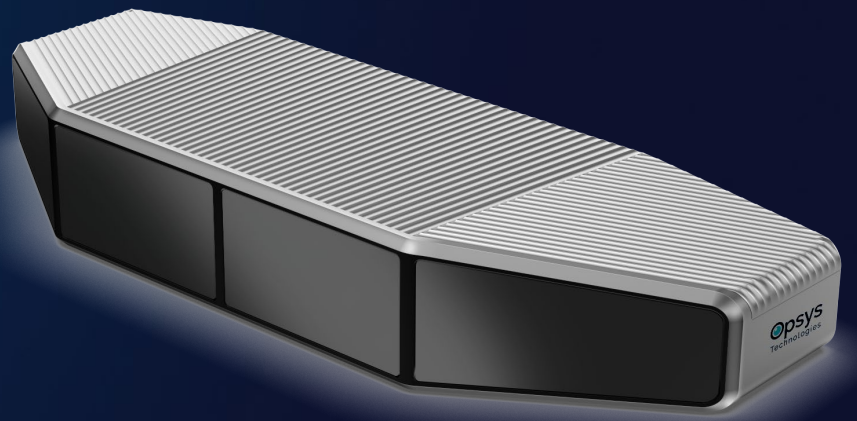
Opsys Technologies

Micro-flash Scanning LIDAR



High Resolution

Long Range

High Reliability

Low Cost

www.opsys-tech.com

November 2022

Opsys Technologies

Established
Jan 2016
Round A Dec 2017
Round B Jan 2020

OSAGE UNIVERSITY PARTNERS
HYUNDAI
83NORTH
TRANSLINK CAPITAL

80 + employees
diverse and experienced team, optical, electro-optical, mechanical, FW, SW engineers

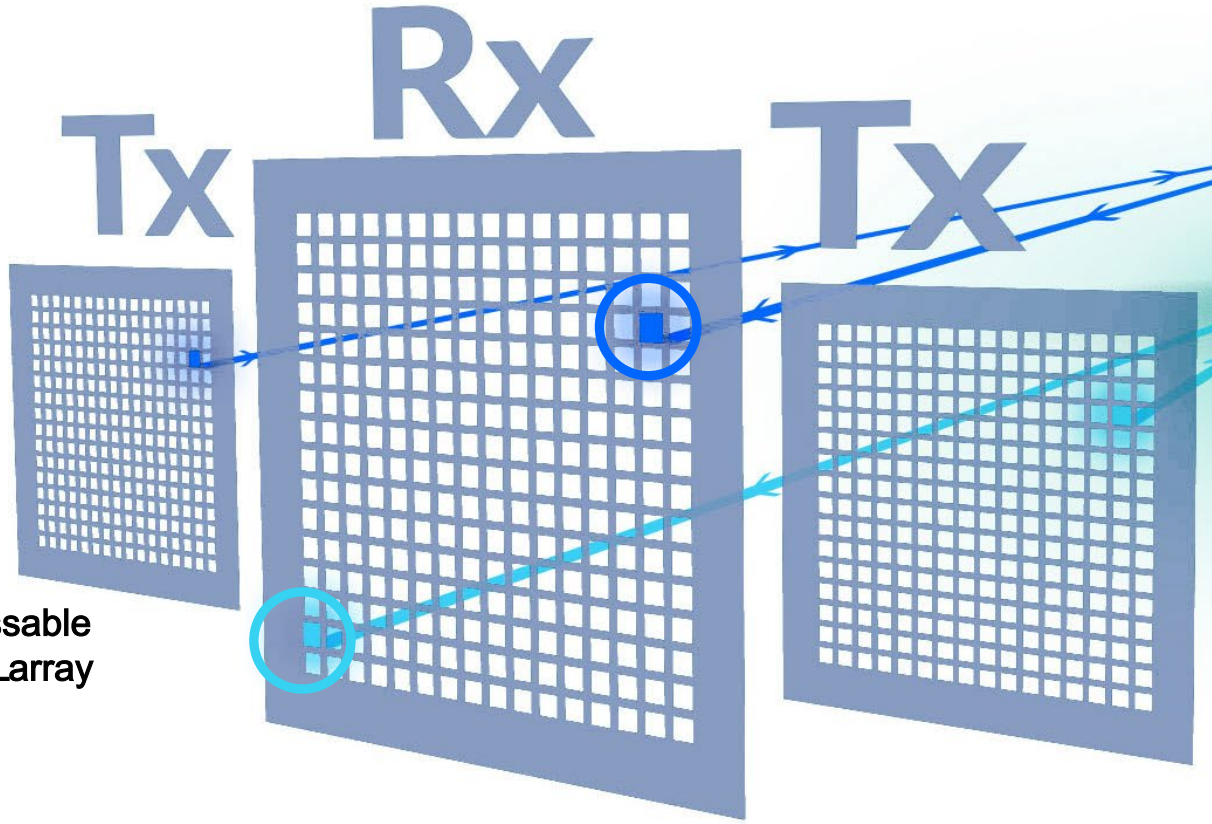
100s Of years
of accumulated experience in Electro-Optics Design and Manufacturing

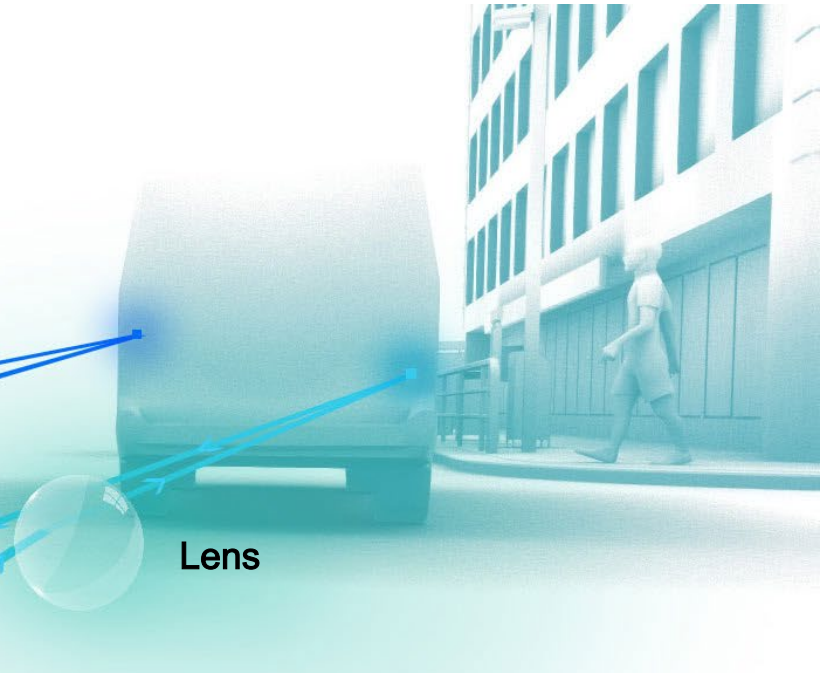
Israel
Engieering branches in San Jose, US and Prague, CZ

Micro -Flash Technology motivation

- Opsys device is technically belongs to “Sequential Flash” category of devices, similar to solutions from LeddarTech, Ibeo and few other companies
- This category of devices features some advantages:
  - Simplicity of assembly and calibration, allowing for high volume production
  - Robustness towards vibrations and temperature changes
  - Lack of dedicated beam steering device
- During initial analysis we identified next weak points of “Sequential Flash” device:
  - Insufficient energy density for long range solution, despite improvement compared to global flash
  - Prone to uncontrolled blooming / optical crosstalk
  - Emitted power can be adjusted only for significant part of device FoV
- **As solution to weak points we decided to reduce “step” of “Sequential Flash” even further, to group of pixels**
- **Therefore Opsys implemented 2D “Sequential Flash” with help of special addressable VCSEL**

IMPLEMENTATION





Scanning is achieved by firing individual cells of VCSEL one after the other 1000 times/sec.
Each VCSEL "illuminates" specific SPAD array pixels

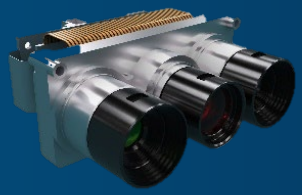
Pure Solid State Scanning LiDAR, No Moving Parts

Benefits of Micro -Flash Technology

- Opsys device maintains relative simplicity of “Flash” branch of LiDARs
- Being closer to scanning devices allow for much narrower emitted beam and higher energy density, which helps to see further and achieve reasonable effective range
- Ability to execute “short” rolling shutter and read out only pixels scheduled to be illuminated at actual step
- Ability to better control blooming and contain it within scan step with injecting object
- Emitter power can be adjusted for each scan step, adapting to environment
- Custom / customer defined scan patterns are possible, including dynamic change
- Ability to implement RoI

SP3.0 TRX Models For Production

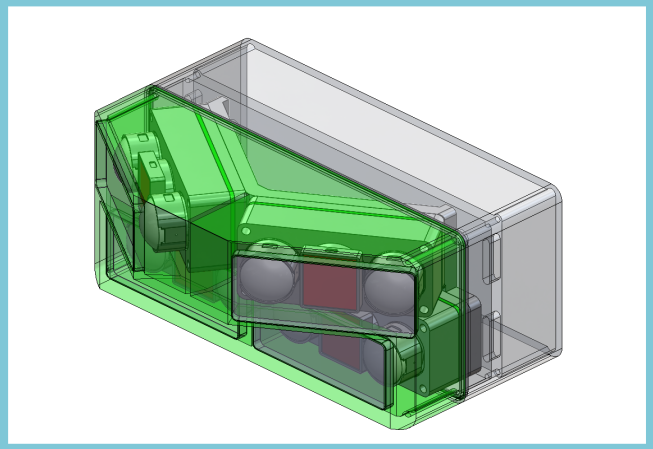
Performance is maintained across the full FOV

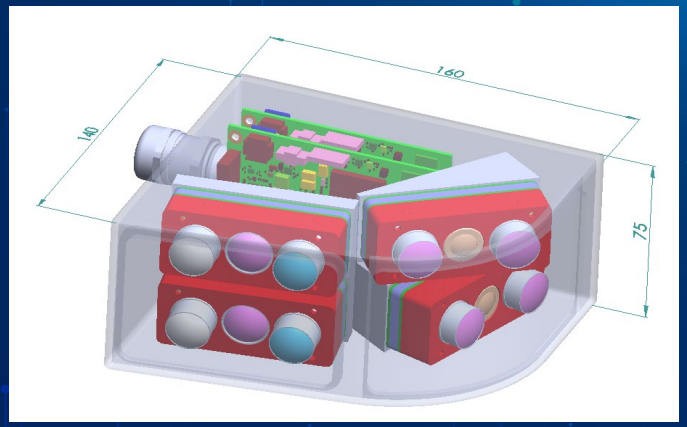


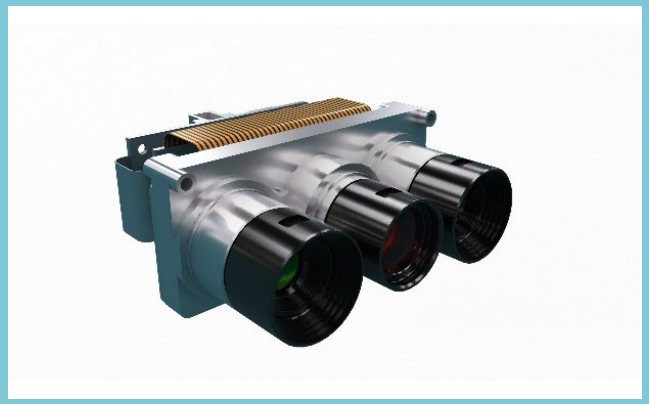
	High resolution	Mid resolution	Low resolution
Base Sensor Horizontal FOV	22.5°	45°	80°
Angular Resolution (H/V)*	0.11ê/0.11º	0.22ê/0.22ê	0.41ê/0.41ê
Single Base Sensor Vertical FOV	6.5ê	13ê	22ê
Observable Range	300m	300m	75m
Range at 10% target with PD>90%	200m	100m	50m
Wavelengths Used	905nm and 940nm		
Point Cloud Update Rate **	10 to 30 fps		
Number of Points per sec for FOV of each Base Sensor	Up to 600k pts/sec at 30 fps (Dual return)		
Number of Returns	Up to 3 (Closest, First and Second Strongest)		
Eye Safety	Class 1		

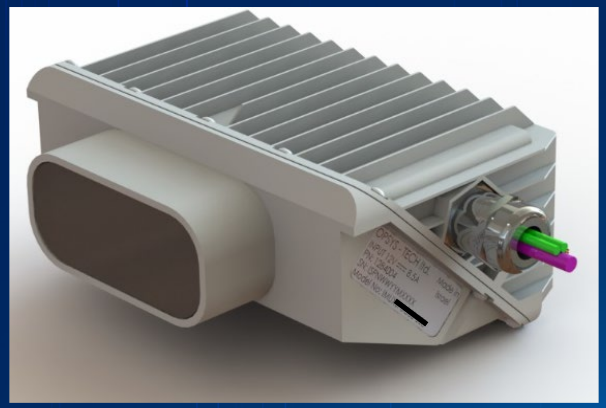
** Other resolution can be delivered*
*** Post averaging of multiple measurements per point*

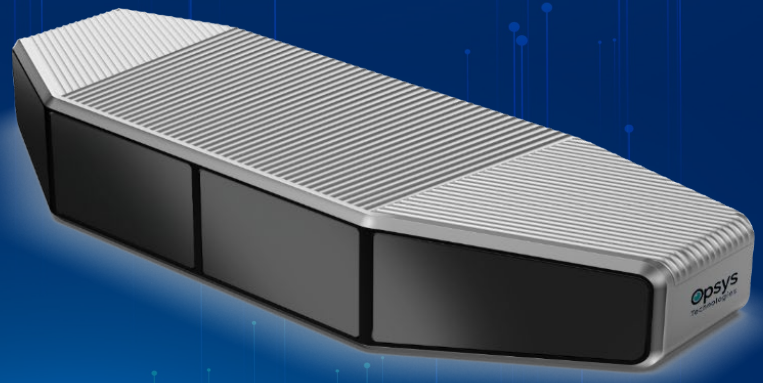
Integration examples – based on TRX units











Short distance 0.4 X 0.4

Summary

- **Full solid state solution without dedicated beam steering device**
- **Modular design, supporting different application and use cases with same base HW**
- **Architecture supporting both distributed and centralised sensor suite design**
- **Robust device not requiring re-calibrations or re-adjustment**
- **Assembly process of same complexity as automotive camera, well scalable for high volume**
- **Sufficient performance for majority of applications**

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THANK YOU