



## Edito

Smart objects have to be autonomous, easy to use and handle, as small as possible, robust and long lasting with a long operating life time! Whatever they will be, there is always a key ingredient for all the electronic systems which is the need to be powered with a minimum of energy. Energy is key for IoT Smart Objects emerging market.

EnSO "Energy for Smart Objects" project is focusing on this very generic need with the goal to provide Autonomous Micro Energy Sources (AMES) thanks to micro storage, energy harvester, smart charger and power conditioning IC elements mounted on a flexible module.

One year and a half after the start of this ambitious project, the dynamics of the actors of EnSO are keeping at a high power level! Two demonstrators designed last year are under evaluation with the 13 end users of the project, and four new ones will be manufactured for this end of year, ready for evaluation beginning 2018! 1st year of the project showed the consortium to pass the targeted objectives thanks to all of the 35 partners. 2nd year is progressing with the same trend.

Welcome in discovering this first newsletter! Welcome in discovering this EnSO project!

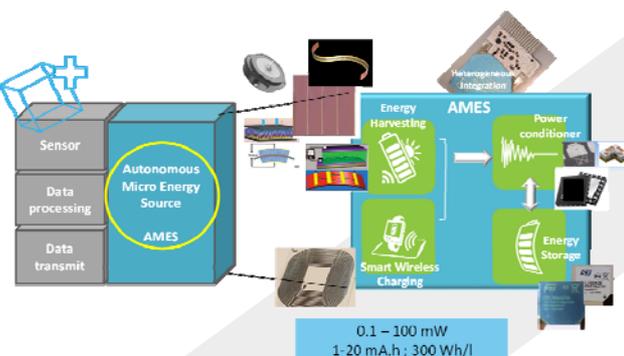
Franck DOSSEUL

## Introduction to AMES

Internet of Things (IoT) is gaining more and more attention in the electronic industry. IoT is a concept where every day's objects will be able to communicate together and are connected through Internet.

A key element is the electronic hardware based on several building blocks, such as sensors, actuators, micro controllers, communication interfaces, power conditioning ICs, energy harvesters and storage devices. These smart objects have to be autonomous and they need to be powered with a minimum of energy.

EnSO project is focusing on providing Autonomous Micro Energy Sources (AMES). AMES will at least consist of 3 elements: micro-storage; energy harvester and smart charger; power conditioning.



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EnSO has been accepted for funding within the Electronic Components and Systems for European Leadership joint undertaking in collaboration with the European Union's H2020 framework programme (H2020/2014-2020) and National Authorities, under grant agreement n° 692482

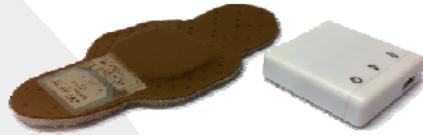


## In this issue...

- Maastricht Instruments: Medical patch
- NFF Ames flexboards demonstrator
- Optimalia's Electronic Medical Device
- Leti Days

## Medical patch for physical activity monitoring powered by smart energy solutions.

Measuring and promoting physical activity has become an increasingly important objective for both researchers and health care professionals worldwide. It is generally known that exercise is beneficial for health and in reducing the risk of metabolic diseases such as diabetes and cardiovascular diseases.



Unfortunately, many adults do not reach the current physical activity guidelines (150 min of moderate to vigorous physical activity per week). Inactivity, especially excessive sitting, is a major impicator of metabolic diseases and has been branded the “new smoking” for its supposed health risks.

Within the EnSO project, **Maastricht Instruments** is developing the next version of its medical patch for physical activity monitoring and accelerometry measurements. The EnSO technologies enable the company to achieve the following advantages:

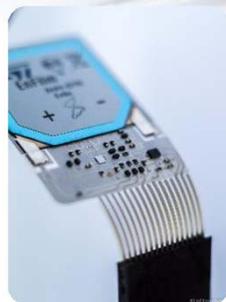
- Improved user comfort due to a thinner physical activity monitor design,
- Increased patient safety for the critical components applied in the medical certified accelerometry sensors,
- No more connectors due to wireless charging,
- Mechanical flexibility of the end product as the medical patch contains a flexible battery solution,

At the IDTechX conference in Berlin, Igor Bimbaud, New Energies BU Director at STMicroelectronics, highlighted the design challenges that have been overcome in the design of this wearable patch for medical applications. Working together with the system designers from Maastricht Instruments, **STMicroelectronics** has been able to provide a fully customized battery, power management and energy harvesting solution for this new medical patch. Maastricht Instruments is currently marketing the products to research and medical professionals via the product platform [www.accelerometry.eu](http://www.accelerometry.eu) and offers the technology as a White label / OEM physical activity sensor to companies worldwide.

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## NFF Ames flexboards demonstrator created at Holst Centre

As a result of the ENSO project, a Proof of concept AMES module was created at **Holst Centre**. The produced AMES consists of a rechargeable battery through energy harvesting by Near Field Communication (NFC). The production consists of a flexible screen printed circuit board. The board is printed on PET and can be shaped into various forms. The resulting foil is suitable for automated component placement using pick and place equipment. The pins also allow the connection of other energy harvesters (e.g. solar cell, piezoelectric harvester) to the AMES module.



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## Project data

Leader:



Tours



36 Partners and 5 third parties

8 countries

Start: 1-1-2016

Duration: 48 months

Total investment: €M 82

## Meet EnSO Partners at:

[1<sup>st</sup> Medical Battery Conf.](#), 16-17 Nov 2017, Dusseldorf, Germany

[iMAPS 2017](#) From Nano to Macro Power Electronics and Packaging European Workshop, 11-12 Oct 2017, Tours, France

[SENSO 2017](#), 15-17 Nov 2017, Gardanne / Aix en Provence, France.

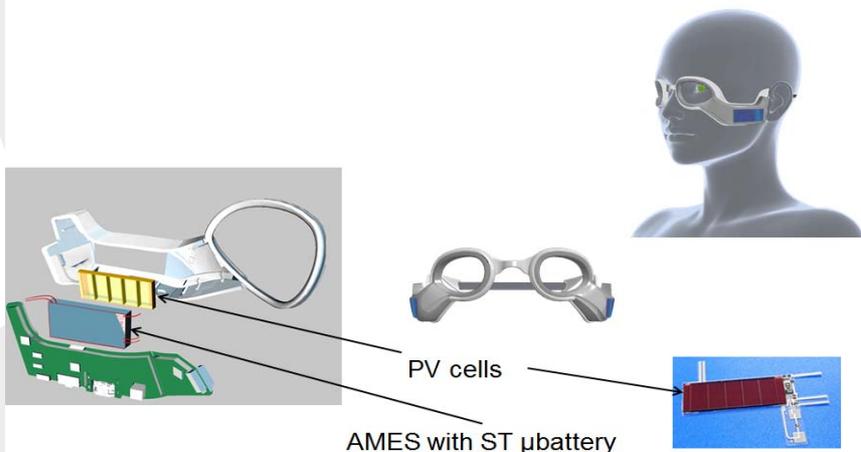
[Power MEMS 2017](#), 14-17 Nov 2017, Kanazawa, Japan.

## Ophtimalia's Electronic Medical Device for continuous measurement of IntraOcular Pressure variation

The glaucoma is a progressive disease, in most of the cases related to the intraocular pressure (IOP), affecting the optic nerve and the retinal fibers and causing a progressive loss of vision if untreated. It needs to be early diagnosed, and the treatment results to be regularly assessed. **Ophtimalia's** device continuously measures intraocular pressure variations, while being ambulatory and non-invasive. Within EnSO the key objectives are :

- Eliminate any risk of battery explosion
- Reduce size and weight: thinner, shapeable
- Fast charging, and energy harvesting

The pictures hereafter show drawings of the form factor of the demonstrator :



The first year AMES architecture and components were successfully tested. Consequently, the block diagram and the bill of materials were frozen. During the second year, the focus will be on Tests of energy harvesting (PV cells), debug of FF demo, current consumption reduction, thanks to application improvements.

### EnSO at Leti days 2017 (June 28-29, Grenoble, France)

Every year, **Leti Innovation Days** attract key international executives eager to learn more about the latest tech trends and developments and discover how tech innovation can be brought to market. Leti Innovation Days also offer high-level networking opportunities between attendees and Leti's experts. This year, more than 400 industrial attendees (30% are foreigners) with intensive participation of CEA, CTO, VP...

EnSO project was represented during Day2 of these LetiDays through several demos. These demos were part of : Routes to innovation – The environmental transition with a specific contribution to the specific topic: "Towards more autonomy":

- Ophtimalia Lens for IOP monitoring application: AMES with PV module (from SOLEMS) and microbattery stack (from ST and CEA) integrated in glasses.
- Smart Wallet: specific wallet that allows smart card recharge which is transparent for the user. Recharge is obtained by NFC communication with the mobile phone thanks to specific dedicated connections inserted within the wallet.
- Smart Tag: smart tag with several sensors (temperature, pressure, humidity, vibration) powered by EnFilm™ microbattery and application on the mobile allowing set-up of the measurement frequency and sensors data reading.



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Welcome to our new  
partners



OUR NEXT NEWLETTER  
WILL BE RELEASED IN  
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