

# EPIC World Photonics Technology Summit

3 February 2020  
San Francisco, USA

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 <b>JENOPTIK</b> MORE LIGHT	 <b>mks   Ophir</b>	 <b>PLX</b> INNOVATIVE OPTICAL SYSTEMS	 <b>vis</b> Vertically Integrated Systems
 <b>Jeppixx</b> Pilot Line	 <b>MedPhab</b>	 <b>MIRPHAB</b> EMERGING CHEMICAL MEMS	 <b>multiple</b>
 <b>LAMOX</b>	 <b>PASSION</b>	 <b>Phabulox</b>	 <b>PIXAPP</b> MEMS-BASED PICO LINE



# 500 MEMBERS



*500 members organizations*  
[www.epic-assoc.com/membership/epic-members](http://www.epic-assoc.com/membership/epic-members)



# EPIC European Photonics Industry Consortium



## Objective:

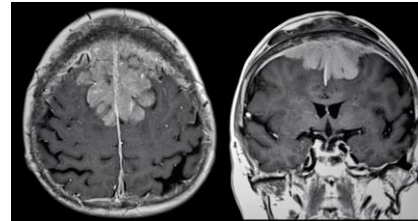
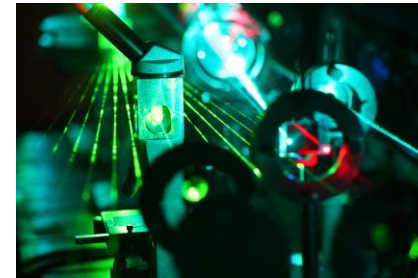
1. Support EPIC members for technology & business development
2. Help European companies access the markets outside Europe
3. Provide leading edge technology to system integrators / manufacturers worldwide.

EPIC publishes **market and technology reports, organizes technology workshops and B2B roundtables, coordinates EU funding proposals, advocacy and lobbying, education and training activities, standards and roadmaps, pavilions at exhibitions.**

[www.epic-assoc.com](http://www.epic-assoc.com)

Our members and activities encompass the entire value chain from:

- Biophotonics
- Displays
- Imaging
- Lasers (for industrial, military, medical applications)
- LED, OLED, and Smart Lighting
- Optic fiber
- Optical components
- Photonic Integrated Circuits: III-V, Silicon Photonics, and TriPleX
- Projectors
- PV solar energy including CPV and OPV, and Batteries
- Sensors (for automotive, defense, medical, ... applications)
- and all other photonic related technologies



Ana Gonzalez, PhD, R&D Manager

Anna Feis, MSc, CFO Investment Advisor

Auri Ripoll, MSc, Marketing Manager

Carlos Lee, MBA, Director General

Elena Beletkaia, PhD, Project Leader

Francesca Moglia, PhD, Project Leader

Helena Jelinkova, Events Manager

Jessica van Heck, BEng, Marketing Manager

Jose Pozo, PhD, Director of Technology

Neringa Noreikienė, MSc, Events Manager

Sana Amairi-Pyka, PhD, Project Leader

Susette Germer, PhD, Public Relations Manager



# 2019 was an amazing year...



1. Amsterdam 10-11 Jan
2. Brussels 15-18 Jan
3. Dresden 21-22 Jan
4. Eindhoven 23-25 Jan
5. Dresden 27-29 Jan
6. San Francisco 1 - 9 Feb
7. Neuchatel 13-14 Feb
8. Karlsruhe 17-18 Feb
9. Torino 19-20 Feb
10. Limoges 20-22 Feb
11. Wetzlar 24-27 Feb
12. San Diego 1-8 Mar
13. New York 9 Mar
14. Toulouse 11-13 Mar
15. Liege 20 Mar
16. Mainz 20-22 Mar
17. Brussels 25-27 Mar
18. Aachen 27-29 Mar
19. Glasgow 7-13 Apr
20. Eindhoven 16-17 Apr
21. Ghent 24 Apr
22. Gottingen 1-3 May
23. Nuremberg 6-7 May
24. Munich 7-8 May
25. Jena 13-15 May
26. Nice 20-22 May
27. Regensburg 22-24 May
28. Glasgow 28-29 May
29. Barcelona 4-6 Jun
30. Berlin 12-14 Jun
31. Silicon Valley 16-21 Jun
32. Munich 23-27 Jun
33. Berlin 1-2 Jul
34. Pisa 2-3 Jul
35. Munich 15-16 Jul
36. Warsaw 16-18 Jul
37. Berlin 27-30 Aug

- EPIC Staff Meeting
- EU Commission (ACTPHAST and PILOT Lines Meeting and P21 Info day)
- LAMPAS Kick-off Meeting
- InPULSE Kick Off Meeting
- SEMI 3D & Systems Summit
- Photonics West
- Outreach
- Outreach
- EPIC Board of Directors Meeting
- EPIC Meeting on Specialty Fiber
- W3+ Fair + Visit Gottingen
- OFC
- Outreach Chiral Photonics
- Quantum Optronics and Captech Meeting
- Outreach visit UPMT Wielandts and LASEA
- EPIC Meeting at Huber+Suhner
- PIC International
- NILIndustray Days
- EPIC AGM
- PIXAPP Consortium meeting
- ECIO 2019
- EPIC Meeting on Industrial Lasers
- SMT Connect
- Dinner in Munich with CEO AMS Technologies
- Optecnet + Outreach
- DCI & NGON
- EPIC Meeting on Automation for Manufacturing
- Visit to University of Glasgow
- EPIC Quantum Summit
- WTMF
- ISUPT/SSPhF Napa + Outreach
- Laser World of Photonics
- Autonomous Machines World
- ePIXfab Summer School
- EPIC Munich B2Run
- Outreach
- EPIC World Photonics Technology Summit

38. Shenzhen 1-6 Sep
39. Noordwijk 11-13 Sep
40. Rheintal 17-19 Sep
41. Dublin 22-25 Sep
42. Antwerp 2-4 Oct
43. Zurich 7-8 Oct
44. Coventry 8-9 Oct
45. Almelo 10-11 Oct
46. Stuttgart 17-18 Oct
47. Christchurch 23-25 Oct
48. Auckland 23-35 Oct
49. Den Haad 29 Oct
50. Eindhoven 30-31 Oct
51. Boxmeer 4 Nov
52. Neuchatel 7-8 Nov
53. Abu Dhabi 12 Nov
54. Atsugi, JP 14 Nov
55. Atami 15 Nov
56. Dusseldorf 19 Nov
57. Barcelona 21 Nov
58. Eindhoven 25 Nov
59. Brussels 3 Dec
60. Gent 6 Dec
61. Amsterdam 11-12 Dec
62. London 13 Dec

- CIOE 2019 Conference
- EPIC Meeting on New Space
- W3+ Fair
- ECOC 2019
- EPIC Staff Meeting
- EPIC BoD Meeting
- Photonex UK
- EPIC Meeting on High Power Laser Systems
- EPIC Meeting on VCSELs Technology and Applications
- Outreach New Zealand (Quantum Presentations)
- Outreach New Zealand (Quantum Presentations)
- Inside Quantum Technology
- EPIC Meeting on LIDAR Technology and Applications
- Visit Marel Poultry
- EPIC Meeting on Wafer Level Optics
- EPIC Meeting on Fiber Sensing for Oil and Gas at ADIPEC
- Visit NTT
- Outreach Hitachi
- EPIC Techwatch at MEDICA
- EPIC Meeting on Fiber Sensing at Smart Cities Expo
- Visit TEGEMA and outreach Eindhoven area
- Round Table at European Parliament
- Invited Lecture on PIC Mnuafcturing
- EPIC Meeting on Cancer Diagnostic and Treatment
- IEEE BICOP Conference

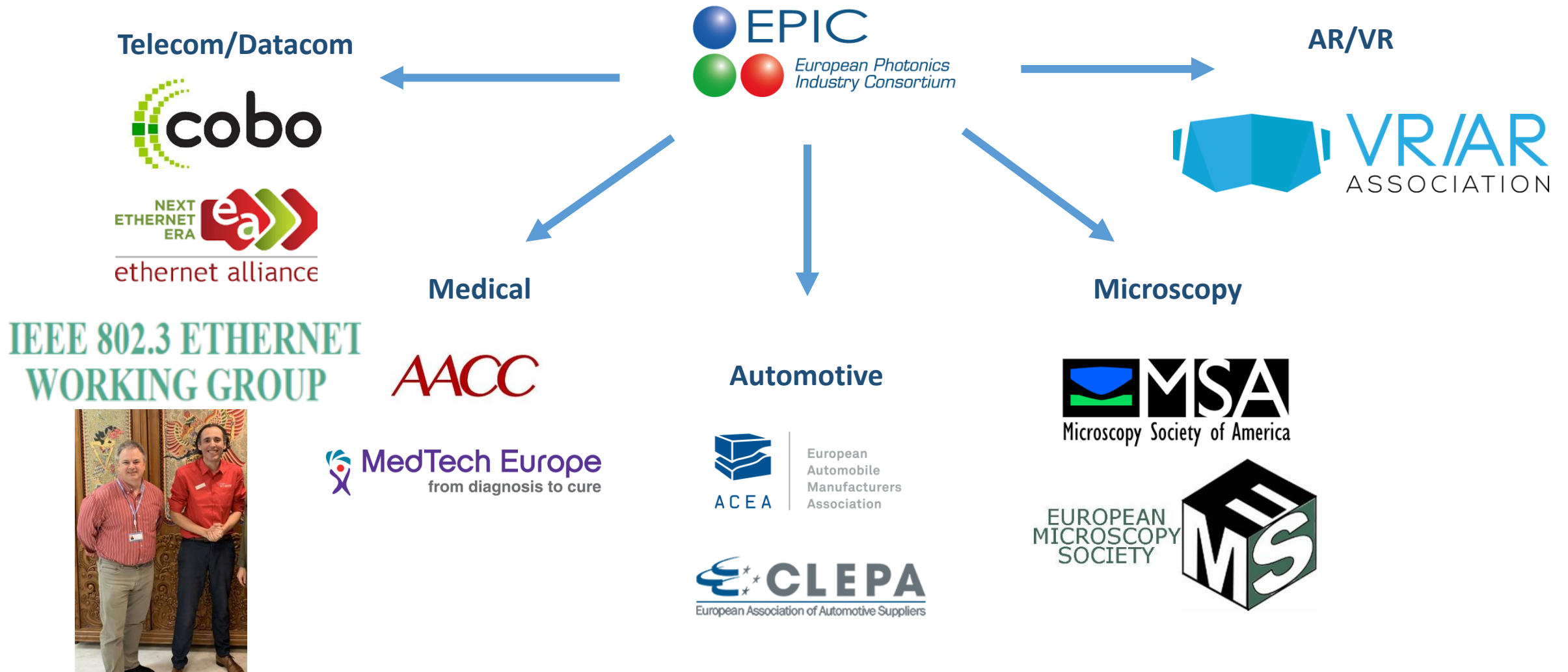


# NEXT EVENTS

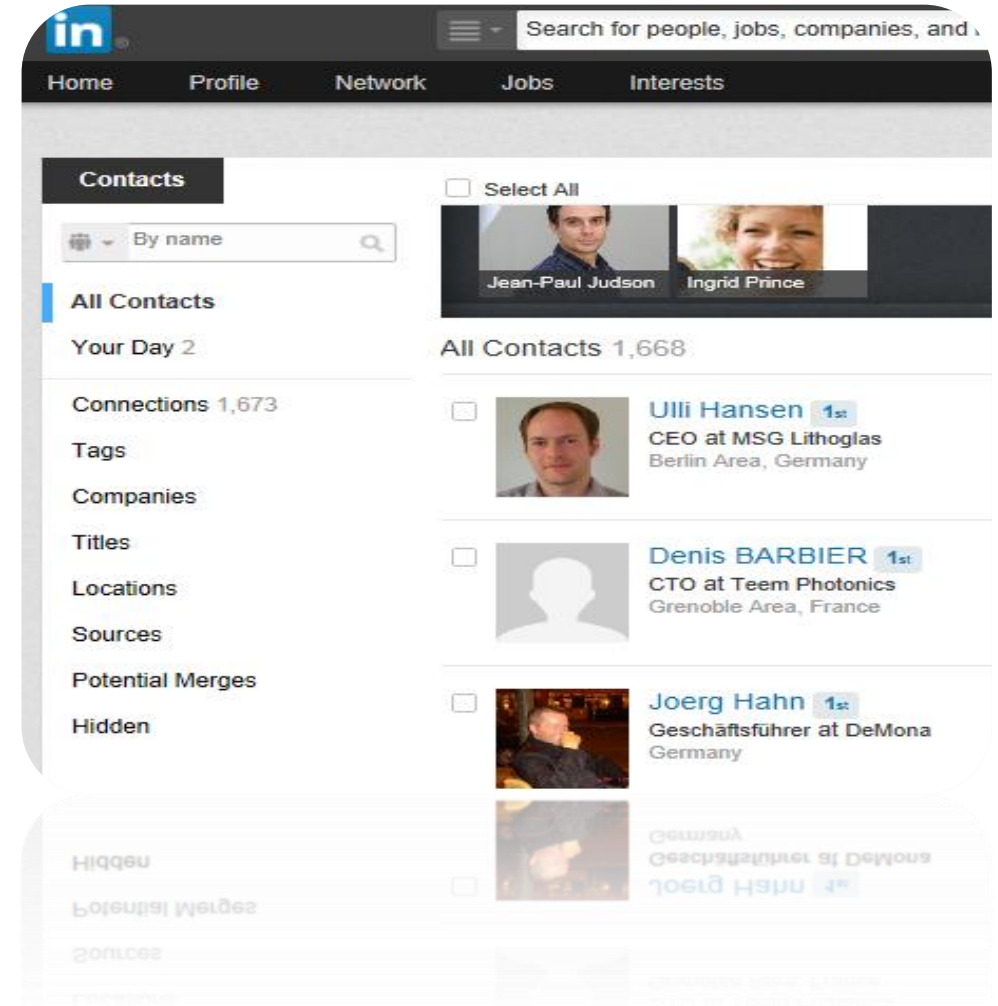
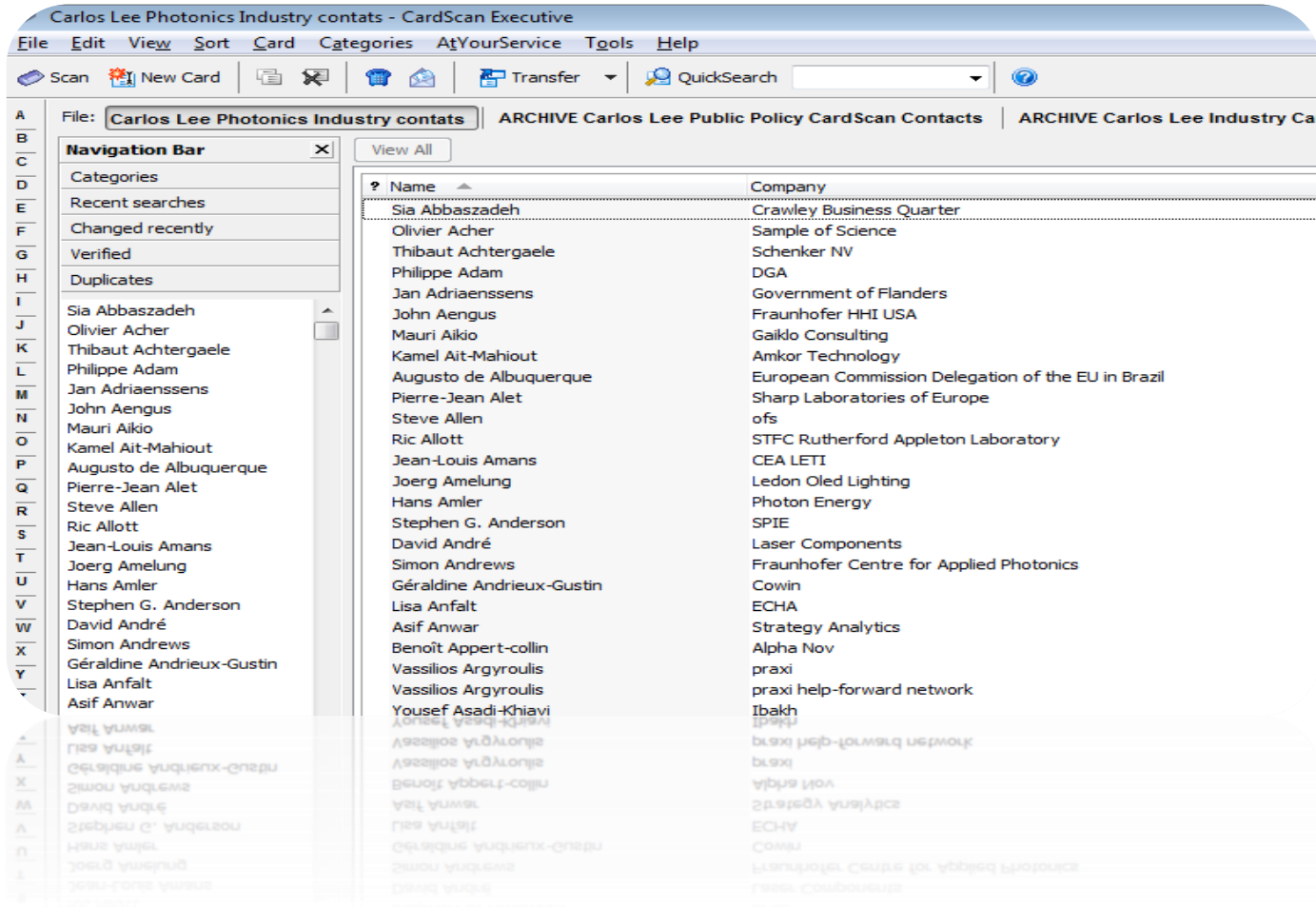


19–20 March 2020	EPIC Meeting on <b>Freeform Optics at Optimax</b> , Rochester, NY
15–17 April 2020	EPIC <b>Annual General Meeting</b> , Vilnius
21 April 2020	EPIC TechWatch on <b>Polymer Optics</b> at Polymer Optics Days 2020, Aachen
28-29 April 2020	EPIC Meeting on <b>Beyond 400G</b> at Microsoft HQ, Seattle
7–8 May 2020	EPIC Meeting on <b>Advanced Micro-Optics at Nanoscribe</b> , Karlsruhe
21–22 May 2020	EPIC Executive Meeting on <b>Industrial Lasers at Convergent Photonics</b> , Torino
4–5 June 2020	EPIC Meeting on <b>Hyperspectral and Multispectral</b> at NORCE, Bergen
3-4 Sep 2020	EPIC World <b>Quantum Photonics</b> Technology Summit, Glasgow
16-17 Sep 2020	EPIC Meeting on <b>Fiber Sensors at HBM Fibersensing</b> , Porto
29-30 Sep 2020	EPIC Meeting on <b>3D Printing of Metal at Siemens</b> , Finspong
29–30 Oct 2020	EPIC Meeting on <b>Automation for Manufacturing</b> at PI, Karlsruhe
5–6 Nov 2020	EPIC Meeting on <b>Micro-Optics for Display, Imaging and Sensing</b> at IMT, Zurich
11 November 2020	EPIC Meeting on <b>Hyperspectral Imaging at VISION</b> , Stuttgart
8-9 December 2020	EPIC Meeting on <b>Medical Devices at Philips</b> , Eindhoven
8-9 March 2021	EPIC Meeting at <b>Bosch Sorsortec</b> in Stuttgart, Germany

# Positioning European capabilities for photonic product manufacturing



# CONNECTING PEOPLE – EPIC’s global network has thousands of contacts EPIC members have access to EPIC’s industrial network





# Investments and M&A's in Photonics



## Venture & Finance

Venture & Finance

H2020

European Projects

Partner Search

EPIC European Collaborative Research Projects

The EPIC Venture and Finance Workgroup is dedicated to the promotion of venture and finance activities among its members. Its mission has always been to maximise the business development opportunities of its members through networking, information and partnership. The Workgroup takes this a step further through a series of focused activities aimed at attracting investors to photonics, promoting trade investment and development and cooperating with the public funding sector on the continuous improvement of financing conditions for photonics entrepreneurs.

**Kurt Weingarten,**  
Managing Director  
of Lumentum  
(Switzerland), Founder  
of Time-Bandwidth  
Products.

“ EPIC’s membership is mainly composed of small and young innovative companies, access to finance is crucial for scaling up their businesses and I am glad to be part of this initiative for taking concrete action to truly help.

## Entrepreneurship in Photonics

## Investing in Photonics



# Investments and M&A's in Photonics




[https://docs.google.com/spreadsheets/d/1qRGqYnsB9\\_KQIHAdGkxnYR0zwQcNwpTXcycu4gzza-g/edit#gid=0](https://docs.google.com/spreadsheets/d/1qRGqYnsB9_KQIHAdGkxnYR0zwQcNwpTXcycu4gzza-g/edit#gid=0)

Photonics Investment Landscape

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Year	Name of Company	Country	Amount raised	Series A (first round Investors	
<p>www.epic-assoc.com/funding/venture-finance</p> <p>Questions/Comments/Corrections, please contact carlos.lee@epic-assoc.com</p> <p>EPIC is the industry association that promotes the sustainable development of organisations working in the field of photonics. We foster a vibrant photonics ecosystem by maintaining a strong network and acting as a catalyst and facilitator for technological and commercial advancement. EPIC publishes market and technology reports, organizes technical workshops and B2B roundtables, engages in advocacy and lobbying, European funded projects, education and training activities, standards and roadmaps, pavilions at exhibitions.</p> 					
2019	GLOphotonics	France	Not disclosed	Not disclosed	Trumpf
2019	TriEye	Israel	\$2 million	Series A	Porsche
2019	Inziv	Israel	\$2.5 million	Series A	Maverick Ventures Israel
2019	Scintil Photonics	France	€4.4 million	Series A	Supernova Invest, Innovacom, Bpifrance joined by Credit Agricole Alpes Développement and Foreis.
2019	BrightWay Vission	Israel	\$25 million	Series B	Koito Manufacturing and Magenta Venture Partners.
2019	Nu Quantum	United Kingdom	£650,000	Pre-seed	Amadeus Capital Partners, IQ Capital, Ahren Capital, Cambridge Enterprise and Martlet Capital, the investment e
2019	Folio Photonics	USA	\$8 million	Further round	Refinery Ventures, Pavey Investments and Capital One Partners.
2019	Cynoa	Germany	\$25 million	Series C	SRF Partners Group (SRF); DBOLED; and SBI Cross-Border Advantage Fund; MIG Funds; and Wecken & Cie, L
2019	Waycare Technology	Israel	\$7.25 million	Series A	SJF Ventures, UpWest, Next Gear Ventures, Innogy, Spider Capital, Goldbell, Zymestic Solutions, and Janom.
2019	Luminar	USA	\$100 million	Further round	G2VP, Crescent Cove Advisors, Octave Ventures, Moore Strategic Ventures, the Westly Group, 1517 Fund, Peter
2019	Xanadu	Canada	\$32 million	Series A	OMERS Ventures, Georgian Partners, Radical Ventures, Real Ventures, Silicon Valley Bank and Tim Draper.
2019	EFFECT Photonics	The Netherlands	€5 million	Not disclosed	PhotonDelta.
2019	Meridian Innovation	Singapore	\$6 million	Further round	Creative Technology Ltd, Excelpoint's investment arm, PlanetSpark and SEEDS Capital.
2019	Tornado Spectral Systems	Canada	\$10million	Series A	BeauVest Group and Roadmap Capital.

# Investments and M&A's in Photonics



<https://docs.google.com/spreadsheets/d/1pwNCZMzeyS6xrLkYMyBnjJhWWcVxIz0KyM6-boL7Ep8/edit#gid=0>

Photronics Merger & Acquisition Landscape ☆ Working... Share

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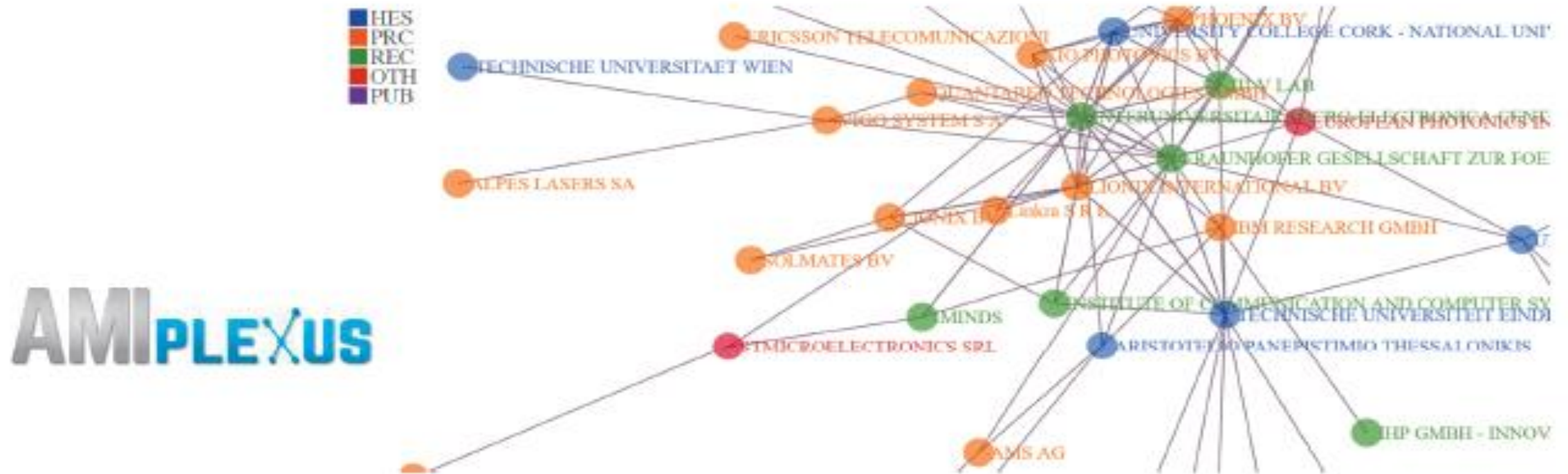
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Year	Type	Mother Company	HQ Country	Company Acquired	HQ Country	Value of Transaction	Comments
2019	Acquisition	Trumpf	Germany	GLOphotonics	France	Not disclosed	Trumpf acquire
2019	Acquisition	Honeywell	USA	Rebellion Photonics	USA	Not disclosed	
2019	Acquisition	SPIE	USA	Xmark Media	United Kingdom	Not disclosed	
2019	Acquisition	Synopsys	USA	Qtronic	Germany	Not disclosed	
2019	Acquisition	LBP Optics	United Kingdom	Symons Mirror Technology	United Kingdom	Not disclosed	
2019	Acquisition	Agilent	USA	BioTek	USA	\$1.2 billion	
2019	Acquisition	FLIR System	USA	NEOS	USA	Not disclosed	
2019	Acquisition	Quantel	France	Optotek	Slovenia	Not disclosed	
2019	Acquisition	ISRA Vision	Germany	Photonfocus AG	Switzerland	Not disclosed	
2019	Acquisition	TKH	The Netherlands	SVS-Vistek	Germany	Not disclosed	
2019	Acquisition	Vast Broadband	USA	NTS Communications	USA	Not disclosed	
2019	Acquisition	Thorlabs	USA	Coda Devices	USA	Not disclosed	
2019	Acquisition	Hexacon	Sweden	Melown Technologies	The Czech Republic	Not disclosed	

# EPIC members have fee unlimited access to AMIPLEXUS

Search for new technologies and observe your competitors! AMIPLEXUS is a useful practical on-line search tool for helping you identify partners in EU funded projects. See what projects your suppliers, customers and competitors are involved in and who are their other partners. See which technologies are in the companies pipelines. You can search by keywords, and refine search results to specific countries, companies, etc... EPIC has acquired a license that allows all employees of all EPIC member companies to freely access [www.amiplexus.eu](http://www.amiplexus.eu)



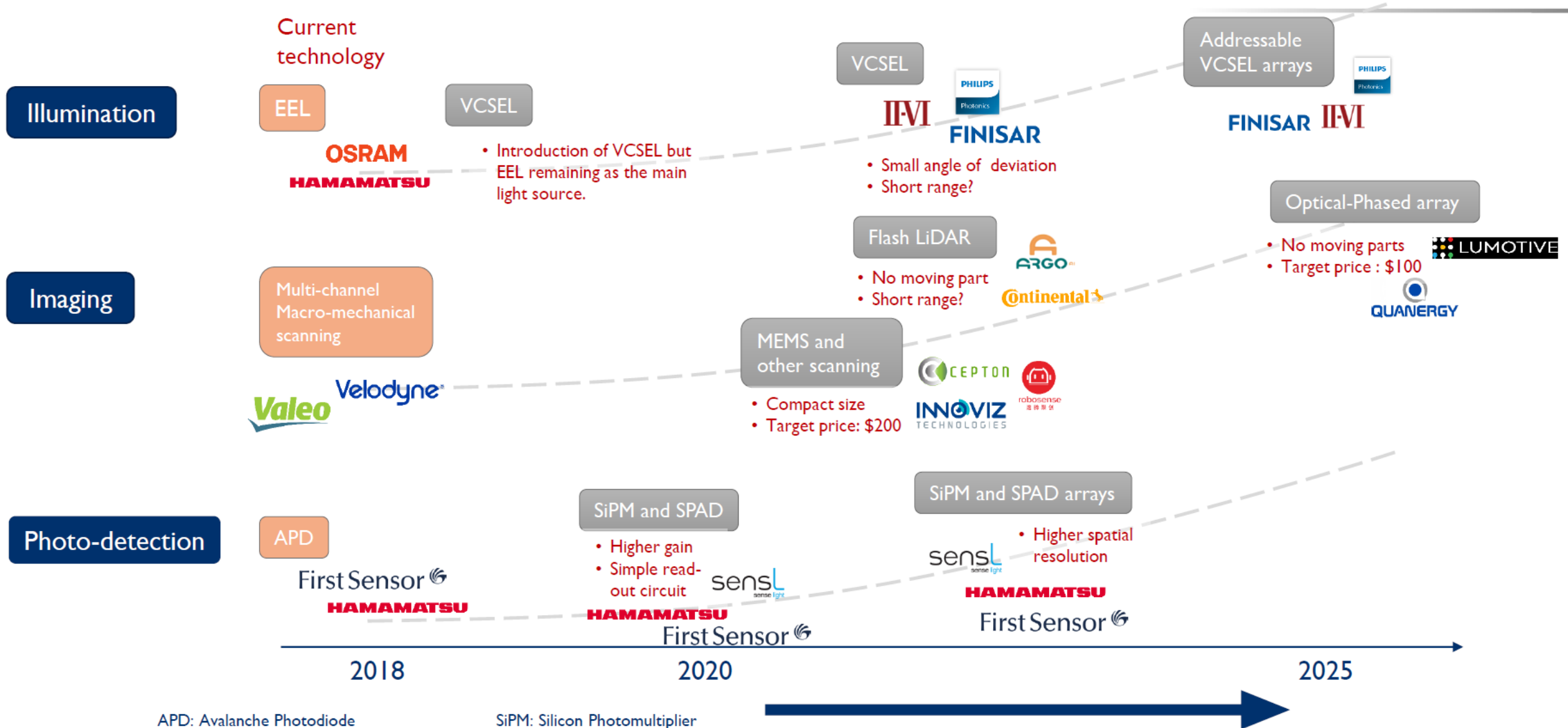
Special report on  
**LiDAR for  
Automotive and  
Industrial  
Applications**

*Technology, Industry  
and Market Trends  
for EPIC*



# TIME-TO-MARKET ANALYSIS

## Introduction of new automotive LiDAR technologies



APD: Avalanche Photodiode

EEL: Edge-Emitting Laser

MEMS: Micro-Electro-Mechanical System

PD: Photodiode

SiPM: Silicon Photomultiplier

SPAD: Single-Photon Avalanche Diode

VCSEL: Vertical Cavity Surface-Emitting Laser

**Special report on  
Status of the  
Camera Module  
Industry - Focus on  
Wafer Level Optics**








*Technology, Industry and  
Market Trends*

**for EPIC**



# MARKET SEGMENTATION

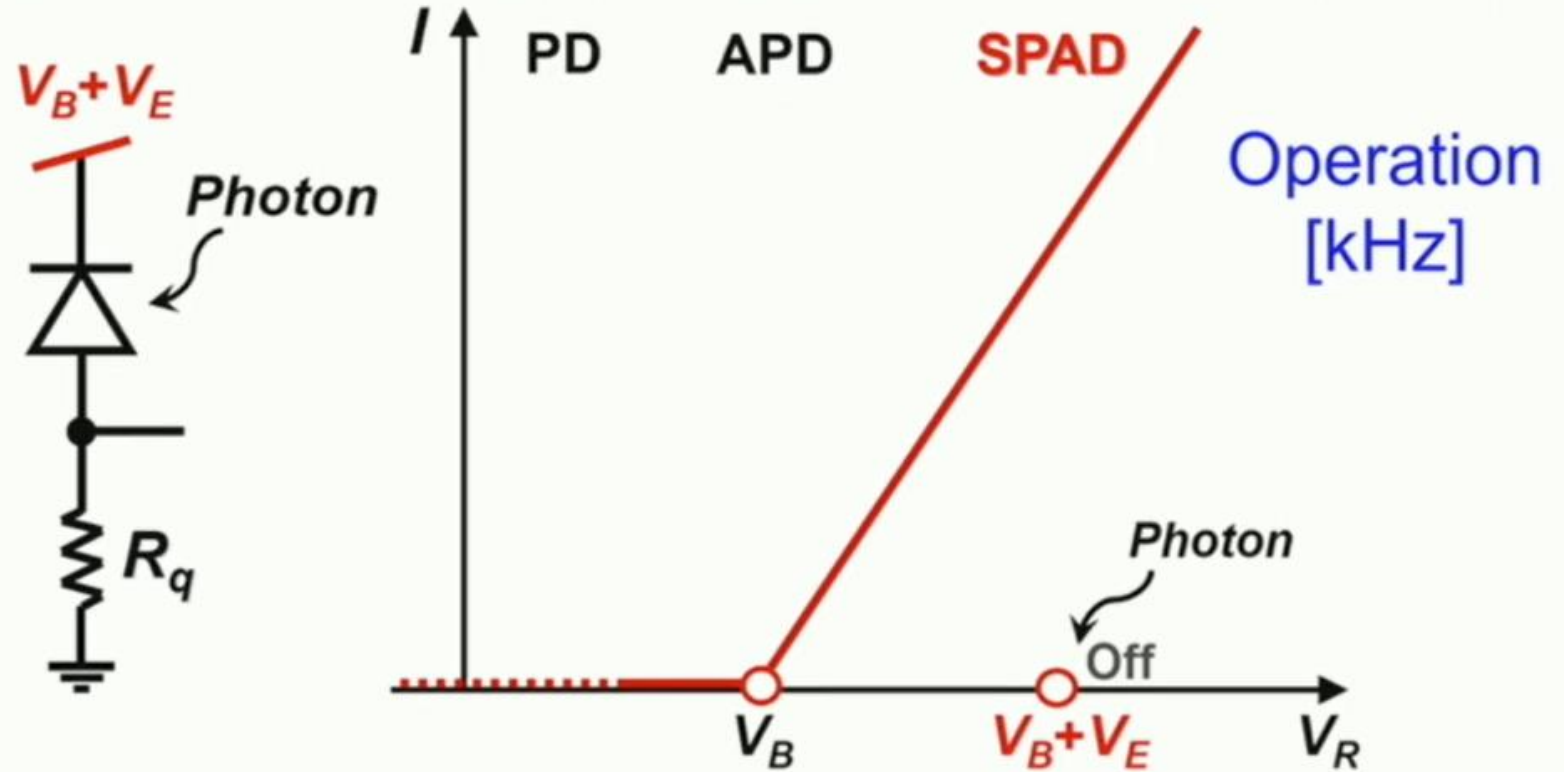
Known WLO application  
 Potential WLO application  
 Unknown WLO application

	Segment	Sensor application (light Rx)	Lighting application (light Tx)
	Industry/space/ defense	Machine vision, <b>barcode readers</b> , professional & broadcast, defense, night vision camera	<b>Datacom</b> , <b>3D printing</b> , AOC, Laser printer
	Security	Security & surveillance cameras	Security & surveillance cameras
	Medical	PET scan, x-ray, <b>endoscopy</b>	OCT systems, <b>pulse oximeter</b> , <b>dermatology laser</b>
	Automotive	In-cabin, infotainment, front ADAS cameras, lidar	POF, <b>lidar</b> , <b>eye tracking</b> , Gesture recognition, <b>automotive lighting</b>
	Computing	Laptop PC, tablets, computer mice	computer mice
	Consumer	DSLR, DSC, video cam, action cam, consumer drones, personal robotics, game stations, <b>AR-VR headsets</b> , smart home devices, <b>smart watch</b>	Laser printer, proximity sensors, autofocus systems, facial recognition, gas sensor, <b>driver monitoring</b> , gesture recognition
	Mobile	<b>Smartphones</b> , feature phones	<b>Smartphones</b> , feature phones



# Fast : Single Photon Avalanche Diode

\*fastree 3D



© Scott Lindner

© Fastree3D 2019 – Company presentation

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04:23



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**Jose Pozo**

Director of Technology and Innovation at EPIC  
- EUROPEAN PHOTONICS INDUSTRY CONS...



*500 members companies*

*[www.epic-assoc.com/membership/epic-members](http://www.epic-assoc.com/membership/epic-members)*

# This presentation was presented at EPIC World Photonics Technology Summit 2020

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