Invitation

SENSational IoT Seminar

STMicroelectronics is pleased to present the

SENSational IoT Seminar

Attend a FREE One-Day Technical Seminar Near YOU!

Sensors and the Internet of Things are changing the way we interact with the things in our life. They enrich the human interface and create a more interactive world. Join us for a day of educational presentations by our design experts as they discuss how to implement new sensor and connectivity technologies to improve our lives and products.

The SENSational seminar goes beyond product presentation and combines new advanced concepts, basic design principles and "real world" application examples. Don't miss this chance to discover and ask the leading industry experts your questions to help you with your next design.

Smart Home / Smart City	Smart ME
•Home security •Smart tag with sensors •Integrating Cellular Connectivity •Voice remote control •Music and voice over BLE	•Body Area Networks •Optical heart rate monitor •Pedestrian dead-reckoning •Contextual Awareness •MEMS Piezo Actuators

For more information and to register, go to http://www.st.com/sensational

www.st.com

Agenda

	Smart Home/Smart City	Smart Me
8:30 AM - 9:15 AM	Registration and Breakfast	Registration and Breakfast
9:15 AM - 10:00 AM	Opening Remarks, The evolution of our sensed world	Opening Remarks, The evolution of our sensed world
10:00 AM – 10:30 AM	Home Security: Using MEMS sensors to enhance door and window security	Wearables: Setting up a body area network (BAN) with sensor synchronization
10:30 AM – 11:00 AM		Using Time of Flight sensors to improve your design
11:00 AM - 11:15 AM	Break: Demo Area open	Break: Demo Area open
11:15 AM - 12:15 PM	Smart City: Implementing a Smart Badge/Tag with MEMS sensors	Integrating optical heart rate and biometrics monitor solution with in a wearable device Presented by Valencell
12:15 PM - 1:30 PM	Lunch & Keynote	Lunch & Keynote
1:30 PM - 2:30 PM	IoT – Integrating Cellular Connectivity and selecting Dev Kits Presented by Verizon	Solutions for implementing Pedestrian Dead-Reckoning
2:30 PM - 2:50 PM	Break: Demo Area open	Break: Demo Area open
2:50 PM - 3:20 PM	Smart Home/Building: Developing voice-operated remote controls, acoustic source localization, and beamforming automatic speech recognition (ASR) applications	Implementing "contextual awareness" features in sensor networks
3:20 PM - 3:30 PM	Break	Break
3:30 PM - 4:30 PM	Solutions for playing high-quality music and voice over BLE	MEMS Piezo Actuators

City	Date
Seattle	9/13/2016
San Diego	9/15/2016
Chicago	10/18/2016
Minneapolis	10/20/2016
Boston	10/25/2016
Austin	10/27/2016
Toronto	11/8/2016

Session Abstracts

Home Security: Using MEMS sensors to enhance door and window security

Home security systems usually depend on expensive and complex video monitoring systems, or by extremely simple on/off contact sensors. Although most new systems today are wireless and incorporate radio transmitters, they are still just monitoring very simple mechanical sensors. The functionality of the system can be enhanced using MEMS sensors that can provide more information than the simple contact sensors. This talk will present a smart solution using ultra-low-power MEMS sensors, microcontroller and radio. This solution can mimic the functionality of the on/off sensor but also can deliver more higher-quality information. A MEMS accelerometer can provide a quantitative measure of motion, vibration and tilt, while in combination with the magnetometer can also provide information on orientation of the door and windows.

Smart City: Implementing a Smart Badge/Tag with MEMS sensors

In this talk a unique system will be presented where environmental and motion MEMS sensors are coupled with an ultra low-power microcontroller; NFC is used both for communication and energy harvesting; a safe and robust thin-film lithium polymer battery can be added for energy storage to enable continuous monitoring. Applications can range from smart packaging (cold supply chain), asset tracking (fragile items, perishable goods), access control, industrial sensor networks, environmental monitoring, smart buildings, etc.

IoT – Integrating Cellular Connectivity and selecting Dev Kits
Presented by Verizon

Learn about IoT Connectivity Management and Dev Kits using ThingSpace. An implementation of our Connectivity APIs using REST has been a long-standing request from the IoT Developer community, and Verizon has responded by creating a completely new IoT platform (ThingSpace). The purpose of ThingSpace, the platform's new REST APIs, and the relevance of those APIs to SOAP-based APIs will be discussed. In addition, the ease with which you and your customers can select appropriate Dev Kits and begin leveraging the connectivity APIs today will be demonstrated during the call.

Session Abstracts

Smart Home/Building: Developing voice-operated remote controls, acoustic source localization, and beamforming automatic speech recognition (ASR) applications

Natural spoken language user interfaces are gaining a prominent position in the architecture of smart living environments. Their speed and ease of use empower the non tech savvy user to immediately deploy complex applications, ranging from internet search to home control or office automation. In order to enable advanced designs to support at best voice interaction functionalities ST has produced a number of HW development tools and optimized FW libraries which may dramatically shorten time to market. This class will present the ST development environment for embedded audio and will discuss the Open.Audio libraries for STM32 optimized for ST digital MEMS microphones.

Solutions for playing high-quality music and voice over BLE

Bluetooth 4.x, also known as Low-Energy, or Smart, is the latest version of the Bluetooth standard, that has been thoroughly redesigned to support ultra-low power communication of low data-rate signals coming from everyday gadgets ranging from fitness trackers to medical devices, and even home lighting. The success of BLE, witnessed by its widespread adoption in all smartphone platforms, has relegated plain old BT 3.0 to a legacy that is needed, as of today, just to support voice and music communication on top of the BLE supported functionalities. With the ever growing importance of Voice and audio in IoT and wearable applications this leaves clearly a gap that may hinder advanced designs. The ST firmware implementation of Music and Voice over BLE, based on an all ST architecture, fills such a gap offering an effective, efficient and highly optimized solution that exploits all the advantages of the BLE while enabling high-quality implementation of all the key Speech and Audio functionalities.

Wearables: Setting up a body area network (BAN) with sensor synchronization

One of the main challenges in Body Area Networks is sensor synchronization. While synchronization is easily performed in wired networks, it can be difficult to obtain in wireless networks. In this talk a synchronization system tailored for Bluetooth Low Energy will be presented which features low latency data transmission and allows real time graph of 3D motion. This solution will enable a wide range of development opportunities for the next generation of wearable and smart clothing.

Session Abstracts

Using Time of Flight sensors to improve your design

Recent developments in Time of Flight sensors have improved the sensor's performance and allow measuring distances up to about 2m, with up to 5m in development, independent of reflectivity. The increased performance can be used in a number of ways to implement new functions in your design to reduce resource usage, contributing to the a green solution.

Integrating optical heart rate and biometrics monitor solution with in a wearable device

Optical heart rate monitor (OHRM) is becoming a MUST among several wearable applications like smart watches, earbuds, wrist and arm bands, etc. There are 5 primary challenges in getting accurate heart rate and other biometrics. Typically filtering algorithms and an accelerometer are used to overcome these issues, but there is much more to it than that. This class will focus on the main challenges a designer has to face when dealing with an HRM solution and how to find the best compromise in the selections of the devices needed to build an HRM solution.

Solutions for implementing Pedestrian Dead-Reckoning

There are a variety of mobile phone and wearable device applications which require location with a high degree of availability and reliability without additional infrastructure. Location information derived from high-sensitivity GPS technology can fulfill this need for a substantially large percentage of time. There are several instances, such as indoor environments where user spend more than 90% of time and GPS signals are degraded or not available at all. In such environments, MEMS inertial sensors (accelerometer, magnetometer, gyroscope, and barometer) that are commonly found in today's smartphones, tablets, cameras, fitness products, and other portable consumer electronics, can be used for activity recognition, fitness application and location computation by integrating with other absolute location technology such as Wi-Fi, BLE tag and map matching. These sensors can, with reasonable accuracy, determine user position and context using a Pedestrian Dead-Reckoning (PDR) technique. PDR does not require any external assistance or infrastructure and is capable of producing accurate relative positioning information. Thus, its characteristics complement the absolute positioning technologies, such as GNSS or Wi-Fi based navigation systems. As a result, PDR suits a hybridized system that would produce continuous user position in an indoor environment with increased accuracy, availability and reliability.

Session Abstracts

Implementing "contextual awareness" features in sensor networks

Integration of MEMS sensors in mobile, smart watches, fitness bands and other wearable devices enables a variety of features that a user experience. Context (or situational) detection is one such important features. Using low cost MEMS sensors such as 3-axis accelerometer, pressure sensor and microphone, these algorithms recognize and track user activity modes such as walking, stationary, jogging, driving, climbing up/down stairs for fitness tracking, detect gestures for more natural user experience, identify state of device to switch between power modes, device carry position and so on.

MEMS Piezo Actuators

A piezo-electric material, such as PZT (Lead Zirconium Titinate), is a substance that links mechanical movement to electrical potential. If voltage is applied to the PZT, a mechanical deflection is observed. Or, if a deflection is induced in the PZT, a voltage is generated. Thick piezo actuators (1mm) have been around for 30+ years, but deposited PZT material (2um) is just in its commercial infancy. This thinfilm piezo capability can be implemented in high volume production already in use for MEMS sensors. The development of the technology has led to the creation of custom piezo print heads and a revolutionary autofocus lens. This presentation will give an introduction to the technology and show potential uses in other market segments.