Session 1 Abstracts

Introduction to ST's Time of Flight Technology: FlightSense
9:30 – 10:10
Presenter: John Kvam, STMicroelectronics

ST has developed and patented its own technology, called FlightSense™, using Time-of-Flight (ToF) principles in order to propose a new generation of high-accuracy proximity sensors. In this session, attendees will learn how ST's Time-of-Flight sensor works, how to integrate it into their industrial design and understand key performance indicators. We will also go through an overview of the Evaluation Kit and supporting GUI during the session.

Getting the Most Out of ST's Time of Flight products
10:20 – 11:00
Speaker: John Kvam, STMicroelectronics

Deeper dive of ST's Time of Flight technology.

Embedded Graphics Possibilities Using the STM32
11:10 – 12:00
Presenter: Mike Hartmann, STMicroelectronics

Looking to add an intuitive graphical user interface to your next embedded design? Need to understand which displays can be used with a microcontroller: LED, LCD, Color TFT, or MIPI-DSI? Are you aware of the graphic tool kits available to quickly create graphical images and display them with your MCU?

In this session you will learn what options are available for displaying graphics using the STM32 family of microcontrollers. The presentation will cover:

- Graphic peripherals available within the STM32 Family
- Common display types and resolutions supported
- Graphical tool kits and libraries available to assist in your next graphical user interface design
- Performance features available to fully optimize and improve STM32 CPU performance enhancing your next embedded design

An overview of the STM32 ecosystem showing available hardware, software and documentation necessary to realize your next graphics based embedded design will also be included.

ST IPAD™ technology: A key enabler for IoT miniaturization
1:00 – 1:40
Presenter: Wayne Salata, STMicroelectronics

STMicroelectronics proprietary IPAD™ (Integrated Passive and Active Devices) technology is leading the way in reducing the footprint of peripheral electronics surrounding intelligent ICs. In addition to resistors, capacitors, and inductors, IPAD can also incorporate ESD diodes and TVS functions for high density protections, filters, and impedance matching circuits. In this discussion, attendees will learn how the broad ST portfolio can help reduce size and cost of their IoT devices.

Understanding Bluetooth low energy (BLE) for Industrial applications
1:50 – 2:45
Presenters: Hary Radakichenane & Raffaele Riva, STMicroelectronics

This class will focus on the key challenges of designing Bluetooth® low energy (BLE) IoT nodes for Industrial applications. Range, reliability, security, and proximity detection are among the most important aspects in this application space. To effectively address them, three key technologies will be discussed in details: Bluetooth Mesh, BLE Beacons, and simultaneous BLE and Sub-GHz communication. Participants will learn how to understand their key performance indicators and how to leverage on ST solutions for developing their Industrial applications.

Multiple Microphones Interfaces for Automotive and IoT
3:00 – 3:40
Presenter: Fabio Cagnetti, bdSound

This presentation from bdSound will show how a multiple microphones interface can help to improve audio and speech quality in a wide spectrum of applications (i.e. Automotive, Intercom, IoT). We will describe different technologies that are key to improve the success rate of ASR (Advanced System Recognition) systems and Voice Assistants, to capture speech signals while rejecting noise and other interferences, and to improve a two-way communication in hands-free systems. Our speech will also include examples of system integration into the STM32F7 family of microprocessors, as well as on STM Accordo 5 automotive ARM + DSP SOC (in both cases using MEMS microphones).

ST SmarTAG: NFC Enabled Sensor Node
3:50 – 4:30
Presenter: Gianmarco Ferrari, STMicroelectronics

ST SmarTAG is a sensor node that can sense temperature, humidity, pressure, motion and transmit the data when triggered by an NFC reader. It can be scaled down based on requirement of several applications, ranging from supply chain, asset tracking to medical, smart apparel, packaging and agriculture. Participants will learn about the ST SmarTAG reference platform and its deliverables to accelerate their own design.

How to design a NFC Reader application: a Step-by-Step approach
4:40 – 5:20
Presenter: Daniel Merino, STMicroelectronics

This presentation will focus on the key challenges of designing a NFC reader application.
Product selection, Antenna tuning, Layout optimization, Read Range, Noise reduction, Power Consumption optimization, Testing and Certification are among the most important aspects in this application design space. Participants will learn how to develop a NFC Reader application leveraging ST High Performance Reader ICs and evaluation tools.

Session 2 Abstracts

Cloud Connected IoT Sensor Nodes with STM32
9:30 – 10:10
Presenter: Manuel Cantone, STMicroelectronics

In this session, we will present the various solutions from ST to connect your IoT node to AWS IoT Core, Microsoft Azure IoT Hub and IBM Watson IoT. The IoT node will transmit sensor data and receive commands to and from Cloud services. These SW packages can jump-start any end-to-end IoT development, saving time in the integration of the different basic functions needed for a sensor-to-cloud development environment.

Secure Identity: Prevent Attacks, Control Devices, and Generate Revenue
10:20 – 11:00
Presenter: Rod Schultz, Rubicon Labs

Connect a device to a network and you now must think like a service provider. How do you secure and defend your service? How do you grow revenue based on that service? And, how do you protect your brand? Rubicon Labs will discuss how IoT services begin with the requirement to have secure unique identity seamlessly integrated into ST Micro devices. Learn how the Rubicon service can help provide trusted data and new revenue on any ST device and any cloud.

Platform Level Security for IoT Devices
11:10 – 12:00
Presenter: Bob Waskiewicz, STMicroelectronics

An essential requirement for any IoT device is its trustworthiness. In this session, using an example of a secure IoT platform, we'll explore implementation-techniques for protecting code, over-the-air updates, provisioning and tamper detection, being used in concert to establish a well-fortified platform

Overview of Vehicle-to-Everything (V2X) Communications
1:00 – 1:40
Presenter: Raed Shatara, STMicroelectronics

Vehicle-to-Everything (V2X) Communications is a key technology for automotive safety applications based on Dedicated Short Range Communication (DSRC) technology. V2X communication is an obstruction resilient 360° secure channel that works in high mobility conditions and delivers performance immune to extreme weather conditions. An overview of V2X technology for safety applications and how these will provide greater levels of vehicle autonomy will be provided.

Teseo LIV3F GNSS Module for IoT
1:50 – 2:30
Presenter: Mike Slade, STMicroelectronics

Introducing the tiny Teseo LIV3F GNSS module for IoT applications. Ideal for compact designs requiring ultra fast time to market. Based on the popular Teseo3 GNSS chipset, and offers the same world class level of performance & configurability. LIV3F GNSS XNucleo board enables co-development with STM32, ST MEMs, and other XNucleo offerings.

VIPower™ Intelligent Switches – Integrated high side, low side and h-bridge drivers
3:00 – 3:40
Presenter: Steven Kuzy, STMicroelectronics

Discover how ST's integrated smart power devices can help you to reduce cost, improve reliability and optimize board space in your designs. We will review common use cases, such as relay or FET replacement, and learn how to select the optimal solution for your application based on specific design constraints utilizing ST's TWISTER™ design simulation tool.

How SiC can boost efficiency and reduce costs in power conversion
3:50 – 4:30
Presenter: Jeff Fedison, STMicroelectronics

Wide band-gap materials like Silicon Carbide (SiC) have long promised a dramatic leap in performance in power electronics. That promise has now become a reality due to ST's MOSFET and diode SiC power discretes. The session will describe how SiC allows engineers to improve power electronic systems in size, efficiency, and cost, and how many more applications than may be expected can benefit.

48V to PoL Direct Conversion
4:40 – 5:20
Presenter: Paolo Sandri, STMicroelectronics

This presentation will present an IC chipset that allows a novel, multi-cells, multi-topology, direct conversion architectures from 48V/54V down to PoL (CPU, DDR, GPU, ASICs). This novel control scheme provides an attractive alternative to traditional power-distribution topologies using 12V input voltage for the point-of load conversion. The implementation of this direct conversion from 48V down to PoL eliminates the intermediate 12V rail used in the conventional power distribution architectures ensuring excellent results in terms of efficiency, flexibility and dynamic voltage management capable of withstanding the most aggressive digital load requirements. This chipset represents the "state of the art" alternative to the traditional approach no longer adequate for today's Data Centers power demand. Several key features are offered by this extremely flexible, multi-architecture, chipset and will be described in this presentation.

Session 3 Abstracts

Unicleo GUI to Evaluate and Configure SensorTile
9:30 – 10:10
Presenter: Mauro Scandiuzzo, STMicroelectronics

The ST SensorTile is a tiny, square-shaped IoT module that packs powerful processing capabilities leveraging an 80 MHz STM32L476JGY microcontroller and Bluetooth low energy connectivity based on BlueNRG-MS network processor as well as a wide spectrum of motion and environmental MEMS sensors, including a digital microphone.

During this session, you will learn how to do fast evaluation and development based on SensorTile and UNICLEO GUI. Using UNICLEO GUI you can configure run time the sensors without debugger, without writing code in order to achieve a Fast Prototyping, reduce time to market in a plug a play small system solution. We will also give examples of how you can use the SensorTile platform to reduce the time to market using available HW, SW, GUI and algorithms.

Low Power Microphone Acquisition and Processing for Always-on Applications
10:20 – 11:00
Presenter: Luca Spelgatti, STMicroelectronics

This session will focus on the tradeoff between performance and low power consumption in embedded IoT platforms used for always on microphone acquisition. It will show different system architectures based on Cortex®-M microcontrollers, with one microphone acquisition and processing depending on the power budget and overall system performance, targeting always-on microphone acquisition as input for automatic speech recognition algorithms.

Athlete monitoring area using LoRa and LoRaWAN
11:10 – 12:00
Presenter: Kim Rowe, RoweBots

Concussions, CTE, heat stroke and internal bleeding can be life threatening issues in contact sports. Using wearable technology these conditions can be identified and alarms can be generated to parents, coaches and medical staff ensuring minimal damage and recovery from events that otherwise might have been fatal. This paper discusses the implementation of such a system using a wearable STM32L4 sensor, LoRa radio and LoRaWAN protocol, Unison WearableOS, BLE, an intelligent gateway, LTE or WiFi, and cloud data processing using Microsoft Azure. Such a system allows athletes to play hard and go home alive.

Wireless Charging in Consumer Applications
1:00 – 1:40
Presenter: Paolo Battezzato, STMicroelectronics

Wireless Battery Charging transmitters are expected to become ubiquitous, allowing consumers to leave their cables at home and charge their portable/ wearable devices anywhere by means of electromagnetic induction used to transfer power from a WBC transmitter (TX) to a receiver (RX) in the device. This presentation will cover both the transmitter (STWBC family) and the receiver (STWLCxx family of Dual-Mode receivers) solutions for applications from 1W up to 15W.

Qi-ready solutions
1:50 – 2:30
Presenter: Marcin Szajner, Würth Elektronik

Introduction to wireless charging coil technologies and application challenges with a brief product overview of Wurth Qi inductors and coil selection tools.

STNRG011: new digital combo IC for Multi-Mode PFCs and LLC converters
3:00 – 3:40
Presenter: Rosario Attanasio, STMicroelectronics

The STNRG011 is a new digital controller tailored for Switch Mode Power Supply (SMPS) applications in the 90W to 300W power range. It embodies a multimode PFC controller (TM and DCM), a high voltage double ended controller for LLC converters with time shift control, a 800 V-rated startup generator and a sophisticated digital engine, that manages optimal operation of the three blocks. The digital algorithms are stored into an internal ROM memory while a programmable NVM (non-volatile memory) allows a wide configurability and calibration of the key parameters in SMPS applications.

Power Over Ethernet
3:50 – 4:50
Presenter: Paolo Battezzato, STMicroelectronics

Power over Ethernet (PoE) is a widely adopted technology used to transfer both data and electrical power over an RJ-45 cable. ST offers solutions for PoE applications, on the powered devices (PD) side, compliant with both the more recent IEEE 802.3at specification, commonly known as PoE+, and the former IEEE 802.3af (PoE). ST offers now solutions also for the most recent IEEE 802.3bt with power up to 99.9W with the PM8805 which is a system in package for powered devices (PD) applications within the PoE world. It embeds: two active bridges and their driving circuitry, a charge pump to drive high-side MOSFETs, the hot-swap MOSFET and the standard single-signature interface IEEE 802.3bt-compliant, including detection, classification, UVLO and inrush current limitation. The device targets the highest possible efficiencies with the smallest footprint providing the interface section of PoE switch mode power supplies and a PGD signal that can be used to enable a PWM controller, a DC-DC converter or a LED driver.

Hands-on Training Room

BlueNRG-2 based IoT node Hands-On Workshop: Learn how to jump start your next IoT design with the BlueNRG-2 low power Bluetooth low energy (BLE) System-on-Chip and ST sensors
9:30 – 12:00
Presenters: Raffaele Riva, Francesco Doddo and Jalinous Esfandyari; STMicroelectronics

This hands-on workshop will show how to simplify the integration of sensors and Bluetooth low energy (BLE) connectivity into your next IoT design using the BlueNRG-2 low power Bluetooth low energy (BLE) System-on-Chip from ST.

The workshop will focus will focus on the BLE protocol and how to develop an embedded application running on BlueNRG-2 System-on-Chip. Participants will learn how to develop a Sensor to Cloud IoT application: acquire sensor data on the BlueNRG-2 evaluation board, transmit them over the BLE link to the ST "BlueMS" mobile application for iOS and Android, and finally post them on the IBM Watson could platform.

The hands-on training is a working session. Please bring your laptop either a Windows Laptop (Windows 7, Windows 8, or Windows 10) or MacBook running Windows (Parallels, VM Fusion). Note that Administrator rights are needed for software and driver installation. ST will provide the required eval board and the companion software.

SPACE IS LIMITED FOR THIS SESSION – FIRST COME, FIRST SEATED.

STM32 Motor Control Hands-on Training Workshop
1:00 – 5:00
Presenters: Dennis Nolan, Gregg Gumkowski and Giovanni Tomasello; STMicroelectronics

This session will present the STM32 ecosystem for advanced field oriented control (FOC) development of motor control applications with a hands on approach. First, we will review integrated motor drivers for driving solenoid, relay or motors (both 3-phase BLDC and Brush DC). Next, using the motor control Nucleo pack for the hardware and the new SDK v5.0, we'll explore how to characterize a 3-phase motor with the Motor Profiler and finally, walk through an improved development approach using the motor control workbench GUI with a workflow supporting the STM32CubeMX GUI configurator while using a motor control firmware library now based on the STM32Cube HAL/LL libraries. This will provide developers with an introduction to a full motor control ecosystem to implement the high-performance and high-efficiency solutions required for standalone and IoT applications of the future.

This is a hands-on training working session – please bring your laptop either a Windows® Laptop (Windows 7, Windows 8, or Windows 10) or MacBook running Windows (Parallels, VM Fusion, etc.). Note: Administrator rights are needed for software and driver installation.

ST will provide the required Motor Control Nucleo Pack (P-NUCLEO-IHM002) and software.

SPACE IS LIMITED FOR THIS SESSION – FIRST COME, FIRST SEATED. Must be present, have a PC with administrator rights and stay for training to receive free kit.