1-M45)

- Finalization of technical developments, sensors and algorithms.
- Preparation for technical and use case evaluation of sensing equipment.

T1.1.1 Sensor technology requirement analysis (M1-M6)

This task has been completed.

T1.1.2 Physical and remote sensing technologies (M3-M45)

Major achievements for the period

All of the WP1 partners contributed to the write-up of the technical work done in the M45 deliverable, D1.31, Validation of technical sensor functionality. Below we highlight the technical development of each of the WP1 partners.

DSD tackled two of the three necessary innovations in the new design Disdro 2.0.

1) The acoustic sensor is now a stand-alone product that is easily to be connected to the other parts of the rain gauge. Research led to the right dimensions and material.
2) The electronics of Disdro 1.0 required 4W at peak demand. Research led to a demand on average of 4mW. This allows the Disdro 2.0 to operate with very low power and very small solar panels.
3) The Internet connectivity has not yet been solved completely. The most promising way forward is LoRa, which is relatively cheap and can run on a few mW. The disadvantage is that it is still an experimental communication mode. To be able to sell our Disdro 2.0 as soon as possible we will use the Spark Electron, a relatively expensive and rather energy consuming GPRS solution and basically annihilating the gains made through improved electronics.

EPFL: have undertaken the following tasks in relation to T1.1.2

a) Field testing of the sensible heat flux (SHF) sensors including comparison to reference devices has been concluded followed by analysis of the obtained data from the various field sites. Preliminary results from this analysis have been presented at the American Geophysical Union (AGU) Fall Meeting in San Francisco in December 2015
b) For the final evaluation phase a new set of 24 rain gauges was installed and integrated, in the AAWA case study, mainly located at schools for involvement of young citizens
c) Most effort went into the continued development of the algorithm of the optical flow for the measurement of surface water velocity in streams. New ideas and perspectives for improvement of the present state of the technology lead to an revival of this development with the objective of reaching the state of a usable App on smartphones. Novelties here are the calculation of results in real time (not server based) and interactive user control.

Starlab's work continued to focus on improving our soil moisture sensors and remote sensing capabilities in the fields of agriculture and water management. In the past 6 months we have finalized all processes for soil moisture estimation and cross analysis between soil moisture probes and satellite imagery. We also integrated satellite imagery information in the WeSenseIt Italian use case platform in collaboration with Quinary. Soil moisture imagery are currently accessible through the Italian platform.

SSS have contributed

a) **“Smartflow water-velocity meter”:** Testing in the Sorge river in Switzerland and in the laboratory was completed and prototypes delivered and installed into the field trials in Vicenza (2 cameras) and Doncaster (1 camera).

b) **“Support to integrate the sensible heat flux sensor”:** Logger systems with test interfaces and accessory equipment delivered to the EPFL for trial.

c) **“Support to case studies”:** New water level sensors delivered for the 2 sites in Vincenza and 1 site in Doncaster and installed. 1 replacement rain gauge installed in Doncaster. Anemometer delivered to Doncaster to be used in a school.

For USFD the main focus has been

a) **Activity Monitoring**

Future development of the (iOS & Android) Mobile Apps to limit resource use and overcome various issues concerning failure to accurately record activities. Improve data server architecture to cope with high data volumes.

b) **Video Communication**

Improve strategies to detail with communication drops (reconnection is more robust) and reduction in signal (reduction in video quality).

This task has been completed.

T1.2 Data capture from social sensors (M1-M45)

The main goal is to provide the ability to make social media (textual) data available to the hybrid networks developed in WP2; in the second phase of the project this involves event recognition using information extraction from text.

T1.2.1 Large-scale flexible collection of data streams (M1-M9)

This task has been completed.

T1.2.2 Large-scale statistical text processing (M7-M18)

This task has been completed.

T1.2.3 Information extraction from social media (M13-M45)

Major achievements for the period

The work has involved three areas:

(a) Improvement to the candidate entity identification be developing high performance parallel DFA algorithm and fuzzy string matching. Both these OpenSource algorithms are available on a public repository (https://github.com/neilireson/multiregexp and https://github.com/neilireson/aho-corasick).

(b) Improvements to geolocation approach by developing a data driven approach to determining term ambiguity

(c) Application of the Information Extraction methodology, techniques and framework to the extraction of entities in a (sports) domain that provides a useful evaluation domain and proof of generic applicability of the WSI approach.

T1.3 Evaluation and testing of physical and social sensors (M13-M45)

T1.3.1 Validation of technical sensor functionality (M13-M45)

Project objectives for the period

Being part of the evaluation of the WeSenseIt citizen observatory this task aims at a continuous monitoring of the installed technical infrastructure and the proper functioning of sensor systems and data transmission protocols. Survey of acquired data should detect any possible technical problems, resolve them, and enable constant improvement of functionality.

Major achievements for the period

DSD tested several prototypes of the Disdro 2.0. Data are promising but calibration was still be an issue and required work during the evaluation.

For EPFL we have:

a. The measurement campaigns of the sensible heat flux (SHF) sensors at various sites have served as a period of technical sensor validation. Results from the data analysis were used to characterize the performance and reliability of the new sensor. Additional evaluation of the SHF sensors came from sensor deployments carried out by students in the context of a course. Students were given SHF sensors connected to an Arduino logger to simulate usage of the sensors by citizens or amateur scientists.
b. Version 2.0 of the stream flow algorithm (a prototype of an Android App) has been tested in the field against standard instrumentation. Results look promising and the App is close to an operational state
c. Preparation of publishable results is currently ongoing and may still take some time before completion.

SSS **"Smartflow water-velocity meter":** All 3 sites found to be lacking in solar power (cameras were drawing more power than specified). All sites were revisited and extra solar panels were installed.

STAR have worked on the validation of both soil moisture retrieval methods. We analyzed the surface of averaging of the soil moisture to obtain the most correlated estimations between both methods. And then we analyse the results of both methods in three fields of experiment where both probes and satellite imagery are estimating soil moisture. Results are good and provide robust methods to estimate soil moisture in fields for multiple applications such as agriculture, flood prevention monitoring.

USFD have carried out evaluations of the activity monitoring, reported in the deliverable, and been involved an increasing amount of users in the Sheffield area, who are engaged in the MoveMore initiative. This activity is continuing beyond the end of the project, both with extension to MoveMore and other project with Public Health England. The Video Communication system has been evaluated in the a domain (physiotherapy) as a proxy for Emergency Response, as it offers a number of parallels in terms of usage requirements, without and issues of endangerment. Funds are being sort by USFD to further exploit this technology in the health care and (visual) disability fields.

T1.3.2 Evaluation of Information Extraction from social streams (M13-M45)

Project objectives for the period

The initial aim is to evaluate the collection, processing and investigation of real-world events in real-time, via the use of high-volume social media streams. In addition, to determine the ability to extract hydrological information from social media, which can be correlated with physical sensor observations.

Major achievements for the period

The laboratory evaluation has involved a large-scale evaluation of the improvements to the geolocation approach. Also a real-world evaluation of the WSI Information Extraction technology is being performed via the Football Whispers initiative (http://www.footballwhispers.com/), which is using our technology to extract real-time information from a high volume social media stream. These evaluations are fully described in the deliverable. D1.32 Evaluation of Information Extraction from social streams.

Issues and deviations with respect to the above mentioned tasks:

There have been no issues or deviations during the period for WP1.

Deliverables and milestones

D1.31 Validation of technical sensor functionality was submitted at M45.

D1.32 Evaluation of Information Extraction from social streams was submitted at M45.

MS4 End of R&D of Technology development was reached on schedule

MS5 End of Evaluation Phase 2 evaluation was reached on schedule

Work package 2: Integrated Social and Physical Sensor Networks

T2.1 Semantic framework for sensor integration

T2.1.1 Semantic Framework for heterogeneous sensor networks (M1-M9)

This task has been completed.

T2.1.2 Data and information normalisation in heterogeneous networks (M9-M21)

This task has been completed.

T2.1.3 Data and information integration in heterogeneous networks (M22-M45)

Major achievements for the period

Results were presented at several conferences in the area. The reference to those publications are:

- Alfonso, L., Chacon-Hurtado, J., Solomatine, D. P. (2016) Optimal design of hydrometric monitoring networks with dynamic components based on Information Theory", EGU 2016 conference, Geophysical Research Abstract, Vienna, Austria
- Alfonso, L., Chacon-Hurtado, J., (2016) "Experiences of citizen-based reporting of rainfall events using lab-generated videos", EGU 2016 conference, Geophysical Research Abstract, Vienna, Austria.
- Chacon-Hurtado, J., Mazzoleni, M., Alfonso, L., Solomatine, D. P. (2016) "Comparison between passive and active social sensors of precipitation for flood forecasting", COWM2016 - International Conference on Citizen Observatories for Water Management, Venice.
- Chacon-Hurtado, J., Mazzoleni, M., Alfonso, L., Solomatine, D. P. (2016) "Scheduling of dynamic hydrometric sensors for operational streamflow forecasting", Hydroinformatics Conference 2016, Incheon, Korea.

Additionally, two journal articles are being prepared.

- Chacon-Hurtado, J., Alfonso, L., Solomatine, D. P., (2016) Non-stationary Kriging type interpolation for dynamic sensor network design. In preparation.
- Chacon-Hurtado, J., Alfonso, L., Solomatine, D. P., (2016) Optimal design of precipitation sensor networks with dynamic sensors. In preparation.

T2.2 Dynamic multi-objective optimisation for dynamic heterogeneous networks

T2.2.1 Algorithms for efficient multi-objective model-based optimization (M1-M36)

This task has been completed.

T2.2.2 Mathematical and algorithmic framework for dynamic network optimisation (M18-M45)

Project objectives for the period

- To develop mathematical formulations and algorithms for a number of specific optimal network design problems
- To identify the optimal sensor locations, variables to measure, time coverage, and reliability range in real-time that would provide the best possible information content for a given water-related societal issue at hand (e.g., flood or water quality forecast)

To accomplish these objectives, different multi-objective optimisation problems are addressed, in which variables to be measured are identified, the MOO problem for dynamic sensors scheduling are posed, and the development of computational tools for network optimisation is carried out, based on the results of T2.2.1.

Major achievements for the period

In the context of the WeSenseIt project, the best spatial and temporal data sources need to be identified to allow dynamic sensors (those carried along by citizens) to complement the information coming from fixed (traditional) sensors. In this task, the mathematical formulations and the algorithms for designing heterogeneous dynamic monitoring networks are developed, applied and evaluated.

Using the algorithmic basis for optimisation developed in Task 2.2.1, we concentrate here on developing mathematical formulations and algorithms for some specific optimal network design problems. The most general one is as follows: to identify the optimal sensor locations, variables to measure, time coverage, and reliability range in real-time that would provide the best possible information content for a given water-related societal issue at hand (e.g., flood or water quality forecast). This problem is formulated and solved in a multi-objective context: one set of objectives relates to the maximisation of benefit (value) that the added data brings to solving the water-related societal issue at hand (e.g. reduce flood damage), and the other set of objectives - to minimisation of resources needed to perform this task (e.g. time, monetary costs, number of sensors, etc.).

Finally, we propose a general framework and software for network optimisation. The theory and algorithms were initially developed for the case study of the Brue catchment, due to the availability of data, and then applied in the official WeSenseIt case studies (WP7). These algorithms are ready to be used for predictive models of WP3 would be fed with information of higher value and content.

Issues and deviations with respect to the above mentioned tasks:

There have been no issues or deviations during the period for WP2.

Deliverables and milestones

D2.22 Mathematical and algorithmic framework for dynamic network optimisation was submitted at M45.

MS4 End of R&D of Technology development was reached on schedule

MS5 End of Evaluation Phase 2 evaluation was reached on schedule

Work package 3: Adaptive risk-based models for social and natural processes

T3.1 Optimal integration of heterogeneous uncertain data into models

Due to the complementary nature of tasks T3.1.1 and T3.1.3 (e.g., varying life-span and space-time coverage data is uncertain and both must be incorporated into models), both have progressed in parallel, so the progress of both tasks is presented here together.

T3.1.1 Uncertainty-aware modelling of natural processes (M1-M21)

This task has been completed.

T3.1.2 Improving current 2D modelling technologies (M19-M32)

This task has been completed.

T3.1.3 Integration of data with varying life-span and space-time coverage into models (M1-M45)

Project objectives for the period

The objective of the task in this stage of the project is to implement and test the innovative and reliable WSI methodology proposed to assimilate citizen-based streamflow observations coming at irregular time steps, common situation in case of citizen-based observations, in an integrated hydrological-hydraulic modelling framework

In particular, in the last 6 months the activities of this task have been focused on summarize and disseminate all the achieved results in journal papers, conference proceedings, Project Deliverables and PhD Thesis of Maurizio Mazzoleni. Such previous activities are:

- Assimilation of data from static physical sensors in hydrological models
- Assimilation of data from static social sensors in hydrological models
- Assimilation of data from heterogeneous static physical and social sensors in hydrological models
- Assimilation of data from static physical sensors in hydraulic models
- Assimilation of data from static social sensors in hydraulic models
- Assimilation of data from dynamic social sensors in hydraulic models
- Effect of citizen engagement in the assimilation of data from heterogeneous dynamic social and static physical and social sensors in hydraulic models

Major achievements for the period

- Submission of PhD Thesis draft (PhD defence fixed for November 28, 2016)

  Mazzoleni M. Improving flood prediction assimilating uncertain crowdsourced data into hydrologic and hydraulic models
- Submission of five journal papers
- Submission of the following conference articles
- Submission of 1 conference poster

T3.1.2 Improving current 2D modelling technologies (M19-M32)

This task has been completed.

T3.2 Modelling perception, engagement and behaviour of citizens

T3.2.1 Development of the ABM algorithms (M2-M21)

This task has been completed.

T3.2.2 Social models development and calibration (M13-M45)

Project objectives for the period

An agent-based model representing the decisions of informed citizens in flood emergency

situations has been developed. Social surveys from two case studies (Doncaster, United Kingdom and Vicenza, Italy) and from the development of the citizens' and professionals' observatories have led to the development of the Agent Based Modelling framework. The framework focuses on the evaluation of emergency protocols. Methodologies and techniques used within the model are described in deliverable 3.20 as well as a description of the model. The applications of the ABM framework on both case studies are not included in this deliverable but in deliverable 3.30 where social and natural modelling is combined.

Major achievements for the period

A framework was developed and coded in an agent-based model to simulate an emergency protocol (including various mitigation measures and their sequence of implementation) from the release of the flood warning to the point of a flood event and its consequences. Such a model can support a systemic and deeper evaluation of the efficient use in terms of time, resources and effectiveness of the plan. The model can be complimentary as a facilitation tool for real time exercises and table-tops exercises in the preparation of emergency activities. In terms of data a well-developed protocol allows the representation of mitigation measures. Specific information is required to input into the model such as the ranking of the measures, the need for collecting certain assets, the number, location and rate of response of professional and engaged citizens. It was not always possible to obtain such information during this project; when unavailable synthetic data has been used to complete the model data requirement in both the English and Italian case studies.

It is also pointed out that long-term surveys are essential for validating and calibrating such a model. The role of Information and Communication Technology such as the Citizen Observatory developed in this project can play a major role as they provide a platform to observe the activities of real citizens and professionals.

T3.3 Physical and social model integration (M19-M42)

Project objectives for the period

Very often physical and social models are built by heterogeneous teams with very different backgrounds, targeting diverse audiences, with processes that may have different temporal scales. The challenge is to make such integration possible. For this reason, the main objective of this task is to integrate physical and social model in order Project objectives for the period in order to improve flood forecast and represent emergency protocols to simulate citizen behaviour in case of flood event. Three different integration strategies are proposed in this task. In the first method, results from a physical model (hydraulic model) are used as input to a social model (Agent Based Model, ABM) to represent citizen behaviour in case of flooding. In the second approach, an ABM is used to assess the arrival time of crowdsourced citizen observations which are assimilated within a hydraulic model to improve flood prediction. In the last approach, a simplified social model is used to estimate the citizen engagement level to share hydrological observations based on their proximity to the river. The output of this model are used to constrain the arrival time of the flow observations assimilated within the hydraulic model. Detail of the ABM or described in T3.2.2.

Major achievements for the period

The work developed in this task is one of the first attempt to integrate physical and social models which have different characteristics. In fact, such integrations is a very complex task that however is promising considering the suggested framework.

The most important finding is that flood forecasting can be significantly improved assimilating crowdsource observations within hydraulic models coming at moment simulated by ABM. In addition, citizen behaviour can be properly represented by ABM in case of different flood event water level provided by the physical model. However, validation of these approaches using real-life flood event has to be performed. Unfortunately, during the period of the WeSenseIt

Project, no relevant flood events occurred in the case study in order to validate our methodologies.

Issues and deviations with respect to the above mentioned tasks:

There have been no issues or deviations during the period for WP3.

Deliverables and milestones

D3.13 Modelling procedures incorporating heterogeneous data was submitted at M45.

D3.20 Models and ABM framework for development and calibration of social models was submitted at M45.

D3.30 Integrated social and physical models was submitted at M45.

MS4 End of R&D of Technology development was reached on schedule

MS5 End of Evaluation Phase 2 evaluation was reached on schedule

Work package 4: Participatory Decision Support and Feedback

T4.1 Methodology for the e-collaboration environment (M1-M6)

This task has been completed.

T4.2 Architectural Support for the e-collaboration environment (M7-M21)

This task has been completed.

The work done in this task and the results achieved have been described in deliverable D4.20 “Architectural support for the e-collaboration environment”, released at M38.

T4.3 Situation awareness and decision-making support

T4.3.1 Cross-dimensional contextualised information space projections (M13-M32)

This task has been completed.

T4.3.2 Decision-making support (M5-M45)

Project objectives for the period

Task 4.3.2 aims to develop support for formalising and capturing decisions in a seamless and non-intrusive way.

Major achievements for the period

Development of Social media Monitoring

- Focus without loss
- Creation of customisable dashboards
- Users can filter down to the information they need and have it as dashboard to be accessed at any time

T4.4 Supporting participation and feedback

T4.4.1 Citizen Participation Support (M15-M32)

This task has been completed.

T4.4.2 Comprehensive up-to-date feedback mechanisms (M22-M45)

Project objectives for the period

The objective of this subtask is to provide comprehensive and up-to-date two-way feedback by enabling access to contextualised information and model predictions through various devices and interfaces.

Major achievements for the period

UNESCO-IHE, DistroMetrics and HydroLogic Research (HR) created a ‘WaterDetective October’ contest for students of the Technical University in Delft. HR released the WaterNuisance (a variant of WaterDetective) for the contest, by adding the application to the Google Play Store.
HR further worked on minor bug fixes in the application and researched the connection of WaterDetective- and public available data with other products of the WeSenseIt Project (i.e. community websites, WeSenseIt platform, etc.). To ensure after project lifetime of operational mobile apps and the Water Detective API, HR researched the possibility of moving the services from the Amazon cloud to HR-owned servers.

For the Report Mobile Apps the following extensions have been developed:

- Addition of min max values checks on input
- New features implemented as required for Vicenza Evaluation
- Small changes to enable lightweight integration with Camera
- iPhone version finalised and released

- Minor bug fixing and graphical updates.

Report Web Interface enhancements are as follows:

- Finalisation of Criticita' Comunali functionality
- Graphical updates
- New dashboard functionalities (Save your own dashboard)
- Minor bug fixing.

The Citizens and Communities Portal (QUI) and the Citizens App (QUI) have been extended in order to:

- Provide more complete information: a "What to do in case of flooding" section, added to portal and app, contains information about how to behave before, during and after an emergency, with links to information sources (internal and external to the portal); a portal section visualizes, in a graph and on a map, the satellite data (soil moisture) collected and stored in the WSI platform.
- Improve usability: a new home page provides access to the different portal sections; reports and posts can be shared without the need to login; the flooding reports can be filtered according to water level; and other minor changes to portal and app to make them more usable.
- Develop new mobile app functionalities - required for the October evaluation in Vicenza and for the WSI technology demonstration done at the COWM conference: measurement of river levels from bridges and check of the consistency of readings; notifications of authorities reports and alerts; visualization of points of interest.
- Integrate other e-collaboration tools: the Citizens Portal has been integrated with the Augmented Reality (AR) app, adding to the portal information about where the AR app can be used; the Citizen's App has been loosely integrated with the Geofence service, allowing it to activate the app when citizens enter an area of interest (a fence).
- "Build your own observatory". Implementation of a tool to enable communities to create and configure their own citizen portal, automatically deploying Ushahidi software and the plugins developed in WeSenseIt

The work done and the technologies implemented in this task have been reported in deliverable D4.40 "Citizens Participation Support and feedback mechanisms", released at M45.

T4.5 Conceptual Integration with GMES and GEOSS (M1-M45)

Project objectives for the period

Participation and dissemination of WeSenseIt activities to the GEOSS and GMES groups and services.

Major achievements for the period

The integration of the WeSenseIT data streams into the GEOSS platform was the main achievement of this period by partner STAR. The data flows have been identified and listed. In collaboration with SoftwareMind, a dedicated web interface have been developed to allow the access to WeSenseIT datasets by variables directly from the WeSenseIt API. Such infrastructure allowed to register all datasets within the GEOSS portals, providing direct access by variables to the data. So, all the data streams of WeSenseIt have been registered into the GEOSS portal

Issues and deviations with respect to the above mentioned tasks:

There have been no issues or deviations during the period for WP4.

Deliverables and milestones

D4.32 Methodologies and technologies for decision-support was submitted at M45.

D4.40 Citizens Participation Support and feedback mechanisms was submitted at M45.
D4.50 Conceptual Integration with GMES and GEOSS was submitted at M45.
MS4 End of R&D of Technology development was reached on schedule
MS5 End of Evaluation Phase 2 evaluation was reached on schedule

Work package 5: Technological infrastructure

T5.1 Requirement specification and software architecture (M1-M8)

This task has been completed.

T5.2 Rapid prototyping for initial version of the WeSenseIt Platform

This task has been completed.

T5.3 Defining a business-ready platform (M13-M45)

Project objectives for the period

In the period between M36 and M42 works in WP5 focused on evaluation of WeSenseIt platform and preparing third major version of the platform: *D5.32 WeSenseIt Platform (final)*, due in month 45.
Main vision of WP5 is to prepare Citizen Observatories for wide adoption in large scale, by providing a reliable and scalable WeSenseIt Platform, to support social innovation & sensor revolution - providing data from citizens, mobile devices and numerous low cost sensors.. To summarize WP5 had the following specific objectives:

- Providing business-ready scalability and high availability (handling huge number of sensors, processing high velocity data streams, providing scalable and reliable backend for mobile applications)
- Management of high-volume geospatial data
- Preparing private cloud infrastructure for tests, research and online operations
- Management of sensor registry/definitions
- Supporting evaluation of WeSenseIt platform: integration and configuration of all sensors and tools, providing access to results, ensuring stability and availability of the platform
- Evaluating business-ready scalable architecture
- Ready to handle billions of sensor readings and petabytes of data
- Supporting mobile apps with millions of users
- User tracking, social sensors at huge scale
- High performance geo-located event processing
- Solutions re-usable and exploitable in other areas
- Management of resource consumption on processing nodes, monitoring and tracking activity in the system.
- Updating the platform definition based on the feedback from evaluation

Apart from business-ready integration, the focus in the final version of the WeSenseIt Platform was put on scalability and high availability tests. Additionally, it introduced changes which resulted from the evaluation phase of the project**.** WeSenseIt architecture was tested against increasing number of sensors and users, and also against huge volumes of data.

Major achievements for the period

- Ensuring stability and availability of the platform during evaluation
    - Software Mind have been maintaining maintaining and monitoring the cluster
    - the services have been moved to high-availability cluster
    - Cloud infrastructure has been moved to vmware
    - ***No major issues during evaluation***
- Improving Platform performance based on load tests

    - Software Mind performed load and stress tests of the infrastructure (using SoapUI tool and accelerating Java Virtual Machine Garbage Collector parameters)
- Implementing advanced platform monitoring for DevOps team
    - Software Mind implemented monitoring and visualisation of major Platform metrics:
        - Main metrics important for the Platform performance (like success and fails of storing measurements, top 10 most active sensors, total number of measurements saved, most popular sensors) are captured constantly with Logstash / Elasticsearch
        - The metrics are visualised and analysed with Kibana
    - Software Mind has also introduced Zenoss Platform monitoring which provides following features:
        - Unified Monitoring and Event Management
        - Service Impact and Analytics
        - Alerting, Remediation, and Integration
- Integration of mobile and satellite sensors
    - requirements analysis of merging satellite sensors data has been performed in collaboration with STARLAB
    - Software Mind has implemented new REST API for mobile and satellite sensors and their measurements
    - Big Data model has been updated to allow effective management of new types of sensor data
    - STARLAB integrated new data streams and is providing satellite sensor data
- Integration of WeSenseIt results with GEOSS
    - Software Mind in collaboration with STARLAB analysed Geoss integration requirements and prepared API (part of Sensor Integration Layer) and GUI (part of Sensor Management platform) for readings export
    - All WeSenseIt datasets have been integrated in GEOSS Portal
- Releasing third major version of the platform: D5.32, *"WeSenseIt Platform (final)"*, in month 45

QUI worked on integration of satellite data streams into Citizens Portal and App and reviewed the deliverable 5.32.

Submission of one conference article

Sieprawski M. (2016) "The value of Internet of Things integration in water governance, decision making and crisis management" COWM2016 - International Conference on Citizen Observatories for Water Management, Venice

Issues and deviations with respect to the above mentioned tasks:

There have been no issues or deviations during the period for WP5.

Deliverables and milestones

D5.32 WeSenseIt Platform (final) was submitted at M45.

MS4 End of R&D of Technology development was reached on schedule

MS5 End of Evaluation Phase 2 evaluation was reached on schedule

Work package 6: Governance and Social Innovation

T6.1 Governance analysis (M1-M6)

This task has been completed.

T6.2 Stakeholder analysis and engagement (M1-M42)

Previous tasks in this work package helped to build functioning observatories in the three case locations with a limited set of highly engaged professionals and citizens building on the already identified specific stakeholders and their requirements. In the second phase, these efforts are expanded as outlined below. Feedback to all WP's provided internally as soon as they were made available.

T6.2.1 Stakeholder sensor adoption and usage (M1-M6)

This task has been completed.

T6.2.2 Encouraging stakeholder participation (M7-M21)

This task has been completed.

T6.2.3 Requirement Analysis for citizen observatories (M20-M21) (M34-M35)

This task has been completed.

T6.2.4 Opportunities and barrier analysis (M33-M45)

Project objectives for the period

Continuously take stock of what encourages and challenges participation based on social research (observations as well as input from T6.2.3) in the three cases and past citizen science projects (updated literature review). This will be implemented in an 'opportunistic' manner, taking advantage of events and developments in the respective studies. This task supports and/or extends existing findings in the literature.

Major achievements for the period

A final period of empirical research was undertaken in all three case study location May - June 2016. This research was combined with 'opportunistic' research taking advantage of events and developments in the respective studies. Based on a framework developed from literature, themes emerged from case owner's reflections and citizen experiences which identify what encourages and challenges current and future participation. The research revealed both institutional (policy focus, funding, trust, abilities etc.) and the social (relevance, empowerment, relationships, abilities, trust etc.) factors common across the cases but with different outcomes for the Observatories. This is reported in Deliverable 6.24 'Opportunities and barriers analysis for Citizen Observatories'.

T6.3 Social innovation and impact of observatory-based knowledge exchange and participation (M13-M42)

Project objectives for the period

The objective of this task was to progress with the conceptual and empirical work at the meso-level to investigate the extent of information and knowledge exchanges mediated by the citizen observatories, to investigate how these knowledge flows affect and change governance processes in terms of participation (as well as other 'good governance' characteristics) as perceived by the different stakeholders and to analyse the pre-requisites and impacts of citizen observatories in terms of social innovation (good governance, community resilience, etc.)

Major achievements for the period

In this period, empirical research was undertaken in all three WeSenseIt case study locations. According to the earlier developed conceptual framework and based on the previous empirical

research, this task then completed the analysis the three case studies from a social innovation perspective. Specifically, we studied a) the social process by which citizen observatories had been constructed by examining the pre-conditions for citizens to engage in data sharing and b) the impacts of citizen observatories and the extent to which these were manifested as changes in governance processes in terms of citizen participation in local flood risk management processes and as 'yield' for the public good in terms of 'good governance' and strengthened community resilience. These activities and their results were reported in Deliverable 6.3 'Report on social innovation and impact of citizen observatory-based knowledge exchange and participation' which was submitted on time.

Issues and deviations with respect to the above mentioned tasks:

There have been no issues or deviations during the period for WP6.

Deliverables and milestones

D6.24 Opportunities and barrier analysis was submitted at M45.

D6.30 Social innovation & impact of citizen observatory-based knowledge exchange & participation was submitted at M45.

MS4 End of R&D of Technology development was reached on schedule

MS5 End of Evaluation Phase 2 evaluation was reached on schedule

Work package 7: Case studies

T7.1 Methodology for case studies (M1-M47)

Project objectives for the period

Define a common methodology for the case studies' analysis, development and evaluation.

Major achievements for the period

Each case study continued the test and evaluation of all the technologies installed in and implemented for the case studies.

T7.2 Doncaster case study (M25-M47)

T7.2.1 Doncaster Case Study Design and Development (M25-M32)

This task has been completed.

T7.2.2 Doncaster Case Study Evaluation (M33-M47)

User Evaluation Preparation

- User engagement activities to find volunteers to join the evaluation
- Presentation of the technologies to city council employees and citizens
- Preparation of a document on how to test the mobile and web app
- Preparation of a draft questionnaire for WP4 evaluation

Technical Evaluation

- StaffSense/Report needs technical evaluation to ascertain robustness/scalability/usability
- Development of automated testing protocols
- Redesign of Android App

Quinary customized, extended and tested the Citizens Web Portal and the Citizen Android App according to Doncaster requirements. Training material and an information pack were also prepared, to support the evaluation exercises.

T7.3 Delfland case study (M25-M47)

T7.3.1 Delfland Case Study Design and Development (M25-M32)

The observatory in Delfland includes thirty soil moisture sensors on fifteen different locations and five disdrometers. Also three variations of the WaterDetective app were developed for citizens to upload their findings on either swim water quality, rainfall intensity or water nuisance. The visualisation of the physical sensors is available in the online observatory and in a dedicated online platform, while the social sensor observations are visible from within the mobile apps.

The collaboration with Delfland waterboard (DWB) encountered a few stumbling blocks. The DWB participated in WeSenseIt through their own 'Digital Delta' initiative (2012-2014), which focussed on themes like the use of big data and digitalized data collection. Increasing participation or engaging in an active collaboration with citizens, was not necessarily an objective for them. Especially in the context of the chosen topic of flood risk.

Unesco-IHE installed soil moisture sensors at 15 different locations (two sensors per location) ranging from petting farms to an organic farm. The fifteen locations were chosen to have a homogenous spread over the Delfland territory. The measurements of these sensors were

used, also by Unesco-IHE, to develop a model for soil saturation and thus retention capacity in case of a major rain event.

Disdrometrics installed disdrometers on five different locations; roofs of private individuals and companies. The measurements of these disdrometers are being broadcasted in the observatory and on a separate website.

Hydrologic developed three different versions of the WaterDetective mobile app. One to monitor rainfall intensity (by comparing current rainfall with movies in the app), one to report on water nuisance (small scale flood issues) like large puddles, clogged drains and overflow canals and one more generic reporting app with broad fllod and dyke related categories (this was the initial version). The functionality of these apps were tested on different occasions with students of Unesco-IHE.

T7.3.2 Netherlands Case Study Evaluation (M33-M47)

Parallel to WeSenseIt three other processes ran within DWB, which made collaboration less straight forward: First of all, the repeating flood issues in the Westland area were solved with extensive technical measures in the sewerage system; eliminating the urgency for residents to engage with the observatory. Second, apart from WeSenseIt there were multiple other projects ongoing for mobile app design, for both reporting irregularities and dike inspection. By now there are two other mobile apps available, further developed and more specifically tailored, for dike inspection with volunteers. And the third related process that ran parallel with WeSenseIt and hindered proper implementation was the introduction of a Customer Contact Center (KCC), which is aiming to centralize all contacts with residents and stakeholders.

The soil moisture sensors were evaluated in close collaboration with the organic farmer at Hoeve Biesland and the local operational manager of the DWB. The soil moisture sensor installed at the field of an organic farmer, did inform that farmer - and her (existing) discussions with the operator of the local pumping station. Also she valued the information of the moisture of the soil in the context of watering needs of her crops. Following that lead, two other soil moisture sensors were replaced to local farming allotments where they can inform amateur gardeners on how much water their plants need.

Disdrometrics conducted a modest user evaluation with the guardians of the five installed disdrometers. The rainfall data collected with the sensors was correlated with KNMI (royal meteo institute) data and with the measurements of a school project on rain gauges (WaterLab).

Following discussions with the DWB about the topic of the observatory, the Water Detective app was adjusted slightly to be able to monitor swim water quality. This version of the app was disseminated in the region of Delft during one hot summer week in 2015.

HydroLogic Research (HR) created a public web page to showcase the WeSenseIt project with the focus on the Delfland case study. This web site contains an overview of technologies created by the consortium and gives additional information about the area of Delfland.

This web page is also a starting point for the public web app containing the WaterDetective reports. The web app gives citizens the ability to see their own and other citizen's observatories.

In the fall of 2015 multiple conversations with the municipalities of Westland and Dordrecht were held (responsible for pluvial floods) to engage them in the observatory.

In October the Dutch partners in the Delfland case study organized the October challenge – in which over 60 students of TU Deft were challenged to use the Water Detective for a month and report all rain induced nuisance.

Finally in June 2016 a scavenger hunt / rain game was organized with the Scouting Paulus in Delft in order to test the user friendliness of the Water Detective app.

T7.4 Alto Adriatico case study (M25-M47)

T7.4.1 Alto Adriatico Case Study Design and Development (M25-M32)

This task has been completed.

T7.4.2 Alto Adriatico Case Study Evaluation (M33-M47)

AAWA continued the test and evaluation of all the technologies installed in and implemented for the case studies and enlarged the participation to the Citizen Observatories. In detail the activities performed were:

- maintenance of the installed sensors;
- maintenance of the involvement of Citizens in the Observatory, especially the school students, promoting new initiatives;

A report about the final evaluation of the Case Study was delivered at M47 (D7.40).

Quinary worked on the following activities:

- Preparation of training material for Vicenza evaluation (October).
- Participation to the training sessions in collaboration with AAWA.
- Participation to the October 10th evaluation event (3 people from QUI: 2 in the operation centre, 1 in schools)
- Review of AAWA deliverable D7.40 and contribution to project final deliverables.

After the October evaluation, the Citizens Portal and App have been extended and tested during exercises and presentations done in schools. Training material was prepared, to support exercises and presentations.

Minor fixes and extension were also developed following the suggestions gathered during the technologies demonstration event in Venice (June 2016, part of the COWM event), to finalize a stable platform for project after life.

Issues and deviations with respect to the above mentioned tasks:

There have been no issues or deviations during the period for WP6.

Deliverables and milestones

D7.20 Doncaster Case Study Evaluation submitted at M47.

D7.30 Netherlands Case Study Evaluation was submitted at M47.

D7.40 Alto Adriatico Case Study Evaluation was submitted at M47.

MS4 End of R&D of Technology development was reached on schedule

MS5 End of Evaluation Phase 2 evaluation was reached on schedule

Work Package 8: Dissemination and Exploitation

T8.1 Dissemination (M1-M42)

Events and dissemination

Relevant events the project partners participated in and related conferences / papers / communications (if any) are listed in the next table.

Event	Location	Paper /Activity	Link
Water and Development Congress & Exhibition, International Water Association, 18-22 October 2015	Jordan	Wehn, U. (2015) Deriving the social innovation potential of ICT-enabled citizen observatories	
4th Asia-Netherlands Water Learning Week, 26-30 October 2015	UNESCO-IHE, Delft, The Netherlands	Wehn, U. (2015) ICT-enabled citizen observatories: the European WeSenseIt project	
Flood & Coast 2016 Conference, 23-25 February 2016	Telford, UK	McCarthy, S., Tapsell, S., Wehn, U., McDonagh, R. and Lanfranchi, V. (2016) The challenges of embedding technological systems into social environments – lessons from the WeSenseIt project	
COWM 2016: International Conference on "Citizen Observatories for Water Management"	Venice, 7-10 June 2016	Organization of the Conference	http://www.conwater2016.eu/index.php/en/
COWM 2016: International Conference on "Citizen Observatories for Water Management"	Venice, 7-10 June 2016	Presentation of a paper: The role of Citizen Observatories in Crisis management and disaster resilience	http://www.conwater2016.eu/docs/programma-cowm-2016.pdf
10th GEO European Projects Workshop	Berlin	Gharesifard, M., Wehn, U. and van der Zaag, P. (2016) Dimensions of citizen observatories: The case of online amateur	

		weather networks, 30 May – 1 June 2016.	
EGU (European Geosciences Union) General Assembly	Vienna	Gharesifard, M., Wehn, U. and van der Zaag, P. (2016) Dimensions and dynamics of citizen observatories: The case of online amateur weather networks, 2016, 23-28 April 2016.	

Peer reviewed journal papers

Journal	Paper	Authors
Journal of Environmental Engineering and Management, Special Issue on ICTs and Water	(2015) Citizen observatories as facilitators of change in water governance? Experiences from three European cases, Vol. 14, no. 9, pp. 2073-2086.	Wehn, U., McCarty, S., Lanfranchi, V. and Tapsell, S.
Advances in Water Resource, 83, 323-339	(2015) Assimilating uncertain, dynamic and intermittent streamflow observations in hydrological models	Mazzoleni, M., Alfonso, L., Chacon-Hurtado, J.C. and Solomatine, D.P
Journal of Water & Climate	(2016) Towards two-way flood risk communication: current practice in a community in the UK,, forthcoming	Siew Ping, N., Wehn, U., Zevenbergen, C. and van der Zaag, P.
Journal of Hydrology	(2016) To share or not to share: drivers and barriers for sharing data via online amateur weather networks,, Vol. 535, April, pp.181-190, doi:10.1016/j.jhydrol.2016.01.036	Gharesifard, M. and Wehn, U.
Technology in Society	(2015) The social innovation potential of ICT-enabled citizen observatories to increase eParticipation in local flood risk management, August, pp.187-198, doi:10.1016/j.techsoc.2015.05.002.	Wehn, U. and Evers, J.
Environmental Science and Policy	(2015) Participation in flood risk management and the potential of citizen observatories: a governance analysis,, 48 (April), 225-236, doi:10.1016/j.envsci.2014.12.017	Wehn, U., Rusca, M, Evers, J. and V. Lanfranchi

Environmental SCIENTIST Journal. 2016	*Citizens Observatories for Effective Earth Observations: the WeSenseIt Approach.*	*Suvodeep Mazumdar, Vita Lanfranchi, Neil Ireson, Stuart Wrigley, Clara Bagnasco, Uta Wehn, Rosalind McDonagh, Michele Ferri, Simon McCarthy, Hendrik Huwald, Fabio Ciravegna.*

Contacts and interactions with the end users

Case Study	Location	Dates	Activity
Italy	Vicenza	5 Oct 2015	Training course for Civil Protection volunteers on the WSI e-collaboration platform and smartphone applications for citizens and authorities.
Italy	Vicenza	7 Oct 2015	Training course for Civil Protection volunteers on the WSI e-collaboration platform and smartphone applications for citizens and authorities.
Italy	Vicenza Province	10 Oct 2015	Civil Protection Exercise to share WSI knowledge and procedures in the field of emergency management with the mayors of the Vicenza Province Local Risk District (5 municipalities) and Civil Protection representatives of other 6 European Countries (Croatia, Macedonia, Romania, Bulgaria, Greece, Hungary). 50 Civil Protection volunteers and 60 students tested WSI technologies
Italy	Vicenza	20 Oct 2015	Meeting with end users to collect evaluations about the trial
Italy	Vicenza	17 Feb 2016 24 Feb 2016 2 Mar 2016 16 Mar 2016	Educational training course for school teachers on flooding risk, emergencies management and the WeSenseIt approach and technologies. Theoretical lessons, teamworks and practical lesson on the field
Italy	Vicenza	10 Jun 2016	Practical demonstration of the WSI technologies during the International Conference COWM 2016
Netherlands	Delft	4 - 11 Jul 2015	Public at lake beaches and water playgrounds to disseminate the swim water quality monitoring app
Netherlands	Delft	Oct 2015	Over 60 TU students - engaging in the October Challenge
Netherlands	Delft	8 Sept 2015 10 Nov 2015	Municipality of Westland
Netherlands	Delft	26 Nov 2015 3 Feb 2016 10 Mar 2016	Municipality of Dordrecht
Netherlands	Delft	30 Oct 2015	Municipality of Delft

		3 Jun 2016	
Netherlands	Delft	17 & 18 Jun 2016 1 & 2 Jul 2016	Scouting Paulus: Rain game / scavenger hunt for the purpose of piloting the Water Detective-app
Netherlands	Delft	11 Apr 2016 2 Jun 2016	Linda Duijndam, organic farmer at the Biesland Hove & Gerrit de Haan, operational manager at Delfland Water board, on use of the observatory
Netherlands	Delft	11 Apr 2016 6 May 2016 23 Jun 2016	Science Center, educational center - discussions on engaging with school classes
Netherlands	Delft	12 Apr 2016	Groenkracht, innovative society for city farming and allotment maintenance on the potential use of soil moisture sensors

Publications

Gharesifard, M., Wehn, U. and van der Zaag, P., Dimensions of Citizen Observatories: The case of online weather networks, under review for *Environmental Management*.

Gharesifard, M. and Wehn, U. (2016) What Drives Citizens to Engage in ICT-enabled Citizen Science? Case Study of Online Amateur Weather Networks, in Ceccaroni, L. and Piera, J. (eds) Analyzing the Role of Citizen Science in Modern Research, IGI Global, forthcoming.

Mazzoleni M., Chacon-Hurtado C., Noh S.J., Seo D.J., Alfonso L. and Solomatine D.P. (2016) “Assimilation of water level observations in hydrologic routing: impact of sensor placement on flood prediction", in preparation for Hydrological Processes

Mazzoleni M., Noh S.J., Lee H., Liu Y., Seo D.J., Alfonso L. and Solomatine D.P. (2016) "Real-time assimilation of streamflow observations into a hydrologic routing model: Effects of different model updating methods", under review in Journal of Hydrology

Mazzoleni M., Cortes A., Wehn, U., Alfonso L. and Solomatine D.P. (2016) “Towards assimilation of crowdsourced data from heterogeneous network of sensors for different levels of citizen engagement", in preparation for Hydrology and Earth System Science

Mazzoleni M., Verlaan M., Alfonso L., Monego M., Norbiato D., Ferri M. and Solomatine D.P. Can assimilation of crowdsourced streamflow observations in hydrological modelling improve flood prediction?, Hydrol. Earth Syst. Sci. Discuss., 12, 11371–11419, 2015, www.hydrol-earth-syst-sci-discuss.net/12/11371/2015/, doi:10.5194/hessd-12-11371-2015 (under review)

Mazzoleni M., Alfonso L. and Solomatine D.P. (2015) Effect of spatial distribution and quality of sensors on the assimilation of distributed streamflow observations in hydrological modeling, Hydrological Sciences Journal, DOI: 10.1080/02626667.2016.1247211

Mazzoleni M., Alfonso L., Chacon-Hurtado J.C. and Solomatine D.P. (2015) Assimilating uncertain, dynamic and intermittent streamflow observations in hydrological models, Advances in Water Resources, 83, 323-339

Seeing through the Eyes of the Citizens during Emergencies. F. Ciravegna, S. Mazumdar, S.N. Wrigley, N. Ireson and P. Cudd. 12th International Conference on Information Systems for Crisis Response and Management (ISCRAM), May, Rio, Brazil.

S. Mazumdar, N. Ireson, F. Ciravegna. Decision Graphs: Managing Decisions for Emergencies. 12th International Conference on Information Systems for Crisis Response and Management (ISCRAM), May, Rio, Brazil

F. Ciravegna, S. Mazumdar, N. Ireson, P. Cudd. Understanding the barriers between citizens and authorities in environmental monitoring. 1st European Citizen Science Conference (ECSA), May, Berlin, Germany

S. Mazumdar, N. Ireson, F. Ciravegna. Citizens Observatories for Effective Earth Observations: the WeSenseIt approach. 1st European Citizen Science Conference (ECSA), May, Berlin, Germany

S. Mazumdar, N. Ireson, F. Ciravegna.Geofence-driven Crowdsourcing and Citizen Science. 1st European Citizen Science Conference (ECSA), May, Berlin, Germany

F. Ciravegna, S.Mazumdar, N. Ireson. Seeing through the eyes of citizens: an application for Occupational Therapists. Insigneo Showcase Event 2016, Sheffield, UK

S. Mazumdar, S. Wrigley, N. Ireson, F. Ciravegna. Engaging Citizens and Communities for Emergencies. International Conference on Citizen Observatories for Water Management (COWM), Venice, 7-9 June 2016

S. Mazumdar, N. Ireson, F. Ciravegna, Citizens Observatories for Earth Observations: the WeSenseIt approach. 10th Geo European Projects Workshop – Citizens' Observatories for environmental policy monitoring and development, Berlin, June 2016

Presentations & workshops

Maurizio Mazzoleni, Martin Verlaan, Leonardo Alfonso, Daniele Norbiato, Martina Monego, Michele Ferri, Dimitri Solomatine, *Towards real-time assimilation of crowdsourced observations in hydrological modeling* (Geophysical Research Abstracts Vol. 18, EGU2016 13385, 2016, EGU General Assembly 2016)

Alfonso L., Chacon-Hurtado J., Mazzoleni M. and Solomatine D.P. (2016) Optimal Design of Hydrometric Monitoring Networks with Dynamic Components based on Information Theory, Hydroinformatics Conference 2016, Incheon, Korea.

Chacon-Hurtado, J., Mazzoleni, M., Corzo, G., Solomatine, D. P. (2016) "On the use of surrogate models for hydrological data assimilation", Hydroinformatics Conference 2016, Incheon, Korea.

Mazzoleni M., Noh S.J., Lee H., Liu Y., Seo D.J. and Solomatine D.P. (2016) "Assimilation of real-time streamflow observations into a hydrologic routing model: Effect of different model structures", Hydroinformatics Conference 2016, Incheon, Korea.

Noh S.J., Mazzoleni M., Lee H., Liu Y., Seo D.J. and Solomatine D.P. (2016) "Real-time assimilation of observations from heterogeneous sensors into hydrologic routing models", Hydroinformatics Conference 2016, Incheon, Korea.

Mazzoleni M., Verlaan M., Alfonso L., Norbiato D., Monego M., Ferri M. and Solomatine D.P. (2016) "Assimilation of streamflow observations from an heterogeneous network of distributed sensors in hydrological modelling" COWM2016 - International Conference on Citizen Observatories for Water Management, Venice.

Noh S.J., Mazzoleni M., Lee H., Liu Y., Seo D.J. and Solomatine D.P. (2016) "Comparative analysis of various real-time data assimilation approaches for assimilating streamflow into a hydrologic routing model", EGU 2016 conference, Geophysical Research Abstract, Vienna, Austria

Mazzoleni M., Verlaan M., Alfonso L., Norbiato D., Monego M., Ferri M. and Solomatine D.P. (2016) "Towards real-time assimilation of crowdsourced observations in hydrological modeling", EGU 2016 conference, Geophysical Research Abstract, Vienna, Austria

Michele Ferri, Francesco Baruffi, Daniele Norbiato, Martina Monego, Giovanni Tomei, Dimitri Solomatine, Leonardo Alfonso, Maurizio Mazzoleni, Juan Carlos Chacon, Uta Wehn, and Fabio Ciravegna, *Citizen observatory of water as a data engine supporting the people-hydrology nexus: experience of the WeSenseIt project*, (Geophysical Research Abstracts Vol. 18, EGU2016-16678, 2016, EGU General Assembly 2016)

T8.2 Exploitation (M13-M48)

Major achievements for the period

HydroLogic Research (HR) set up the outlines for Deliverable 8.22 Exploitation Report. The exploitation report describes the exploitation plans for the WeSenseIt solution, which consists of three coherent entities:

1. WeSenseIt IT Platform forms the basis of the complete WeSenseIt solution. Each WeSenseIt Service and WeSenseIt Package depends on the WeSenseIt IT Platform to store data, receive data or interact with other services.
2. WeSenseIt Services are the building blocks of WeSenseIt. Each service delivers unique user functionality or data. Different service types can be distinguished, e.g. smart apps, hardware sensors or web applications, or even consultancy projects
3. WeSenseIt Packages combine different WeSenseIt Services based on specific subjects, regions or client groups.

HR prepared several templates for the SME's within the consortium. The outlines and templates are presented to the consortium partners during the project meeting in Milano (January 2016). HR organised a 'Delfland case study' exploitation meeting together with Starlab, Distrometrics and UNESCO-IHE to discuss Business Model Canvas and Value Chain of the case study. HR collected the contributions of other WeSenseIt partners and continued working on this Deliverable.

Quinary contributed to the deliverable D8.22 "Exploitation Report" and worked on the dissemination exploitation activities with potential customers/partners, including public bodies and private companies. Among them:

- Meetings with a regional provider of IT services to evaluate the possibility to use WeSenseIt technology in a fire prevention scenario: identification of information sources and definition of needed customization.
- Meetings with Lombardia regional cluster "Smart Cities and Communities" to identify collaboration with local players, in order to participate to regional calls.
- Virtual meetings and information exchange with local bodies in Sicily to evaluate the opportunity to apply WeSenseIt technologies in a landslides monitoring scenario.
- Meeting with potential commercial and technology partners to extend and commercialize the WeSenseIt technologies: definition of joint exploitation scenarios and business plans.

T8.4 Coordination with EU initiatives (M1-M48)

During the last period, the final document of the tasks have been written, describing the dissemination and communication activities carried out during the WeSenseIt project, related to EU initiatives, including GEOSS, Copernicus, and the Citizens Observatories sister projects (first round of EC funded COs). It describes the context of each EU initiative, and the participation in conferences/workshops, and the publication of dedicated papers. This document justifies the WSI project as being part of the global ecosystem of EU initiatives. With an objective of project dissemination, the project took advantage of the multiple channels available and events organized over Europe.

Issues and deviations with respect to the above mentioned tasks:

There have been no issues or deviations during the period for WP8.

Deliverables and milestones

D8.12 Dissemination Report submitted at M48.

D8.22 Exploitation Report was submitted at M48.

D8.32 Showcasing Report was submitted at M48.

Project management during the period

Work package 9: Management

T9.1 Project Coordination (M1-M48)

Project objectives for the period

This WP will ensure the effectual and timely achievement of goals within the project in the most cost- effective manner. The central objectives are:

- To ensure the effective planning and coordination of work, tasks and outcomes of the individual work packages, including the timely submission of deliverables
- To provide the necessary structures and support to facilitate project management, decision-making, quality management and accountability
- The administration and financial management of the project, including the periodic and final reports to the EU Commission
- To guarantee a smooth flow of information and efficient decisions-making processes within the consortium

Communications management with external groups and with the EU Commission WP Leaders also play an important role in technical management preparing the periodic activity reports and finalizing deliverables. The person month allocation for this work is included in the respective work packages.

To ensure timely delivery of all necessary reporting documents including deliverable and payments of funds to partners.

Major achievements for the period

USFD updated project reporting guidance notes and partners submitted reports on a quarterly basis so the coordinator could ensure the work was being carried out by each partner as foreseen in the DoW as well as monitoring the anticipated expenditure. The Steering Committee have met on a regular basis during the plenary meeting and also monthly to ensure any management issues are addressed and dealt with in an efficient and timely manner. The project coordinator has constantly worked with the work package leaders to ensure a uniform approach to reporting and this has again been successful. We maintain a project Wiki which has been used to facilitate the quarterly reporting and is organised with reminders for internal and external deadlines and constant contact is in place between USFD and the other partners. All partners were paid their period 2 payments (if applicable) in good time.

T9.2 Progress Monitoring and Quality Management (M1-M48)

Project objectives for the period

This is to ensure that regular updates on project progress are given and that quality checking is in force and can be carried out in a reasonable timeframe.

Major achievements for the period

The project wiki was set up at the beginning of the project and is used for periodic reporting as well as sharing information with regards to meetings, deliverables and any other issues arising. The procedure in place for setting and monitoring internal and external deadlines as well as publishing final versions of reports and quality control are in place and functioning well.

The Quality Management Handbook is available to the consortium for reference when required.

The reviewing mechanism in place for deliverable submissions is working well and involves having a draft ready approximately one month before the due date, this is then reviewed by

the appointed reviewer and comments are discussed and addressed, the final submission is then released for a quality check around one week before submission.

T9.3 Meetings and liaison (M1-M48)

Project objectives for the period

To ensure that the Steering Committee as well as the consortium meet on a regular basis to ensure project goals are achieved.

Major achievements for the period

The Coordinator has organised and chaired the Steering Committee (SC) Meetings which have been held with the plenary meetings detailed below in the list of project meetings.

In order to meet less often, the regular telephone conferences which are organised on a monthly basis to address any pressing issues are undertaken. The structure has worked well for the final phase of the project.

T9.4 Risk Management (M1-M48)

Project objectives for the period

A risk management plan covering both internal and externally induced risks.

Major achievements for the period

The Risk Management Plan was created by USFD as foreseen in the DoW. This is reviewed at the meetings of the Steering Committee and updated when required. We have not had any issues in the area of risks in the final period of the project.

Deliverables and milestones

There have been no deliverables submitted for WP9

List of project meetings

- Plenary & Steering Committee Meeting, Milan, Italy, 12-15 January 2016
- Monthly virtual Steering Committee Meetings, April – September 2016

Management structure and procedures

The management structure is designed to ensure a clear assignment of responsibility, and effective communication among the partners, so as to achieve successful and timely completion of the tasks within the project. It is intended to be both lightweight and responsive. The University of Sheffield (USFD) acts as co-ordinator, with overall responsibility for the management and administration of the project.

Each work package has a work package leader, responsible for continuously monitoring and ensuring progress with the tasks in the work package, coordinating efforts between the partners involved, and managing the timely generation of deliverables. Moreover, each partner has a site leader, responsible to the work package leaders for the contributions from that site (sometimes these are one and the same person in the case of sites which are also leading a work package).

The site leaders together form the **Steering Committee** (SC), which meets on a regular basis in conjunction with the WeSenseIt project meetings. It is chaired by the coordinator, and is responsible for the overall success of the project.

Reporting conventions

Periodically each project partner reports on progress, we do internal reporting on a quarterly basis in order to monitor efforts and finances in order to keep watch on expenditure. Bi-annually a joint progress report is produced by the partners. We will prepare formC's and where required a certificate of financial statement at month 18, 36 and 48, which have been collated by the

project coordinator.

Quality control and evaluation

The reports and deliverables are used as a basis for quality control. Each deliverable is reviewed internally by other project partners. The SC oversees quality control, using these reviews as the basis for identifying any problems.

Consortium agreement

As is standard the consortium agreement sets the internal rules of the project, and has been signed by each partner. It regulates the management and delivery of each partner's work, and is used as a foundation to create an exploitation agreement and plan. The consortium agreement further specifies the authority, procedures and decisions by the SC. The consortium agreement also regulates the rights and responsibilities of each project partner, and details important management aspects and points such as decision points and timelines; patents, trademarks; the rights of each partner in the exploitation of the results, conflict resolution, together with any relevant ethical and gender policies and related matters.

Conflict resolution

Formally, the SC is responsible for initiation of conflict resolution procedures, in conformance with the rules of the Consortium Agreement, although informal collaboration is the basis for most, if not all, necessary resolutions. If necessary, resolution will be sought through the SC.

Project tools

We are using email and Skype communication tools along with an internal wiki for consortium members to upload and share information.

External Expert Advisory Board

The consortium has established an External Expert Advisory Board (EEAB) who are directed by the Steering Committee, their main role is to provide feedback about the general scientific direction of the project. The board will be composed of senior partner representatives as well as 4 external members from industry, public administration and academia.

Problems which have occurred in the reporting period

There have been no significant problems during the period.

Consortium Changes

Partner SMIND was taken over Ailleron and this has been reflected in the participant portal.

From 1 July 2016 to 30 September 2016 the QUI WeSenseIt team (Clara Bagansco, Giovanni Ferrari, Massimo Ferraro, Luca Monti) have become Tech Rain Employees. The team have worked in Quinary premises in via Bisceglie 76 Milano, following the plans that Quinary agreed with WeSenseIt partners during the plenary meeting in Milano (13-15 January 2016).

The cost of personnel remained the same after the takeover: Tech Rain agreed to charge Quinary the same costs declared in Quinary cost statements.

In particular, in the period July-September 2016, the team will finalise the work already planned by Quinary taking on the following tasks:

- Fixing of issues and extensions following the results of the last exercise in Venice (June 2016), to finalize a stable platform for project after life.
- “Build your own observatory”. Implementation of a tool to enable communities to create and configure their own citizen portal, automatically deploying Ushahidi software and the plugins developed in WeSenseIt
- Demonstration of WSI technologies to Quinary potential customers/partners, including public bodies and private companies.
- Review of AAWA deliverable D7.40 and contribution to project final deliverables.

- Participation to telco with partners.

QUI will have resources made available to them through TechRain from M37 onwards in order to complete the final phase of the project. The cost of this amounts to €29,750.

Seven Person Months were taken from partner QUI to give to KNOW due to them taking the lead on WP4, the appropriate budget amount was also amended. Partner ADV have also amended their efforts moving 5PM from WP2 and reallocating 2.5 to WP5 and 2.5 to WP7.

After the final reporting period the budget has been amended slightly to fund the valid overspending partners utilising the underspending partner budgets basing the calculation on the percentage of partner overspends as agreed by the Steering Committee. The total underspent amount has been calculated to €80,204 and the overspending amount in total is €87,374. The revised budget per partner for the whole consortium is below along with a reallocation calculation.

Beneficiary number	Beneficiary short name	Confirmed eligible costs (whole duration of the project)						Revised Requested EU contribution (€)
		Spent Effort (PM)	Personnel costs (€)	Subcontracting (€)	Other Direct Costs (€)	Indirect costs OR lump sum, flat-rate or scale-of-unit (€)	TOTAL costs	
1	USFD	153.59	€ 666,073.74	€ 2,061.43	€ 110,624.42	€ 466,018.90	€ 1,244,778.49	€ 1,002,136.53
2	IHE	43.47	€ 262,295.54	€ 9,000.00	€ 401,328.79	€ 225,596.74	€ 898,221.07	€ 692,233.77
3	EPFL	83.75	€ 420,085.60	€ 2,289.80	€ 42,005.59	€ 277,254.71	€ 741,635.70	€ 565,640.87
4	MU	35.64	€ 198,221.55		€ 25,122.56	€ 134,006.47	€ 357,350.58	€ 274,641.23
5	SSS	29.02	€ 217,650.00		€ 37,647.47	€ 153,178.48	€ 408,475.95	€ 315,414.98
6	DSD	23.60	€ 112,688.15	€ 45,249.63	€ 74,925.78	€ 112,568.36	€ 345,431.92	€ 263,799.78
7	ADV	30.89	€ 139,713.87		€ 49,620.46	€ 113,600.60	€ 302,934.93	€ 235,906.97
8	HR	40.83	€ 250,761.63	€ 21,584.62	€ 28,482.53	€ 167,546.50	€ 468,375.28	€ 364,889.23
9	KNOW	78.36	€ 239,006.67	€ 669.43	€ 24,513.18	€ 158,111.91	€ 422,301.19	€ 318,774.15
10	STAR	45.53	€ 196,839.14		€ 44,491.11	€ 108,820.33	€ 350,150.58	€ 267,287.80
11	SMIND	110.39	€ 284,537.90	€ 142,188.31	€ 26,558.98	€ 83,202.52	€ 536,487.71	€ 401,981.12
12	DMBC	11.54	€ 76,359.79		€ 34,759.33	€ 22,223.82	€ 133,342.94	€ 100,109.50
13	AAWA	47.00	€ 197,472.45	€ 17,080.00	€ 44,208.27	€ 145,008.43	€ 403,769.15	€ 307,434.17
14	QUIN	53.53	€ 284,337.54		€ 23,839.66	€ 98,540.87	€ 406,718.07	€ 313,514.80
Total		**787.14**	**€ 3,546,043.57**	**€ 240,123.22**	**€ 968,128.13**	**€ 2,265,678.64**	**€ 7,019,973.56**	**€ 5,423,764.89**

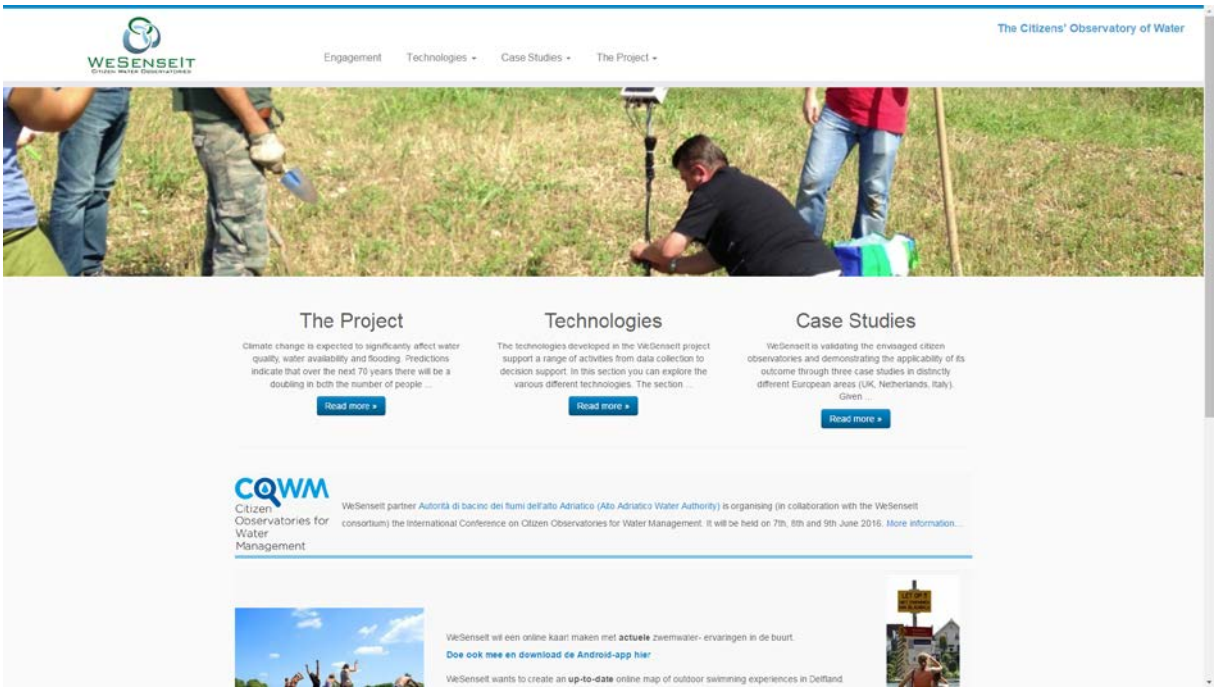
Revised Budget Consortium per partner at period end

Partner	Period 1 - Accepted	Period 2 - Accepted	Period 3 - Submitted	Total claims (P1-4)	Budgeted Funding Amount	Overspend Amount	% of the overspend	Anticipated reallocation from underspend	EXTRA ALLOCATION	Adjusted overspend per partner
USFD	€ 219,870.35	€ 431,581.47	€ 351,721.33	**€ 1,003,173.15**	€ 990,540.92	**€ 12,632.23**	14.46%		€ 11,595.61	**€ 1,036.62**
IHE	€ 229,128.45	€ 91,283.38	€ 372,290.96	**€ 692,702.79**	€ 686,987.37	**€ 5,715.42**	6.54%		€ 5,246.40	**€ 469.02**
EPFL	€ 130,112.39	€ 270,653.52	€ 166,738.63	**€ 567,504.54**	€ 544,794.00	**€ 22,710.54**	25.99%		€ 20,846.87	**€ 1,863.67**
MU	€ 91,882.74	€ 77,051.18	€ 105,707.31	**€ 274,641.23**	€ 289,472.80	**€ 14,831.57**				
SSS	€ 144,416.02	€ 137,705.06	€ 33,293.90	**€ 315,414.98**	€ 316,489.20	**€ 1,074.22**				
DSD	€ 123,252.91	€ 18,823.44	€ 121,723.43	**€ 263,799.78**	€ 315,098.00	**€ 51,298.22**				
ADV	€ 108,370.45	€ 4,464.42	€ 123,072.10	**€ 235,906.97**	€ 240,151.60	**€ 4,244.63**				
HR	€ 150,753.08	€ 155,641.54	€ 58,494.61	**€ 364,889.23**	€ 373,645.20	**€ 8,755.97**		**€ 80,204.61**		
KNOW	€ 114,878.68	€ 94,314.52	€ 110,949.60	**€ 320,142.80**	€ 303,464.50	**€ 16,678.30**	19.09%		€ 15,309.65	**€ 1,368.65**
STAR	€ 108,897.71	€ 141,463.98	€ 18,011.74	**€ 268,373.43**	€ 255,144.00	**€ 13,229.43**	15.14%		€ 12,143.80	**€ 1,085.63**
SMIND	€ 209,809.17	€ 149,110.54	€ 43,446.08	**€ 402,365.79**	€ 397,678.25	**€ 4,687.54**	5.36%		€ 4,302.87	**€ 384.67**
DMBC	€ 33,360.23	€ 49,317.53	€ 17,441.52	**€ 100,119.28**	€ 100,000.05	**€ 119.23**	0.14%		€ 109.45	**€ 9.78**
AAWA	€ 171,060.74	€ 85,906.51	€ 51,279.56	**€ 308,246.81**	€ 298,344.00	**€ 9,902.81**	11.33%		€ 9,090.17	**€ 812.64**
QUIN	€ 119,908.70	€ 120,299.27	€ 73,446.27	**€ 313,654.24**	€ 311,955.00	**€ 1,699.24**	1.94%		€ 1,559.80	**€ 139.44**
TOTAL	**€ 1,955,701.62**	**€ 1,827,616.36**	**€ 1,647,617.04**	**€ 5,430,935.02**	**€ 5,423,764.89**	**€ 87,374.74**	**100.00%**		**€ 80,204.61**	**€ 7,170.13**

Calculation of budget redistribution

Development of the Project Website

The project website is up and running and has been since M1 (October 2012), the url for this is http://www.wesenseit.eu/ the website has been produced and is maintained by partner USFD.



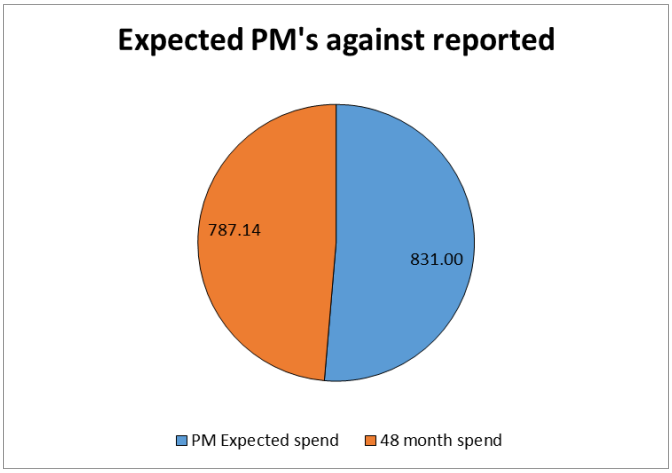
A snapshot of the WeSenseIt homepage (25/11/2016)

Dissemination activities

Full details can be found in WP8 above.

Deviations

Budgeted costs vs expenditure for period 3 and also for the full period can be found in Tables 3.3 and 3.4, the budget vs actuals is largely to plan. There is a global underspend on Person Months which is largely due to the way IHE claim the costs for their students.



PM budget vs actuals

USFD

USFD are spending 118% of their PM's compared with the budgeted amount. The main overspend was due to WP7 where we spent more time on the Case Studies. There is no anticipated negative impact on the project due to this. We are overspending slightly in the budget and this is mainly due to the travel budget as referenced previously in period 2. The Plenary Meeting costs have all been borne by the USFD budget. These have all been attended also by the researchers working on the project as well as the PI, project manager and the project administrator. The costs have been kept to a minimum.

USFD can confirm that all purchases that have been made are in line with our own accounting procedures and are eligible costs to the WeSenseIt project.

IHE

IHE are spending approximately 27% of their total PM budget. The reason for the low person month consumption is with regards the charging method of PhD students. We do not consider the time of students to be included in the PM's instead claiming their costs and time as other direct costs. We are overspending slightly in budgetary terms.

EPFL

EPFL has committed 1.5PM as uncharged effort. We are spending 13PM's over our allocated budget and are only 4% over our allocated costs.

MU

Sue Tapsell changed from a full time to a part time role within our Centre and then retired in August. Budgeted time was allocated to Simon McCarthy contributing to a higher bias in spend towards Simon but at a lower monthly rate and so contributing to an overall reduced personnel spend but slightly higher PM spend. Final year budgeted personnel time for social research and preparation for demonstration exercises in the Netherlands case was not required. Also for the UK and Italy cases the budgeted longer term end user social research in relation to use of the observatories was not possible due to later than envisaged wider launch of the final observatories. An EU project review was not required. All these factors resulted in a slight underspend (5%) in direct personnel costs. The majority of budgeted Consumable costs were moved from WP3 to WP6 where they were required. Some of the budgeted Travel costs were allocated from WP6/7 to WP8 reflecting the emphasis in required work.

SSS

There are no significant deviations to report.

DSD

DSD have consumed only 84% of our budget and 81% of our budgeted person months. With the introduction of our financial management system in period 2 we were able to complete our part in the project for a lower effort and personnel rate. There has been no negative impact on our contribution to the project.

ADV

There are no significant deviations to report.

HR

HydroLogic Research has deviated from the budget allocation in the last period, this is explained per work package and per other costs.

WP3: The activities in this work package were already closed in the second period, HR has no changes to report on here.

WP4: Compared to previous reporting period, the total use of PM in WP4 has become more in line with the budget. The development activities were gradually changing from new development to testing and modification.

WP5: The activities in this work package were already closed in the second period, HR has no changes to report on here.

WP7: The realisation of PM is less than scheduled for period 3. However, the majority of the budget for this work package has been spent due to the involvement of more senior staff.

WP8: The budget for activities in WP8 have been exceeded. This is caused by a too optimistic budget allocation at the start of the project. For the WeSenseIt budget of HR the same tariff was used for each work package. However, exploitation and dissemination activities are usually performed by senior staff members. In fact the use of PM's in this work package was slightly lower than budget.

HR has also some deviations on the other costs such as travel budget. The budget that was allocated for traveling, equipment and consumables has not been used fully. Less costs were needed to fulfil the tasks. Also, several expenditures that were originally included for other direct costs had to be booked under subcontracting, according to the financial guidelines. Consequently the budget for subcontracting has been exceeded.

The remaining resources have been spent on PM as announced in the deviations of reporting period 2. Not all resources were needed as PM, which leaves a small amount of remaining budget by the end of the project for HR.

KNOW

KNOW have overspent in both PM's (114%) and budget (105%) due to our increased effort in WP4 where we have a leading role. As referenced in period 2 we employed less costly team members which meant that we could contribute more effort for a smaller amount of funding. There has been no negative impact on the projects goals due to this.

STARLAB

There are no significant deviations to report for the period.

SMIND

There are no significant deviations to report for the period.

DMBC

Underspending on PM's have continued as predicted in the final period of the project. All tasks have been completed as expected and there has been no negative impact on the projects goals.

AAWA

There are no significant deviations to report for the period.

QUIN

QUIN has deviated from the budgeted allocation of person months as we have employed lower salaried researchers to undertake tasks that we originally planned to be undertaken by higher salaried ones. This means that we could commit more effort for the same cost, with no impact on the expected outcomes or in the budget consumption.

From M37 onwards QUI has had resources made available to them through a third party, namely TechRain S.p.A., in order to complete the final phase of the project.
From 1 July 2016 Researchers that were part of the former Quinary WeSenseIt team (Clara Bagnasco, Giovanni Ferrari, Massimo Ferraro, Luca Monti) have become Tech Rain Employees.

From 1 July 2016 to 30 September 2016 the above mentioned team has worked in Quinary premises in via Bisceglie 76 Milano, following the plans that Quinary agreed with WeSenseIt partners during the plenary meeting in Milano (13-15 January 2016).

Table 3.1 Human effort per work package

EFFORTS PER ACTIVITY PER BENEFICIARY

Grant No	296322
Period	01.10.2015 - 30.09.2016
Project	Framework 7 Collaborative Project

Acitity Type	USFD	IHE	EPFL	MU	SSS	DSD	ADV	HR	KNOW	STARLAB	SMIND	DMBC	AAWA	QUI	TOTAL
RTD/Innovation Activities															
WP1 - Social and Physical Sensors	9.38		15.00		0.50	3.94	12.06		0.65	1.12					**42.65**
WP2 - Integrated Social and Physical Sensors Networks	7.00	1.11											12.45		**20.56**
WP3 - Adaptive risk-based models for social and natural processes		2.09		4.95											**7.04**
WP4 - Technological infrastructure	9.60							2.53	9.50	0.44				3.73	**25.80**
WP5 - Technological infrastructure							0.87		2.50		6.33			1.00	**10.70**
WP6 - Governance and social innovation		2.67		5.04											**7.71**
WP7 - Case studies	14.10	2.17	3.25	1.60	0.20	0.44	7.50	0.51	10.30			3.37		4.56	**48.00**
Total 'RTD'	**40.08**	**8.04**	**18.25**	**11.59**	**0.70**	**4.38**	**20.43**	**3.04**	**22.95**	**1.56**	**6.33**	**3.37**	**12.45**	**9.29**	**162.46**
Other Acitivies															
WP8 - Dissemination and exploitation	3.00	0.62	6.25	2.25	2.02	1.13	1.59	2.10	1.20	0.92			1.30	2.17	**24.55**
Total 'Other'	**3.00**	**0.62**	**6.25**	**2.25**	**2.02**	**1.13**	**1.59**	**2.10**	**1.20**	**0.92**	**0.00**	**0.00**	**1.30**	**2.17**	**24.55**
Consortium Management Acitivies															
WP9 - Project Management	12.11	1.86													**13.97**
Total 'Managment'	**12.11**	**1.86**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**13.97**
TOTAL BENEFICIARIES	**55.19**	**10.52**	**24.50**	**13.84**	**2.72**	**5.51**	**22.02**	**5.14**	**24.15**	**2.48**	**6.33**	**3.37**	**13.75**	**11.46**	**200.98**

Table 3.2 Human effort per work package (cumulative)

Workpackage	WP1		WP2		WP3		WP4		WP5		WP6		WP7		WP8		WP9		TOTAL per Beneficiary	
	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual total	Planned total
1 - USFD	24.38	20.00	17.75	14.00	-	-	31.97	28.00	-	-	-	-	30.31	20.00	6.00	6.00	43.18	42.00	153.59	130.00
2 - IHE	-	-	6.12	47.00	6.77	52.00	-	-	-	-	15.17	44.00	11.25	20.00	2.19	2.00	1.97	2.00	43.47	167.00
3 - EPFL	54.25	44.00	9.00	9.00	-	-	-	-	-	-	-	-	14.25	12.00	6.25	5.00	-	-	83.75	70.00
4 - MU	-	-	-	-	8.52	7.00	-	-	-	-	22.03	18.00	2.70	3.00	2.39	2.00	-	-	35.64	30.00
5 - SSS	22.20	22.00	-	-	-	-	-	-	-	-	-	-	3.80	4.00	3.02	3.00	-	-	29.02	29.00
6 - DSD	20.02	22.00	-	-	-	-	-	-	-	-	-	-	1.01	4.00	2.57	3.00	-	-	23.60	29.00
7 - ADV	15.93	16.00	-	-	-	-	-	-	2.48	2.50	-	-	9.51	6.50	2.97	3.00	-	-	30.89	28.00
8 - HR	-	-	-	-	4.03	8.00	23.71	22.00	3.08	4.00	-	-	6.45	9.00	3.56	4.00	-	-	40.83	47.00
9 - KNOW	11.37	10.00	-	-	-	-	42.99	21.00	4.66	5.00	1.47	-	16.17	8.00	1.70	3.00	-	-	78.36	47.00
10 - STARLAB	24.74	21.00	-	5.00	-	-	9.31	4.00	-	-	-	-	8.22	7.00	3.26	3.00	-	-	45.53	40.00
11 - SMIND	3.00	4.00	3.61	4.00	8.40	3.00	14.99	11.00	70.51	68.00	-	-	9.88	10.00	-	2.00	-	-	110.39	102.00
12 - DMBC	-	-	-	-	-	-	-	-	-	-	-	-	11.54	16.00	-	4.00	-	-	11.54	20.00
13 - AAWA	-	-	12.45	14.00	-	-	-	-	-	-	-	-	30.75	29.00	3.80	4.00	-	-	47.00	47.00
14 - QUI	-	-	2.05	3.00	-	-	24.72	23.00	5.80	6.00	-	-	17.54	10.00	3.42	3.00	-	-	53.53	45.00
TOTAL	175.89	159.00	50.98	96.00	27.72	70.00	147.69	109.00	86.53	85.50	38.67	62.00	173.38	158.50	41.13	47.00	45.15	44.00	787.14	831.00

Table 3.3 Budget vs Actuals for the period (costs)

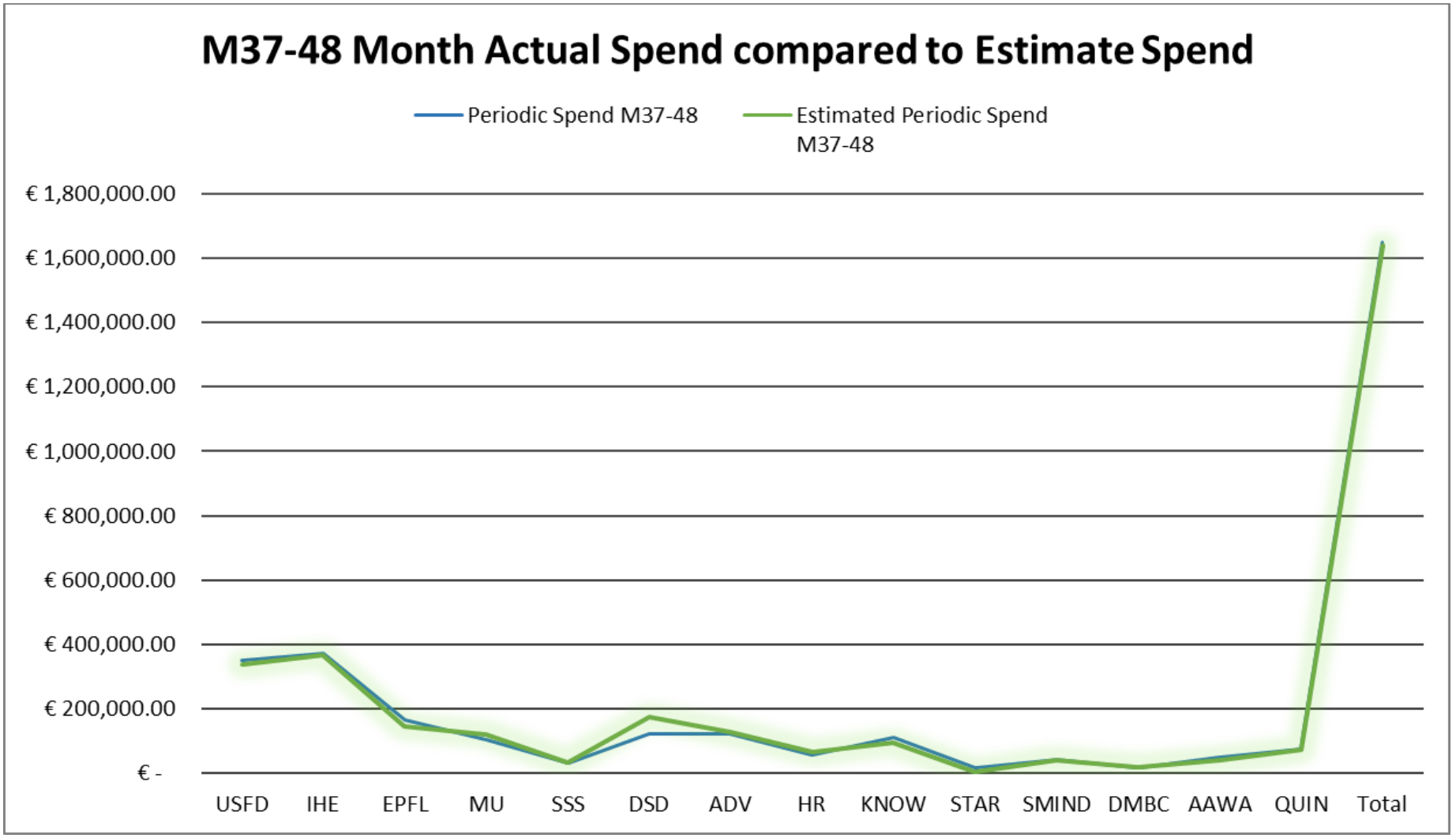


Table 3.4 Budget vs Actuals for the full period (costs)

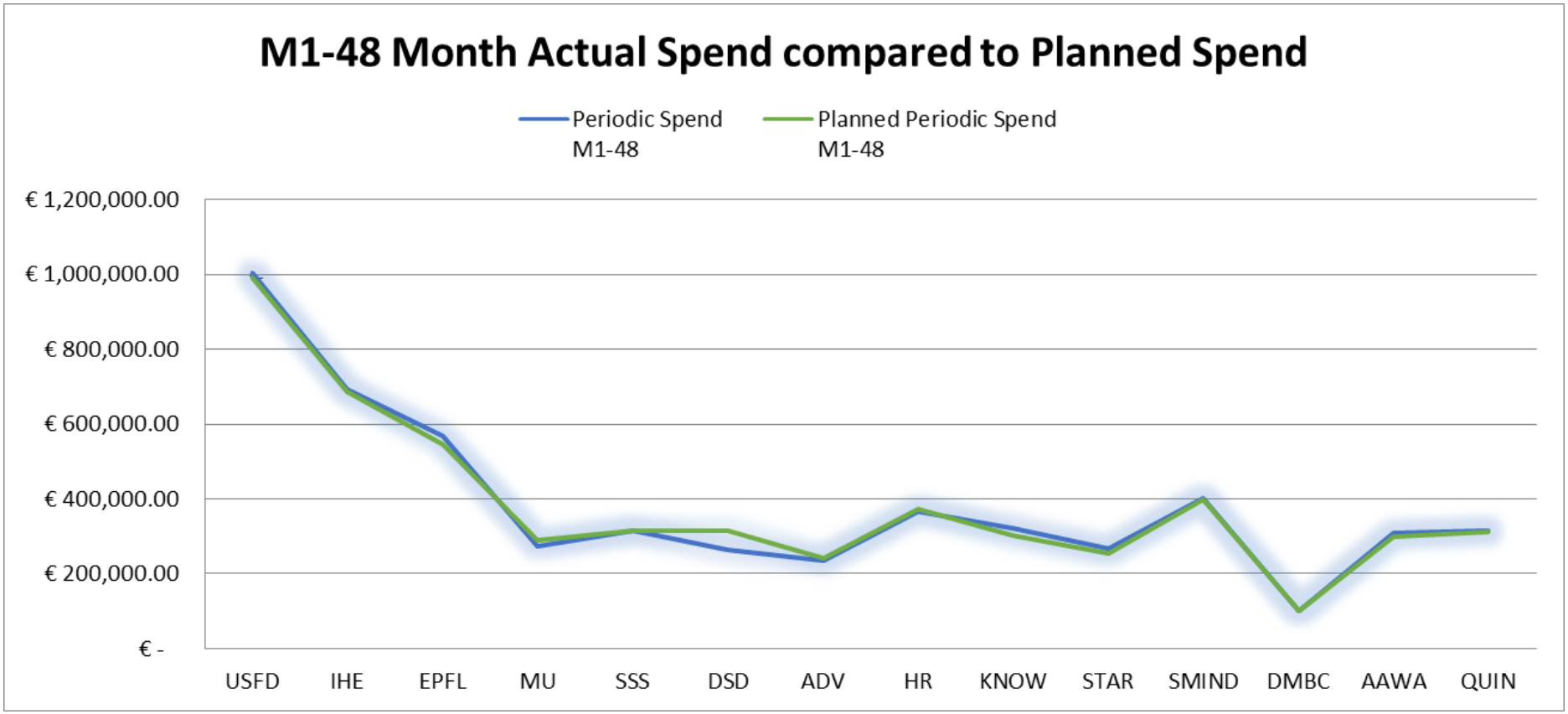


Table 3.5 Key personnel effort according to DoW

Participant's short name	Name of the key personnel (as in DoW)	Old total, carried over from last report	PM for this period	New total
USFD	Fabio Ciravegna	7.2	3.6	10.8
	Eckart Lange	3.6	1.2	4.8
	Vita Lanfranchi	7.14	0	7.14
IHE	Dimitri P. Solomatine	4.07	1.71	5.78
	Uta Wehn de Montalvo	5.33	1.08	6.41
	Leonardo Alfonso	7.89	4.07	11.96
	Jaap Evers	0.51	0	0.51
	Lobbrecht	0.71	0	0.71
	Peter Stroo	0.03	0	0.03
	Maria Rusca	0.75	0	0.75
	Andreja Jonoski	0.02	0.2	0.22
EPFL	Marc B. Parlange	0	0	0
	Tristan Brauchli	28	12	40
	Steven Weijs	24	0	24
	Hendrik Huwald	7.5	1.5	9
MU	Sue Tapsell	4.32	1.31	5.63
	Simon McCarthy	13.82	8.5	22.32
	Christophe Viavattene	3.66	4.03	7.69
HR	Arnold Lobbrecht	4.29	0.36	4.65
	Slavco Velickov	2.53	0	2.53
	Roland Price	1.37	0	1.37
SSS	Guillermo Barrenetxea	0	0	0
K-Now	Sam Chapman	0.7	0	0.7
	Rodrigo Carvalho	4.43	0	4.43
	Paul Ridgeway	0	0	0
DSD	Stijn de Jong	5.98	0	5.98
	Jeroen Netten	8.59	0	8.59
	Nick van de Giesen	3.25	0.11	3.36
	Rolf Hut	5.61	0.15	5.76
ADV	jose J. de las Heras	1.83	0	1.83
	Sara Prior	1.39	8.76	10.15
	María Mendoza	0.82	1.39	2.21
	Manuel Fernandez	0.29	4	4.29
	Luis López	0.22	2.22	2.44
	María Eugenia Moreno	0.11	0	0.11
	Alberto Cantalejo	1.01	0	1.01
	Gerardo Glorioso	3.27	1	4.27
STAR	Enric Sola	19.89	0	19.89
	Antonio Repucci	0.8	0.38	1.18
	Ellizabeth Gil	5.45	0.23	5.68
	Esteve Farres	6.5	0	6.5

Participant's short name	Name of the key personnel (as in DoW)	Old total, carried over from last report	PM for this period	New total
SMIND	Marcin Sieprawski	0	0	0
	Grzegorz Tabor	0	0	0
	Rafal Janik	20.19	6.33	26.52
	Adam Dabrawski	11.41	0	11.41
	Milosz Mazurek	21.08	0	21.08
	Wojciech Kozak	11.08	0	11.08
	Rafal Ciesielski	16.91	0	16.91
	Jan Stanislawski	2	0	2
	Maciej Starzyk	3.96	0	3.96
	Wojciech Klapyta	3.9	0	3.9
	Sabina Politylo	2.31	0	2.31
DMBC	Rosalind McDonagh	2.31	0.67	2.98
	Debbie Ward	2.92	1.53	4.45
	Gill Gillies	0.58	0.03	0.61
	Mark Watson	0.1	0.41	0.51
	Andrea Czlapka	0.15	0.04	0.19
AAWA	Michele Ferri	6.6	0	6.6
	Martina Monego	0.8	0.2	1
	Francesco Baruffi	3.4	0	3.4
QUI	Luca Gilardoni	2.23	0	2.23
	Massimo Ferraro	9.6	2.2	11.8
	Silvia Mazzia	1.91	0	1.91
	Clara Bagnasco	7.27	2.96	10.23
	Luca Rossitto	6.3	0	6.3
	Emanuele Gian	5.51	0.37	5.88
	Luca Monti	4.45	3.15	7.6
TOTAL		**343.85**	**75.69**	**419.54**

Explanations on changes in Key personnel

USFD

Dr Vitaveska Lanfranchi is now working for partner KNOW. There are no further deviations to report.

IHE

As referenced in period 2, Jaap Evers, Lobbrecht, Peter Stroo and Maria Rusca are no longer committing any effort to the WSI project. The work has been continued by the core project team and there has been no impact on the work due to this.

EPFL

As referenced in period 2 Marc B. Parlange is not charged directly to the project.

HR

As referenced in the period 2 report Prof. Roland Price retired and Slavco Velickov left the company.

SSS

As referenced in period 2 report Guillermo Barrenetxea left SSS at the end of July 2013. He was replaced by Davis Daidié an EPFL engineer specialising in remote systems, data loggers and weather measurement devices.

KNOW

As referenced in the period 2 report Sam Chapman is no longer working for KNOW and has been replaced by Vita Lanfranchi from USFD who has significant expertise in this area (as she

was named key staff there). Rodrigo Carvalho and Paul Ridgeway are no longer working at KNOW thus will not be contributing any time.

DSD

Stijn de Jong left DSD at the end of January 2014, Jeroen Netten left DSD at the end of 2014.

ADV

As referenced in the period 2 report Marta Eugenia Moreno and Alberto Cantalego are no longer working for ADV.

STAR

Enric Sola left the Company in April 2015 and Esteve Farres left the Company in February 2014. As mentioned previously Antonio Repucci and Esteve Farres are no longer working for StarLab

SMIND

As referenced in the period 2 report we now have only Rafel Janik committing any time to the project that is charged.

AAWA

Martina Monego and Francesco Baruffi are no longer working at AAWA as detailed in the period 2 report.

QUI

Luca Gilardoni, Silvia Mazzia and Luca Rossitto are no longer committing any time to the WSI project as referenced in the period 2 report.

Summary Financial Report

Available in FORCE

Certificates

List of Certificates which are due for this period, in accordance with Article II.4.4 of the Grant Agreement.

Beneficiary	**Organisation short name**	**Certificate on the financial statements provided? yes / no**	**Any useful comment, in particular if a certificate is not provided**
1	USFD	No	Expenditure threshold not reached
2	IHE	Yes	Certificate uploaded in portal
3	EPFL	No	Expenditure threshold not reached
4	MU	No	Expenditure threshold not reached
5	SSS	No	Expenditure threshold not reached
6	DSD	No	Expenditure threshold not reached
7	ADV	No	Expenditure threshold not reached
8	HR	No	Expenditure threshold not reached
9	KNOW	No	Expenditure threshold not reached
10	STARLAB	No	Expenditure threshold not reached
11	SMIND	Yes	Certificate uploaded in portal
12	DMBC	No	Expenditure threshold not reached
13	AAWA	No	Expenditure threshold not reached
14	QUI	No	Expenditure threshold not reached