Community

Conference Notes

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Review: CES2017

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So far, in this section, we have only had an eye on events related to industrial photonics. But this year it makes sense to take a look at the Consumer Electronics Show (CES) in Las Vegas because some the optical technologies that were presented there have great potential for industrial applications as well.

So this year the major show stopper was not the new smartphones (which also contain exciting optics), but electric cars with many optical sensors: As an example, the new FF91 from the China backed venture Faraday Future intends to challenge Tesla's luxury cars with more horse power, more range and… more optical sensors: 10 high definition cameras, 13 long and short range radars and 12 ultrasonic sensors.

LIDAR sensors without moving parts will get much cheaper

Among all these new sensors, the LIDAR sensors are currently the most interesting. Google uses a LIDAR system with 64 lasers and receivers; although they admit that the price for the LIDAR unit alone is $75,000 [1].

But this may change this year. Already at CES 2016 Quanergy, an automotive startup based in Sunnyvale, California, promised a LIDAR module for less than $250. In the summer of 2016, Israeli startup Innoviz announced a HD solid state LIDAR system for less then $100 and the LIDAR sensor company Velodyne suggested in December 2016, already, that it might be possible to push the price of solid state LIDAR sensors below $50 [2].

This year, Innoviz touted a partnership with automotive supplier Magna. Quanergy raised the bet and promised full scale manufacturing of its 3S sensor for 2017. Therefore, mass production is on the way and those price promises may be tested.

Details of the Quanergy solid state sensor were described last year [3]. It uses an optical phased array as a transmitter, which can steer pulses of light by shifting the phase of a laser pulse as it is projected through the array, similar to modern warfare radar systems. This enables an optical system free of any moving parts. At the Massachusetts Institute of Technology's Photonic Microsystems Group, researchers are developing a LIDAR-on-a-chip system that is smaller than a dime, has no moving parts and could be mass-produced at a very low cost for use in self-driving cars, drones and robots [4].

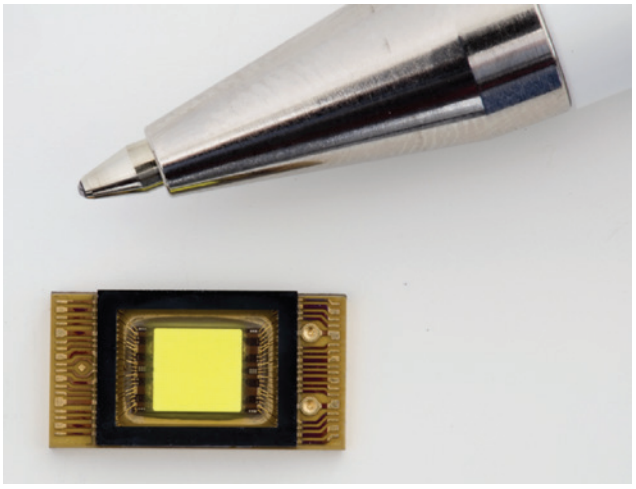
If this LIDAR sensor comes in a price range of about $100, it becomes relevant for other applications as well. First there is augmented reality [or AR copared to virtual reality (VR)], where pictures of the surroundings are augmented with computer generated information. According to CES rumors, Apple is working with Carl Zeiss on such a technology. AR might become very interesting for orientation in manufacturing sites, or for human-machine interactions.

Other applications of such sensors could be in all kinds of autonomous movement in production areas, as well as in process control applications.

Smart car headlights are coming next

While there is a lot of hubbub around connected cars and ever more displays inside the cockpit, smart car lighting

According to Quanergy, their new S3 solid state sensor might be manufactured in large numbers for less than $250 (Photo: quanergy).



The new LED chip with 1024 individually controllable light points (pixels) is about the size of a fingernail. The combination of three such chips allows a resolution of 3072 pixels per headlight. (Photo: OSRAM Licht AG.)

is being introduced rather silently for substantial safety benefits. Particularly, German car makers are working on adaptive LED headlights which change their direction on the street if people or other cars enter the scene.

A German collaboration, including Osram and Daimler, developed an LED matrix chip with more than 1000 individually controllable pixels. An onboard camera recognizes oncoming vehicle and pedestrian traffic, automatically dimming the high-resolution LED chips to ensure that the head areas of oncoming people are not dazzled by the light beam. Market introduction is expected by 2020.

Car maker Audi already sells top models equipped with pixelated LED headlights – 30 small LEDs per headlight. They are combined into groups and emit light through lenses or via reflectors. If the camera detects other road users, the control unit switches off individual LEDs at lightning speed or dims them over 64 steps.

And the smart phones?

The CES is a place to promote all gadgets from remote vacuum cleaners, fancy OLED TVs up to electric cars. And yes, smartphones. While the bigger-is-better-fight gets harder, new optics features such as a 3D scanner for virtual reality perception or even ultraflat cameras [5] might be more eye catching.

References

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