

# UrbanFlood



## Acceptance of Internet Services to Combat Climate Change Induced Disasters

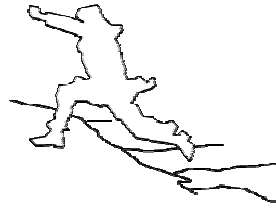
### Work Package 7 – D7.4

version 1.0, November 2010



## URBAN FLOOD

A project funded under the EU  
Seventh Framework Programme  
Theme ICT-2009.6.4a  
ICT for Environmental Services and  
Climate Change Adaption



Grant agreement no. 248767  
Project start: December 1, 2009  
Project finish: November 30, 2012

Coordinator

Urban Flood Project Office at TNO-ICT  
Prof dr Robert J. Meijer

Eemsgolaan 3  
PO Box 1416  
9701 BK Groningen  
The Netherlands

E : robert.meijer@tno.nl  
W : www.urbanflood.eu

**DOCUMENT INFORMATION**

Title	Acceptance of Internet Services to Combat Climate Change Induced Disasters
Lead Author	Bob Pengel (STOWA)
Contributors	
Distribution	Public
Document Reference	UFD7.4v1.0.STO

**DOCUMENT HISTORY**

Date	Revision	Prepared by	Organisation	Approved by	Notes
17-11-2010	V0.5	Bob Pengel	STOWA		First draft, review
30-11-2010	V1.0	Bob Pengel	STOWA		Final version

**ACKNOWLEDGEMENT**

The work described in this publication was supported by the European Community's Seventh Framework Programme through the grant to the budget of the Project **UrbanFlood**, Grant Agreement no. 248767.

**DISCLAIMER**

This document reflects only the authors' views and not those of the European Community. This work may rely on data from sources external to the UrbanFlood project Consortium. Members of the Consortium do not accept liability for loss or damage suffered by any third party as a result of errors or inaccuracies in such data. The information in this document is provided "as is" and no guarantee or warranty is given that the information is fit for any particular purpose. The user thereof uses the information at its sole risk and neither the European Community nor any member of the UrbanFlood Consortium is liable for any use that may be made of the information.

© **URBANFLOOD CONSORTIUM**



## 1 Introduction

Deliverable 7.4 is a deliverable in the category “other”. The deliverable, “Acceptance of Internet Services to Combat Climate Change Induced Disasters”, can be seen as a statement on the progress in the field – and as such is somewhat difficult to “prove”. As an UrbanFlood deliverable it can more usefully be interpreted as a result of the UrbanFlood project up to date. The results and the plans of UrbanFlood for the next years were presented and discussed in depth during the Joint International UrbanFlood & SSG4Env workshop “Monitoring and Flood Safety” on November 11 and 12, 2010 in Amsterdam, and during the first UrbanFlood Advisory Board Meeting, held on November 10.

The deliverable has been defined as the agreed statement of the workshop, which reflects the opinions of a broad and truly international group of experts in fields related to the UrbanFlood EWS, its ICT and Internet building blocks and its application in practical water and emergency management.

### 1.1 UrbanFlood

UrbanFlood is a project investigating the use of sensors within flood embankments to support an online early warning system, real time emergency management that UrbanFlood is developing. It is a project under the EU 7th framework Programme which started in December 2009 and will run for 3 years. Partners of UrbanFlood include TNO Information and Communication Technology, the University of Amsterdam and STOWA (Dutch acronym for the Foundation for Applied Water Research) from the Netherlands; HR Wallingford in the UK, ACC Cyfronet AGH in Poland and OOO Siemens in Russia.

### 1.2 SSG4Env

SSG4Env, short for “Semantic Sensor Grids for Rapid Application Development for Environmental Management” is a project which is demonstrating its developments in the computer science field using a coastal flood warning system. It is a multi-disciplinary project which aims to provide environmental management tools to key decision makers in a form that is simple, live and dynamic.

Critical flood management decisions depend on information provided by a variety of sources including legacy databases with historical data, real-time data from various instruments and sensors, mathematical models and simulations. Increasingly, information is available from networks of intelligent sensors, which can aid key decision making, but in turn present new challenges in how to use the additional information in an operational real time environment.

SSG4Env aims to make the powerful tools such as registries and ontologies now being developed in the computer science field available to users of environmental data, while UrbanFlood focuses on building an online, Internet based early warning system which makes use of dike sensor data.

## 2 Workshop “Monitoring and Flood Safety”

### 2.1 Planning

In the summer of 2010 the UrbanFlood project announced that it planned to organize an international workshop. Meanwhile, discussions with the SSG4Env project showed that this project has much in common with UrbanFlood while the overlap is limited. The logical conclusion was to combine forces and offer an even more interesting joint workshop on the use of sensors and early warning systems to make us all safer from flooding. Both 7th framework projects are supported by the European Union.

UrbanFlood and SSG4Env have invited international researchers, practitioners and policy makers in the fields of sensors, ICT and Flood Early Warning, and discussed the interim results and plans of the two projects.

The joint UrbanFlood & SSG4Env International Monitoring and Flood Safety Workshop was held at Grand Café Frankendael, Middenweg 116 in Amsterdam, the Netherlands on Thursday 11th and Friday 12th November 2010.

The goals of the workshop were: Sharing of the UrbanFlood and SSG4Env project results; learning from others in the field and exchange of knowledge and experience and looking for possibilities to cooperate. Presentations and discussions are grouped under 4 themes:

Theme 1: Sensing; theme 2: ICT; theme 3: Modelling; theme 4: Trials (Application-Implementation).

### 2.2 The workshop and results

Against a backdrop of storm and rain a truly international group of over 60 experts from 9 different countries gathered in Amsterdam to look at the future of flood safety: modern sensor techniques, models, real-time monitoring and the Internet. For each of the workshop themes several thought-provoking presentations were given. The Dutch LiveDijk and Geobeads were presented, but also examples and experiences from the USA, the UK, France, Russia, Poland and the Czech Republic. The (concept) Early Warning System of UrbanFlood was demonstrated to a very interested public.

All presentations are available on video, see the project website [www.urbanflood.eu](http://www.urbanflood.eu). At the website you can also find several of the workshop documents: the programme (pdf); detailed programme and abstracts (pdf) and list of participants (pdf, also as Annex to this report). During the breaks UrbanFlood and SSG4Env applications were demonstrated.

The workshop concluded with a plenary discussion titled: “Towards European Cooperation on Flood Protection”. In this session the workshop statement, which is detailed in the next Chapter, was discussed and approved.

### 3 Workshop Statement

**“Sensor information combined with an appropriate “cyber-infrastructure” can be used to better monitor and manage our flood defenses and thus combat climate change induced disasters”**

This statement was discussed during the final plenary session of the Joint International UrbanFlood & SSG4Env workshop “Monitoring and Flood Safety” (12 November 2010, Amsterdam). The participants agreed with this general statement, and noted that for a viable UrbanFlood Early Warning system the following issues need close attention:

- *Sensor networks can be important tools in Early Warning and in day to day management of flood defenses*
- *The right data has to be available at the right time to the right person in the right format.*
- *Practical applications exist in the Netherlands, the UK, the USA, the Czech Republic and France.*
- *Ideas on the important parameters and methods to measure them are available*
- *Methods to translate sensor data into relevant parameters as well as simulation methods have to be improved*
- *Reliability and bandwidth are important factors to consider*
- *It is of the utmost importance to involve the end user in the entire development process so they can get results they can really use and really want to have:*
  - *Make an inventory of the wishes and requirements of the intended user*
  - *Make sure you stay in close contact with the user during the development; taking the results of an initial survey, hiding in a room for 3 years to develop a great system and then presenting the end result to the world does not work.*
  - *Support the end user in implementation of the system and open a conduit for feedback; ensure that the feedback is indeed used to upgrade the system*
  - *Ensure some sort of support after the end of the project*
- *Important other issues from the discussion are:*
  - *Roadmap*
  - *Scientific publications*
  - *Business case*
  - *Governance*
  - *Window of opportunity*
- *UrbanFlood will produce a first version of the roadmap*
- *Urban Flood will produce a website for (among others) an inventory of expertise*

It is clear that Work Package 7, Dissemination and Standardization, will have to play a major role in ensuring that the stakeholders stay involved; however, the developers will need to keep this very important aspect high on their agenda too.

## *Annex 1 List of Workshop Participants*

### LIST OF PARTICIPANTS

<b>Name</b>	<b>Organisation</b>	<b>Country</b>
Tarek Abdoun	Rensselaer Polytechnic Institute	USA
Evert van den Akker	TNO Informatie en Communicatietechnologie	NL
Olivier Artieres	TenCate Geosynthetics France S.A.S.	France
Sander Bakkenist	BZ Innovatiemanagement BV	NL
Bartosz Balis	Cyfronet AGH	Poland
Jackie Banks	Environment Agency	UK
Robert Belleman	UvA	NL
Adam Belloum	UvA	NL/Alg.
Dr. Vojtech Benes	G IMPULS Praha, spol. s r.o.	CZE
Harry Bos	VolkerWessels Telecom	NL
Dr. Zuzana Boukalova	Regional Environmental Center CR	CZE
Jacqueline Bredius	STOWA	NL
Jeroen Broekhuijsen	TNO ICT	NL
Marian Bubak	Cyfronet AGH	Poland
<i>Filip Cejka</i>	<i>VODNÍ ZDROJE, a.s.</i>	<i>CZE</i>
<i>Mihai Cristea</i>	<i>UvA</i>	<i>NL</i>
Professor Mike Clark	GeoData (university of Southampton)	UK
<i>Gerrit Dortland</i>	<i>TenCate Geosynthetics Netherlands bv</i>	<i>NL</i>
Edouard Durand	Centre d'Etudes Techniques de l'Equipement Normandie Centre (CETE NC)	France
Stefan Flos	SJF Projects & Support	NL
Alex Frazer	Electronics and Computer Science (University of Southampton)	UK
Ben Gouldby	HR Wallingford Ltd.	UK
<i>Cor Groeneweg</i>	<i>YSI</i>	<i>NL</i>
Prisca Haemers	Rijkswaterstaat, Centre for Water Management	NL
<i>Geeralt van den Ham</i>	<i>Deltares</i>	<i>NL</i>
Bram Havers	IBM Global Business Services	NL
Craig J. Hickey	National Center for Physical Acoustic, University of Mississippi	USA
Dr. Craig Hutton	GeoData (university of Southampton)	UK
Marc Igigabel	CETMEF (Centre d'Etudes Techniques Maritimes et Fluviales)	France
Christiaan Jacobs	Waterschap Noorderzijlvest	NL
<i>Ed King</i>	<i>YSI</i>	<i>NL</i>
Tijs de Kler	SARA	NL
Andre Koelewijn	Deltares	NL
Valeria Krzhizhanovskaya	UvA	RU / NL
<i>Bernhard Lang</i>	<i>OOO Siemens</i>	<i>Russia</i>
Fabrice Lecornu	Ifremer	France
Kirk Martinez	Electronics and Computer Science (University of Southampton)	UK
Martin van der Meer	Fugro Water Services	NL



Name	Organisation	Country
Robert Meijer	TNO ICT	NL
Natalia Melnikova	UvA	RU / NL
<i>Ilya Mokhov</i>	<i>OOO Siemens</i>	<i>Russia</i>
<i>Mark Morris</i>	<i>HR Wallingford Ltd.</i>	<i>UK</i>
Robin Newman	SSG4Env - Emu Ltd.	UK
Job Nijman	Fugro Water Services	NL
Pieter-Christiaan van Oranje-Nassau, van Vollenhoven	Custodia	NL
Artem Ozhigin	OOO Siemens	Russia
Nico Pals	TNO ICT	NL
<i>Mark Pehlig</i>	<i>Fugro Ingenieursbureau B.V.</i>	<i>NL</i>
Bob Pengel	STOWA	NL
Gerhard Pevny	Logotronic	Austria
Erik Peters	Alert Solutions BV	NL
Patrick Pinettes	TenCate France	France
Reinhard Pohl	Technische Universität Dresden	DU
Ing. R.D. (Rob) van Putten	Waternet Ingenieursbureau	NL
Alexander Pyayt	OOO Siemens	Russia
Niall Quinn	University of Southampton	UK
Samantha Roe	SSG4Env - Emu Ltd.	UK
Fajran Iman Rusadi	UvA	NL/?
<i>Simone van Schijndel</i>	<i>Deltares - Delft Hydraulics</i>	<i>NL</i>
<i>Dr. Baldev Setia</i>	<i>MM Engineering College, Nat. Inst. of Technology Kurukshetra</i>	<i>India</i>
Warren Shallcross	SunWater Limited ACN 131 034 985	AUS
Michael Sharp	USACE, Engineer Research & Development Center	USA
Gleb Shirshov	UvA	RU/ NL
Jonathan Simm	HR Wallingford Ltd.	UK
ir L.J.M. Smeets	Agentschap NL	NL
Rémy Tourment	CEMAGREF Groupement d'Aix en Provence	France
Roelof Versteeg	Sky Research	USA
<i>Pepijn van der Vliet</i>	<i>Alert Solutions BV</i>	<i>NL</i>
Reinhard Vogt	Hochwasserschutzzentrale Köln	DU
Bram van der Waaij	TNO	NL
Matt Wadey	University of Southampton	UK
Yogev Wallach	Custodia	-
Ludolph Wentholt	STOWA	NL
H. Wiering	VolkerWessels/Landustrie?	NL
<i>Grazyna Wojcieszko</i>	<i>European Commission</i>	<i>EU</i>
Prof. Mourad Zeghal	Rensselaer Polytechnic Institute	USA
Wouter Zomer	BZ Innovatiemanagement BV	NL

**Total participants: 77**

*\* note: italics means not present during (part) of the workshop*

## **Annex 2**                      **Detailed Workshop Programme**

### **Thursday morning, 11 November**

09:30 to 10:00	<i>Registration / coffee</i>
10:00 to 10:15	Welcome / goals for the workshop – <i>Nico Pals</i>
10:15 to 10:45	About UrbanFlood / introduction to the themes – <i>Rob Meijer</i> The role of Users in the SG4E project - <i>Craig Hutton</i>
10:45 to 12:30	<b>Theme 1 - Sensing</b>
<i>10:45-11:05</i>	Development of a Multiscale Monitoring and Health Assessment Framework for Effective Management of Flood-Control Levee Infrastructure – <i>Mourad Zeghal and Tarek Abdoun, Rensselaer Polytechnic Institute, USA</i>
<i>11:10-11:40</i>	<i>Coffee break + demo + poster presentations + info market</i>
<i>11:40-12:00</i>	Early Detection of Dams and Dikes Anomalies with a Fibre-Optics Based Monitoring Solution (Artières, P. Pinettes, C. Guidoux, Y.-L. Beck, J.-R. Courivaud, J.-J. Fry, G. Dortland) – <i>Olivier Artières, TenCate Geosynthetics, and Patrick Pinettes, geophyConsult, France</i>
<i>12:05-12:25</i>	GeoBeads, multi-parameter sensor network for levee monitoring – <i>Erik Peters, Alert Solutions, NL</i>
12:30 to 13:30	<i>Lunch break + demo + poster presentations + info market</i>

### **Thursday afternoon, 11 November**

13:30 to 15:15	<b>Theme 2 - ICT</b>
<i>13:30-13:50</i>	Sensor networks and the semantic web - <i>Kirk Martinez, University of Southampton's Electronics and computer sciences department, UK</i>
<i>13:55-14:20</i>	Common Information Space, a framework for creating and hosting Early Warning System – <i>Bartosz Balis, PhD, Cyfronet AGH, Poland</i>
<i>14:25-14:45</i>	Machine Learning Methods for Environmental Monitoring and Flood Protection (Alexander Pyayt, Bernhard Lang, Ilya Mokhov, Artem Ozhigin) – <i>Alexander Pyayt and Artem Ozhigin, OOO Siemens, Russia</i>
<i>14:50-15:10</i>	The Strength of Solid Data..... – <i>ir. M.T. van der Meer, Fugro Water Services, NL</i>
15:15 to 16:00	<i>Coffee break + demo + poster presentations + info market</i>

16:00 to 17:30	<b>Theme 3 - Modelling</b>
16:00-16:20	Coastal Flood Modelling – <i>Robin Newman Emu Ltd, UK</i>
16:30-16:50	The UrbanFlood multiscale modelling cascade and Virtual Dike for simulation of dike stability under dynamic hydraulic loading – <i>Valeria Krzhizhanovskaya and Natalia Melnikova, University of Amsterdam/StPSPU, NL/Russia</i>
17:00-17:20	Use of artificial intelligence methods in complex flood defence reliability analysis – <i>Ben Gouldby, HR Wallingford, UK</i>
17:30 to 18:30	<i>demo + poster presentations + info market</i> <i>Drinks (offered you by STOWA)</i>
18:30 onward	<i>Social Dinner</i>

### Friday morning, 12 November

08:30 to 09:00	<i>coffee + demo + poster presentations + info market</i>
09:00 to 10:45	<b>Theme 4 – Application &amp; Implementation</b>
09:00-09:20	Empowering Stakeholders in Flood Management and Response (M.Clark; C.Hutton) – <i>Professor Mike Clark, director of the GeoData Institute, University of Southampton, UK</i>
09:30-09:50	Improvement of the inspection of dikes by GMS in the Czech republic (V. Beneš, G IMPULS Praha spol. s r.o.; Z. Boukalová, VODNÍ ZDROJE, a.s.) – <i>Vojtech Benes, Czech Republic</i>
10:00-10:15	LiveDijk Eemshaven: the first sensor network in a sea dike – <i>Sander Bakkenist, BZ Innovation Management BV and Christiaan Jacobs, Water Board Noorderzijlvest, NL</i>
10:20-10:35	Monitoring of embankments in the UK – <i>Jonathan Simm, HR Wallingford, UK</i>
10:45 to 11:30	<i>Coffee break + demo + poster presentations + info market</i>
11:30 to 12:30	Discussion: Towards European Cooperation on Flood Protection
12:30 to 13:00	Closing remarks – <i>Rob Meijer</i>
13:00 onwards	<i>Lunch + demo + poster presentations + info market, departure</i>

**Demonstrations:**

Interactive simulation and visualisation for early warning systems: live demo on a multitouch table. *Rob Belleman, Fajran Iman Rusadi, Gleb Shirshov and Valeria Krzhizhanovskaya, University of Amsterdam, and Jeroen Broekhuijzen, TNO*

Generating Early Warning Systems: Live examples of three different Early Warning Systems.

*Jeroen Broekhuijzen (TNO), Bartosz Balis (Cyfronet), Artem Ozhigin (Siemens), Alexander Payayt (Siemens), Tomasz Bartynski (Cyfronet), Marek Kaztelnik (Cyfronet)*

SensorGrid4Env Flood Demonstrator

*Jason Sadler, Craig Hutton, Oles Kit (GeoData)*