



EUROPEAN  
COMMISSION

Community Research



## D8.5 Citizen involvement report

Grant agreement number	224416
Project acronym	HYDROSYS
Project title	Advanced spatial analysis tools for on-site environmental monitoring and management
Funding scheme	CP/STREP
Date of latest Annex I against which the assessment will be made:	October 31, 2009
Date of delivery	September 26, 2011 (updated version)
Dissemination level	Public (PU)

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## Summary

This report describes the various actions that have taken place to involve the general public (“citizens”) in the HYDROSYS project, highlighting the methods and potential impact, and summarizing the various actions. Citizens have been successfully included in various stages of the project, thereby raising the awareness of the project’s outcomes and potential usefulness.

Throughout the project, citizens were involved by means of the following: presentations, hands-on activities, and demonstrations. Target groups of citizens included elementary and secondary school students, teachers, and community organizations with an interest in hydrology. In addition, during public events as well as the Nordic scenarios, the “general public” was involved directly.

A total of 13 actions involving citizens were taken over the course of the project. With these events and activities targeting groups of citizens, knowledge of Hydrosys technology has been disseminated among a diverse population. Events and activities ranged from a dozen to more than a thousand participants. For example, EPFL hands-on activities for young students included learning about how we are all connected through the hydrologic cycle, then learning how we monitor parts of this cycle with sensorscope (with a group of 30 students). In contrast, more than 5000 people attended the Infratech exhibition in May 2011, where Aalto, HIIT, TUG, Luode presented their final mobile applications and provided hands-on demonstrations for participants. At the SLF anniversary event (March 2011, ~1500 attendants), a Hydrosys demonstration was held.

The involvement of citizens allowed us to assess general interest and “accessibility” to the applications shown, as well as input from citizens regarding future directions for hydrological technology research. We obtained valuable input with which we could improve our various interactive visualization components at the mobile applications, and discussed general usability issues for using the concept of HYDROSYS technology was not always well understood, especially by older citizens. Younger citizens seem to be more receptive and were involved with monitoring campaigns and other activities along the way. In general, the cell phone applications seem better suited for the general public, whereas handheld systems are more focused on specialists. As such, results of these actions include improvement of the hand-held user interfaces and physical design.

The short-term impacts of these citizen involvement activities include improving environmental education and awareness of the general population. Long-term impacts should be felt most directly by the younger generation, with elementary and secondary school students and teachers learning about technology for hydrology through direct hands-on activities.

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# 1 Introduction

This report provides a general overview of the various actions in which citizens have been involved in the HYDROSYS project. Citizens have been one of the target groups of the HYDROSYS project, and have had a special role in the project: they form the only target group that has no direct geosciences background, and is normally not involved in the monitoring of environmental processes.

Citizen involvement has been a “background movement” in the project, which builds atop the opening of both the systems and the data, making it available to a wide public. In general, the data generated within the project, as well as the developed systems can be made available to researchers, professional users, as well as the public.

Below, we provide a short overview of the main methods used, and the impact that is expected to be achievable on the long run. In the remainder of the document, we summarize some of the key actions, and provide a general overview of all the other smaller events.

## 1.1 Methodology

Citizens have been involved in the HYDROSYS project in three different ways. These ways address different goals and can be seen as complementary actions, even though the underlying premise is the same: promote awareness of the project outcomes, and potentially interest in its usage.

### Further reading

It is recommended to also read report D9.5, which summarizes all the dissemination actions performed in the project. This also includes general promotion methods such as the website or brochures, which also have been accessed by citizens.

- **Public dissemination:** via the web-site, but also through public events, the public has been informed in “simplified ways” on what actions have been performed in the project, what results have been achieved and how these results could be useful.
- **Educational sessions:** several sessions, in particular open days and other public demonstrations at universities, have been organized to show and promote the potential usefulness of using the research systems for explaining environmental concepts in a school-like setting.
- **Scenarios:** in particular in the Nordic scenarios, citizens have been included in monitoring exercises at the sites.

## 1.2 Expected longer term impact

In the long term, we expect that the HYDROSYS outcomes could affect, or support the following impacts:

**Raise public awareness:** in particular the “front-ends” of the project (the mobile clients) can be used to raise the awareness on natural resources by sharing information on consumer systems.

**Educational value:** requiring a basic understanding of the application, the mobile clients can be used to visually experience the consequences of environmental

degradation, by showing data representing environmental processes directly in context to the real environment.

To secure potential impact, in particular the cell phone has been proven useful. It (a) represents an open platform that is widely available and is (b) quite straightforward (understandable) in its functional approach. The cell phones are front-end applications run on top of GSN to provide access to top-level environmental information. These applications should be freely available and usable without much instruction. In comparison, the handheld application supports a slightly more complex interaction and visualization approach, which has proven to be more useful for in particular specialists.

## 2 Descriptions of selected events

In this section, we describe a number of selected events. For a full overview of all actions, please refer to the appendix at the end of this document.

### 1.1 Public dissemination: Davos public final event

Various demonstrations on HYDROSYS was given to the broad public at the WSL/SLF anniversary public event in Davos, March 20th.

The SLF had organized a large scientific outdoor- marked with contributions from the different research groups operation at the SLF. The anniversary was a joint event with the Swiss Alpine Club of Davos who celebrated its 125 year existence. The interested people could take the opportunity to get a large bunch of information on the scientific and operational activities of the WSL Institute for Snow and Avalanche Research. In total 19 pavilions, each of them dealing with a specific topic of one SLF research group, provided a diverse offer of scientific information and interactive activities.

There were stands which showed how the daily avalanche bulletin is being created, others showed interactively how to protect buildings and roads from avalanches. Moreover people could try if they would be suitable as test pilot for skis, and the diversity of the alpine flora was presented. Analysing the annual circlets of a tree trunk, scientists explained the life of a tree to the people and it was possible to explore how a snow profile is being measured, how snow relates to discharge and how permafrost looks like.

Hydrosys had an own stand where the project could be demonstrated to the interested public. The stand consisted of some poster-boards where Hydrosys and Swissex were explained and where the aims and the state of the projects were shown. Additionally stuff from TUG and SLF demonstrated the handheld prototype to interested people: As the place has a free line of sight to the Dorfberg field-site, an adapted version of the Dorfberg demo could be shown. Moreover two additional sensorscope stations had been setup directly at the market. Furthermore the BLIMP was flying above the site. Data monitored by the BLIMP were displayed on a large screen.

In order to gather direct feedback, interested people were motivated to fill in questionnaires (see D8.4 system usability report) and information material on the project was distributed.

The market was open to the public from 9 till 16.00 and the organisational committee estimated that a total number of 1500 people and several media were joining the event during the day.



## 1.2 Educational sessions: EPFL Lausanne school-oriented events

On November 11, 2010, a demonstration was held as part of a wider effort to encourage local students in the Lausanne area to study environmental sciences. Students learned about the water cycle and participated in hands-on activities to understand how water is used in communities and shared with nature. For example, one activity involved pouring colored water into cups that the students were holding. Each student represented a different part of the (anthropogenic and natural) water cycle (e.g. drinking water, rivers, ocean, clouds, etc.). Polluted water or wastewater was represented as the colored liquid, while the natural parts of the cycle were clear water. A sensorscope station installed next to the EFLUM Laboratory on the EPFL campus was used to demonstrate how scientists can observe different parts of the water cycle and how the water cycle is linked to meteorology through evaporation.



In March of 2011, students participated in a second and similar activity where they were asked to draw different parts of the water cycle and to include sensorscope instruments in HYDROSYS (224416) – D8.5 Citizens involvement report – September 26, 2011

their drawings. Two examples are shown below. On the left is the sensorscope cup anemometer used for measuring wind speeds and direction. On the right various components of the sensorscope station are shown, along with labels indicating their usage in La Fouly.

### 1.3 Scenarios: citizen involvement in Nordic scenarios

The Nordic scenario of the HYDROSYS project provided through its instances an excellent opportunity to construct a feed-back relationship between the results/products of scientific research and regular citizens. This relationship enabled simple citizens to shape the development of the HYDROSYS system by providing input on the functionality of the system as well as the design of the user interfaces on one side. On the other side, it offered HYDROSYS system developers a valuable and raw reflection of the utility of the system as the citizens can be regarded here as a special category of end-users with a primary sense of environmental awareness.

The HYDROSYS system - citizens interactions were established during a series of events taking place indoors [workshops, demonstrations] and outdoors [monitoring campaigns, field demonstrations] covering aspects of public environmental awareness along with environmental education. One of the most interesting events took place during the summer/autumn 2008 in Nummela when members of HYDROSYS team pictured the qualitative state of local hydrological system to a group of local citizens and stakeholders by displaying water parameters on mobile phones through a user interface constructed by HYDROSYS project partner Luode Consulting [Figure 1].

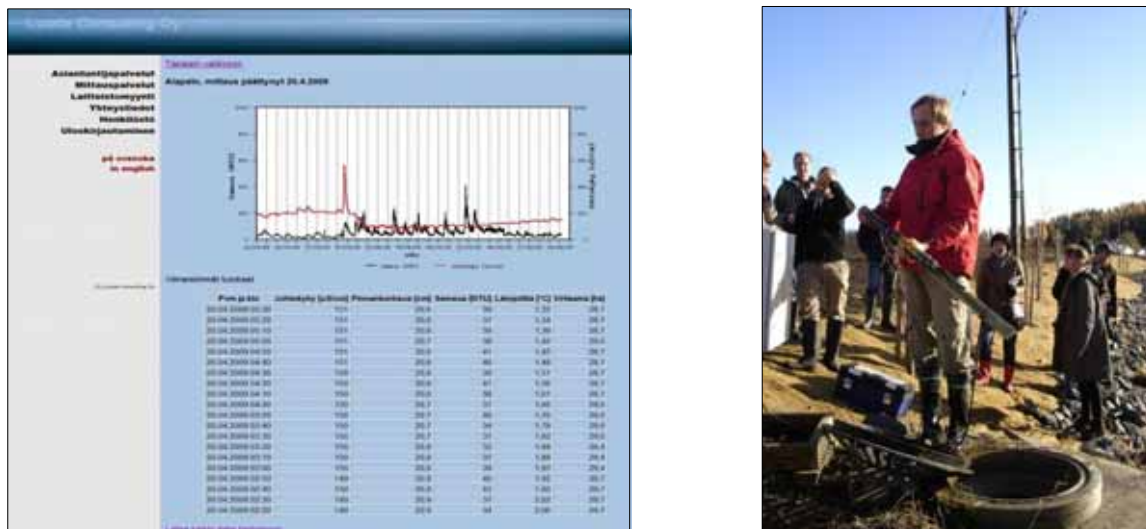


Figure 1. Displaying measurements on site in 2008 Nummela campaign

The measurement campaign data was the backbone for the decisions taken by local municipality. After assessing the state of the system from the data, the stakeholders together with a group of volunteers zoned a 1.5 km downstream section of Ridalinpuro with a 300 m

protection buffer. Additionally, a 200m section of the stream was stabilized using slowly biodegradable meadow seeded stabilization mat [Figure 2].

As a direct result, HYDROSYS system contributed substantially to the increase of environmental awareness of the local citizens or volunteers by providing them an opportunity to get a snapshot of the state of the environmental state in the site and consequently base their actions on this state.



Figure 2. Volunteers during the stabilization of 200m section of Ridalinpuro stream during 2008

In Kylmäoja, the second site of the Nordic scenario the citizens interacted with the system during both on site campaigns and indoor workshops. In total, there were carried out six measurement campaigns in Kylmäoja. During each of these events, particularly in the beginning respectively end of the campaigns when the sensor stations were installed respectively deinstalled, random citizens stopped to satisfy their curiosity. At the same time the HYDROSYS team informed them about the goals of the project, the time-line and planned actions. The opinions of this citizens were taken into account in the design of the environmental activist storyboard. These actions determined an increase in environmental awareness and improved the environmental education of regular citizens. For further details refer to D9.2 addendum, environmental activist storyboard. A second aspect of the system-citizens interaction is centered around indoor events where the general public either was “educated” or debated on environmental matters specially from a scientific point of view. In this sense, a workshop was held in Lahti in 19.11.2009 where approximately 40 participants were familiarized with the HYDROSYS-SYS system [Figure 3].



Figure 3. End-users and citizens during the Lahti workshop in 2009

A similar event titled “Environmental modeling seminar” was organized by Aalto University, Lahti group in Finland during February 2009. This event exposed the HYDROSYS system to the environmental modeling academic community. The participants were acquainted with the system seen from a scientific perspective, as a tool available to environmental researchers to perform on site modeling an related tasks. The last noticeable event that involved the general public was the “InfraTech 2011 Exhibition” on 18.-20.5.2011 in Turku, where over 5 000 public utilities industry oriented visitors were gathered to find out the latest innovations and products of the field. The HYDROSYS project was presented and the complete prototype was demonstrated to the public on a stand [Figure 4]. The system was thought by public as a practical tool both for experts and common people dealing with environmental issues, and in general it was seen as a required step in the development of environmental monitoring and planning.



Figure 4. HYDROSYS demonstrated to general public during InfraTech 2011 in Turku, Finland

## Appendix: Citizens actions during the full 36 months of the project

HYDROSYS member involved in this demonstration, When and where	Kind of demonstration	Purposes of the demonstration	End user involved	Main results of the demonstration
EPFL 24 March 2010, O3E International Seminar, Nice, France	Presentation	Presentation of Hydrosys tools	Secondary school science teachers	Presented Hydrosys tools and new technology for alpine environmental monitoring as it can be applied to education.
EPFL 17 April 2010 Bank Landolt field site visit Crans-Montana/Plaine Morte, Switzerland	Presentation	Presentation to sponsors	Members of the sponsoring group and local community	"Stream temperature evolution in Switzerland under climate change scenarios"
EPFL 11 November 2010	Presentation and hands-on activities with sensorscope stations	Involve students in EPFL science projects – inform them of future education opportunities at EPFL – answer the question: What is research?	Elementary and secondary school students – outreach activity on campus – 30 students	Students learned about hydrologic and meteorological monitoring in an alpine catchment using wireless sensor network
WSL, TUG, UCAM 20 March 2011 Davos, Switzerland	Field demonstration	Show Hydrosys to interested citizens on SLF anniversary celebration	~1500 people at total event, ~20 filling in questionnaires	Most people liked the handheld system and could clearly see the benefits. Handling of the system was considered to be appropriate. Nevertheless some people were not able to understand the system and the goals of the project: the tools are quite focused on specialists, hence, some older / non-technical users had sometimes difficulty to grasp the full concept.

<b>HYDROSYS member involved in this demonstration, When and where</b>	<b>Kind of demonstration</b>	<b>Purposes of the demonstration</b>	<b>End user involved</b>	<b>Main results of the demonstration</b>
<i>Aalto – HIIT – Luode August 2008 Espoo, Finland</i>	<i>Advisor board meeting</i>	<i>Identifying end user requirement, developing HYDROSYS system</i>	<i>6 people (Advisory board)</i>	<i>General presentation of the project, project components and early prototype of the 3D-model system in cell phone. Professional users and environmental specialists of project study areas discussed how and where presented system could be utilized. Needs, requirements, ideas and criticism were collected to be utilized in system development.</i>
<i>Aalto – Luode September 2008, Nummela, Finland</i>	<i>Field demonstration</i>	<i>Identifying end user requirement, developing HYDROSYS system</i>	<i>9 people (municipality, regional environment center and water protection organization)</i>	<i>On site presentation of study site and ongoing water quality measurements to environmental specialists. They were impressed of real time measurement data of sensor stations. Their ideas of utilizing real time water quality data in HYDROSYS system were collected to be utilized in system development.</i>
<i>Aalto – Luode September 2008, Nummela, Finland</i>	<i>Field demonstration</i>	<i>Identifying end user requirement, involving citizen</i>	<i>15 people (children and staff of local kinder garden)</i>	<i>HYDROSYS-system presentation to children playing on the influenced area of the stream. Children amazed HYDROSYS with their knowledge in environmental risks concerning stream water.</i>
<i>Aalto – HIIT – Luode September 2008, Nummela, Finland</i>	<i>Field demonstration</i>	<i>Involving citizen</i>	<i>20 people (municipality, citizen, local environment activists, Aalto water engineering laboratory)</i>	<i>Community effort finalizing stream restoration work by planting vegetation along the stream. HYDROSYS system was presented to people participated to the work in order to involve local people to the project and environmental activities on their neighborhood.</i>
<i>Aalto – Luode – TUG October 2008, Nummela, Finland</i>	<i>Field demonstration</i>	<i>Testing usability of the system, developing HYDROSYS system</i>	<i>10 people (municipality, regional environment center and water protection organization)</i>	<i>Study site, ongoing water quality measurements and prototype of Alpine system (TUG) were presented to end users consisted of environmental specialists. End users tested user interface of the prototype and familiarized with real time water quality data of sensor stations that will be visualized in the prototype later. Their comments, ideas and criticism were collected to be utilized in system development.</i>

<b>HYDROSYS member involved in this demonstration, When and where</b>	<b>Kind of demonstration</b>	<b>Purposes of the demonstration</b>	<b>End user involved</b>	<b>Main results of the demonstration</b>
<i>Aalto – HIIT September 2009, Nummela, Finland</i>	<i>Field demonstration</i>	<i>Testing usability of the system, developing HYDROSYS system</i>	<i>13 people (municipality, citizen, local environment activists, Aalto water engineering laboratory)</i>	<i>Prototype of 3D-model (Kylmäoja) running in the cell phone user interface was presented to people participating in community effort. Discussions were held on the quality of the scene representation, the usability and usefulness of the data visualization and potential use cases and benefits of the system. While the discussions reflected the early interviews on general level, the demonstrations did spring out good feedback on the user interfaces on a more detailed level.</i>
<i>Aalto – HIIT – Luode – TUG – WSL November 2009 Lahti, Finland</i>	<i>Expert workshop</i>	<i>Identifying end user requirement, developing HYDROSYS system, assessing impacts, testing usability of the system</i>	<i>30 people (specialists of hydrology from several organizations and companies)</i>	<i>Prototypes of Nordic system, a 3D-model running in the cell phone user interface, and Alpine video based system was presented to hydrologists participated to expert work shop. Usability of the devices were tested and discussion held of the user interfaces and working with the device on the field. Main findings of the expert workshop are reported report D8.4</i>
<i>Aalto – HIIT - Luode April 2010 Kylmäoja, Finland</i>	<i>Indoor presentation and field demonstration</i>	<i>Presenting progress of the project, demonstrating prototype, testing usability of the system, assessing impacts and collecting feedback</i>	<i>6 hydrologists and environmental specialists from regional and municipal environment and water offices</i>	<i>Progress of the project and prototype of the system was presented to Advisory board members and other environmental specialist before testing it on the field. End users were impressed of online simulation and annotation functions of the system and accessing to the system also outside of the area. When testing the prototype on the field, a couple of practical issues were highlighted to improve the user interface, e.g. readability in bright but rainy conditions, font sizes and colors of object.</i>
<i>Aalto – HIIT – Luode, TUG May 2011 Turku, Finland</i>	<i>Final Event: Demonstration in Infratech 2011 Exhibition</i>	<i>Demonstration of the complete prototype – cell phone and handheld prototypes, datapipeline</i>	<i>The exhibition was mainly focusing on geoscientists (utilities companies, ~ 5000 visitors) in general, but there was a wide participation, for example of activists too.</i>	<i>The system was thought by public as a practical tool both for experts and common people dealing with environmental issues, and in general it was seen as a required step in the development of environmental monitoring and planning.</i>