

A good book is never exhausted. It goes on whispering to you from the wall.

Anatole Broyard

CEO's Note

Dear Readers,

What is a good book? The quote from Anatole Broyard just tells us, that a good book is something good to us. However, it does not tell us, which kind of books. I'm convinced that Anatole Broyard considered mainly literature as a publisher in the New York Times. To me as an engineer, most fascinating books have been those which covered engineering science or any technical stuff. However,



one of the most thrilling books to me was «Picosecond Electronics and Optoelectronics» which I read in the year 1985. Long time ago! The term «Picosecond» was extremely thrilling for me at that time and I did not imagine that I will be once in the mist of this "ten-to-the-minus-twelve" time domain.

As already announced here we are close to the rollout of the first series production modules TOF>cam 635. A prototype has been presented at the RoboBusiness show end of September in Santa Clara. The response was tremendous and it motivated us to give an extra push to launch this product. We're happy to send now some samples to selected customers. The 3D TOF camera modules come with a ROS driver so they can be implemented into existing robot platforms with very little effort. Thus, the user can focus on his application software instead of dealing with rather complex camera operation. The result is a faster time-to-market of our customers robots.

As a refresher, the TOF>cam 635 has the following properties:

- 160 x 60 pixel
- FOV 56x22.5° with 5m range
- SLAM beam 2x2° with 15m range
- Low power with single 5V supply
- Fully calibrated and compensated
- Works under full sunlight

The spacial resolution is good enough for applications like obstacle detection, people counting or many industrial use-cases. At that time, even a microsecond was quite hard to manage. Believe me! If somebody considered faster speed, ten nanoseconds was the amazing leading edge. Well, at that time, the picosecond was ten thousand times faster than state of the art. So, this was the right stuff for me, for whatever reason! At least to consider, to become familiar to this scale and to become part of a community to push the limits.

Coming back to the quote of Anatole Broyard, the title of the book «Picosecond Electronics and Optoelectronics» still crosses my mind regularly. It's not the content - that was far out of scope for my technical understanding at that time - it's just the title which gave me guidance for my entire engineering life what to pursue. A «Picosecond» represents approximately one sixth of a millimeter the light travels in this time. Incredible!

Beat De Coi

PS: «Optoelectronics» was a nice engineering description of our discipline back then. However, I like the nowadays established term «Photonics», because it expresses much better that Photonics is an independent scientific discipline.

TOF>cam 635 is coming soon

We kept the spacial resolution by intention low in order to offer an extremely cost effective for applications such as

- Service robots and AGVs
- Humanoid robots
- Robot vacuum cleaners
- Door control and people counting
- Drones, etc.



TOF>cam 635 with a wide and a narrow FOV

After a very successful start to the TOF Academy program in Zurich in August 2018, ESPROS will launch this event in January in San Francisco, USA. Under the new name 'TOF Developer Conference', we will held this event from January 29-31, 2019 at Mission Bay Conference Center at UCSF.



Picture 1: TOF Developer Conference 2018 in Zurich

It's a pleasure inviting you to the next edition of TOF Developer Conference. Whilst photonics is a quite new engineering discipline, elements of it such as lens design, LED and laser technology, imaging, microelectronics, image processing have been developed and taught for a long time. 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 2D imaging systems is on an acceptable level. But when it comes to 3D TOF and LiDAR, the skill limits in the engineering community become evident because of the specific interdisciplinary know-how needed!



A successful design of a 3D TOF camera for example needs a deep understanding of the underlying optical physics - theoretical and practical. In addition, the behavioral model of the imaging system and an excellent understanding of the sensing artifacts in real applications is key knowhow. And further more, 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. A TOF camera consist of 9 functional building blocks which have to be understood and fine-tuned carefully to create a powerful but cost effective design.

So, many more disciplines than just electronics and software are in the game. It's not rocket science, but the relevant understanding of these 9 blocks is a must to know if someone gets the duty to design a 3D TOF camera.

Course objective

There is, at least to our knowledge, no engineering school which addresses TOF and LiDAR as an own discipline. We at ESPROS decided to fill the gap with a training program called TOF Developer Conference. 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 Developer Conference shall become the enabler for electronics engineers (BS and MS in EE engineering) to design working TOF systems. It is ideally for engineers who are or will be involved in the design of TOF cameras. Our aim is that this initiative helps to close the gap between the desire of TOF sensors to massively deployed TOF applications.

Preview: TOF Developer Conference in China

Shanghai, 2 April 2019 Shenzhen, 9 April 2019

Register now - places are limited, first come – first serve.



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