

## Coordinator's vision



We know the images from the newspaper: cars floating through tunnels, citizens equipped with boots, umbrellas and pump hoses to free their floors of flood waters. They show how localised storms with heavy rainfall can have disruptive consequences for private lives and the urban economy. Accurate information about rainfall and flooding is needed to be able to prevent such damage. This information, however, is very difficult to acquire, especially for cities with their highly variable urban landscapes that cause storms and water flows to move in unpredictable ways. Whether we want to model flooding, explain occurred flood damage or flood complaints, accurate rainfall data are an absolute necessity and precisely this type of data is lacking for urban areas.

That is why we started the RainGain project: to obtain detailed data about peak precipitation and flooding at an urban scale. Rainfall radars will be implemented at four pilot locations: Leuven, London, Paris and Rotterdam, using the latest available technologies. The pilots serve as test sites to demonstrate the capabilities of radar technology for urban rainfall estimation and forecasting. The pilots represent a variety of urban characteristics, where different types of radar technologies will be tested; RainGain thus provides an outstanding platform to test the implementation of rainfall radars in urban areas.

Radar data will be used in detailed urban flood models to simulate and predict urban flooding down to the level of individual households. This information will help water managers in the cities to react adequately to heavy precipitation and to develop effective solutions for improved flood protection, such as warning systems and optimisation of storage capacity. Water managers from the four pilot cities are actively involved in the RainGain project to make sure the developed rainfall and flood data products are made fit for use in water management practice.

I'm very much looking forward to the interactions and discussions between radar experts, urban hydrologists and water practitioners that are to take place during our biannual project meetings. And to the first results of the urban radars and flood models that will become available over the coming half year. In this newsletter you will find more information about the pilot locations where rainfall radars and flood models will be implemented. More details of project activities can be found in the work package descriptions. If the information in this newsletter has triggered you to become more closely involved in RainGain, we cordially invite you to attend one of our annual National Observer Group meetings in Belgium, France, the Netherlands or the UK or one of the international project events. More information is available in this newsletter.

Please enjoy reading our first newsletter and I sincerely hope to see you at one of our project events

Kind regards,

**Marie-claire ten Veldhuis**  
TU Delft, the Netherlands



## RainGain in brief

- RainGain provides innovative tools for timely and accurate forecasting of urban pluvial flooding, which enables timely responses to this type of events in order to protect critical population and infrastructure.
- RainGain is based on EU-funded transnational cooperation between people and authorities, which allows to develop a high common level of knowledge and efficiency in tackling urban pluvial flooding to protect European citizens.
- RainGain aims to disseminate and make available the tools and methodologies developed in the project, so that its target groups are informed, educated, involved and mobilised so that vulnerability to urban pluvial flooding is reduced.

## The role of National Observer Group (NOG)

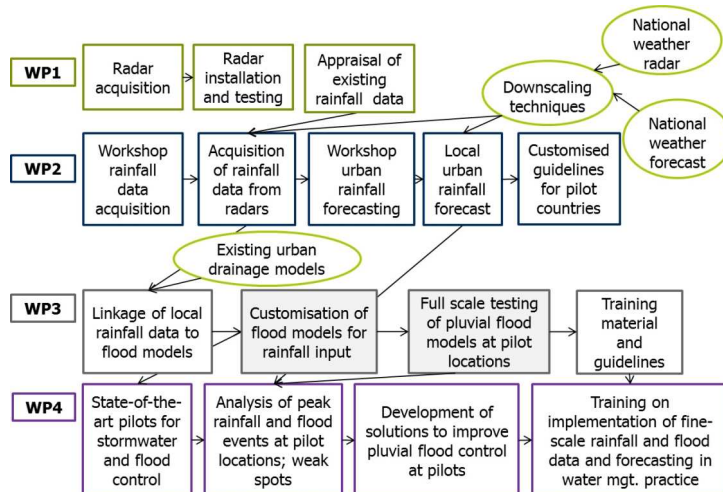
An important feature of the RainGain project is the practical implementation of the knowledge and tools for fine-scale rainfall data, urban flood modelling and prediction that will be developed in the project. National Observer Groups are created in each of the four partner countries for this purpose. Observers from city councils, water companies, weather agencies, environmental and planning agencies will come together in yearly meetings.



The National Observer Group meetings will be used distribute information generated in the RainGain project, to exchange experiences with and between practitioners from different organisations and to provide training for the implementation of project results.

## Work structure

The overall project is divided in four different phases or work packages (WP1 – WP2 – WP3 – WP4) covering all the relevant aspects of pluvial flood management:



### In this Issue:

- Coordinator's vision 1
- RainGain in brief 2
  - The role of National Observer Group (NOG) 2
  - Work structure 2
  - Active project team 2
    - WP1: Radar acquisition 2
    - WP2: Fine-scale rainfall data acquisition and prediction 3
    - WP3: Urban pluvial flood modelling and prediction 3
    - WP4: Implementation of fine-scale rainfall data, flood modelling and prediction into urban water management practice 3
- Diary of events 4
  - Upcoming events 4

## Active project team

WP1 – By Daniel Schertzer – LEESU – Ecole des Ponts ParisTech: *Radar acquisition*

**Action A1:** Acquisition of X-band radars: preparation and realisation of public tender procedures, detailed studies on location and installation, design of infrastructures (e.g. power and internet connections), getting the necessary authorisations for emission and infrastructures and selection of the best offer.

**Action A2:** Installation and testing of the radars, set up of internet platform for data transmission, validation of the obtained data set up operational data flow monitoring.





**Action A3:** Appraisal of rainfall data and downscaling models: investigation of all possible rainfall data sources, collection of rainfall data and quality assurance, review and appraisal of the existing rainfall downscaling models, and comparison of test site results.

**Action A4:** Future data use and resolving ownership of acquired radars: the radars will continue to function and deliver rainfall data after the end of the project period. During the project, a platform and agreements will be set up for future dissemination of rainfall data, after the project has ended. Investments WP1 I1 and I2 (one investment shared by 2 partners) of one radar to be acquired in the Netherlands.

### WP2 - By Patrick Willems - KU Leuven: *Fine-scale rainfall data acquisition and prediction*

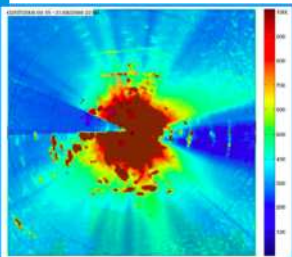
**Action A5:** Exchange of experiences gained on the use of fine scale (X-band and super-resolution C-band) radar data, combined with other existing rainfall data, for street level rainfall estimation. During an international workshop to be held in Leuven, in April 2012, attended by radar experts from the partner institutions and invited national radar experts from the partner countries, common methods will be agreed upon for street level rainfall estimation.

**Action A6:** Implementation of common method and technology for fine scale rainfall estimation (for present and past rain storms). The common method and technology agreed upon during the workshop WP2 A5 will be applied to all four pilot locations (Leuven, Paris, Rotterdam, London). The added-value of the X-band and super-resolution C-band radars will be shown by comparing the accuracy of the fine-scale radar estimates to the best estimates that could be made in the absence of the X-band or super-resolution C-band radar.

**Action A7:** Exchange of experiences on the real-time forecasting of fine scale rainfall, during an international workshop, to be held in 2014, attended by radar and rainfall forecasting experts from the partner institutions and invited national experts on numerical weather prediction. A common method will be agreed upon for street level rainfall forecasting.

**Action A8:** Based on the outcomes of the WP2 A7 workshop, the agreed common method for rainfall forecasting will be implemented for each of the four pilot locations (Leuven, Paris, Rotterdam, London), resulting in an operational system for local rainfall forecasting.

**Action A9:** Set up of customised guidelines for fine-scale rainfall estimation and forecasting in urban areas in the partner countries. The guidelines will allow the generic application of the technology in any urban area in NW Europe. Training and dissemination on these standards and technology will be provided national observer meetings.



### WP3 - By Ćedo Maksimović - Imperial College London: *Urban pluvial flood modelling and prediction*

**Action A10:** Adoption, customisation and automatic linkage of rainfall forecasts to pluvial flood models. The format of the rainfall data in each case study can be different and the flood models are also different. Therefore, rainfall data formats will be customised and converted into a format that can be directly fed into the flood models for specific cases. Protocols to carry out this procedure will be defined.

**Action A11:** Improvement and customisation of models for urban pluvial flood forecasting at fine scales in each of the pilot locations. Models that accurately represent urban flooding, taking into account the interaction between the flow on the surface (streets, parks, gardens, curbs, etc.) and the flow in the sewer system, but that are fast enough to allow real time prediction of urban pluvial flooding, will be set up at each pilot location with the support of ICL (UK). Models will be customised for each case study according to the characteristics of the area, the data that are available and the software that is operated locally. A common protocol for urban pluvial flood modelling and forecasting will be developed for transnational applications.

**Action A12:** Full-scale testing of the models for pluvial flood prediction in each of the pilot locations. Models will be tested using historical data of rainfall and flooding levels at strategic locations of the system. Thus, the ability of the models to predict urban pluvial flooding will be assessed and the uncertainties in the prediction will be quantified. Afterwards, real time operational tests will be undertaken.

**Action A13:** Development of guidelines and training material for capacity building and training of future end-users. Training material and guidelines will be designed based on the "common core" of the methodologies of WP3 that is to serve all partners. This also includes a pilot local flood plan and simplified "easy-to-understand" training material for the general public.

### WP4 - By Marie Claire Ten Veldhuis - TU Delft: *Implementation of fine-scale rainfall data, flood modelling and prediction into urban water management practice*

**Action A14:** Analysis of the current stormwater and flood control techniques at the pilot locations, as a starting point for development of improved solutions.



**Action A15:** Analysis of heavy rainfall event data and water system functioning at the pilot locations based on data from WP2. The information will be used to identify weak spots in the water systems at the pilot locations.

**Action A16:** Development of solutions for flood-prone locations and testing of the solutions based on rainfall data and flood models from WP2 and WP3. The results and practical applicability of fine-scale rainfall and flood data in water management practice will be evaluated based on interviews with relevant partners. The results of testing and evaluation will be presented and discussed at the final project conference in 2015.

**Action A17:** Training material on implementation of rainfall and flood data for development of flood control solutions will be prepared based on the results for the pilot locations. Training will be given during national observer meetings that will be held in each of the participating countries

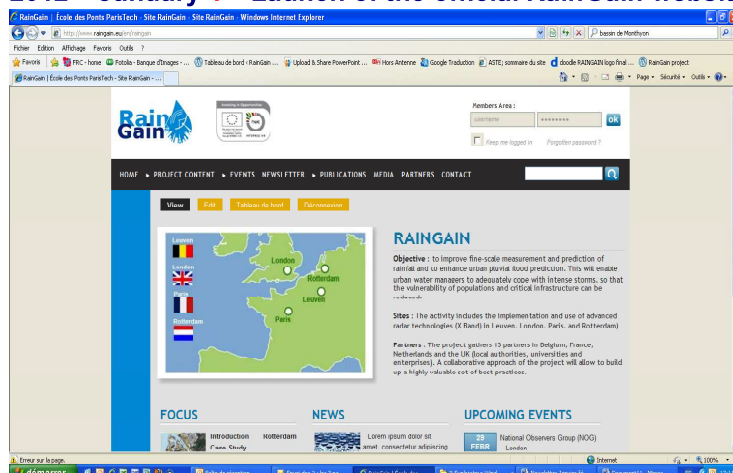
## Diary of events

### 2011 – November 18<sup>th</sup> Kick off meeting – Paris



The RainGain team – École des Ponts ParisTech

### 2012 – January 1<sup>st</sup> Launch of the official RainGain website



Follow RainGain at: [www.raingain.eu](http://www.raingain.eu)

## Upcoming events

### National Observer Group meetings

February 29<sup>th</sup>  
London



March 13<sup>th</sup>  
Rotterdam



April 18<sup>th</sup>  
Leuven



April 20<sup>th</sup>  
Paris



These meetings will provide an opportunity to learn more about the project, to discuss key aspects of pluvial flood management, and find out about opportunities to get involved in the project. The audience is expected to be around 30 specialists, practitioners, academics and local and central government policy-makers.

### WP2 International Workshop on “Fine-scale rainfall estimation”

April 16<sup>th</sup>  
Leuven



The aim of that workshop is to present and discuss (among international experts):

- Methods for fine-scale rainfall estimation combining rain gauge, X-band and C-band radar data
- Uncertainties involved in radar (and rain gauge) measurements
- X-band and C-band radar calibration and adjustment
- X-band versus super-resolution C-band radar data

### Feedback:

This is the first issue of the RainGain newsletter.

Help us to improve our future issues by sending us your feedback: [webmaster@raingain.eu](mailto:webmaster@raingain.eu)

Thank you for your time!

