4onse ISSUE 1 August2017

Newsletter

Open Environmental Monitoring: data for all

Manual weather monitoring station in Sri Lanka

What's Inside

Welcome

Welcome to the first issue of the 4onse Newsletter! In order to inform you about the project progress, the results produced and interesting activities undertaken and foreseen within the project a new issue every four months will be published. The issues will be accessible trough the project website: www.4onse.ch

4onse is in place since October 2016 and will run until October 2019. The project partners are pleased to welcome you on the pages of the first newsletter, hoping you'll enjoy the reading.

Analysis of four times Open, Non-conventional, Sustainable and Effective monitoring systems

a project fund within the Research for Development program with decision IZ07Z0_160906 / 1

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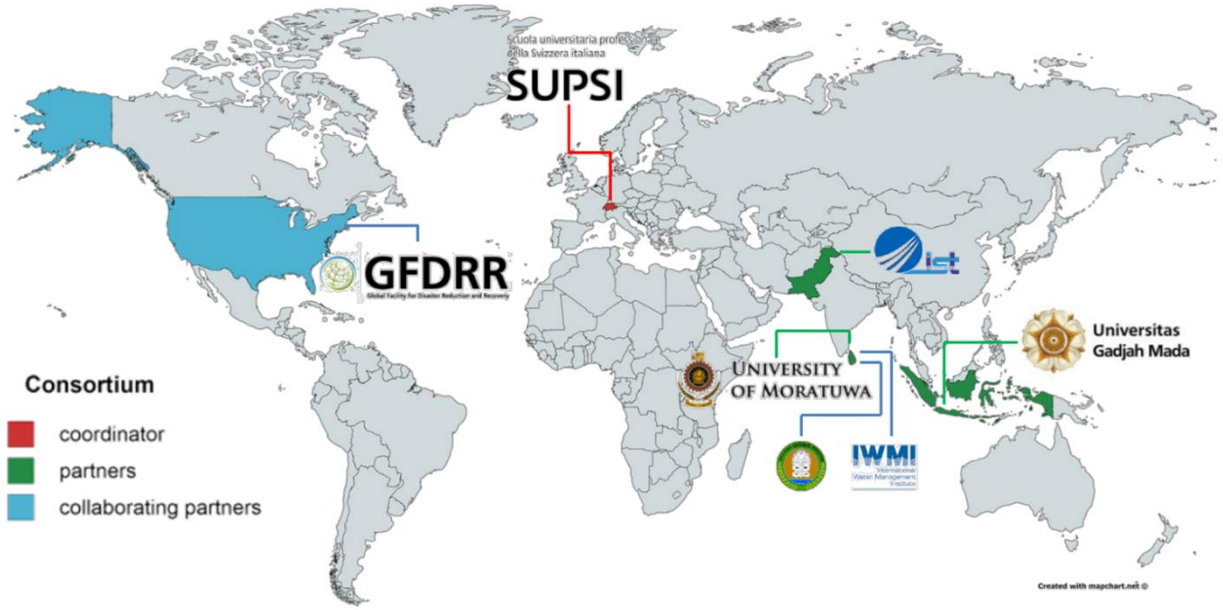
What is 4onse?

Project

An Environmental Monitoring System is needed not only to prevent many natural risks such as droughts, flooding and landslides but also to provide information for a better management of water resources and crops irrigation and finally it helps to increase the reliability of weather and climatological models. In addition, a monitoring system can directly impact the economic, social and political spheres. Unfortunately, in most developing and low income countries, the high costs of hardware and software are currently limiting the capacity of using hydro-meteorological data to support resource management, policy making and smart decision taking. 4onse is developing and studying potentially disruptive technologies to «**EMPOWER ALL WITH MONITORING AND DATA EXPLOITATION**». The major challenge of this *r4d* project is the deployment and evaluation of a network of low cost monitoring stations based on fully open (data, standard, hardware, software) non-conventional technologies. The network should be capable of providing measurements related to wind speed and direction, temperature, rainfall, humidity, light, pressure, water level and soil moisture at a time interval of 5 minutes.



Take a look at this 2 minutes introduction video to better understand the issues and the proposed possible solution to be investigated.

https://youtu.be/CjkzajQD02o

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Why do we run this project?

Looking for answers...

Open technologies are well established and well reputed nowadays and several prototypes of weather stations have been developed and proposed recently. Nevertheless, in literature there's no investigation on how a full system of these non-conventional technologies does perform from a data quality, sustainability and applicability perspective. Setting up a system of about 30 stations in a test basin we'll try to answer to the following research questions:

- Are non-conventional solutions able to fill the gap?
- To what extent they can be an alternative to authoritative data?

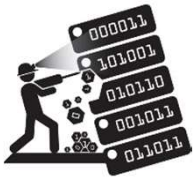
Data quality

accuracy, completeness, timeless, reliability

Sustainability

costs, durability, maintainence, interoperability

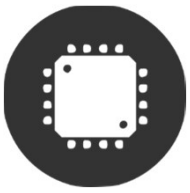
Applicability



fields of use, user access, interfaces

The 4 Open pillars

4onse is a «Open» based project where the main technologies used to integrate a fully open system are: Arduino (www.arduino.cc) for the Open Hardware component, SOS (http://www.opengeospatial.org/stan-dards/sos) for the Open Standard component, istSOS (www.istsos.org) for the Open Software component and finally, CKAN (ckan.org) for the Open Data component.



Open
Hardware
Arduino

Open
Standard
SOS

Open
Software
IstSOS

Open
Data
CKAN

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Project updates

System design

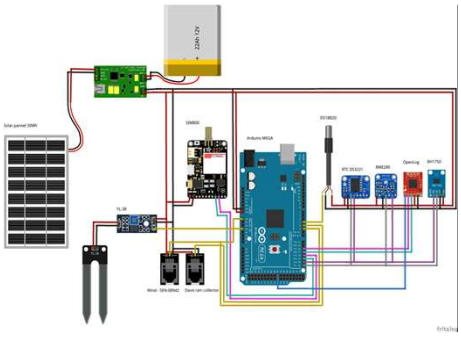
The decisions for specific components of the non-conventional monitoring system rely on three factors:

- Reliability, the capacity of the system to continue monitoring regardless of the failure of some of the stations.
- Scalability capacity of the monitoring system to scale is very important, in fact the density and the number of stations could change in time.
- Costs, important since it affects not only the set-up phase but also the maintenance during the years.

The basic components of the monitoring system consist in diverse monitoring stations and a data warehouse. The single monitoring station can be further decomposed in four elementary components: power unit, sensing unit, processing unit and transceiver.
The data warehouse is composed by one receiver and one or more server unit. The server unit is then characterized by specific processors (CPU), memory (RAM), hard drives, network connection, video and power supply. Accessible market and budget might limit the hardware choice. A detailed list of all components has been defined, taking into account the required specifications of the measuring parameters, the costs and their availability.

Sensor technologies

The sensor design involved the analysis of literature and best practices in the field of monitoring systems and the available non-conventional technologies. This led to the definition of the 4onse weather station design as illustrated aside and to the design of the software logic to read, store and send data in near-real-time to istSOS server.



Sensors currently selected & in testing:

• Air Temperature:	DS18B20	(~3 USD)
• Air humidity & pressure:	BME280	(~5 USD)
• Wind speed & direction:	SEN-08942	(~70 USD)
• Rainfall:	Davis Collect.	(~100 USD)
• Light:	BH1750FVI	(~3 USD)
• Soil moisture:	YL-69	(~5 USD)
• Internal Temperature:	DHT11	(~2 USD)

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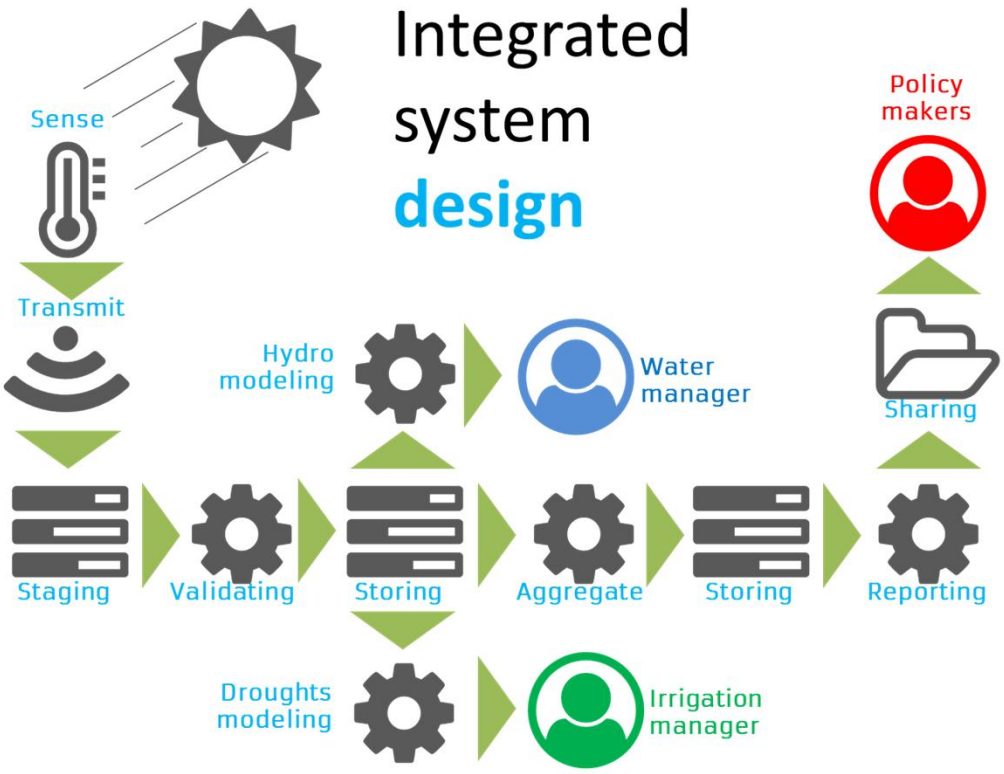
Project updates



Upcoming Events

18-22 Jul	**FOSS4G-Europe 2017 conference, Paris** D. Strigaro will talk about the extension of the scalability of istSOS within the *4onse* project.
12-14 Oct	**14th International Congress of Asian Planning Schools Association** Dr. Emeshi Warusavitharana will present 4onse within the framework of the main theme: Reshaping Urban and Rural Development Through Planning under Sub-Theme 5: Smart/Intelligence.
16-19 Oct	**3rd Scientific Meeting in Sri Lanka** This meeting will be dedicated to plan the system deployment and knowledge transfer and stakeholder training on case study location in Deduru Oya Basin.

Past Events

21-23 Nov	**First policy workshop held in Colombo** The first policy workshop of the project was held on 21st of November 2016 at Hotel Ozo, Colombo, to identify the specific needs and weather stations.
23-25 Jan	**1st Scientific meeting in Sri Lanka** During the meeting Prof. Massimiliano Cannata and Dr. Milan Antonovic witnessed the development progress of some hardware components and their interaction with the Arduino processor. Ongoing discussions on the final hardware design took place in a nice atmosphere and lead to major decisions concerning the final design of the stations.
26-29 Jan	**FOSS4G-ASIA Hyderabad, India** The second edition of the conference FOSS4G-ASIA took place in the city of Hyderabad, in the Indian State of Telengana. This kind of event is related to the development of open source geospatial technologies and to promote its widespread use. For the 4onse project Prof. Cannata from SUPSI (member of the organizing committee) presented the current status and ongoing developments of the project.
3-4 Feb	**Environmental Awareness protection & New Challanges** The *4onse* project has been presented at St. Wilfreds P.G. College , one of the highest ranking colleges in India. Dr. Marcus Hoffmann has been invited as a guest of honor to talk about ongoing open source projects at SUPSI with a special focus on the *4onse* project.
8-11 Feb	**XVIII GRASS MEETING - X GFOSS DAY - OSMIT2017** At the italian language main conference on Open Source software and Standards, the advances of 4onse has been presented to an audience of about 100 people.
23–28 Apr	**European Geosciences Union - General Assembly** 4onse was presented in the «Natural Hazard and Risk Assessment in Developing Countries» and in the «Earth science on Cloud, HPC and Grid» sessions.
2-3 May	**2nd Scientific Meeting in Switzerland** Three collaborators from Sri Lanka arrived at SUPSI (Switzerland) to define all necessary sensor components of the weather stations and build up a prototype. Further on, a public Info Lunch conference has been organized at the SUPSI campus, attracting around 40 participants listening to the presentation on the recent project developments.

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Join us

4onse is a fully Open project where everyone's contribution is more the welcome and considered very valuable !!!

If you feel to participate in the effort of building and testing non-conventional monitoring system for strengthen sustainable data production and management for sustainable development subscribe here: http://4onse.org/#/cooperation?_k=9my982

You will have prior access to the project outcomes (documentation, tutorials, source code, etc...) so that you can install the weather station in your premise !!!