



simpli-city

The Road User Information System Of The Future

WP 2 – Vision and Requirements

D2.4.2: State of the Art Wiki Update

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Delivery Date: 03/2014

Dissemination Level: Public

Version 1.0

This document describes the current development of SIMPLI-CITY's State of the Art Wiki and its functionalities. The repository will be updated continuously in order to ensure that all SIMPLI-CITY partners are well aware of the latest methodologies and technologies in fields relevant for SIMPLI-CITY. Furthermore, it is publically available so that other researchers in this field can benefit from the findings of the SIMPLI-CITY consortium in this context.



Document Status	
Deliverable Lead	Daniel Burgstahler, TU Darmstadt
Internal Reviewer 1	Stefan Schulte, TU Vienna
Internal Reviewer 2	Vadim Petrenko, TIE Nederlands
Type	Deliverable
Work Package	WP2: Vision and Requirements
ID	D2.4.2: State of the Art Wiki Update
Due Date	31.03.2014
Delivery Date	03.04.2014
Status	Approved

Document History	
Contributions	V0.1, Daniel Burgstahler, TUDA, 14.02.2014, document initiation V0.2, Daniel Burgstahler TUDA, 04.03.2014, content update V0.3, Michaela Kargl, FGM, 10.3.2014, content update V0.4, Daniel Burgstahler TUDA, 10.03.2014, content update V0.5, Vadim Petrenko, TIE, 21.03.2014, internal review V0.6, Stefan Schulte, TUV, 21.03.2014, internal review V1.0, Daniel Burgstahler, TUDA, 24.03.2014, integrated feedback
Final Version	March 31 st , 2014

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Executive Summary

The purpose of this deliverable is to describe the current status of the State of the Art Wiki constituted by the SIMPLI-CITY consortium. The used powerful repository is briefly described and an explanation how the consortium plans to move forward regarding media collection during the project is given. This content repository is intended to contain a set of relevant bibliography items (including books, conference and journal articles, and videos). It is further intended to utilize classification and tagging of items to allow an easy navigation. The repository is updated continuously during the course of SIMPLI-CITY in order to cope with the fast changing nature of involved methodologies and technologies. It is provided through the SIMPLI-CITY homepage to the general public. This allows researchers and practitioners to use the findings made within SIMPLI-CITY in this context.

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1 Introduction

SIMPLI-CITY – The Road User Information System of the Future – is a project funded by the Seventh Framework Programme of the European Commission under Grant Agreement No. 318201. It provides the technological foundation for bringing the “App Revolution” to road users by facilitating data integration, service development, and end user interaction.

Within this deliverable, a description is given, how the State of the Art (SOTA) investigation is handled within the project. After a short project overview, the used SOTA repository and structure is explained and the way of collaborative interaction between the project partners is illustrated. Furthermore an overview is given how the SOTA repository has grown during the first 18 months of the project.

1.1 SIMPLI-CITY Project Overview

Analogously to the “App Revolution”, SIMPLI-CITY adds a “software layer” to the hardware-driven “product” mobility. SIMPLI-CITY will take advantage of the great success of mobile apps that are currently being provided for systems such as Android, iOS, or Windows Phone. These apps have created new opportunities and even business models by making it possible for developers to produce new applications on top of the mobile device infrastructure. Many of the most advanced and innovative apps have been developed by players formerly not involved in the mobile software market. Hence, SIMPLI-CITY will support third party developers to efficiently realise and sell their mobility-related service and app ideas by a range of methods and tools, including the Mobility Services and Application Marketplaces.

In order to foster the wide usage of those services, a holistic framework is needed which structures and bundles potential services that could deliver data from various sources to road user information systems. SIMPLI-CITY will provide such a framework by facilitating the following main project results:

- **Mobility Service Framework:** A next-generation European Wide Service Platform (EWSP) allowing the creation of mobility-related services as well as the creation of corresponding apps. This will enable third party providers to produce a wide range of interoperable, value-added services, and apps for drivers and other road users.
- **Mobility-related Data as a Service:** The integration of various, heterogeneous data sources like sensors, cooperative systems, telematics, open data repositories, people-centric sensing, and media data streams, which can be modelled, accessed, and integrated in a unified way.
- **Personal Mobility Assistant:** An end user assistant that allows road users to make use of the information provided by apps and to interact with them in a non-distracting way – based on a speech recognition approach. New apps can be integrated into the Personal Mobility Assistant in order to extend its functionalities for individual needs.

To achieve its goals, SIMPLI-CITY conducts original research and applies technologies from the fields of Ubiquitous Computing, Big Data, Media Streaming, the Semantic Web, the Internet of Things, the Internet of Services, and Human-Computer Interaction. For more information, please refer to the project Website at <http://www.simpli-city.eu>.

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1.2 Deliverable Purpose, Scope and Context

The purpose of this deliverable is to summarize the current status of the SOTA repository used in the project. For the sake of completeness the used repository platform is briefly described. This document highlights the current state of the SOTA Wiki repository and how the repository has grown during the first 18 months of the project.

1.3 Document Status and Target Audience

This document is listed in the DoW as “public” as the State of the Art Wiki allows keeping track with current developments and technologies that tackle similar challenges as SIMPLI-CITY. Furthermore, the corresponding findings should be provided as well to an interested external audience, like researchers or practitioners active in the same domain. This deliverable is to be used by all participating project members. It will help them to keep track of current methodologies and technologies that might be applied during the SIMPLI-CITY project. Furthermore, the State of the Art Wiki will provide external parties insights into the foundations and technologies that SIMPLI-CITY is based on and allows them to benefit from and contribute to the media library.

1.4 Abbreviations and Glossary

A definition of common terms and roles related to the realization of SIMPLI-CITY as well as a list of abbreviations is available in the supplementary document “Supplement: Abbreviations and Glossary”, which is provided in addition to this deliverable.

Further information can be found at <http://www.simpli-city.eu>.

1.5 Document Structure

This deliverable is broken down into the following sections: Section 1 deals with the background of the SIMPLI-CITY project and this deliverable, while Section 2 describes the SOTA repository and explains it from a technical perspective. Section 3 deals with the structure of the SOTA repository and gives initial numbers about its current contents. The growth of the SOTA repository is described by basic statistics in Section 4 and finally Section 5 concludes this deliverable with a short summary.

2 State of the Art Repository

The SOTA repository is intended to serve the following purposes:

- Allow SIMPLI-CITY members to share literature (or more generic: media) and thoughts about media in their respective fields of expertise relevant for the project.
- Allow SIMPLI-CITY members to use this media as a basis for writing deliverables, technical reports, and scientific papers.
- Allow SIMPLI-CITY members to classify and tag media. The idea is to create a living repository, which exists not only as means to statically store literature, but as a means to allow the consortium members to actively share and discuss media.
- Provide the technical infrastructure for the State of the Art Wiki.

2.1 State of the Art Wiki

As stated in deliverable D2.4.1, the SIMPLI-CITY SOTA Wiki is based on the open source media management solution Zotero¹. Zotero is a Cloud-based open source solution for media management, which has been built and maintained by the “Centre of History and New Media” of the George Mason University. Zotero provides a central Cloud storage and a group concept, which allows working cooperatively together on a reference library. To access and edit the group library, a plugin for Firefox (cf. Figure 1) can be used or a standalone client (cf. Figure 2) or just the web browser. Additionally, there are several plugins available to use Zotero with other browsers and with add-ins use of the reference library within several office software products can be made. This tool already has a good reputation and solves many problems related to cooperative development of reference libraries and document sharing, allowing for shared groups, supporting Microsoft Word as well as LaTeX, and by allowing for easy collection, structuring, tagging of and commenting on all kinds of media. It can extract bibliographic data from Google Scholar, ACM and IEEE digital libraries, Amazon and many other sites and databases.

In order to make SIMPLI-CITY's Zotero repository and the resources and findings gathered within the repository easily and conveniently accessible not only to the project partners, but as well to interested third parties, it is integrated in the official SIMPLI-CITY webpage (<http://www.simpli-city.eu/state-art>). Consequently, an automatic nightly export of the SIMPLI-CITY Zotero repository has been realized, which is directly linked to the SIMPLI-CITY homepage to keep the SIMPLI-CITY SOTA repository up-to-date.

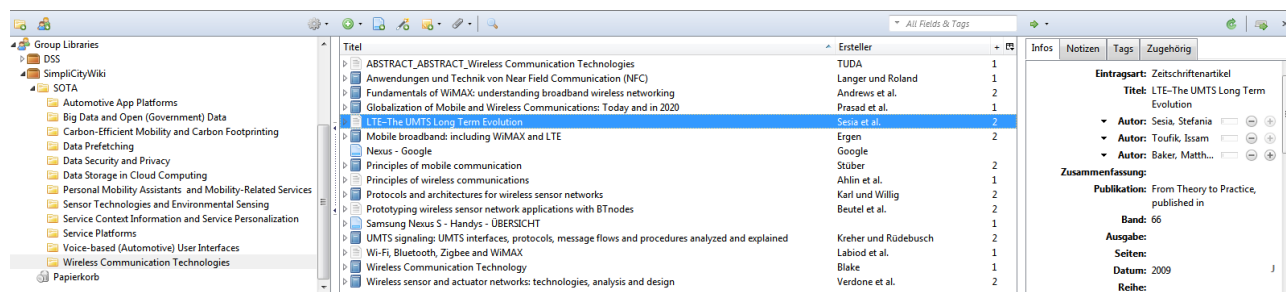


Figure 1: Zotero Interface

The SIMPLI-CITY Zotero group is also publicly available on a page on the Zotero homepage: <https://www.zotero.org/groups/148877>. This has the following benefits:

¹ Available online at <http://www.zotero.org>; last access on 04.03.2014

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- The SIMPLI-CITY SOTA is available to interested third parties in a structured way.
- The SIMPLI-CITY SOTA is indexed by Google Scholar and similar tools, thus increasing the visibility of SIMPLI-CITY.
- The page provides a feed covering recent additions and updates (cf. Figure 3).

The SOTA repository will be used by all consortium members, but external parties will be able to benefit from it as well. This can happen in two ways: On one side, externals are able to access the shared Zotero library (as it is a public library) as well as the exported entries through the SOTA repository's homepages. Otherwise, externals can be granted the right to enhance the shared Zotero library, enabling them to contribute their own resources that will ultimately be available through the SOTA repository's homepages, as well. So, the basic Wiki idea still exists, but has been transformed into an ever-expanding source for general SIMPLI-CITY terms, topics and definitions and corresponding related work as a sound and encompassing basis for an up-to-date SOTA overview.

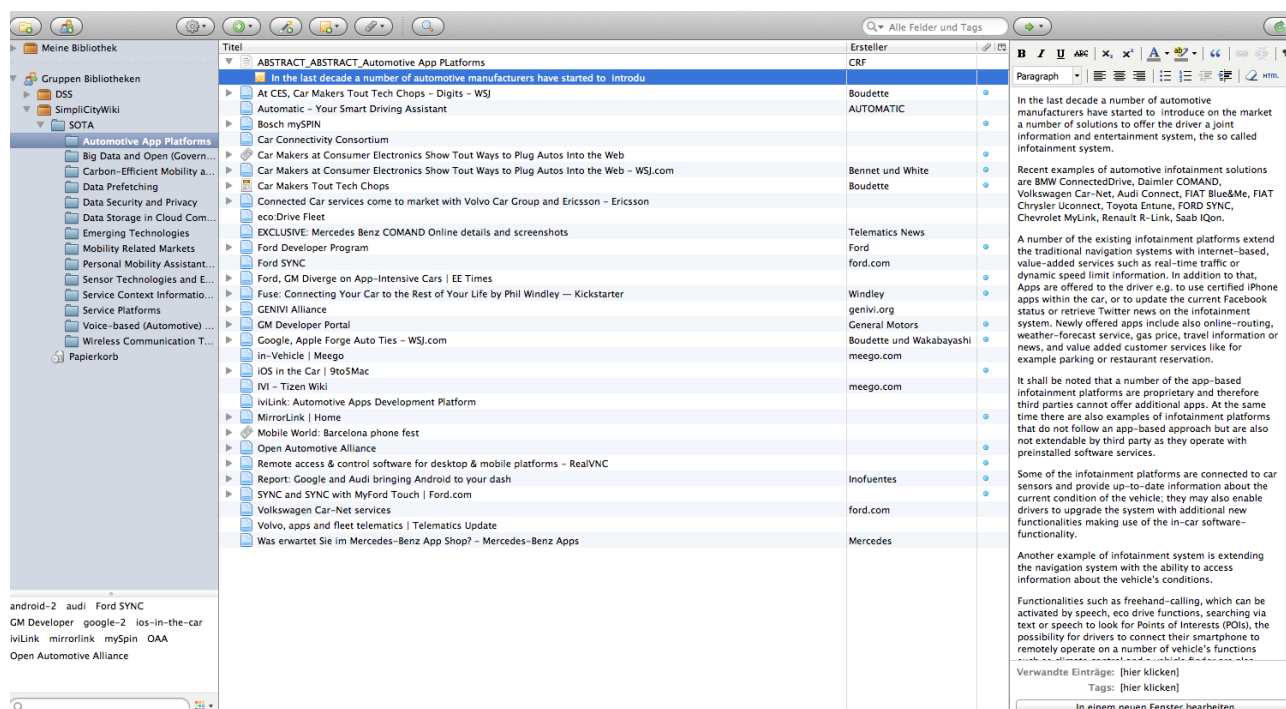












Figure 2: Zotero Standalone Client

[Home](#) > [Groups](#) > SimpliCityWiki

SimpliCityWiki

Recently Added Items

Title	Added By	Updated On
 Apache Karaf : Index	bonoamt	03.03.2014 15:11:50
 Apache Felix : Index	bonoamt	03.03.2014 15:18:13
 Eclipse Equinox : Index	bonoamt	03.03.2014 15:19:36
 OSGi Alliance : Index	bonoamt	03.03.2014 15:27:35
 ABSTRACT ABSTRACT Mobility Related M...	TUDA	14.02.2014 19:23:57
 IBM – Smarter Planet – Transportation systems – Overview – United States	TUDA	14.02.2014 19:00:53
 Intelligent Infrastructure: Neural Networks, Wavelets, and Chaos Theory for Intelligent Transportation Systems and Smart Structures	TUDA	14.02.2014 18:40:19
 Mobility aids market study report.pdf – oft1374	TUDA	14.02.2014 18:38:49
 Trends in the Emerging New Mobility Industry InnoMobility 2013	TUDA	14.02.2014 18:36:37
 eCoMove	TUDA	14.02.2014 18:34:15



Simpli-CITY

State of the Art (SOTA)

<http://simpli-city.eu/>

- Owner: [Daniel Burgstahler](#)
- Registered: 2013-02-17
- Type: Public
- Membership: Closed

Members (13)



Figure 3: SIMPLI-CITY Zotero Group

3 State of the Art Structure

The entries in the SOTA repository are classified into the following categories, which originate from general topics relevant to SIMPLI-CITY which have been conjointly identified by the SIMPLI-CITY consortium. Currently, the repository includes 244 references. The amount of references regarding each topic is denoted in brackets behind the respective title. The stated numbers denote the amount of references after the SOTA Wiki initiation and the growth to the total number of references corresponding to the respective topic today.

- Mobility Related Markets (0->22)
- Emerging Technologies (0->18)
- Sensor Technologies and Environmental Sensing: (5-20)
- Carbon-Efficient Mobility and Carbon Footprinting: (8->13)
- Big Data and Open (Government) Data: (7->10)
- Voice-based (Automotive) User Interfaces: (9->14)
- Wireless Communication Technologies: (15->22)
- Automotive App Platforms: (14->32)
- Data Prefetching: (5->6)
- Data Security and Privacy: (11->14)
- Personal Mobility Assistants and Mobility-Related Services: (23->31)
- Service Platforms: (9->13)
- Data Storage in Cloud Computing: (3->8)
- Service Context Information and Service Personalization: (18->21)

Furthermore, the literature was tagged to allow for better navigation and is also visualized in Figure 4.

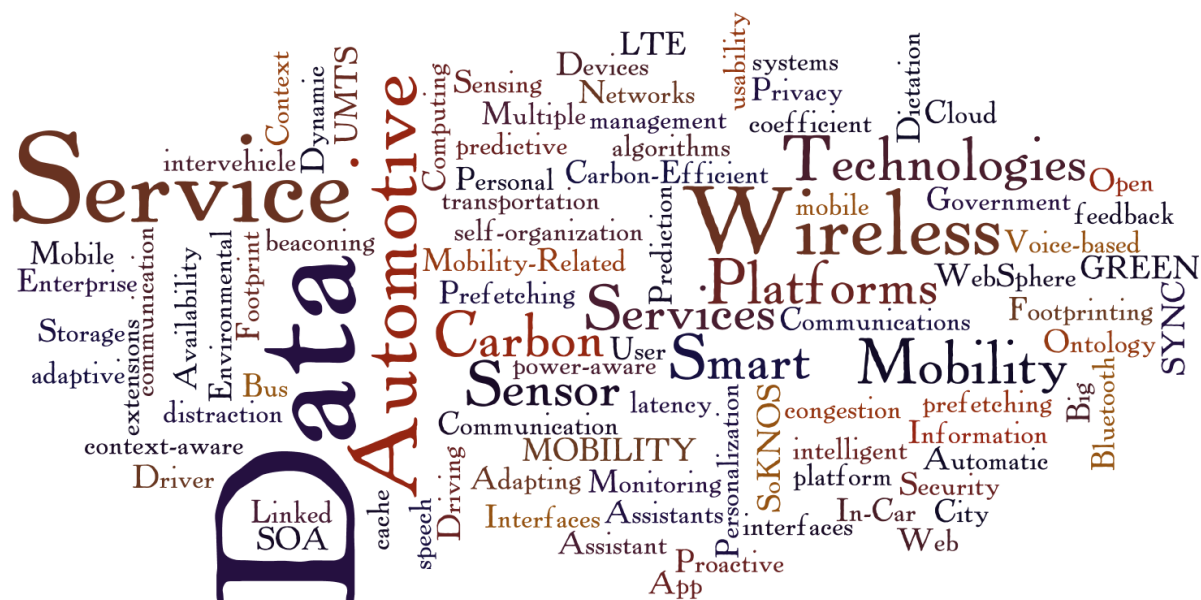


Figure 4: Tag Word Cloud

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Each topic is presented on a separate webpage that starts with an introductory and explanatory text followed by the respective state of the art references to the topic. Figure 5 shows the generated SOTA entry on the SIMPLI-CITY home page for the topic '*Big Data and Open (Government) Data*' with the introduction text and the first five references as an example.



The screenshot shows the SIMPLI-CITY website header with the logo and navigation menu. The main content area is titled 'State of the Art' and features a section for 'Big Data and Open (Government) Data'. The text describes the need for a large amount of heterogeneous data and lists five references.

Big Data and Open (Government) Data

Providing the road user information system of the future requires access to a large amount of heterogeneous data through different service providers. Since more and more organisations and public authorities provide open data, big data is an important dimension to be considered. On the one hand, data from different sources can be harnessed to augment the quality of information provided to users (and especially drivers within SIMPLI-CITY). On the other hand, open data highlights challenges in understanding different levels of data format, e.g., non-textual such as shape files.

Cities generate very large volumes of data centred around the interactions of its citizens within the city environment. Some of this data is generated by the local and government authorities and is considered as open, some of it is generated by private companies delivering services in the city (taxis, weather conditions, historical traffic conditions), and more is generated by the residents of the city (social media feeds, car incidents, road congestions, entertainment events). Within such an open and heterogeneous environment, there are opportunities for better services, less waste, and new opportunities for people to interact with the city – whether it be how to navigate the public transport networks or in predicting and explaining anomalies in traffic conditions. Dublinked and other initiatives (Data.gov,2013)(Data.Gov.UK, 2013)(Data.Gouv.FR, 2013)(Spaghetti, 2013)(Dublinked, 2013) have been created to harness this rich resource of information.

Collection, aggregation, organisation, tracking and synchronisation of different data types, i.e., static and dynamic data (through streams) and from various sources, i.e., social and sensor data, are all key challenges that need to be highly considered. Accessing and managing heterogeneous data, together with maintaining a coherent, robust, optimal and up-to-date view is a complex task [(Auer et al., 2007),(Bizer, Heath & Berners-Lee, 2009)] mainly due to the large amount of data that needs to be exploited.

[1] Data.Gouv.FR, “Données publiques / Open Data,” 2013. [Online]. Available: <http://www.data.gouv.fr/>. [Accessed: 07-Mar-2013].

[2] Spaghetti Opendata, “Spaghetti Opendata | Italiane e italiani che fanno cose con i dati,” 2013. [Online]. Available: <http://www.spaggiatiopendata.org/en>. [Accessed: 07-Mar-2013].

[3] Data.Gov.UK, “home | data.gov.uk,” 2013. [Online]. Available: <http://data.gov.uk/>. [Accessed: 07-Mar-2013].

[4] Data.Gov, “Home | Data.gov,” 2013. [Online]. Available: <http://www.data.gov/>. [Accessed: 07-Mar-2013].

[5] Dublinked, “Welcome to Dublinked,” 2013. [Online]. Available: <http://dublinked.ie/>. [Accessed: 07-Mar-2013].

Figure 5: SOTA Page for the Topic '*Big Data and Open (Government) Data*'

4 SOTA Repository Update

After its initial setup in project month 6, the SIMPLI-CITY SOTA Repository has been continuously updated. Besides new references in the existing topics, the new topics *Mobility Related Markets* and *Emerging Technologies* have been introduced. After the initial setup the repository consisted of 120 references in 8 topics. Until March 2014 the repository has grown to 14 topics with a total of 244 references. Furthermore the content of the description texts corresponding to each topic has been updated with a special focus on the technology forecast and the resulting impact to the SIMPLI-CITY project. Figure 6 gives an indication about the growth of the repository since its initiation.

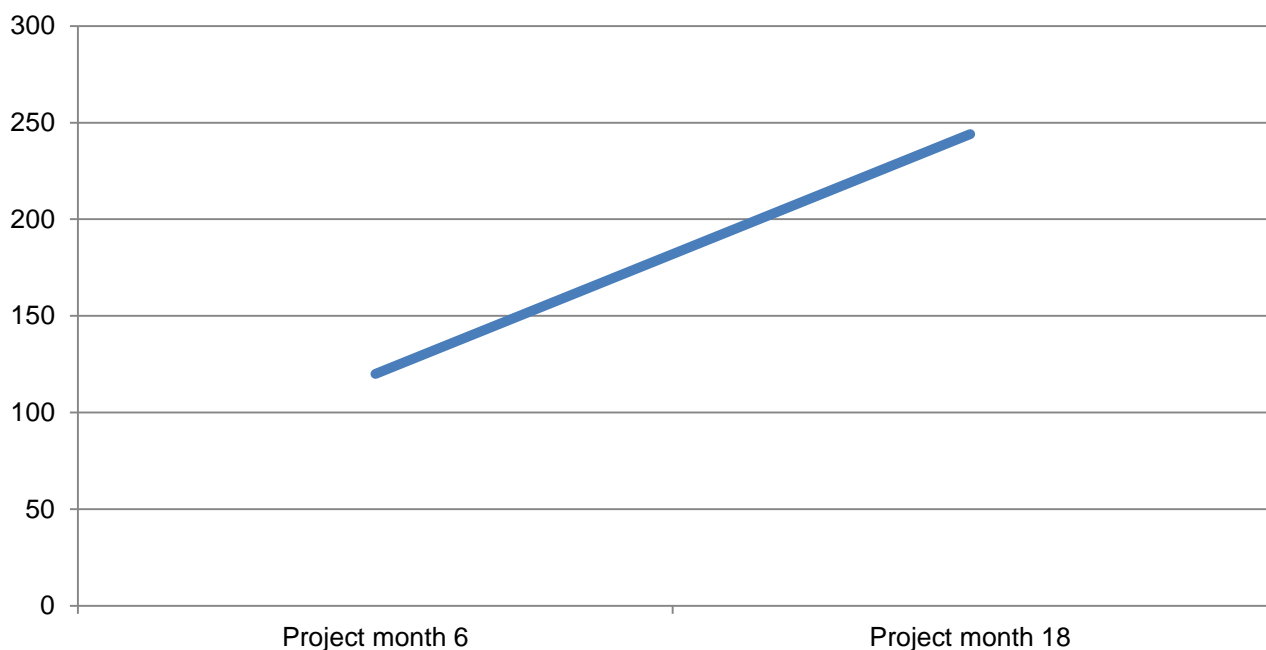


Figure 6: Number of Entries in the SOTA Repository

5 Summary

This document describes the functionality and the principle of the SIMPLI-CITY SOTA Wiki repository and how it has been updated. The first approach towards a SOTA repository was based on a Wiki, which was initially populated with literature. However, after its initiation a few challenges became clear. These were mainly concerning with people's hesitation to fill the Wiki due to the fact that traditionally literature references are maintained with the help of citation library tools. These challenges have been successfully solved by the change to the Zotero repository system. Since its initiation, the SIMPLI-CITY consortium members have continuously updated the SOTA repository. New updates in the repository are automatically inserted into the web page² on the SIMPLI-CITY home page on a daily bases. The used solution has proved to be very convenient for academic as well as more practitioner-focused consortium members.

² <http://simpli-city.eu/state-art>