

The future depends on what we do today.

Mahatma Gandhi

CEO's Note

Dear Reader

It's a very good feeling, if an engineer finds applications on the market, where his work or her ideas are successfully adopted. When I'm traveling throughout the world, I always check out the elevator door safety devices. The cool thing is, that almost every third elevator (that's my gut-feeling) uses sensors which contain ESPROS chips. Statistically speaking that's about 200 million epc138 photodiode amplifier chips that drive them to unbeatable reliability even under full sunlight conditions and give them decades of lifetime.

Another example of a successful story is shown on the right. Our customer Fagor Automation is using our epc901 line imager chip for accurate absolute position measurement. The main reason, why Fagor Automation decided to use this chip is its tremendous speed. At highest optical resolution of 1024 pixels, up to 44 thousand continuous frames per second (kfps) can be acquired. By using the burst mode, 500 kfps is feasible.




"Fagor Automation is a company with great experience in the development and manufacturing of products for machine automation and control. It excels by its capability to develop software and the versatility of its productive process to offer solutions tailored to the needs of their customers." This is stated on Fagor's website. And it continues: "Historically, we at Fagor Automation have focused our efforts on the machine-tool sector where we are one of the world leaders. Besides, our wide technical and sales network spread out in more than 50 countries through our own branch offices and distributors."

ESPROS is extremely proud to be an important partner of Fagor Automation. And we are happy that our chips find more and more applications in industrial sensing, IoT devices, infrastructure sensing, building automation, volumetric and activity monitoring.

Thanks to our impressive business partners and thanks to my staff which make all together these fantastic products possible.

Beat De Coi

epc901 meets FAGOR's need for speed

The high speed operation and reliable accuracy of the epc901 made it the clear choice for Fagor Automation's high accuracy safety and angular encoders. ESPROS has enjoyed a successful partnership with Fagor since 2016. They initially used earlier photo diode models before switching to the more powerful epc901. For 45 years, Fagor Automation has been a leading provider for automation products, controls, motors, drives  including high accuracy linear and angular encoders. FAGOR's new generation Series3 functional safety encoders is packed with new features ensuring each product is 'connected, robust and precise'.

"The main reason we use the epc901 is the high speed operation capabilities of this sensor. This is especially important on some of the open type angular encoder series," explains Fagor's Feedback Systems – Research and Development Director José Emilio Oti. He adds: "The epc901 lies at the heart of many of Fagor encoders, as well as the Series 3 functional safety encoders. Our very positive experience with the earlier epc products, meant that we were very interested in using ESPROS' latest line imagers. Our partnership successfully matches our half century of experience with ESPROS' sensor innovation."

The epc901 is a small footprint and very thin line imager chip. It is designed to fulfill the need of very

low optical cross-talk in encoder sensors because the encoder code wheel or ruler can be placed as close as 50µm above the optical sensitive part of the imager. This is possible due to its backside illuminated imaging technology (BSI). Standard frontside imagers need typically a distance of 10-20 times more and thus have to deal with a high cross-talk. Although, it is a high-performance CCD line sensor capable of storing a total of 4 frames in the frame store elements for ultra high-speed image acquisition of up to 500k lines per second. In the continuous mode, even 44k lines per second are possible.

Features include the following:

- Very high sensitivity due to 100% fill factor
- Up to 44 kfps per second with epc901, other models achieve 143 kfps (continuous)
- Four on-chip memories on-chip allow up to 500 kfps for four images in a row
- On-chip correlated-double sampling
- Single-ended or differential analog video output
- Temperature sensor
- Ultra small CSP packaging 8.0x1.3x0.23 mm

More information about Fagor Automation can be found [here](#). Information related to the epc901 and its sister products, epc902 .. 905, can be found [here](#).

What is your job at ESPROS?

I am responsible for everything optics related in the R&D department. The main tasks are evaluating illumination (LEDs, VCSELs, laser diodes...) and designing the optics for our cameras. PCB layout is also a part of my job. This also includes the maintenance of the part-library and preparation of the data for order. In addition, I'm also responsible for some tasks in our ERP tool. There I also maintain the part-library and update the bill of material of our products. Furthermore, I'm involved in the evaluation and characterization of our products. This includes a wide variety of tasks. Bringing up new hardware, writing test cases and test instructions, testing the cameras and preparing and carrying out EMC and eye-safety measurements.

What do you most enjoy about your job?

Besides the very interesting field I'm working in, I love the fact, that I have such a variety of tasks to perform. Sometimes I have to be highly concentrated and work extremely precisely, sometimes I get carried away by the flow. But if I'm stuck with something for a long time, there is always something else that I can do to take a break and re-order my mind.

Where are you from and where do you live now?

My father is from Laos, but I was born and raised in Chur, the capital of the biggest canton in Switzerland, where I still live.

What do you like to do in your spare time?

If I'm not in front of my PC, you can find me on my bike (Trails and Down-Hill) or practicing martial-arts. I also like to play games with my friends and family. Everything from board games to card games such as Magic: the Gathering or Pen and Paper like Dungeons & Dragons.

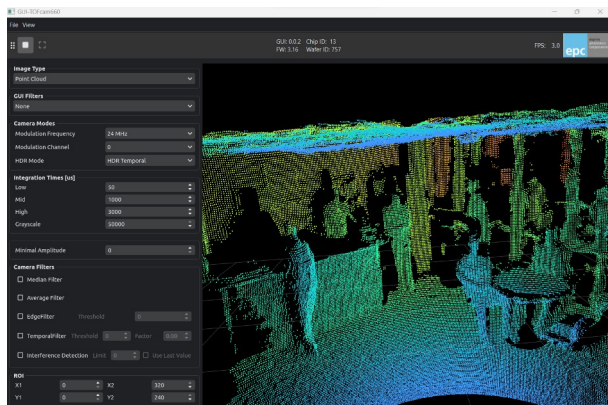
If you could have a superpower, what would that be and why?

I'd like to be able to immediately have the perfect water temperature every time I take a shower! No fiddling with the controls.



New TOFcam Toolkit

Evaluation is the key to the successful integration of a 3D camera into the desired application. In the simplest case, one can find out whether the camera's sensitivity is sufficient to reliably detect even dark objects at the desired distance. Not only that, the



speed of the camera, the spatial resolution, the field of view (FOV) and the dynamic range are also important parameters that need to be assessed. If several 3D cameras then work in the same environment, virtually hand in hand, it is crucial that they do not interfere with each other or are disturbed by other active sensors. All of this can be tested extremely conveniently with the new TOFcam toolkit.

The ESPROS [TOFcam Toolkit](#) is designed to control and visualize the scenery with a 3D point cloud of all

ESPROS TOFcams. It provides Python modules and GUI applications for interactive control and visualization. Everything needed is in this framework to speed up evaluation and integration.

The TOFcam Toolkit is compatible with the ESPROS [TOFcam-660](#), [TOFcam-635](#), [TOFcam-611](#), and [TOFrange-611](#). The framework is open to be extended by the user so new features can be added to suit specific application requirements.

The [documentation](#) guides through the installation and explains to run the ESPROS TOFcam Toolkit.

Key features:

- Modulation frequency and channel controls
- Integration time setting and automatic HDR mode selectable
- Minimum amplitude setting
- Configurable spatial filters like median, average, edge
- Configurable temporal Kalman filter
- Configurable interference detection
- modifiable and extendable to suit your application
- Built-in Python console (run time)
- Configurable GUI and data visualization (3D point cloud)
- Example scripts

It's free to download and free to use. Don't waste time and start now.

You want to purchase our products? Check out on [Digi-Key](#) or get in touch with our [sales team](#).



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