

Editorial to the Proceedings of the Workshop **Environmental Infrastructures and Platforms with Citizens Observatories and Linked Open Data (ENVIP'2013)**

Arne J. Berre¹, Sven Schade²

¹ SINTEF, Norway

Arne.J.Berre@sintef.no

² JRC, Italy

Sven.Schade@jrc.ec.europa.eu

Abstract. In 2010, the Environmental Infrastructures and Platforms (ENVIP) initiative was introduced as a means to identify the European potentials and specify common building blocks ('services and enablers') related to environmental information sharing and re-use. In the first years, the work of ENVIP focused on a set of EU funded research and development projects supporting the Shared Environmental Information System (SEIS). This paper briefly presents the intermediate results and introduces the next wave of expansion activities, which follow two newly emerging trends: Citizens Observatories and Linked Open Data. It thereby summarises the scope, structure, contents, and outcomes of the Environmental Information Systems and Services – Infrastructures and Platforms (ENVIP'2013) workshop, which was held on October 10, 2013, in conjunction with the ISESS'2013 conference in Neusiedl am See, Austria.

Keywords: Environmental Infrastructure, Platform, Architecture

1 Introduction

Information and Communication Technologies (ICT) are essential for reaching environmental sustainability. They provide the necessary support in terms of tools, systems and protocols to establish a dynamic environmental space for collaboration in a more and more sophisticated digital world. Core challenges are not only related to providing seamless environmental data access to public authorities, businesses and the public at large, but also to allowing for interoperable environmental services based on Web technologies, and stimulating innovation and growth.

The Shared Environmental Information System (SEIS) [1] is one of three major initiatives – along with the INSPIRE Directive [2] and the Global Monitoring for Environment and Security (Copernicus) [3] – undertaken in Europe to collect and share environmental information for the benefit of the global society. Different efforts emerged towards the creation of infrastructures and platforms for environmental information systems and services – including a rich set of European research and

development projects. Spatial data infrastructure (SDI) is a general term for the computerised environment for handling data that relates to a position on or near the surface of the earth. It may be defined in a range of ways, in different circumstances, from the local up to the global level.

In this context, the Environmental Infrastructures and Platforms (ENVIP) initiative [4,5,6,7] was introduced as a means to identify the European potentials, specify common services and building blocks ('enablers') and their relations, and provide a framework to sustain the results of research and development projects that are usually funded for up to four years.

A number of SEIS contributing projects have recently been completed. Most of these have been investigated in previous ENVIP events, in particular at ENVIP'2010 [5, 6] and at the ENVIP session during ISESS'2011. Meanwhile, new European activities have started in order to advance on the global agenda for sustainable development. These particularly included several projects dealing semantic aspects of geospatial information and the application of Linked Data approaches, as well as a set of projects on Citizen Observatories [8], facilitating citizen contributions and interaction on environmental data, including contributions to the Global Earth Observation System of Systems (GEOSS) [9].

The latest Environmental Information Systems and Services – Infrastructures and Platforms (ENVIP'2013) workshop, which was held on October 10, 2013, in conjunction with the ISESS'2013[10] conference in Neusiedl am See, Austria, provided the opportunity to present results from some of the recent projects and to update the previous findings. This editorial summarises the scope, structure and contents, and outcomes of the ENVIP'2013 workshop and concludes with an open invitation for further contributions. The complete proceedings of the event provide further detailed papers reporting on the various results from the projects as they were presented during the workshop.

2 The ENVIP workshop topics and papers

A number of SEIS contributing projects have recently been completed. Some of the SEIS related projects under the environment topic have been investigated in previous ENVIP events, in particular at ENVIP'2010 [5, 6] and at the ENVIP session during ISESS'2011. The 2013 workshop consisted of the 3 regular sessions in addition to a join session with ISESS: There were 9 papers presented in the workshop in addition to 4 invited talks and three paper presentations jointly with the ISESS conference.

The session topics, presentations and papers were the following:

Session 1: ENVIP Requirements and consolidation - and Open and Linked Data and Services

“Environmental Infrastructures and Platforms with Citizens Observatories and Linked Open Data“, Arne J. Berre, Sven Schade, Dumitru Roman (*Paper in main ISESS'2013 proceedings [10]*).

“SERVUS – Collaborative Tool Support for Agile Requirements Analysis”, *Thomas Usländer*, Thomas Batz and Hylke van der Schaaf [11].

“Linked Open Data for Environment Protection in Smart Regions – The SmartOpenData Project”, Phil Archer, *Karel Charvat*, Mariano Navarro De La Cruz, Carlos A. Iglesias, John O’Flaherty, Tomás Robles and Dumitru Roman [12].

Session 2: ENVIP for Environmental Service Composition and Data Fusion

“Enabling Access to Environmental Models, Data, and Services on the Web – Technical Results Summary from the ENVISION Project”, Dumitru Roman, Tertre Francois, Alejandro Llaves, Miha Grear, *Maja Skrjanc*, Ioan Toma, Michael Pantazoglou, Silviu Trasca, Nils Rune Bodsberg and Morten Borrebæk [13].

“SUDPLAN Services Available After FP7 and Their Possible Future Use”, *Sascha Schlobinski* and Lars Gidhagen [14].

“Overview of the FP7 Project EO2HEAVEN - 'Earth Observation and Environmental Modelling for the Mitigation of Health Risks’”, *Kym Watson*, Jose Lorenzo and Ingo Simonis [15].

Session 3: ENVIP for Citizens observatories and crowd sourcing

“enviroCar – Crowd Sourced Traffic and Environment Data for Sustainable Mobility”, *Simon Jirka*, Albert Remke and Arne Bröring [16].

“Using 3D Urban Information Models to Aid Simulation, Analysis and Visualisation of Data for Smart City Web Services (i-SCOPE)”, Wilson, P. Parslow, F. Prandi, R. de Amicis, *Martin Ford* and S. Cadzow [17].

“A Practical Approach to an Integrated Citizens' Observatory: The CITI-SENSE Framework”, Mike Kobernus, *Arne J. Berre*, Richard Rombouts, Mirjam Fredriksen, Hai-Ying Liu, Marta Gonzalez, Alena Bartonova [18].

“Development of an Environmental Information System for Odour using Citizen and Technology Innovative Sensors and Advanced Modelling”, Ulrich Uhrner, *Giovanna Grosso*, Anne-Claude Romain, Virginie Hutsmeke, Julien Delva, Wolfgang Kunz, Arnaud De Groof, Yannick Arnaud, Philippe Valloggia, Laurence Johannsen, Bernard Stevenot and Philippe Ledent [19].

Invited talks. In addition to the above papers the workshop hosted three invited talks:

“Ubicity Framework for Crowd Sourcing and Crowd Tasking”, *Jan van Oort* and Denis Havlik.

“NRG4Cast – Energy Forecasting for Electrical Cars, Municipalities and City Districts”, *Maja Skrjanc*, Mitja Jermol, Kostas Kalaboukas.

”COBWEB – Citizen Observatory Framework with Access Management in GEOSS“, *Bart De Lathouwer* [21].

Some workshop presentations were organised as a collaboration session with the ISESS conference, in particular for the following three ISESS papers in [10]:

“Environmental Infrastructures and Platforms with Citizens Observatories and Linked Open Data “, *Arne J. Berre, Sven Schade, Dumitru Roman.*

ENVIROFI - Bringing Biodiversity to the Future Internet, *Katharina Schleidt, Nina Laurence, Andrea Giacomelli, and Denis Havlik.*

Enabling the Future Internet for Environmental Information Systems, *Thomas Usländer, Arne J. Berre, Carlos Granell, Denis Havlik, José Lorenzo, Zoheir Sabeur, and Stefano Modaffer.*

3 ENVIP Analysis of Past Research and Development Projects

The following shows a categorisation of the contribution and focus areas of the various projects presented in the workshop. Previous ENVIP events, in particular at ENVIP’2010 [5, 6] and at the ENVIP session during ISESS’2011 [7], have also produced similar categorisations.

Projects	Reference Architectures	Semantic Annotation, Ontologies & Publication	Resource discovery	(Data, Service and Model) Composition	Sensors and Observation Web	(Web) visualization and Portals	Linked Open Data	Security, Trust, Privacy
SmartOpen Data	x	x	x			x	x	
EO2HEAVEN	x		x	x		x		
SUDPLAN	x			x		x		
enviroCar	x	x	x		x			
i-SCOPE	x			x				
CITI-SENSE	x	x	x	x	x	x		
OMNISCIENCE	x	x			x			
ENVISION	x	x	x	x	x	x		
COBWEB	x							x
NRG4Cast		x		x				
ENVIROFI	x		x	x		x		x

Figure 1 Contribution areas of the represented projects

The ENVIP session at ISESS’2011 [7] adopted some of the analysis structure from ENVIP’2010 by starting the creation of a reference architecture, extending to broader

resource discovery, and composition. At ISESS'2011 some of the projects from ENVIP'2010 presented their further progress, and in addition a number of new projects were presented. The ENVIROFI project had also extended work on the reference model and on the further identification of specific environmental enablers and generic enablers as reported in the papers [22,23] at previous ISESS conferences.

4 ENVIP Evolution and Outlook

A number of the initial projects and activities that contributed to ENVIP have now finished, while new projects are emerging, and the next step is to analyse which of the results that should be captured as best practices to be used by other projects and activities in the future, and potentially also fed into future standardisation activities.

A broader initiative has been started for the further identification of services and architectural components through the ENVIP community [6] and the CEN/TC287 TR 15449-2 SDI Best Practices [24]. The objective is that recently finished and ongoing projects and initiatives around SDI can contribute with their results and best practices to the various architectural elements of an SDI, including the experiences from the use of various geospatial and ICT based standards. With an expansion in new projects for citizen observatories and Linked Open Data it is seen that these projects can benefit from the best practices of the recent activities, as well as contribute with new potentially shared services. This will also serve as a foundation for change requests for existing standards and for potentially new standard through the collaboration with CEN/TC287, OGC, ISO/TC211, GEOSS and INSPIRE.

For an optimal evolution from past to present projects we encourage project consortia for these projects, as well as other organizations working on related topics, to contribute their relevant results to the CEN/TC287 TR 15449-2 Best Practices registry and to join the ENVIP initiative at envip.wikidot.com for the further analysis and synergies of the results. The ENVIP'2013 workshop session during ISESS'2013 has aimed at a further refinement of the ENVIP reference architecture and also continued the reporting and analysis of emerging project results, including reports from emerging projects in the areas of Citizens observatories and Linked Open Environmental data.

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