CHIPS.

Newsletter
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TOF Academy is the enabler to working TOF systems.

Beat De Coi

CEO's Note

Dear Readers,

TOF and LiDAR are two extremely hot topics. Many companies want to jump on the train to use this technology. It looks so simple: Just take a TOF imager chip and a lens, an LED or a VCSEL for the illumination, some electronics and some software and the TOF camera is ready.

It's a camera that provides images where every pixel gets the object distance data, or, even better, the 3D coordinates of every object point in space. It seems really simple! But unfortunately, the reality is a bit different. Objects are typically not as cooperative as desired. They may absorb all the light so no distance data at all can be obtained. Or they are reflective like a mirror and reflect all the illumination "away" with the same result. Or they are reflectors like cat's eyes and generate too much reflected light so the pixel in the camera chip gets saturated. Or there is so much sunlight on the target that the image becomes noisy due to the ambient light shot noise. And, and, and. There are so many things that interfere with the expectations of an ideal TOF camera that many camera design projects fail. Be it due to too high expectations for 3D data quality or be it due to a lack of necessary photonics know-how of the design engineers.

In a successful TOF camera project, all elements must match together: The requirement specs need to be achievable, the optical power budget must provide enough reflected light from the object to obtain distance data and the camera lens must be of high quality and designed for TOF applications. This means the AR coating must match the wavelength used with excellent straylight suppression, the power supply has to provide a clean and stable supply voltage under any condition, which is very critical for the illumination. The illumination and its drivers also have a big impact on 3D data quality, thermal management must be designed effectively, and, last but not least, the software in the camera has to be powerful enough to do all the necessary calculation, compensation, filtering and transformation stuff. Finally, the cost targets have to be achieved to be commercially successful with the product. By the way, the most dominant cost drivers in TOF cameras are the receiver lens and the illumination. The TOF camera chip typically ranks as third. Hence a very sensitive TOF imager allows cost reduction due to less spending on illumination. What's more, the camera will not heat up as much, increasing lifetime and reducing power consumption.

Check out the ESPROS TOF solutions. They are best in class in terms of sensitivity and ambient light suppression! No wonder so many companies chose ESPROS for their projects.

Beat De Coi

Cooperation Agreement with Hypersen

ESPROS has established a wide network of strong and experienced partners such as Benewake of Beijing, and Shanghai Data Miracle Co. Ltd., to name just two. Our well established international relationships are bringing ESPROS Time-of-Flight (TOF) technology rapidly into products and markets.

Contract signing ceremony at CIOE: Tony Wong/Suffice, Alan Wang/Hypersen and Beat De Coi/ESPROS

At the recent CIOE in Shenzhen, China, ESPROS Photonics signed a contract with Hypersen Technologies (Shenzhen) Co. to supply them with mass delivery of the ESPROS TOF epc635 imagers. These run Hypersen's new Solid-state LiDAR (HPS-3D Series). The extremely high sensitivity of the chip allows a lower illumination power compared to other TOF imagers. In addition, due to the effective suppression of the ambient light component in the charge domain, the Hypersen cameras can be used perfectly in- and outdoor.

Successful First Edition of TOF Academy

From 29-31 August 2018, ESPROS Photonics AG ran the first seminar to train engineers on TOF camera implementations.

Hands-on work to enforce the topics learned with useful practical examples

Professional lectures provided solid background on TOF

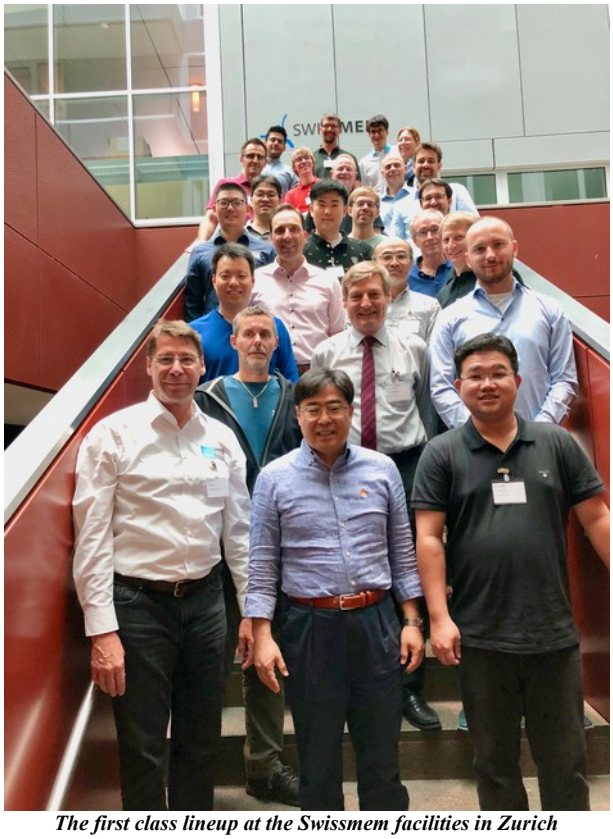
With a full audience at Swissmem Zurich, Beat De Coi and his team showed over two-and-a-half days how important it is to have a deep understanding of underlying optical physics, a behavioral model of the imager used, the effects of good or bad lenses etc. and an excellent understanding of the artifacts, to do a successful design of a TOF camera. With a mix of theoretical background, guidelines to working implementations based on examples and practical work, the course gave a very good overview of how to improve the challenging knowledge of TOF systems.

The course consists of 10 lessons, supported with more than 300 slides provided in a comprehensive book. A lot to talk about and a lot to learn. However, one of the participants commented after the academy: "The depth of knowledge and understanding is a convincing argument to recommend the course to others."

Another participant said: "Before the academy, I was hesitant about designing a TOF system. But during and after the course, I gained the self-confidence to deploy this technology."

Such nice compliments for our first staging of the TOF academy. A survey after the course gave an overall satisfaction rate of more than 90 percent. Even experienced camera design engineers were able to learn a lot about the differences between 2D and 3D camera design.

There are additional editions planned in the US, China and other places in Asia and in Europe. TOF needs to be deployed now! The basis needed for that are engineers with a deep understanding of the technical background.



The first class lineup at the Swissmem facilities in Zurich