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Platform for Large Area Conformable Electronics by InTegration

Deliverable 9.11

Dissemination Kit

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Table of Contents

1 Executive Summary

The dissemination kit is a collection of materials useful for public dissemination by the EC. The dissemination activities by the project are summarized and evaluated in the deliverable D 9.9.

The following material collection is being provided to the EC:

- A general presentation covering the mission, the way of working and the results of the Place-it project and will be provided in the final report Deliverable 1.11.
- A picture collection with short descriptions (Powerpoint format) which will be available on the website.
- The set of e-modules generated within the project to educate the project partners as well as the general audience. It will also be used to train researchers and students by the institutes. The e-modules are also available on request from the website.
- A feedback of the Flex&Stretch Electronics Conference IV which took place in November 2013.
- The “Place-it story” generated and released by the Research Media Ltd.
- The set of Newsletters (I – V) created during the progress of the project.

Most of the information will be present on the website. The public website (www.place-it-project.eu) will be online until 2016.

2 Introduction

2.1 Purpose of the document

This document summarizes the material provided to the EC for its dissemination purposes.

2.2 Related documents

- D9.2 containing the initial dissemination plan for year 1
- D9.4 reviewing year 1 and setting targets for year 2
- D9.6 reviewing year 2 and setting targets for year 3
- D9.9 reviewing year 3/4

3 Dissemination Kit

3.1 General presentation

The general presentation is limited to 20 pages of description. It will be part of the final report of the project (Del 1.11)

3.2 Pictures and Photos

A separate collection of high resolution pictures and photos is generated and will be provided in PPT format.

3.3 E-modules

The e-modules have been revised by the authors and will be released on the website in December 2013. The set of pdf-files is also available for the EC.

Please see below the topics of the e-modules:

01 Phototoxicity and Photobiology

02 Renal Demonstrator

03 Phototherapy

04 Biocompatibility

05 Automotive

06 Standards in Optical Radiation Safety

07 Foil Technology

08 Stretch Technology

09 Textile Technology

10 Testing by Washing

3.4 Public website (www.place-it-project.eu)

The website will be active until 2016 as agreed in the GA. It will list upcoming publications steaming from the scientific results of the project. It will also maintain the Newsletters as well as the e-modules.

Currently it covers a brief summary of the Flex&Stretch Electronics Conference IV as held in Eindhoven, 12-13 November 2013.

Upper part of homepage

Lower part of homepage

Figure 1 The PLACE-it homepage

3.5 Newsletter V

The final Newsletter has been released just-in-time with the F&S Conference. The distribution of the electronic version was used to remind the community to register for the conference. It was distributed to the participants F&S Conference and it is also available for download from the web site.

It contains a description of the automotive demonstrators, the OLED-based renal function monitor prototype, the announcement of a new project TERASEL and the farewell by the coordinator.


PLACE-it Newsletter V

Platform for Large Area Conformable Electronics by InTegration

Welcome to the fifth issue of the PLACE-it Newsletter.
PLACE-it is a EC funded project within FP7 (ICT-248048), see: www.cordis.lu. In the project we develop a platform for conformable optical systems, based on light-emitting foils such as OLEDs, stretchable materials and/or fabrics. With this integration platform, the building blocks can be combined to form conformable opto-electronic systems such as smart bandages or (automotive) interior lighting applications.
This 5th and last newsletter will give you a summary of the outcomes in the PLACE-it project and will be focused on the description and presentation of the demonstrators. Additionally there will be an outlook to new EC projects where partners will be involved.

PLACE-it stretched the world of flexible electronics. Farewell of the project coordinator

As the PLACE-it project is coming to an end, it is time to conclude and discuss the outcomes. First of all, I'm very proud of the team which developed in great consensus very different demonstrators based on a common way of thinking. Team work and spirit were continuously very high in the many meetings and appointments where progress and planning was discussed in full extend. I think we managed to reach our objectives although finishing touch has still to take place. We can look back already on great results. Many examples are available. Hereby only some of them:

- We have created a wearable medical measurement device based on OLED technology. The first OLED based medical measurement device shows very promising results and can grow into a new category of OLED applications.
- First time flexible OLEDs are demonstrated in combination with deformable textiles.
- International recognition achieved (Avantex Innovation price) by the new way of automatic embroidery of light emitting elements on large scale substrates.
- Core technology contribution to a commercial product launch of Philips BlueTouch product. Both in clinical measurement technology and in industrial manufacturing of components.
- Many more already and a few still to come in the coming months.

... -> page 7

Content of this issue of the PLACE-it Newsletter

The current newsletter reflects the upcoming end of the project. It is therefore dedicated to the current status of the demonstrators.

On the pages 2-5 you will find different variations on the same topic – a sun visor which includes ambient lighting. The sun visor is in fact the demonstrator to compare different technologies and test their robustness. The final demonstrator will be a car roofing with ambient lighting, which is still under construction.

Page 6 is dedicated to medical applications. Here you will find a report on the first smart bandage for renal function monitoring based on OLEDs and a sock which measures leg volume on patients with heart disease.

You will find an outlook to the new TERAGEL project on page 7.
As usual the final page is reserved for general information on the project.

Content Issue No. 5:

I The Project

Fig. 1: Concept with stretchable conductive fabrics

SEVENTH FRAMEWORK PROGRAMME
RESEARCH
www.place-it-project.eu

Figure 2 Title page of PLACE-it Newsletter V

Each partner received the pdf-version as well as printed samples for individual distribution. Hard copies are also available for fairs or conferences. They are regularly used by partners on international conferences and fairs.

3.6 Flex Stretch Conference 2013 (www.flexstretch2013.eu)

Almost 100 participants ranging from technologists, academia, (textile) designers and end-users companies as well as material supplier to the field of textile – stretchable and flexible electronics were gathered for two days at the Flex Stretch Conference 2013 as held in the Evoluon of Eindhoven 12 and 13 November 2013. Prior to the conference the Monday was devoted to tutorials on the basic technologies and demonstrator examples as organized at the Holst Centre, Eindhoven.

Figure 3 Instruction at the Tutorial of F&S 2013

Figure 4 F&S conference participants

The two days offered plenty opportunity for discussion and interaction amongst the participants and speakers. Together with the lectures around themes like sports and wearables, medical and mobile applications and the basic technologies of tex-, flex- and stretch this provided ample background to conclude that a very exciting future lies ahead of new-fashioned electronics. By integration into thin, conformable and comfortable materials new applications can be served and electronics will approach mankind even closer.

Also Cath Rogan reported on the conference (2nd December 2013):

http://www.innovationintextiles.com/flex-stretch-electronics-conference-review/

Cath Rogan reports from Eindhoven

When I mentioned I was going to an event called Stretch-Flex, there were a few raised eyebrows among those who know me but had never imagined me at a yoga retreat. Indeed, walking through Eindhoven's impressive High Tech Campus en-route to the Holst Centre on a quiet, clear November morning, the setting would have been quite appropriate had that been the case. The Flex-Stretch conference and workshop, however, were definitely not for those seeking a Zen state of calm. Instead a blistering pace of presentations, hands on demonstrations and poster displays was designed to stretch the grey matter and flex the jaw muscles of the delegates and it did so very successfully.

This was the fourth biennial conference, originally formed as part of the activities of the FP7 STELLA (Stretchable Electronics for Large Area Applications) project, which evolved as that project completed and successor projects took on further developments in the field. This year's conference was organised by three current FP7 project groups:

- PLACE-IT (Platform for Large Area Conformable Electronics by Integration)
- I-Tex (Intelligent And Luminous Textiles)
- PASTA (Platform for Advanced Smart textile Applications)

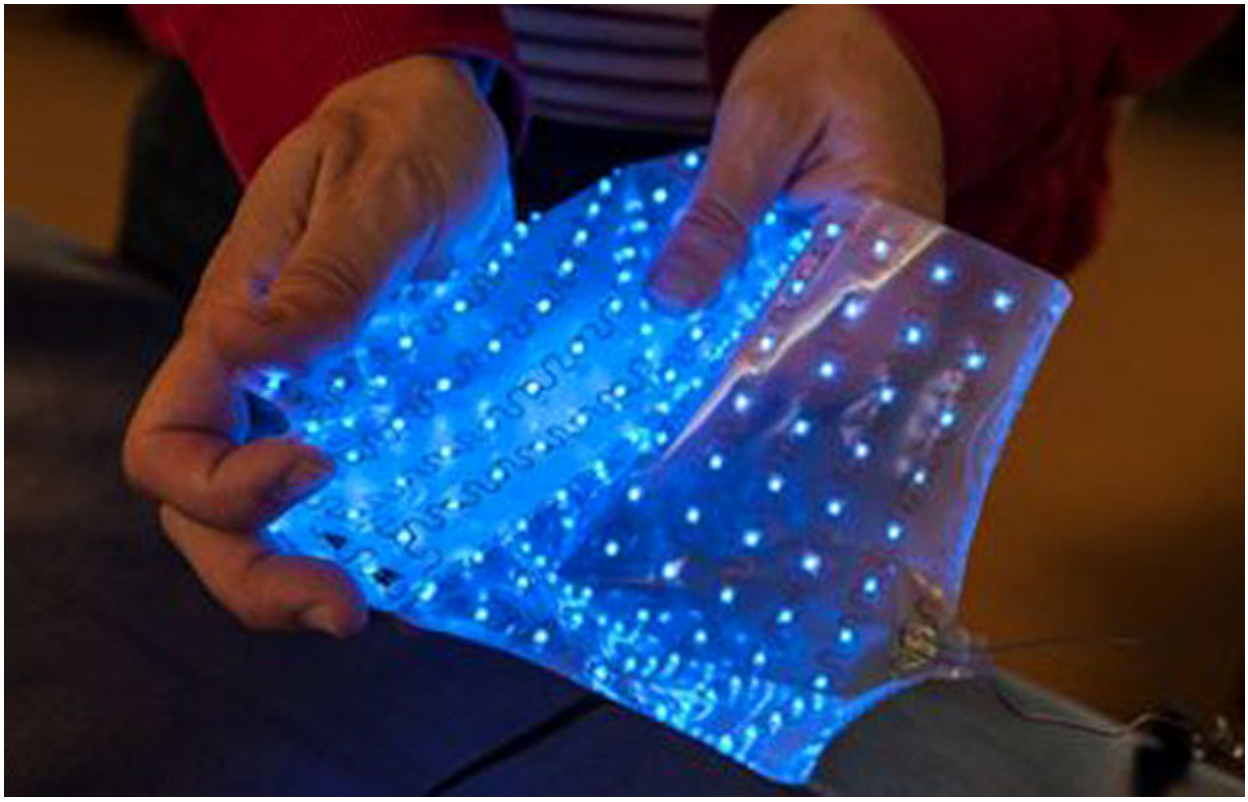
As much of the projects are focused on the integration of flexible electronics and textiles, this year's conference was itself heavily textile focused, although the attendance remained predominantly from the electronics community. The organisers are considering a name change to reflect the emergence of the textile elements in this area however; perhaps "Stretch, Flex & Tex" may now be more appropriate.

The three main FP7 project teams were each represented at the workshop, where they went through the main aims and outcomes of the projects to date before the participants split into smaller groups to spend the afternoon getting close-up and hands on with some of the main technology demonstrators. It struck me during the workshop and subsequent conference presentations that these FP7 projects were very commercially driven.

I recall hearing several times over the course of the conference that the teams were challenged to work with existing production equipment and processes as much as possible, which meant that many of the new methods and applications we saw could achieve a relatively rapid and hopefully successful transition to commercialisation. Others, of course would take new machinery, skills and supply chain amendments to cross that bridge, but the groundwork was clearly laid with the transition to industrial production methods in mind.

This was a theme strongly encouraged by Andreas Lymberis, Research Program Officer for the European Commission who gave the opening keynote presentation. In it, he outlined the opportunities for new R&D as part of the Commission's upcoming Horizon 2020 launch in December 2013. Recognising that many EU funded projects have not met the challenges of translating research into real world products, there will be new regulatory requirements for industrial participation in these new projects along with a specific drive to engage more with high growth SMEs.

With a number of significant policy changes including simplified and improved reimbursement tools and the ability for SME's to participate without the need for a consortium, the Commission hopes to significantly improve the success of prototype and early commercialisation steps, which have historically been the weak link in the EU research chain.



There were so many FP7 project participants represented at the workshop and conference (and some with posters too) as well as some crossover of participants in more than one project, so the boundaries became a little blurred as I tried to differentiate between them all. It mattered very little in the end, however, as it simply meant that there were lots of people available to answer questions.

With so much of the FP7 work to show and tell, and so many project partners on the agenda, there was inevitably a significant amount of repetition among the first day's presentations, but this was to be expected. What I hadn't expected was that so many of the presenters had simply not prepared for the timed slots they were given – and it showed. The conference had fortunately been arranged around extended networking breaks, but the over-runs ate into much of that time. When the topics are absorbing and the presenters clearly so passionate about their work, this isn't necessarily a problem, but it did add to the frenetic sense of the already quite technical and detailed presentations.

We rattled through reviews of progress in PLACEit with demos of flexible phototherapy blankets and automotive interior lighting, and PASTA (flexible interconnects and microelectronic components integrated into yarns). Frankly, I haven't space to do these very impressive pieces of work justice here, so I suggest you check out the relevant project websites (listed below) and see for yourself. The Holst Centre's own website also has a great overview (and YouTube video) of several of the PLACEit product demonstrators along with further information on some of the additional conference topics which you can find herehttp://www.holstcentre.com/NewsPress/NewsList/StretchableOLED.aspx

As is often the case in E-textiles, LEDs (and in some cases, OLEDS) were to be found in many of the applications and methods discussed. Perhaps this is unsurprising as the uses for lighting in conformable textiles are so diverse. We saw them used in healthcare applications (light therapies from the Philips teams), automotive head-linings (the cost, complexity and weight saving potential for these LED alternatives being major drivers for this sector) and as eco and energy efficient replacements for domestic or commercial lighting applications.

The issues of integrating lighting into textiles actually cover pretty much all of the key problems of combining electronics and textiles and in effect, they form a handy proving ground for critical issues like managing the transition areas from rigid to flexible substrates, making successful connections between textiles and electronic components and coping with the challenges of weather or laundry proofing. Solving these issues with LEDs could form the "jumping off point" for a much broader range of electronic components.

OLEDS offer the opportunity for even more flexibility and energy savings than traditional LEDs with these printed devices providing totally new flexible form factors for lighting. At the moment however, relatively high production

costs, some wavelength restrictions and the challenges of creating effective flexible encapsulation are among the main constraints faced in making the transition from stunning lab based concepts to the mass market. With work in active matrix amoleds being driven by the large consumer electronics manufacturers however, it is clear that the emergence of these new lightweight, flexible displays may eventually replace many current traditional LED functions.

The core topic of creating flexible electronic circuits was addressed in several approaches, from using different grades of composite structures for managing the transition from stiff islands to flexible polymer sections, to the use of foil meanders embedded in PDMS or stretched out and applied to textile carriers, printing foils onto pre-stretched elastomers and even one approach using fluid channels. Like the “digital tattoos” formed from ultrathin plastic electronics, these enabling technologies are not yet commercially ready, but the sheer volume of development work in this area, much of it driven by real world requirements for new healthcare applications, coupled with the progress to date suggests that this stage is fast approaching.

Aside from lighting applications, the use of microelectronic RFID tags embedded in yarns and the development of ultra lightweight flexible photovoltaic films offered a glimpse of entirely new future applications.

Day two of the conference saw something of a change in gear as the spotlight moved from foil & flex technologies, lighting and stretchable circuits and components to (mostly) commercial products. The early session covered sports and wearables, taking in variations in desirable form factors (with the ideal monitoring products becoming “invisibly” integrated in clothing) to data accuracy and requirements of current and emerging monitoring systems.

This was followed by some diverse textile applications from conductive yarn developments to some thought provoking concepts developed for helping dementia patients to remain “connected” and create immersive storytelling experiences for children through the use of technologies including image recognition software and vibration modules integrated into textile products like duvet covers and pillows. By effectively “hiding” what might otherwise be daunting technology in more recognisable and acceptable forms.

Further medical applications were discussed in the closing session where some of the most jaw-dropping devices were shown, including some incredible flexible microelectronics for catheter devices and organ-on-a chip developments. The astonishing advances in neurosurgery and prosthetics demonstrated some very clear opportunities for flexible electronics in a presentation by Otto Bock, whilst Clothing Plus showed just, how far textile sensors have come in a few short years but just how much further there is to go when looking to close some of the medical application gaps.

The Flex-Stretch workshop and conference offers less of an “introduction” to e-textiles than a master-class in the latest developments and emerging trends. Much of the information is quite technical and assumes a level of knowledge to begin with. With such a technical bias, it is inevitable that parts of the conference are simply incomprehensible to electronics novices, although for the most part, the sessions were pretty accessible. The pace and content was fast and packed fit to burst, which made the experience quite exhausting at times and may have benefitted from more focus and less content.

Sometimes, less really is more and had the sessions stuck to their original schedule, the networking breaks would have been similarly less hurried and more beneficial overall. The venues and organisation (other than the overruns) were excellent, the topic range and mix of research and commercial content were informative and inspiring.

Overall the Flex-Stretch workshop and conference offered an exceptional learning and networking experience for those interested or involved in E-textiles. With the recent shift in emphasis towards textiles, the organisers are considering a new, textile specific event next year and we are keen to gauge the level of interest in such an event, so please let us have your feedback.

Now if they could just squeeze in those yoga / meditation sessions to sooth my overheated brain…that would be just grand.

FP7 Project websites:

http://www.place-it-project.eu

http://www.pasta-project.eu

http://www.i-tex.nl/

- See more at: http://www.innovationintextiles.com/flex-stretch-electronics-conference-review/#sthash.URa5zGqy.dpuf

3.7 The “Place-it story” told by the Research Media Ltd.

The following text will be released in an article in http://www.international-innovation-healthcare.com/ . Pictures have already been delivered to support the text. The version below is still in editing phase, and will differ slightly with the final version (not available on this moment of writing)

FIRST FOIL BASED OLEDS ON TEXTILE
©Holst Centre

PLACE-IT

A place for wearable electronics

A new project based in The Netherlands aims to develop successful electronic textiles products for a range of applications. Koen van Os introduces the project and outlines the reasons for its initiation

Could you elucidate the Platform for Large Area Conformable Electronics by InTegration (PLACE-It) project's background? What was the motivation behind it?

About five years ago, LED technology became available for integration into wearable products. There was a similar demand within the automotive interior industry, which sought to integrate LED in large panels. LED costs became affordable and organic LEDs (OLED) were appearing on the horizon. There was a general expectation that these new components could be integrated into the appearance of existing products.

Adapting technology for human skin requires a different kind of 'comfort' thinking not embedded in conventional electronic product development. Experts from a variety of sectors have to be consulted. The idea of the project is to bring these people together to generate discussion and collaboration.

How is the project structured?

The structure was planned from the outset by project initiator Dr Liesbeth van Pieterson from Philips. First, we evaluated application descriptions and needs, and then defined building blocks; this was followed by an intense period of creating, testing and evaluating these potential projects. Next, we brought them all together in the so-called Integrated Testing Vehicles process as subparts of the final demonstrators. Between the requirements, we checked tests and held discussions with advisors.

The demonstrators are almost complete and we are confident they will meet expectations. This structure yields application for all directions chosen by the project (from human body to car body).

PLACE-It's vision is focused on the end-user at all times. How does this approach influence the project as a whole?

People involved in the project have different backgrounds and aspirations, and identifying the individual needs of the end-user is important for creating a common vision. Feedback from end-users dominates the decisions we make.

In phototherapy, for example, organisation is centred around the Philips BlueTouch project, which was initiated during product development to create a device for patients with back pain. This product development brought enormous amount of needs and end-user feedback to PLACE-It.

Could you discuss the work conducted on the development of wearable textile-based phototherapy systems? How has PLACE-It contributed to the development of Philips BlueTouch?

Philips BlueTouch is undergoing clinical proofing, some of which is being undertaken as part of the PLACE-It project. Several of our partners contributed to this investigation. Special measurement set-ups at RWTH Aachen University, Germany, have proved Blue Light affects biomechanical processes in our bodies. PLACE-It provides the textile-based building block for the project. This product could be built on conventional flexible printed board technologies, but we hope to convince product development that PLACE-It is mature enough (in short time) and a good alternative. By this, we validated the industrialisation, reliability and robustness of this practice. This is beneficial for further product development, where the

When technology meets textiles

In recent years, the science and applications of smart materials has developed significantly. Hoping to take this industry to the next level, the PLACE-it consortium is creating innovative electronics products for such areas as human health and the automotive industry

technology will potentially be more visible during product design.

The PLACE-it consortium has a diverse range of members spanning both academia and industry. Has this variety strengthened the consortium as a whole?

The consortium has a shared goal to involve all interested parties in addressing issues as they arise. However, this is not limited to the consortium itself, and input from external players is always welcome. Collaborating further afield gives us opportunities to disseminate results in new directions. Our partners come from various locations, which will greatly strengthen the outcome of the project.

How do you predict the field of wearable electronics and e-textiles will develop over the coming years?

There are many opportunities for this technology. Amazingly, it could cross from reality into the virtual world, which is currently developing at a very fast rate; the internet offers many solutionsw every day. PLACE-It's conformable electronics provide another expression of this virtual world by, for example, collecting light effects input without dedicated action of the end-user involved. Logically, it makes sense to apply this idea to healthcare-related applications, but fashion and self-expression are still to be discovered as an application area.

SMART MATERIALS – those which sense and respond to environmental conditions and stimuli – are on the rise and are gaining more attention than ever before in a wide range of disciplines. Already, these smart textiles or 'e-textiles' are transforming the way we think about materials and their potential place within sectors such as healthcare, education, public safety, fashion, entertainment and interior design. As with many smart technologies (phones, for example), these innovative textiles are often multipurpose, and can adapt to their surroundings and operate autonomously.

As e-textiles represent a relatively new industry, research and prototypes are still in the early stages of development; however, their potential to increase competitiveness in Europe is an exciting prospect for many researchers. Hoping to explore this evolving class of electronics further is Koen van Os who, in coordination with Dutch electronics giant Philips and 11 other partners, has developed the Platform for Large Area Conformable Electronics by InTegration (PLACE-it) project. With a budget of €16 million, PLACE-it is one of the largest ICT projects currently being supported by the EU's Seventh Framework Programme (FP7).

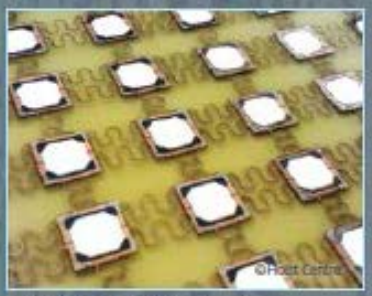
The team is conducting intelligent textile research to develop a range of unique electronic products that benefit various sectors: "We will present industrial design rules and recommendations to make large area light emitting, electronic and sensing surfaces. It is about creating technologies that can cover 'skins', from human skin to automotive, and we are even looking at building skins, ie. architecture. We are also evaluating, for example, phototherapy and biomechanical sensor technologies," van Os outlines.

WHY CONFORMABLE ELECTRONICS?

Until recently, electronic systems were generally flat, rigid and inflexible; designs that have been appropriate for devices such as phones and computers, but not for our bodies. For wearable technologies, researchers must take into consideration the human form: the way it moves and bends, and its softness. Product designs must therefore be conformable (stretchable), breathable, comfortable, robust and lightweight. "Uncontrolled movement and body shape are demanding for covering technology, and a certain percentage of elasticity is required if electronics are to fulfil this demand. Without this elasticity, large area electronics will create air-gaps, pressure points, sharp folding lines, cracks, etc. when folding over 3D bodies," van Os explains. Conformable electronics have a wide range of promising applications, but the team is predominantly interested in their ability to cover human or automotive bodies, almost like a 'cyber skin'.

BEST OF BOTH

Bringing together expertise from academic and industrial sectors, the PLACE-it consortium benefits from both clinical proficiency and advanced technical knowledge. Their main objective is to co-develop flexible large-area technologies that are, for example, foil- and light-based, stretchable and fabric-based, and that interconnect to create high-quality optoelectronic systems with unique technical properties and performances. PLACE-it offers something unique in that it examines flexible, stretchable and fabric technologies simultaneously for heterogeneous integration. To reach this goal, the team will create conformable devices by comparing the best features and integrating the most effective technologies.



STRETCHABLE ELECTRONIC SYSTEM

WWW.RESEARCHMEDIA.EU 77

PLACE-IT

OUR FRIENDS ELECTRONIC

Van Os is working with leading electronics company Philips, which is coordinating the PLACE-it project through their International Philips Research organisation, with the aim to better people's lives through technology and innovation. Philips Research has three main research programmes – healthcare, lifestyle and lighting – each of which enables profitable growth for Philips by bringing rapid innovations to market.

From diagnostic imaging to patient care, home and personal healthcare to healing environments and services, the Philips healthcare programme creates innovative technologies to alleviate the pressures of healthcare systems and prepare for an ageing population, focusing on patients and care providers to find solutions to current healthcare issues. Examples include Philips BlueTouch, a device which exposes the body to blue LED light, causing the release of nitric oxide (a known pain relief); a blanket to treat neonatal jaundice; and a light-emitting device worn on the wrist to treat carpal tunnel syndrome.

In addition, the lifestyle programme identifies methods to improve the quality of people's lives by focusing on consumer requirements such as personal care, and home and interactive living. Their lighting projects look at ways to generate sustainable electricity through innovative methods including LED conversion and systems, advance light delivery and effective energy management.

With laboratories in The Netherlands, Germany, the UK, India, the US and China, Philips Research is in a position to perform high-level research and create meaningful innovations that improve lives not only in Europe, but globally. The company will provide its knowledge of coordinating European projects, as well as electronic design and optics, to progress the project further.

BONDED OLED ONTO TEXTILE ©Holst Centre

LEARNING APPROACH

Since the project's inception and throughout each process, van Os and the PLACE-it team have focused on the requirements of the product's end-users, listening to advice and feedback from stakeholders to ensure their products met specifications and were tailored and adapted accordingly. This has enabled the group to work effectively and with decisiveness, and they are confident this approach could be applied to a number of other projects.

By synchronising clinical insight with the physical realisation of potential developments, the researchers have been able to perform each process and stage reliably and with speed. The team has also identified that extensive, detailed manufacturing and industrialisation are crucial to the project's success.

GET INVOLVED

Now coming to the end of its four-year duration, the PLACE-it consortium has set the benchmark for e-textiles, bringing great potential and new ideas to this growing industry. "PLACE-it has introduced a new method of application thinking based on stretchable technologies that could change products and markets in the near future, and the consortium invites other companies and institutes to set boundaries even further – please make contact if you are interested in certain parts of this project or in forming collaborations!" van Os states.

STRETCHABLE ELECTRONIC SYSTEM ©Holst Centre

ALTERNATIVE FOIL BASED COMPONENTS ©Holst Centre

?? INTERNATIONAL INNOVATION

PLACE-it applications

The PLACE-it consortium has developed five demonstrators with advanced technologies to showcase its expertise in the e-textiles sector. Below, we highlight some of their most successful products to date

BLUE LIGHT THERAPY

Arguably the most innovative and successful product developed by the team is the stretchable Blue LED Light Therapy for effective pain relief. Blue light enhances the body's release of nitric oxide – which possesses pain-relieving qualities. 50 per cent stretch will be demonstrated in devices so they can be worn, for example, on the back. Clinical evidence suggesting this therapy works has already been established, and the device is comfortable to wear all day, every day.

In addition, this mobile phototherapy device could also be used in other significant ways, eg. as a blanket to treat neonatal jaundice or worn on the wrist to treat carpal tunnel syndrome. "Our technology is bridging the gap between typical healthcare treatment (hospital appointments, for example), and personal, self-motivated care," van Os adds.

OLEDS

The project has developed groundbreaking e-textile technology to demonstrate the integration of organic LED (OLED) components on textile in large format. The group has created light-emitting surfaces that mimic the experience of ordinary textiles (such as blankets and bed linen), but that are also designed to change colour instantly or sparkle, for example. These products could transform the way we think about interior design spaces, it both formal and informal contexts.

BIOMEDICAL TECHNOLOGY

Using OLED technology, a flexible fluorescence measurement device has been created to assess the elimination kinetics of the renal marker FITC-Sinistrin (water-soluble fructan linked to fluorescein-isothiocyanate). "Status and functionality of kidneys can be measured by this revolutionary device, which uses PLACE-it technology to find the way to low-cost, high-comfort solutions," van Os elucidates. The team hopes this product will help to detect end stage renal disease (ESRD) earlier and more consistently.

AUTOMOTIVE LIGHTING & SKIN

In line with their light-emitting surfaces for interior design, PLACE-it is also developing automotive parts based on novel lighting technologies that are functional, sustainable, energy-efficient and cost-effective. Innovative interior designs for such features as sun visors are now being redesigned based on the team's light emitting surface technologies.

The team has also invented automotive headliners or ceilings that act as a skin to the body of a car. "Those large mechanical parts which have now lighting functionality can be produced in a cost-effective and reliable way by PLACE-it technologies," van Os explains.

INTELLIGENCE

PLACE-IT

OBJECTIVES

It is the aim of PLACE-it to analyse, develop and implement technology for the proper combination of functionalities in foil, stretchable and fabric substrates, resulting in conformable opto-electronic systems. PLACE-it aims to develop:

- An integration platform of foil, stretch and fabric technologies with opto-electronic functionality
- Foil, stretchable and fabric-based devices for light emission, electronics, sensing and with interfaces to other technology building blocks
- Design guidelines to implement the technology platform in a broad range of applications
- Demonstrators, ie. optoelectronic systems, showing the possibilities of the technology platform

KEY COLLABORATORS

Philips Research Eindhoven (coordinator) • **Netherlands Organization for Applied Scientific Research** (TNO – HOLST) • **Technische Universitat Berlin** • **Freudenberg Forschungsdienste KG** • **Interuniversity Microelectronis Centre** • **Centexbe** • **TITV Greiz** • **Philips Lighting** • **Grupo Antolin** • **InnovationLab** • **RWTH Aachen** • **Ohmatex Dk.**

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EU Seventh Framework Programme (FP7)

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4 Conclusions

By this dissemination kit, the PLACE-it project team has covered all the available information to be used by the EC.