



**TOF Academy is the enabler to working TOF systems.**

*Beat De Coi*

## CEO's Note

Dear Readers,

Photonics is a quite new engineering discipline. Of course, parts of it have been developed and taught for a very long time. Such like lens design, LED and laser technology, imaging, microelectronics, image processing, etc. That's fine so far but bringing it all together into working systems is quite a challenge. Nowadays, the know-how in the design of imaging systems is quite on an acceptable level. But when it comes to TOF and LiDAR, the skill limits in the engineering community become evident! A successful design of a TOF camera for example needs a deep understanding of the underlying optical physics, the behavioral model of the used imager, an excellent understanding of the artifacts, etc. Also thermal management is an issue because these cameras have an active illumination, typically quite powerful. And, as a consequence, eye-safety becomes an issue as well.

Since there is, at least to our knowledge, no engineering school which addresses TOF and LiDAR as an own discipline, we decided to fill the gap with a training program called TOF Academy. The objective is to provide a solid theoretical background, a guideline to working implementations based on examples and practical work with TOF systems. Thus, the TOF Academy shall become the enabler for electronics engineers (BS and MS in EE engineering) to design working TOF systems. It is ideal

for engineers which have or will become the duty to design a TOF system.



The first course takes place from 29 - 31 August 2018 at the premises of Swissmem in Zurich. Swissmem unites the Swiss electrical and mechanical engineering industries and associated technology-oriented sectors in Switzerland ([www-swissmem.com](http://www-swissmem.com)). If you want to learn more about TOF to gain advantage to your competitors, sign-in to the TOF Academy #1 in Zurich. Please send an email with your contact information to [TOF.Academy@espros.com](mailto:TOF.Academy@espros.com) and you will receive an application form together with additional course information.

We hope that our initiative helps to close the gap between the desire of TOF sensors to massively deployed TOF applications.

*Beat De Coi*

## New: epc611 Evaluation Kit

An evaluation kit is available for our latest member of the TOF family. The epc611 is a simple and easy to use 8x8 TOF imager chip which has been designed for applications like IoT, drone altimeter, mobile robotics or even simple gesture control. The epc611 chip is the successor of the epc600 and epc610 chips. It allows an up to 10x faster acquisition, a better range accuracy and a higher sensitivity for longer range. It utilizes all the powerful features of its larger brothers epc635 and epc660 because the chip is based on the same architecture. More details about this very powerful but easy to use 3D TOF chip can be found in the datasheet which can be downloaded from our website [www.espros.com](http://www.espros.com).

The evaluation kit comes with two sample implementations: The **TOF>range 611** which is a single spot range finder module with a range of up to 15m and the **TOF>frame 611** which is a very tiny TOF camera with a FOV of 12° and a range of 2m. The kit contains an USB interface which bridges the

UART interface of the modules to a standard USB interface of the host computer. The modules are powered by USB, so no additional power supply is needed.

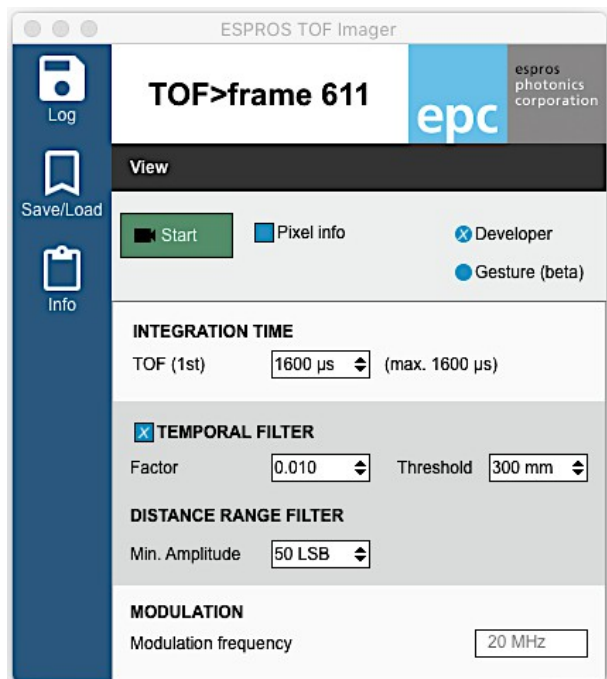


*epc611 Evaluation kit*

The GUI identifies the module connected to the USB interface and selects the matching operation mode. In the TOF>range 611 application, a single distance information is presented with some statistics data. The firmware in the TOF>range 611 module automatically adjusts the integration time according to the distance and the object reflectivity. Thus, an accurate distance measurement over a wide distance range can be obtained.

If a TOF>frame 611 is connected, the display presents graphical as well as numerical data of the

image per pixel. A Kalman filter can be used as a temporal filter which allows smoothing the distance output. The parameters Kalman Factor and Threshold allow a tuning to the application requirements.



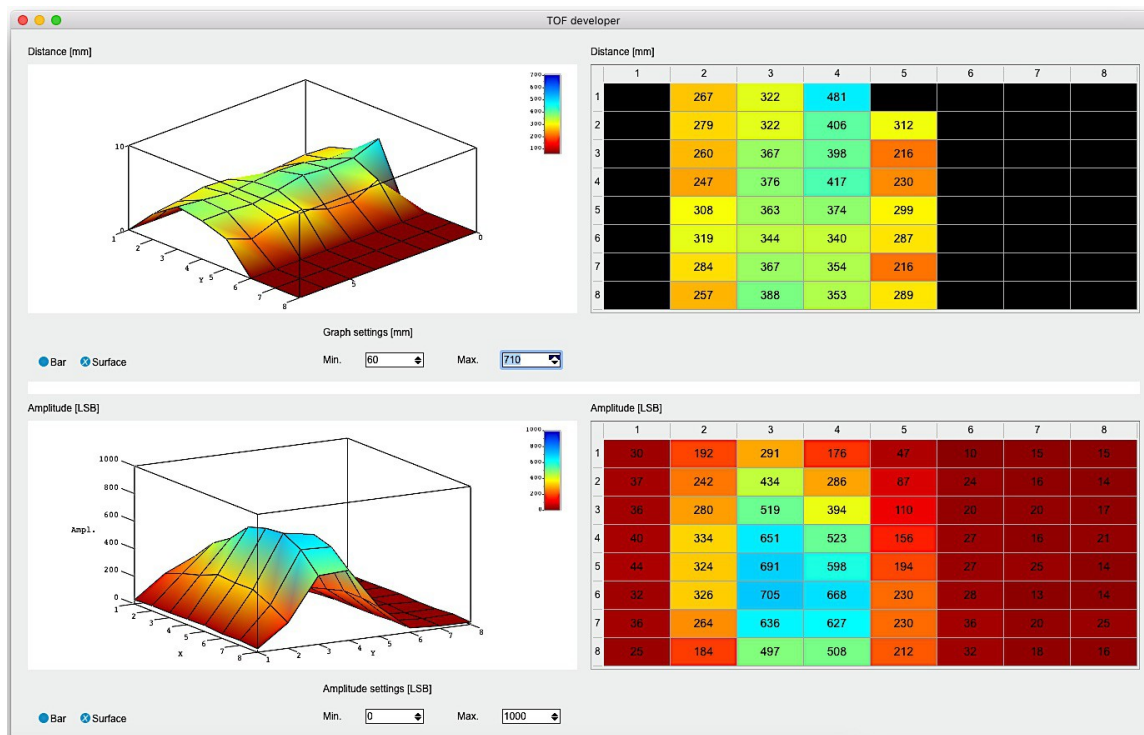
*Settings menu*

Distance & Amplitude Information		
Statistics over 100 samples		
	Distance:	Amplitude:
Current:	3213 mm	20641 LSB
Average:	3212.5 mm	20669 LSB
Minimum:	3211 mm	20562 LSB
Maximum:	3215 mm	20831 LSB
$\sigma$ :	0.9 mm	38 LSB
Temperature: 41.2 C°		
Reset: click right mouse button		

*Statistical data of the TOF>range 611 output*

The Evaluation kit contains also a simple implementation of gesture recognition (beta version). It shows that with very little software even gestures in 6 directions can be detected. Of course, the same functionality can be used to count people or objects.

Check it out! The Evaluation kit epc611 comes for CHF 490.00 only. Please contact your local sales partner or directly [sales@espros.com](mailto:sales@espros.com).



*Live graphical presentation of distance and amplitude image*

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