

D6.2.2

Collection of scientific publications/presentations 2

Final report



NOTICE

The research leading to the results presented in the document has received funding from the European Community's Seventh Framework Programme under Grant agreement number 619437.

The content of this document reflects only the authors' views. The European Commission is not liable for any use that may be made of the information contained herein.

The contents of this document are the copyright of the SUNSEED consortium.

Document Information

Call identifier	FP7-ICT-2013-11
Project acronym	SUNSEED
Project full title	Sustainable and robust networking for smart electricity distribution
Grant agreement number	619437
Deliverable number	D6.2.2
WP / Task	WP6 / T6.2
Type (distribution level) ¹	PU
Due date of deliverable	M39 (final)
Date of delivery	28.4.2017
Status, Version	V1.0
Number of pages	21 pages
Responsible person, Affiliation	Mahesh Sooriyabandara- TREL
Authors	Ziming Zhu, Mahesh Sooriyabandara, Silviu Nistor -TREL
Reviewers	Jimmy Jessen Nielsen- AAU

¹

PU	Public
RP	Restricted to other programme participants (including the Commission Services)
RE	Restricted to a group specified by the consortium (including the Commission Services)
CO	Confidential, only for members of the consortium (including the Commission Services)

Revision history

Version	Date	Author(s)	Notes	Status
1.0	21-04-2017	Ziming Zhu, Mahesh Sooriyabandara, Silviu Nistor	Contents inserted based on partners' inputs	Final

Table of Contents

SUNSEED project.....	6
Executive Summary	7
1 Dissemination activities in RP1.....	8
1.1 Publications and presentations in RP1	8
1.2 Website and press release	8
1.3 Preparation of MWC'15	9
1.4 Preparation of Workshop 1.....	9
2 Dissemination activities in RP2.....	10
2.1 Publications and presentations in RP2.....	10
2.2 MWC'15 and GSMA Sunseed Case Study	13
2.3 Workshop 1.....	14
2.4 Standardization activities.....	15
2.5 Preparation of workshop 2.....	16
3 Dissemination activities in RP3.....	17
3.1 Publications and presentations in RP3.....	17
3.2 Workshop 2.....	19
3.3 Workshop 3.....	20
3.4 Workshop 4.....	21

SUNSEED project

SUNSEED proposes an evolutionary approach to utilisation of already present communication networks from both energy and telecom operators. These can be suitably connected to form a converged communication infrastructure for future smart energy grids offering open services. Life cycle of such communication network solutions consists of six steps: overlap, interconnect, interoperate, manage, plan and open. Joint communication networking operations steps start with analysis of regional overlap of energy and telecommunications operator infrastructures. Geographical overlap of energy and communications infrastructures identifies vital DSO energy and support grid locations (e.g. distributed energy generators, transformer substations, cabling, ducts) that are covered by both energy and telecom communication networks. Coverage can be realised with known wireline (e.g. copper, fiber) or wireless and mobile (e.g. WiFi, 4G) technologies. Interconnection assures end-2-end secure communication on the physical layer between energy and telecom, whereas interoperation provides network visibility and reach of smart grid nodes from both operator (utility) sides. Monitoring, control and management gathers measurement data from wide area of sensors and smart meters and assures stable distributed energy grid operation by using novel intelligent real time analytical knowledge discovery methods. For full utilisation of future network planning, we will integrate various public databases. Applications build on open standards (W3C) with exposed application programming interfaces (API) to 3rd parties enable creation of new businesses related to energy and communication sectors (e.g. virtual power plant operators, energy services providers for optimizing home energy use) or enable public wireless access points (e.g. WiFi nodes at distributed energy generator locations). SUNSEED life cycle steps promise much lower investments and total cost of ownership for future smart energy grids with dense distributed energy generation and prosumer involvement.

Project Partners

1. TELEKOM SLOVENIJE D.D.; TS; Slovenia
2. AALBORG UNIVERSITET; AAU; Denmark
3. ELEKTRO PRIMORSKA, PODJETJE ZA DISTRIBUCIJO ELEKTRICNE ENERGIJE D.D.; EP; Slovenia
4. ELEKTROSERVISI, ENERGETIKA, MERILNI LABORATORIJ IN NEPREMICEVINE D.D.; ES; Slovenia
5. INSTITUT JOZEF STEFAN; JSI; Slovenia
6. GEMALTO SA; GTOSA; France
7. GEMALTO M2M GMBH; GTOM2M; Germany
8. NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO; TNO; The Netherlands
9. TOSHIBA RESEARCH EUROPE LIMITED; TREL; United Kingdom

Project webpage

<http://www.sunseed-fp7.eu/>





Executive Summary

The purpose of this document is to describe in detail the dissemination activities of the SUNSEED project. Our main goal is to ensure that the SUNSEED project results, in terms of research outcomes, developed products and technical solutions, are appropriately disseminated to the relevant target communities in a timely manner. During the reporting periods, the SUNSEED partners have published scientific results in high impact conferences and journals. Furthermore, SUNSEED has presented a demo at the prestigious MWC 2015. Three SUNSEED workshops were organized, with participants from other EU projects and companies. Finally, the project website and social networking tools were appropriately used to communicate and promote the project.

1 Dissemination activities in RP1

1.1 Publications and presentations in RP1

RP1 list of conference publications

Authors	Paper title	Conference name	Place and date	Status
Čedomir Stefanović, Petar Popovski, Ljupčo Jorgušeski, Radovan Serneć	SUNSEED – an evolutionary path to smart grid comms over converged telco and energy provider networks	Global Wireless Summit 2014	Aalborg, May 2014	Published
German Corrales Madueño, Čedomir Stefanović, Petar Popovski	Efficient LTE Access with Collision Resolution for Massive M2M Communications	IEEE GLOBECOM Ultra-Reliable Communications Workshop	Austin, Texas, December 2014	Published
Aleksandra Rashkovska, Jošt Novljan, Miha Smolnikar, Mihael Mohorčič, Carolina Fortuna	Online Short-term Forecasting of Photovoltaic Energy Production	The Sixth IEEE Conference on Innovative Smart Grid Technologies (ISGT2015)	Washington D.C., USA, February 17-20, 2015	Published
Serneć, Radovan, Jorgušeski, Ljupčo, Švigelj, Aleš, Jurše, Jurij, Fan, Zhong	Smart grid communications networks : the case for reusing telco infrastructures	International symposium on ICT, INTSIKT 2014, “ <i>Pametne tehnologije za pametnu budućnost</i> ”	Tuzla Bosnia and Hercegovina, June 2014	Published

RP1 list of talks

Speaker	Talk title	Event name	Place and date
Ljupčo Jorgušeski	SUNSEED overview	Workshop on independent networks	NYU, USA, Jan. 2015

1.2 Website and press release

The SUNSEED website has been set up and continuously updated (sunseed-fp7.eu). A linkedin group has also been set up and project was covered in Slovenia press. These activities have been reported in D6.1.1 and D6.1.2.

1.3 Preparation of MWC'15

The preparation of the Mobile World Congress required considerable amount of work. One challenge was to be able to build a demonstrable proof of concept prototype at an early stage of the project. The preparation of the booth and the definition of the visuals and communication supports also consumed significant bandwidth.

1.4 Preparation of Workshop 1

The 1st SUNSEED workshop was held in Aalborg, March 2016. A lot of preparation work happened in RP1:

- Discussion and decision on workshop topic, including compiling list of presenters to invite
- Composing workshop programme, initial scheduling of presentations and poster sessions
- Sending out invitations to workshop presenters and attendants
- Preparation of workshop webpage
- Announcement of workshop on SUNSEED webpage and SUNSEED linkedin

The details of this workshop were reported in D6.2.3.

2 Dissemination activities in RP2

2.1 Publications and presentations in RP2

RP2 list of journal publications

Authors	Paper title	Journal name	Date	Status
Jimmy J. Nielsen, Germán C. Madueño, Nuno K. Pratas, René B. Sørensen, Cedomir Stefanovic and Petar Popovski	What can wireless cellular technologies do about the upcoming smart metering traffic?	IEEE Communications Magazine	September 2015	Published
Germán Corrales Madueño, Jimmy Jessen Nielsen, Dong Min Kim, Nuno K. Pratas, Cedomir Stefanovic, Petar Popovski	Assessment of LTE Wireless Access for Monitoring of Energy Distribution in the Smart Grid	IEEE Journal on Selected Areas in Communications	November 2015	Published
Ziming Zhu, Sangarapillai Lambotharan, Woon Hau Chin, and Zhong Fan	A Mean Field Game Theoretic Approach to Electric Vehicles Charging	IEEE ACCESS	February 2016	Published

RP2 list of conference publications

Authors	Paper title	Conference name	Place and date	Status
J. J. Nielsen, D. M. Kim, G. C. Madueno, N. K. Pratas and P. Popovski	A Tractable Model of the LTE Access Reservation Procedure for Machine-Type Communications	IEEE GLOBECOM	San Diego, December 2015	Published
Germán C. Madueño, Nuno K. Pratas, Čedomir Stefanović, Petar Popovski	Massive M2M Access with Reliability Guarantees in LTE Systems	IEEE ICC 2015	London, June 2015	Published
Ziming Zhu, Doudou Zhou, and Zhong Fan	Short term forecast of wind power generation based on SVM with pattern matching	IEEE Energycon 2016	Leuven, Belgium, April 2016	Published
Ziming Zhu, and Zhong Fan	An Efficient Consumption	IEEE Energycon 2016	Leuven, Belgium, April	Published

	Optimisation for Dense Neighbourhood Area Demand Management		2016	
Urban Kuhar, Kemal Alič, Anže Medved, Roman Novak, Aleš Švigelj	Low-voltage-grid state estimation testbed	IEEE 24th International Electrotechnical and Computer Science Conference ERK 2015	Portorož, Slovenija, September, 21-23 2015	Published
Blaz Kazic, Maja Skrjanc, Primoz Skraba, Dunja Mladenic, Urban Kuhar, Anze Medved, Kemal Alic, Roman Novak, Ales Svigelj, Jurij Jurse	Pseudo-measurements based on the Forecasted Smart Meter consumption for State-Estimation	EMENDER 2015 – Energy Management Data Elaboration, 1st International Workshop on Energy Management, Prediction and Big Data Elaboration	Ljubljana, Slovenia, 06.10.2015	Published
Urban Kuhar, Jurij Jurse, Kemal Alič, Gorazd Kandus, Aleš Švigelj	A Unified Three-Phase Branch Model for Distribution System State Estimation	IEEE ISGT EUROPE 2016, Ljubljana	Ljubljana, Slovenia, October 9-12, 2016	Published
Aleksandra Rashkovska, Jošt Novljan, Miha Smolnikar, Mihael Mohorčič, Carolina Fortuna	Online Short-term Forecasting of Photovoltaic Energy Production	The Sixth IEEE Conference on Innovative Smart Grid Technologies (ISGT2015)	Washington D.C., USA, February 17-20, 2015	Published
Žiga Hribar	Zmanjševanje operativnih tveganj z nadzorom ključnih parametrov kakovosti v postopku dobav naprednih števec in njihovo spremljanje v času delovanja	12. Konferenca slovenskih elektroenergetikov 12th conference of Slovenian Power Engineers	Portorož May 2015	Published
Jurij Jurše Bojan Miličič	Projekt SUNSEED, zagotavljanje napredne observabilnosti obratovanja v distribucijskih pametnih omrežjih	12. Konferenca slovenskih elektroenergetikov 12th conference of Slovenian Power Engineers	Portorož May 2015	Published
Janez Zrnc Elektroservisi	Izkušnje z izvajanjem statističnega vzorčenja populacij pametnih števec električne energije, ekonomski učinki za EDP in predlogi potrebnih izboljšav	12. KONFERENCA SLOVENSКИH ELEKTROENERGETIKOV	Portorož May 2015	Published

RP2 list of talks

Speaker	Talk title	Event name	Place and date
---------	------------	------------	----------------

Ljupčo Jorgušeski	SUNSEED's overview	Workshop on Robustness and Resilience of (interdependent) Infrastructures	TNO, The Hague, The Netherlands 14 th September 2015
German C. Madueño	Poster: What can Cellular Wireless Technologies do about the Upcoming Smart Metering Traffic	SUNSEED 1st workshop	Aalborg University March 25, 2015
Jimmy J. Nielsen	DSO-Telecom Cooperation for the Establishment of Smart Grid Services - Examples from the SUNSEED project	ADVANTAGE training school	Aalborg University May 7, 2015
Nuno K. Pratas	Paper Presentation: Massive M2M Access with Reliability Guarantees in LTE Systems	ICC'15	London, UK Jun 10, 2015
Petar Popovski	Keynote speech at the MASSAP workshop	IEEE ICC, MASSAP workshop	London, UK Jun 12, 2015
Petar Popovski	Lecture on 5G and Internet of Things for the Telenor employees	Telenor Research	Oslo, NO June 18, 2015
Jimmy J. Nielsen	How Suitable are Cellular Networks for Connecting Future Electricity Smart Meters	FABULOUS'15	Ohrid, MK Sep 23, 2015
Petar Popovski	Lecture on 5G and Internet of Things for the Ericsson employees	Ericsson	Stockholm, SE Nov 23, 2015
Jimmy J. Nielsen	A Tractable Model of the LTE Access Reservation Procedure for Machine-Type Communications	GLOBECOM'15	San Diego, CA Dec 9, 2015
Nuno K. Pratas	Presentation of the activities of the MassM2M research group	APNET External Seminar	Løkken, DK Dec 17, 2015
Jimmy J. Nielsen	A Tractable Model of the LTE Signaling and Data Limitations in Machine-to-Machine Communications	Italian Networking Workshop	San Candido, IT Jan 13, 2016
Jimmy J. Nielsen	A Tractable Model of the LTE Access Reservation Procedure for Machine-Type Communications	APNET section meeting	Aalborg University Jan 27, 2016
Zhenzhe Zhong, Ziming Zhu, and Silviu Nistor	Research advances at TRL technology and applications – Overview of SUNSEED	Industrial seminar	University of Bristol, November 2015
Radovan Sernec, Bojan Miličič,	PLC and LTE interconnect for state	9th Workshop on Power Line Communications	Klagenfurt September 2015

	estimation in distribution grids	WSPLC 15	
Radovan Sernec, Jurij Jurše, Bojan Miličič,	Trajnostna in robustna komunikacijska omrežja za podporo pametnim omrežjem v distribuciji, projekt SUNSEED;	En.grids 015: Konferenca Energetike.NET in Tehnološke platforme za pametna omrežja	Ljubljana February 2015
Žiga Hribar	Obvladovanje tveganj pri upravljanju večjih populacij naprednih števcov v njihovem celotnem življenjskem ciklu	En.grids 015: Konferenca Energetike.NET in Tehnološke platforme za pametna omrežja	Ljubljana February 2015
Žiga Hribar	Testiranje večjih populacij naprednih števcov EE pred njihovim prevzemom s kontrolo kakovosti ključnih parametrov, <i>Žiga Hribar, Elektroservisi d. d.</i>	Inovacija energetike'15	Brdo pri Kranju Oktober 2015
Hervé Ganem	IOT and security	Public round table at GSMA	Feb. 2015
Hervé Ganem	A basic secure element for IOT	Global platform workshop	March 2015
Herve Ganem	Distributed security architecture for IOT	ETSI security week	June 2015
Herve Ganem	Distributed security architecture for IOT	Working session of ESMIG group	June 2015
Herve Ganem	Outsourcing IOT security management	World smart week conference	Sept. 2015
Herve Ganem	IOT security overview	Conference organized by 'pole systematic' in Paris	Sept. 2015

2.2 MWC'15 and GSMA Sunseed Case Study

SUNSEED exhibited at Mobile World Congress (MWC) held in Barcelona in March 2015 under the sponsorship of the GSMA. At this event, SUNSEED showed an early prototype demonstrating its security and trust management solution for smart grid involving the use of an embedded secure element (possibly an eUICC) embedded in the device. Mobile World Congress is the largest worldwide event in mobile communications and has a huge media impact, with more than 90,000 visitors in 4 days. The prepared pitch was delivered to more than 300 visitors during the show. Our demo has been well received and attracted media coverage such as Electronics360.



Figure 1: SUNSEED demonstration at Mobile World Congress

In February 2016 GSMA published a case study based upon the SUNSEED project. This case study, primarily targeted at utilities companies is showcasing the problem addressed by the SUNSEED project and the benefits of the solution implemented in the project. It explains in particular how Telekom Slovenia has been integrated as a major player of the project to provide the SUNSEED communication network and ensure the security of SUNSEED communications.

(<http://www.gsma.com/connectedliving/the-electricity-grid-of-the-future>)

2.3 Workshop 1

The 1st SUNSEED workshop is a whole-day event that took place in Department of Electronic Systems, Aalborg University, Aalborg, Denmark. In the workshop, each invited speaker gave a 10-15 minutes talk initially, and then afterwards there was a poster/interaction session where speakers were able to discuss more directly with other speakers and attendees in the workshop. The workshop had a morning block and an afternoon block. The main topic of the workshop was on communications in smart grid, and understanding the requirements to the communication from different sides. The workshop was held on March 2016. More details are reported in D6.2.3 on <http://sunseed-fp7.eu/deliverables/>.

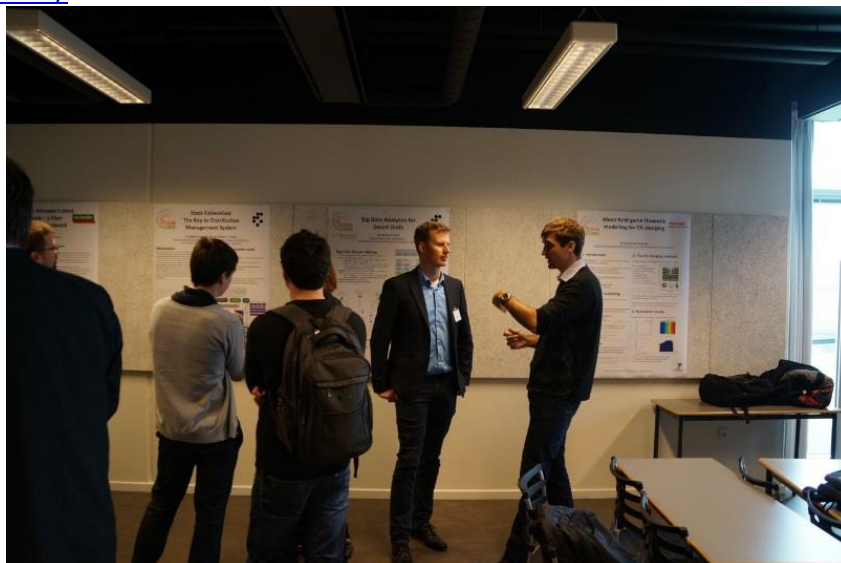


Figure 2: Workshop 1

2.4 Standardization activities

TNO has been the first to develop an open source implementation of the XMPP extension protocol standard (XEP) for IoT (<http://xmpp.org/extensions/xep-0347.html>). During this implementation TNO has reviewed this standard and proposed updates to this standard which have been accepted by the XEP standardization committee. (<https://github.com/joachimlindborg/XMPP-IoT/pull/7>). The open source implementation can be found at <http://tno-iot.github.io/ekster/>.

TNO also follows the development of Narrowband IoT (NB-IOT) in 3GPP. NB-IOT is a clean-slate technology (w.r.t. LTE) designed for the Internet of Things (IoT) applications. NB-IoT is part of 3GPP Release 13, to be frozen in Q2 2016 (the rest of Release 13 is already frozen). Mainly we follow the relevant standardization activities in 3GPP RAN1 group, who is leader of the NB-IoT work item and where the PHY layer of NB-IoT is being specified. We also follow corresponding standardization activities in 3GPP SA2 group (architecture), RAN3 group (architecture), and RAN 4 group (performance requirements). The technical specification of NB-IoT will be incorporated in existing LTE specifications. Interested readers may refer to the following two 3GPP technical reports for the outcome of 3GPP studies for NB-IoT:

- TR 45. 820, “Cellular system support for ultra-low complexity and low throughput Internet of Things (CIoT)”.
- TR 23.720, “Study on architecture enhancements of cellular systems with support for ultra-low complexity and low throughput Internet of Things”.

As a new topic for oneM2M Release 2 (following Rel- 1 publication in 01/2015), Gemalto initiated a new Work Item on dynamic authorization scenarios for IoT (referred to as WI-0019) and provided several contributions (e.g. SEC-2015-0605R01 reviewing existing frameworks such as UMA and OAuth, or SEC-2015-0654R01 refining proposed scenarios) to this work item, which resulted in the production of a Technical Report investigating the topic (TR-0019, currently being finalized for publication) and in the inclusion of a flexible token based authorization framework in the current Release 2 draft of the oneM2M Security specification, TS-0003 (to be published in Q3 2016). This work also affects other oneM2M deliverables such as TS-0001 (Reference Architecture) and TS-0004 (Protocols)

The oneM2M work item on Dynamic Authorization was undertaken in conjunction with another Work Item, WI-0023 aiming at improving the oneM2M Release 1 authorization architecture and access control policies model. This other Work Item also benefitted from SUNSEED interactions which resulted in Release 2 support for Role-Based Access Control Policies and for flexible distribution of authorization architecture components such as Policy Reference Point, Policy Decision Point and Policy Enforcement points on oneM2M entities such as endpoint devices, intermediate gateways and infrastructure servers.

Overall, the oneM2M authorization architecture enhancements are expected to be a major selling point for Release 2, together with the support for semantics and interworking frameworks with other standards.

2.5 Preparation of workshop 2

A lot of work has been done in RP2 for preparing Workshop 2 which was held in March 2016 at TNO, including

- Discussion and decisions on workshop theme, presentations and agenda
- Discussions and decision on interactive sessions (e.g. discussion items, introductory slides, voting principles, etc.)
- Invitations to workshop participants and attendees
- Organizing the logistical part of the workshop (room rental, catering, poster print-out, etc.)

There are also major updates of project webpage (presentations, posters, deliverables put online).

3 Dissemination activities in RP3

3.1 Publications and presentations in RP3

RP3 list of book chapter publications

Authors	Chapter title	Book title	Date	Status
Jimmy Jessen Nielsen, Ljupco Jorguseski, Haibin Zhang, Hervé Ganem, Ziming Zhu, and Petar Popovski	5G and Cellular Networks in the Smart Grid	Transportation and Power Grid in Smart Cities: Communication Networks and Services	January 2017 April 2017	Submitted Request to submit major revision

RP3 list of journal publications

Authors	Paper title	Journal name	Date	Status
Kielgast, Mathias Rønholt; Rasmussen, Anders Charly; Laursen, Mathias Hjorth; Nielsen, Jimmy Jessen; Popovski, Petar; Krigslund, Rasmus	Estimation of Received Signal Strength Distribution for Smart Meters with Biased Measurement Data Set	IEEE Wireless Communications Letters	October 2016	Published
Peter Zidar	Pametni števc (Smartmeters)	Popular science magazine "Življenje in tehnika" (Life and Technology).	February 2017	Published
Jimmy J. Nielsen, Hervé Ganem, Ljupco Jorguseski, Kemal Alic, Miha Smolnikar, Ziming Zhu, Nuno K. Pratas, Michal Golinski, Haibin Zhang, Urban Kuhar, Zhong Fan, Ales Svigelj	Secure Real-Time Monitoring and Management of Smart Distribution Grid using Shared Cellular Networks	IEEE Wireless Communications Magazine	April 2017	Published
Jimmy J. Nielsen, Rongkuan Liu, Petar Popovski	Ultra-Reliable Low Latency Communication (URLLC) using Interface Diversity	IEEE Transactions on Communications	March 2017	Major revision requested

RP3 list of conference publications

Authors	Paper title	Conference name	Place and date	Status
Nielsen, Jimmy Jessen; Popovski, Petar	Latency Analysis of Systems with Multiple Interfaces for Ultra-Reliable M2M Communication	IEEE 17th International Workshop on Signal Processing Advances in Wireless Communications	Edinburgh, UK July 2016	Published
Ljupčo Jorgušeški, Haibin Zhang, Manolis Chrysalos, Michal Golinski, Yohan Toh	“LTE Delay Assessment for Real-Time Management of Future Smart Grids”	1 st EAI International Conference on Smart Grid Inspired Future Technologies	Liverpool, UK February 2016	Published
Jimmy J. Nielsen, Rongkuan Liu, and Petar Popovski	Latency-Optimized Interface Diversity for Ultra-Reliable Low Latency Communication (URLLC)	IEEE GLOBECOM	Singapore, December 2017	Submitted
S. Nistor, A. Khan, M. Sooriyabandara	Machine learning for phasor measurements estimation on distribution networks	Intelligent System Applications to Power Systems Conf., 2017	San Antonio, Texas, USA September 2017	Submitted
Ljupco Jorguseski, Varun Nair, Jimmy J. Nielsen	SUNSEED Trial – A Delay and Traffic Assessment of Access Networks for Real-Time Monitoring of Future Smart Grids	IEEE International Conference on Smart Grid Communications	Dresden, Germany, October 2017	Submitted
Urban Kuhar, Gregor Kosec, Ales Švigelj	Measurement Noise Propagation in Distribution-System State Estimation	Mipro 2017 40th jubilee international convention on ICT, electronics and microelectronics	Opatija, Croatia, May 22 - 26, 2017,	Accepted

RP3 list of talks

Speaker	Talk title	Event name	Place and date
Peter Zidar	Mobile operators and 5G <ul style="list-style-type: none"> • EU Smart Grid projects • IoT in LTE and 5G networks • Future mobile services 	Telco Data Analytics & Location Based Services Europe	Melia Avenida, Madrid, Spain 25 – 26th October 2016
Jimmy J. Nielsen	Latency Analysis of Systems with Multiple Interfaces for Ultra-Reliable M2M Communication	IEEE 17th International Workshop on Signal Processing Advances in Wireless Communications	July 6, 2016, Edinburgh, UK.
Peter Zidar	Project SUNSEED: Establishing role of telecoms in future smart-grids	10th Annual Telecoms Energy Efficiency Forum	Barcelona, Spain 3rd & 4th April, 2017

RP3 list of report publications

Authors	Report title	Date	Status
Arthur D. Little	Creating a Gigabit Society – The role of 5G	March 2017	Published

3.2 Workshop 2

The second SUNSEED smart grid workshop was a one-day event including a morning session oriented to the research community and an afternoon session focused on the industry parties. The workshop attendees were very satisfied with the overall workshop, its structure and the communicated information (e.g. 85% to 90% of the received feedback scored good or excellent on these aspects). The workshop had 10 presentations, 10 posters, 2 demonstrations (also supported by the posters) and two interactive sessions (one for the research morning session and one for the afternoon industry session). The workshop was held in The Hague, The Netherlands, on March 8, 2016. More details can be found in D6.2.4 on <http://sunseed-fp7.eu/deliverables/>.



Figure 3: Workshop 2

3.3 Workshop 3

The third SUNSEED smart grid workshop was a very successful half-day event as a part of much larger event European Utility Week in Barcelona visited by 12000 international visitors, which also included exhibition, where over 600 exhibitors showcased their solutions across the entire smart energy value chain, from transmission to end-user. The workshop was organized in collaboration with SUNSEED's sister project VIMSEN and had 5 presentations and 1 panel session. Based on the received feedback attendees were very satisfied with the overall workshop, its structure and the communicated information. The workshop was held on November 17 2016. More details can be found in D6.2.5 on <http://sunseed-fp7.eu/deliverables/>.



Figure 4: Workshop 3

3.4 Workshop 4

The fourth SUNSEED smart grid workshop, entitled 'Smart Distribution Networks: Technologies and Business models', is a very successful full-day event, organised by SUNSEED in collaboration with H2020 project 'P2P-SmarTest' and FP7 'Advantage'. This workshop aims to present recent research findings and trial results from three large European collaborative projects and to discuss about disruptive technologies and business models for distribution networks. Through technical presentations, demos and panel discussions, by the end of the day we anticipate answers to the following questions

- What technologies are useful in the DNO network in the short to mid-term?
- What are the real business or research opportunities?

The workshop has 9 presentations, 2 panel sessions, as well as a technology demonstration/exhibition session, where the three projects showcase their solutions across the smart distribution network. Based on the received feedback attendees were very satisfied with the workshop. The workshop was held in London on April 10 2017. More details can be found in D6.2.5 on <http://sunseed-fp7.eu/deliverables/>.



Figure 5: Workshop 4