CHIPS.

Newsletter
March 2019

Begin with the end in mind.

Stephen R. Covey

CEO's Note

Dear Readers,

Did you know that the implementation of a TOF or LiDAR system needs professional competence in nine engineering majors? To me, that's the reason that probably nine out of ten TOF projects crash. At least this is my gut-feeling. Some of the projects fail right at the beginning, which is good since the investment was limited. Others fail after years of trial and error engineering. Either way it is difficult to accept given the frustration and unrealistic expectations.

The point is that a Major in TOF engineering is not a broadly taught engineering discipline in technical universities. They teach electronics, information science, (applied) physics, image processing, optics, microelectronics, communication theory and the like. However, majors about bringing it all together for engineers who can specify and lead TOF design projects are extremely rare*.

If you want to learn more about the pitfalls and solutions of TOF implementations, join one of the TOF Developer Conferences we offer (refer to the reverse of this newsletter). It's a two and a half day intensive course which covers the important topics from system specification to the detailed discussion of a full TOF camera implementation.

A participant from the recent conference in San Francisco stated in his course review «better than any SPIE lecture». What a statement! The only thing we want to achieve is to enable engineers and project managers to become successful in their work. This investment is a cost saver for every TOF project regardless of the image sensor used.

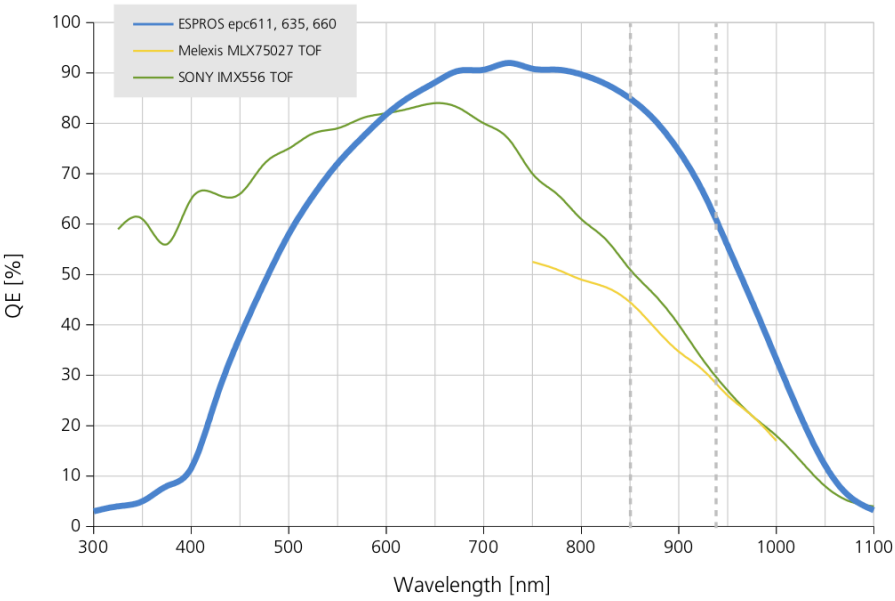
Beat De Coi

*The University of Applied Sciences HTW in Chur/ Switzerland offers a Bachelor of Science in Photonics since 2016 (www.htw.ch). An important part of the lectures is TOF theory, implementation and application. Please advise if you are aware of such a photonics major in other locations of the world.

TOF imager performance comparison

The sensitivity of a TOF imager is a key parameter to achieve a long distance operation at the lowest possible illumination power. According to the diagram on the right, ESPROS offers an unbeaten quantum efficiency which is achieved by our CMOS/CCD technology OHC15L (patented e.g. EP 26181180 and others).
Benefits are:

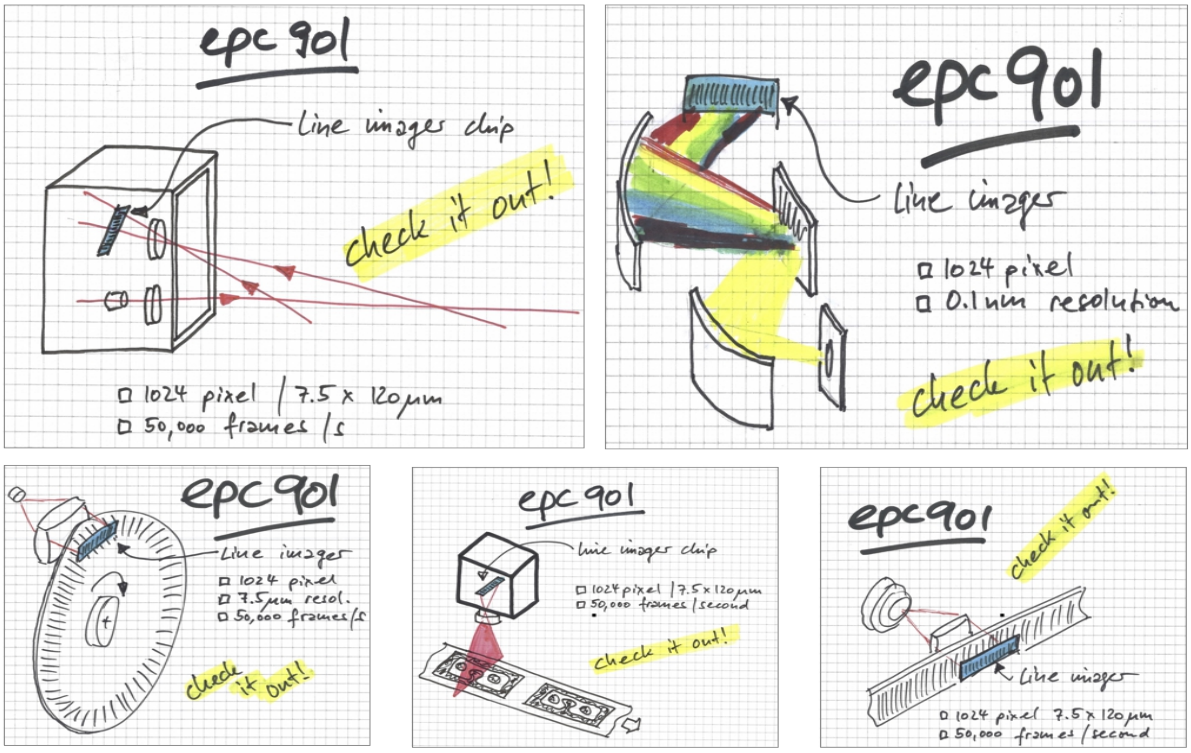
- longer distance eye-safe operating range with a given illumination power
- lower cost for the illumination to achieve the same operating range



Comparison of the quantum efficiency between TOF chips (Source: Melexis datasheet, Lucid Vision Labs Inc. presentation, ESPROS measurement data)

Competitor imagers have a 10µm pixel pitch whereas our epc611, 635 and 660 imager feature a 20µm pixel. The sensitivity is proportional to the pixel area which is 400µm^2 in an ESPROS TOF imager, whereas it is just 100µm^2 in the competitor devices. Smaller pixel pitch results in higher spatial resolution but at the cost of sensitivity which is more important in real world applications. All in all, the achievable operating range with the same illumination power is significantly higher with ESPROS TOF imagers.

epc901 Line imager



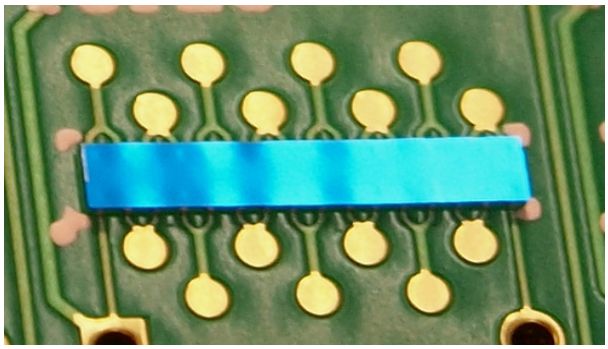
A line imager is quite a simple device: Just a bunch of very small photo diodes lined up in a row. However, the beauty is that the number of photo diodes is very high, they are very narrow, and have no separation between each other. This is possible by the integration of the photo diodes on one silicon chip which allows the integration of more circuitry such as amplifiers or temperature sensors.

The result is a very versatile device with many applications. Also, because of the features of our OHC15L CMOS/CCD technology, even more applications are feasible. The collage of application sketches above show a

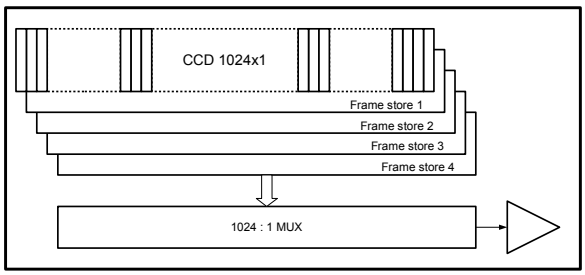
- triangulation light barrier with the capability to measure distance accurately with µm resolution
- spectrometer ranging from 350 - 1100nm with a resolution down to 0.1nm
- rotary encoder with arc seconds resolution
- line scanner (RGB and black and white)
- linear encoder with sub-µm resolution

Its 1024 pixel with a size of 7.5 x 120µm are about ten times more sensitive in the near infrared NIR than competitor products. It allows to run applications on lower power and less ambient light issues.

Check it out!



the epc901 line imager is a very small device: 10 x 1.3 mm



Block diagram of the epc901 line imager

Register now! TOF Developer Conference China in April 2019

Our next conferences in April 2019 in China:

- April 2-4 TOF Developer Conference, Shanghai
- April 9-11 TOF Developer Conference, Shenzhen

Don't miss this opportunity to get a deep understanding of how to implement TOF technology at its best. Register now!
Places are limited, first come-first served!
Check it out here or email us:
tof.developerconference@espros.com

++ Be part of our team and click here for our current job opportunities ++