

Morning Presentation

ST Automotive Update

Time: 9:15 – 10:00

Speaker: Alex Popovic, STMicroelectronics

Session 1 Abstracts

Vehicle-to-Everything (V2X) communications

Time: 10:15 – 10:55

Speaker: 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.

Automotive Broadcast Receivers Overview – AM/FM, HD & DAB

Time: 11:05 – 11:45

Speaker: Raed Shatara, STMicroelectronics

Automotive manufacturers are increasingly demanding better quality reception from radio designers to provide enhanced audio listening experience for their customers. Audio content can be provided from many sources today, including AM/FM/HD/DAB/DRM signals, CDs, SD cards, USB flash drive, IP, etc. The modern broadcast receiver incorporates sophisticated DSP algorithms for signal reception and must include the upcoming digital standards around the world. The digital services are HD in the US, DAB in Europe, DRM in India & Australia, CDR (specs are still evolving to this date) in China. Analog AM/FM broadcasting has been and will be around for many years to come worldwide. This presentation gives an overview of the automotive broadcast receivers use cases and architectures.

High Performance Sensors for Advanced Vehicle Systems

Time: 12:45 – 1:25

Speaker: Stuart Ferguson, STMicroelectronics

Implementation of advanced vehicle features continues to lean heavily on silicon micro-machined sensor technologies. Sophisticated systems such as precise vehicle positioning and road noise cancellation, which enhance passengers' safety and comfort, require highly stable, highly precise, very low noise sensors. The presentation will break into two parts:

- Identification of key parameters for inclinometers, microphones and IMUs, and how they are achieved
- Examples of typical systems configurations, such as precise vehicle positioning and road noise cancellation

During the presentation, we will match current application requirements with available sensor technologies, as well look at how future developments in sensors will continue to transform the way we drive.

Designing with VIPower™ Intelligent Switches – Integrated high side, low side and h-bridge drivers

Time: 1:30 – 2:10

Speaker: David Swanson, STMicroelectronics

VIPower switches are a unique, cost effective, solution for driving loads. They are fully protected switches yet still need some administration to stay healthy in adverse environments. You can find them in virtually every module in a vehicle.

At first glance, they appear to be simple high side switches. How complicated can that be? The answer to that question is that nothing is simple. When it comes to faulted load protection, or compensating for lamp inrush currents, or the ever increasing power densities and ever decreasing package sizes, load driving a wide range of loads and protection methodologies the simple high side switch can get quite complex. These methodologies have evolved as we need more flexibility and to find more reliable ways of protecting the device from faulted loads.

This presentation will outline the history / evolution of VIPower High Side Switches from the 1980's until now. There will be a detailed discussion on the design requirements for the current technology High side drivers, both in hardware and software, to ensure long lasting reliable operation.

Silicon Carbide (SiC) for Vehicle Electrification

Time: 2:40 – 3:20

Speaker: Jeff Fedison and Andrea Tranchida, STMicroelectronics

In Automotive applications SiC PowerMOSFET solutions offer large advantages at any load condition in terms of power losses and efficiency. This is translated into longer battery autonomy, possibility to reduce battery size and to adopt a smaller cooling system. This session will go through ST's state-of-the-arte Silicon Carbide solutions as well as new packaging ideas conceived for EV applications.

Automotive MCU's for Electrification Applications

Time: 3:30 – 4:10

Speaker: Akhilesh Kotla, STMicroelectronics

One of ST's missions is Smart Driving which fosters the Electrification of the car, embodied by the fast rise of hybrid-electric and electric vehicles. In this session, we look at an overview of key systems of hybrids (HEVs) and electric (EVs) vehicles: the on-board battery chargers, the DC/DC converters, the main traction inverter and 48V systems, and how they are managed with ST's SPC5 Microcontrollers.

Security Overview and Hardware Security Module (HSM) technology

Time: 4:20 – 5:00

Speaker: Khaldoun Albarazi, STMicroelectronics

The vastly increasing demand of vehicle connectivity and infotainment, such as vehicle-to-vehicle, vehicle-to-infrastructure, cloud computing, over-the-air, cellular connections, etc., introduces neuromas means of vulnerability and security threats. Moreover, the rapid growth in vehicle autonomy, as in autonomous driving and ADAS, and the deployment of computerized control modules, set vehicle security as a top priority safety item. To address security in automotive at the module level, there are three types of tasks to undertake; 1) Network Authentication to ensure secure communication between authorized nodes only, 2) Data Encryption to avoid malicious attacks, and 3) Firmware Authentication to guarantee trusted firmware updates. ST's 32-bit automotive MCU product family offers a state-of-the-art, hybrid hardware/software security solution that complies with the latest standards aimed to address automotive security.

Session 2 Abstracts

Learn how to connect your next IoT design to the Cloud using IBM Watson IoT Platform and the ST Discovery Kit IoT node

Time: 10:15 – 10:55

Speaker: John Walicki, IBM

This track will discuss how to integrate sensors, wireless connectivity (WiFi), a low-power microcontroller and sensor libraries into your next IoT design. You'll then learn to connect the Discovery Kit to IBM Cloud and Watson IoT Platform to create a new application in minutes using Node-RED.

Accelerate your IoT Solution with LoRaWAN™ and machineQ™

Time: 11:05 – 11:45

Speaker: Ross Gilson, machineQ™ - a Comcast company

LoRaWAN™ provides long range and low power wireless connectivity to sensors that can potentially be deployed for a decade or more. Hardware with this deployment lifespan needs to have a reliable and cost-effective way to be updated over the air (OTA).

This session will cover the various capabilities LoRaWAN provides to upgrade devices, how to transition between device “classes” and how updates to the firmware should be packaged before being sent to the end devices.

machineQ offers firmware update over-the-air (FUOTA) reference implementations on the ST Micro Discovery development kit, allowing customers to quickly get up to speed and quickly implement FUOTA on their end devices.

How to Design a NFC Reader Application: a Step-by-Step Approach

Time: 12:45 – 1:25

Speaker: Dan 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.

Verizon STM32L4 LTE Cat-M1: Simplifying Cellular connectivity for IoT Embedded Devices

Time: 1:30 – 2:10

Speaker: Mike Arenas, Verizon Wireless

The ThingSpace™ IoT Development Kit with STMicroelectronics combines the hardware and software you need to get your next cellular IoT project off the ground. This development kit enables a wide diversity of applications by combining best in class processing, cloud capabilities, credited Verizon open development end-device certification, and an IoT developer plan.

This kit also comes with the ability to connect your device to Verizon's ThingSpace Platform. ThingSpace is an IoT connectivity and device management solution for Cat M1 and NB-IoT devices that are certified on Verizon.

Sensing at the Speed of Light: Introduction to ST's Time of Flight Technology

Time: 2:40 – 3:20

Speaker: John Kvam, STMicroelectronics

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

Fault Prediction with Vibration Sensing

Time: 3:30 – 4:10

Speaker: Luca Bartholomeo, STMicroelectronics

Concept of fault prediction has been around for many years and one classic example is the use of piezo sensors in checking motor health to predict wear down or use of ultrasound sensors to detect pipe leak. However not only that traditional sensors are bulky, and expensive, they are also very power hungry, leading to a very limited use case. STMicroelectronics is fueling innovation in predictive maintenance with a wide range of sensors that are compact, low power and accurate enough to implement fault prediction by means of Motion, Temperature, Humidity, Ultrasound and Vision sensors. Combining ST's sensor solutions with low power STM32 MCUs, power management and connectivity enables users to quickly start prototyping for sensing, analyzing, predicting and communicating important service information.

USB Type-C & PD

Time: 4:20 – 5:00

Speaker: Greg Gosciniak, STMicroelectronics

USB standard has evolved from a data interface capable of supplying limited power to a primary provider of power with a data interface. The new USB PD is now enabling a new ecosystem. Different use cases will be explained, showing implementations and major products involved.

Session 3 Abstracts

Designing with ST Automotive LED drivers for Front Lighting

Time: 10:15 – 10:55

Speaker: David Swanson, STMicroelectronics

The massive presence of LEDs in our daily lives is no longer anything new. Across various market segments—mobile applications, Signage, LCD TV backlight, Illumination and Automotive—LED lighting is a matter of fact. The reduction in LED prices, coupled with increased LED efficiency (lumens per watt), has fueled the redesign of many common devices, each requiring different LED drivers.

This presentation will focus on Automotive LED driver solutions for Exterior Lighting. New technologies are constantly emerging for LED drive. The presentation will introduce new concepts for digital power control for the LED lighting using a unique state machine architecture for PWM control.

ST Automotive Power Supplies

Time: 11:05 – 11:45

Speakers: Massimiliano Merisio, Joe Jiang & Steven Kuzy, STMicroelectronics

The latest car generation includes more and more functionalities in body control, car infotainment / connectivity (including Advanced driver assistance systems -- ADAS), and clusters. The automotive environment is generally sensitive for noise minimization to satisfy EMC specifications, but car infotainment applications, in addition, also demand a high switching frequency to prevent noise injection into the tuned radio bandwidth. Specifications for extreme power bus conditions, like load dump and cold crank, require sustaining a wider input voltage range than the nominal battery voltage. During this presentation you will be exposed to ST's design tools for faster prototyping and an overview of ST's product portfolio.

Rapid Prototyping with MEMS sensors and microcontrollers. A Hands-On Workshop introducing the ST AlgoBuilder

Time: 12:30 – 3:00

Speaker: STMicroelectronics Team

ST's AlgoBuilder is a complete Development environment enabling quick prototyping of solution that can be built using MEMS Sensors, microcontroller and software building blocks such as algorithm libraries with user's own logic.

AlgoBuilder uses a simple graphical design approach (drag and drop, connect, set properties) for quick prototyping of applications for MEMS sensors and STM32 MCUs.

A wide range of function blocks are available in libraries including motion sensor algorithms, such as, sensor fusion, activity recognition and more. Function blocks can be also created by the user.

C code is generated from the graphical design and combined with binary libraries and FW template for selected STM32 microcontroller. The output of the application is fully functional FW project which can be compiled and immediately used with one of the NUCLEO board to test its functionality.

Unicleo-GUI can be used to visualize, store and playback sensor data and display outputs from running firmware generated by AlgoBuilder.

The Workshop will walk you through some different examples of prototypes using the AlgoBuilder platform and ST's development boards. All participants will receive a FREE STM32L4 Nucleo + X-NUCLEO-IKS01A2 eval boards. Space is limited, first come, first seated

All Participants must have a PC running Windows (7 or 10) with administrator privileges to participate. SPACE IS LIMITED FOR THIS SESSION – FIRST COME, FIRST SEATED.

Simplifying Integration of Sensors Data, Using the NFC Enabled Multi-Sensors Node, STEVAL-SMARTAG1 – Hands-on Training

Time: 3:20 – 5:45

Speaker: Dan Merino, STMicroelectronics

Learn how to simplify the integration of environmental and inertial sensors, NFC Dynamic Tag connectivity, and a low-power microcontroller into your next IoT design using the new STEVAL-SMARTAG1 development kit.

The STEVAL-SMARTAG1 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 final application requirements. The platform can accelerate the design of applications such as Supply Chain/ Cold Chain monitoring for perishable and valuable goods, asset tracking, Healthcare, Smart Apparel and Smart Packaging and Smart Agriculture among others.

During this session, you will use the STEVAL-SMARTAG1 development kit and the GUI for the ST25R3911B (NFC High Performance Reader/Writer) to configure sensors without a debugger, and without writing code in order to achieve a Fast Prototyping, reduce time to market in a plug a play small system solution. The workshop will walk through using the development kit and platform to reduce the time to market using available HW, SW, GUI and algorithms.

All participants will receive the Free STEVALSMARTAG1 and ST25R3911B-Discovery development kits and related SW. You must stay for the training session to receive a board.

SPACE IS LIMITED FOR THIS SESSION – FIRST COME, FIRST SEATED. All participants must have a PC running Windows8 or above with administrative privileges.