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Pandion Evaluation Kit (EVK3)

February 2021

SensL Division – Intelligent Sensing Group
Cork Ireland

SPAD Arrays

Improved angular resolution

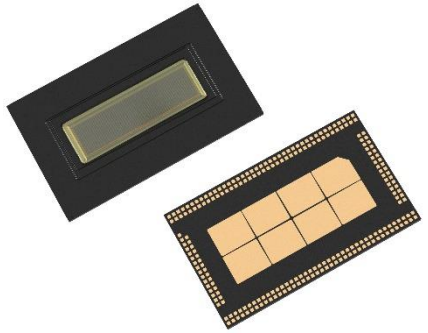
- Higher density pixels = higher resolution & more point cloud details

Better ambient light rejection

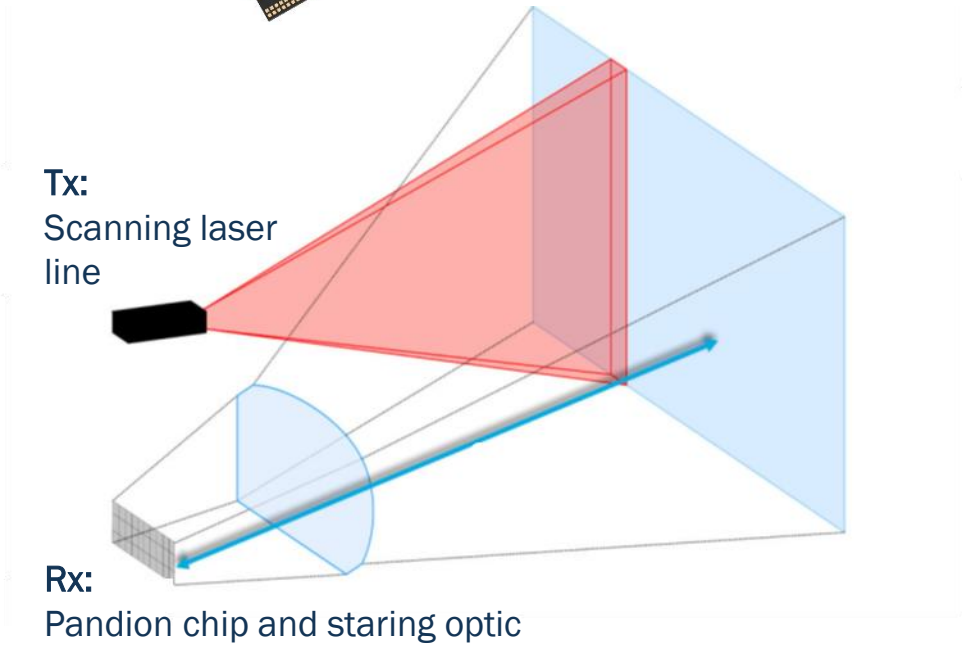
- <5ns recovery time = less dead time

Flexibility for low cost system design

- Flash for short range (<15m)
- Scanning for long range



Pandion SPAD Array



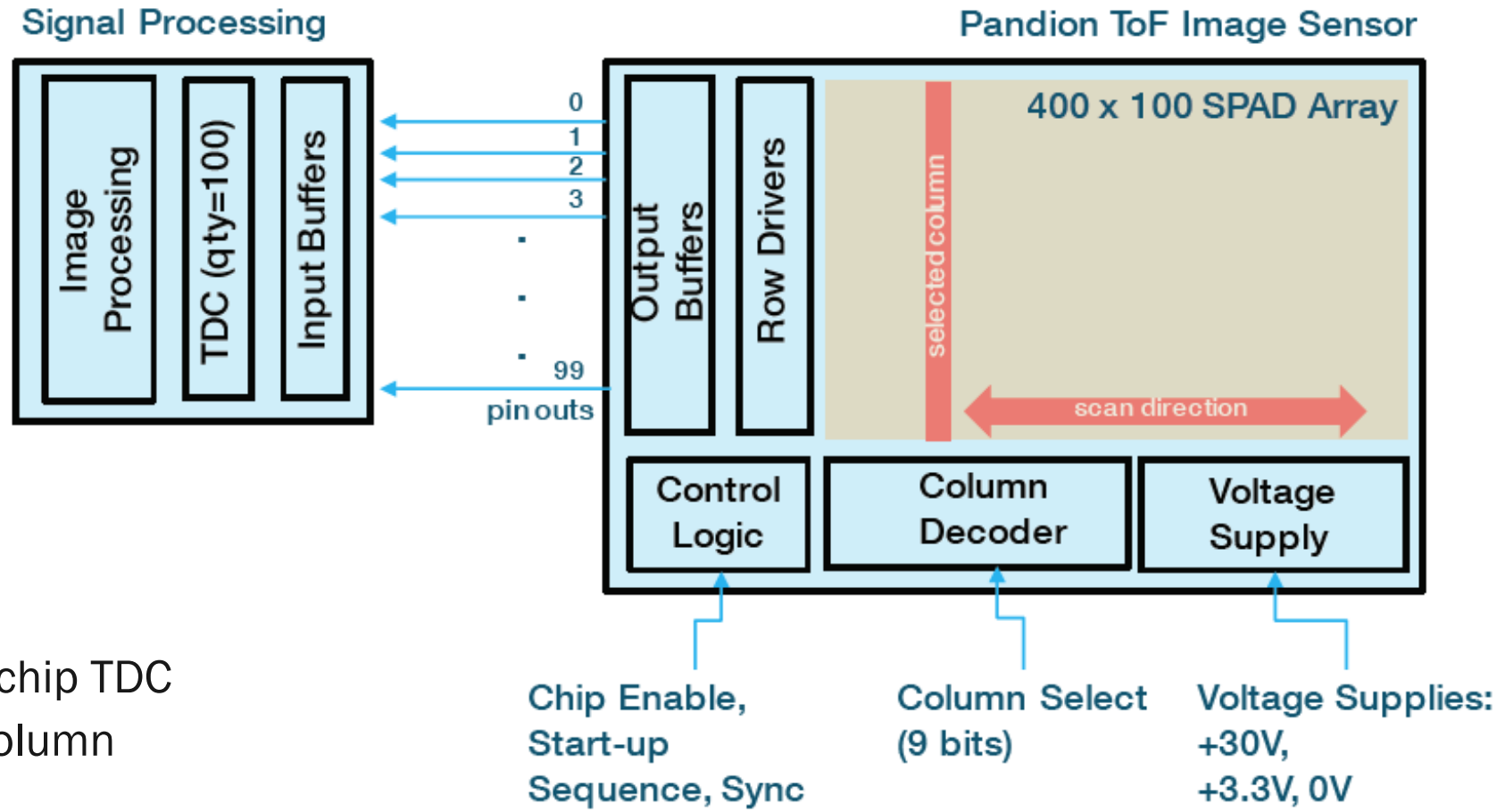
Example SPAD Array Architecture

Allow for wide field rolling shutter readout eliminating scanning for long distance if desired

Wide range of markets from industrial to consumer

Pandion Application Block Diagram

- 1st generation
- 400x100 SPAD array



Basic System Operation:

Select single column

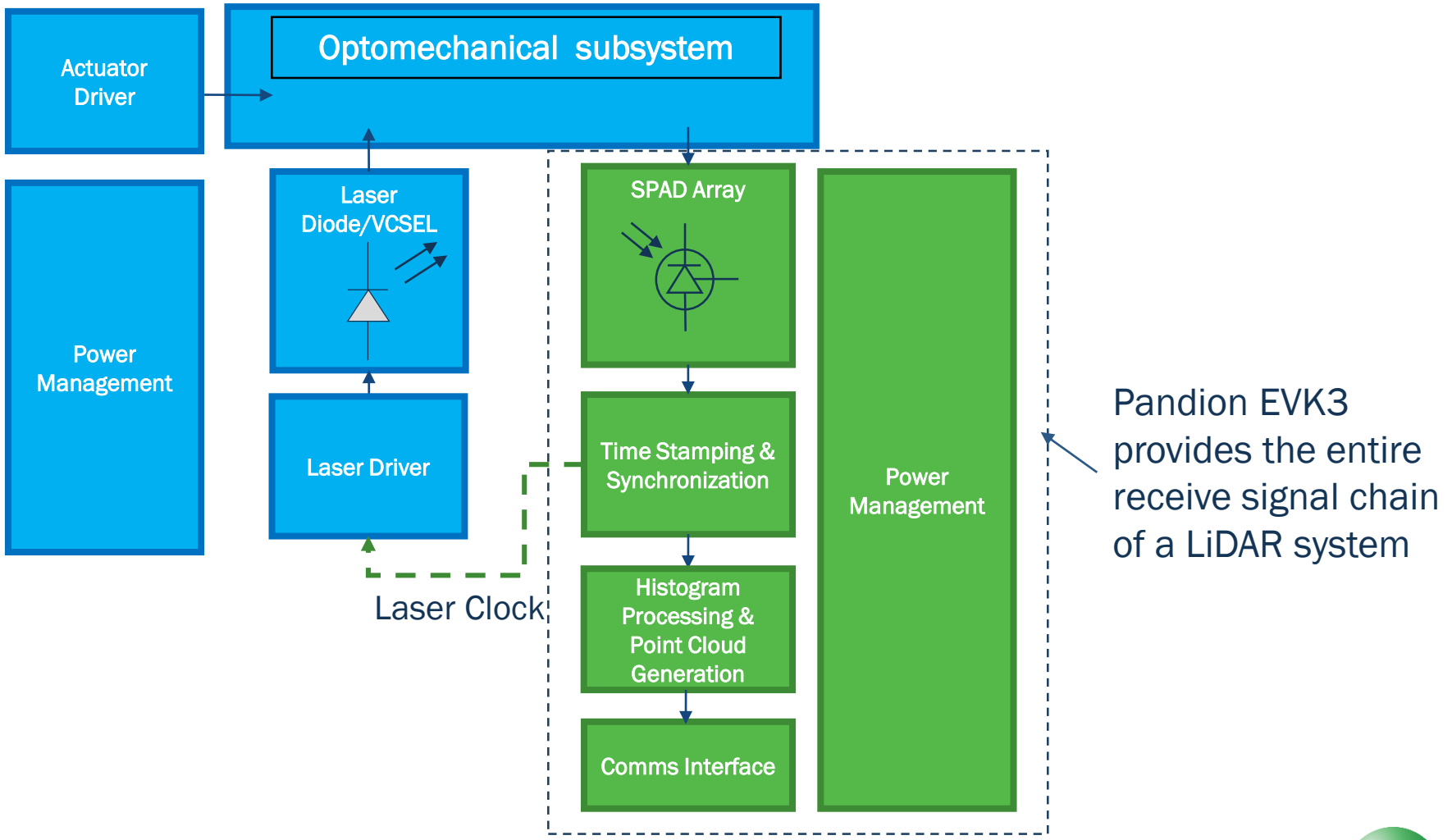
Fire laser

Timestamp 100 signals with off-chip TDC

Scan laser and repeat for next column

Only one column is enabled for exposure/read at a time

LiDAR System Block Diagram



Pandion EVK3

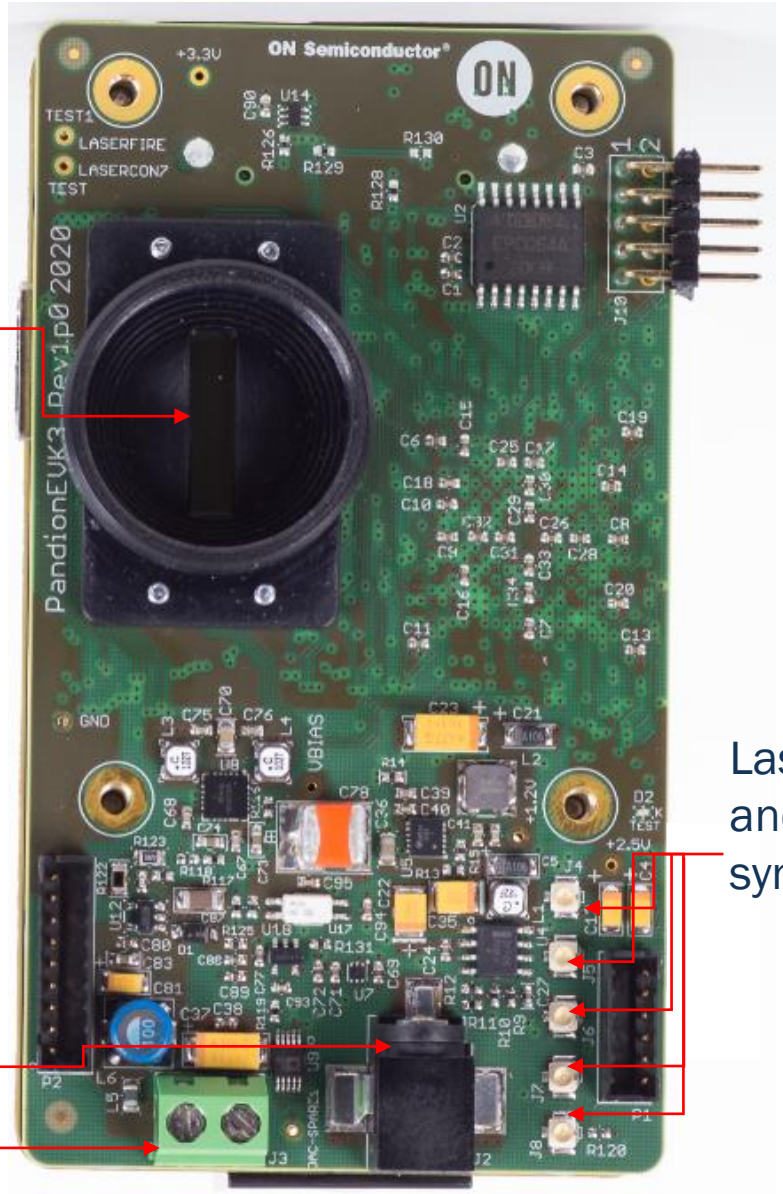
Pandion Chip and Lens mount

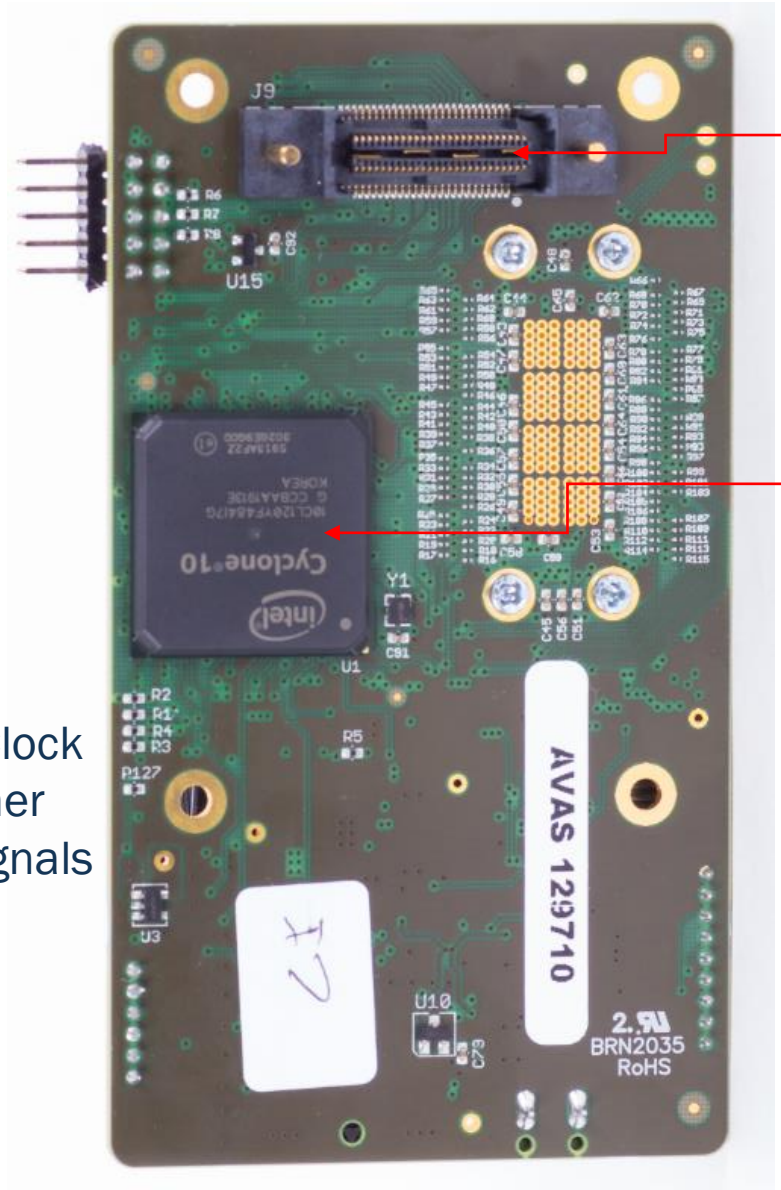
Power Supply Connector options

Laser Clock and other sync signals

Connector to Demo3 eval board or Custom PCB

FPGA with 100 TDCs and Processing





Pandion EVK3

- <u>3 x customer use cases:</u>
  - Pandion Evaluation
    - Point cloud processed by Demo 3 and DevWare for visualization
  - Full Readout Solution
    - Build EVK3 into custom LiDAR sensor
    - Point cloud data processed by customer ECU or processor
  - Reference Design
    - PCB schematic, layout, BOM, and FPGA code available to customers

Pandion EVK3

EVK3 Hardware

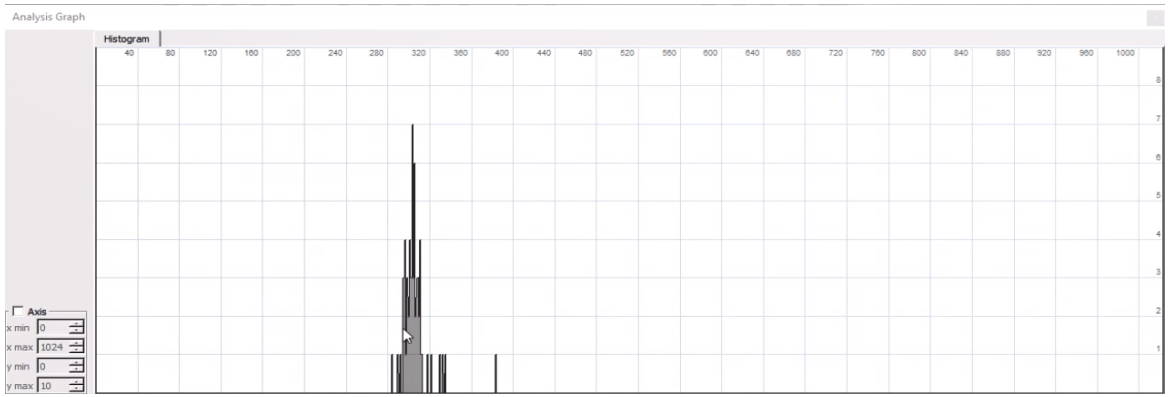
p/n: PAN-400100-A-AI-GEVK3

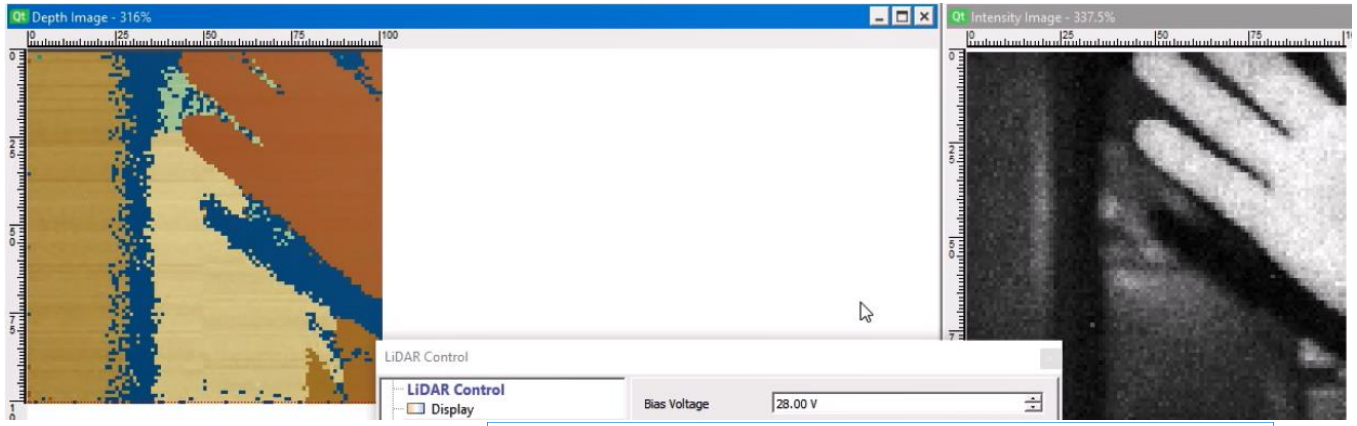
Additional Requirements

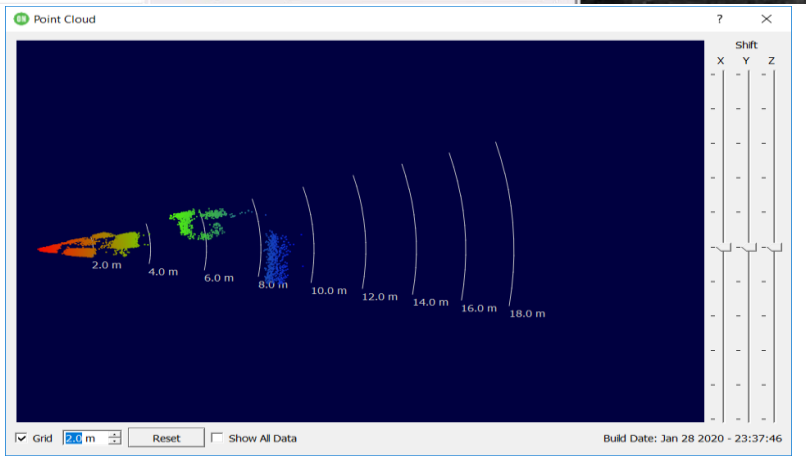
- Detector Optics
  - Connect to standard lens mount
- Illumination source
  - Cables to connect laser clock (U.FL type)
- ON Semiconductor Demo3 interface board
  - Ordered separately
    - p/n: AGB1N0CS-GEVK
- PC
- Software
  - Download from Image Sensor Portal
  - DevWare Version >6.0.34

DevWare Evaluation Software Functionality

- ON Semiconductor DevWare Evaluation Software
- Hardware control
  - Active channels (rows & columns)
  - Pulse width control (VDN, VDP)
  - Sensitivity adjust (HV)
  - Laser clock frequency
- Frame configuration
  - Histogram settings
  - TDC resolution
  - Samples per measurement
  - Depth mask & peak threshold
    - To filter noise
  - Offset calibration
- Image capture, replay & zoom
  - Histogram output
  - 2D & 3D depth output
  - Customizable depth colors
  - 4D imaging (depth and intensity) output

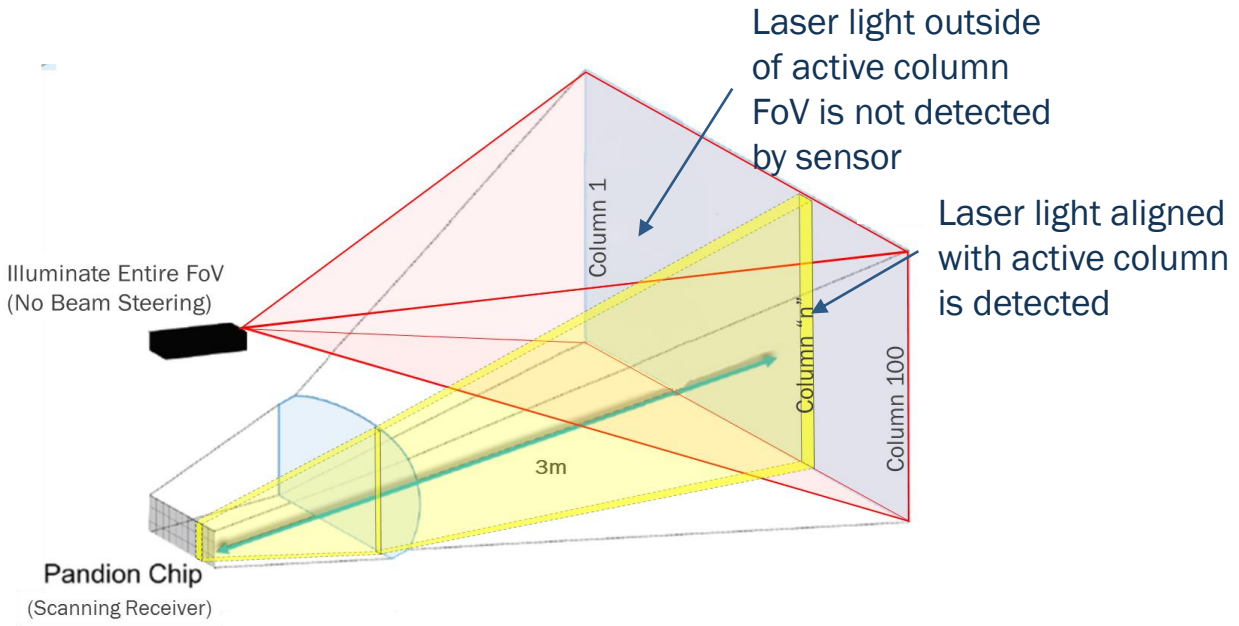






Pandion Short Range Demo

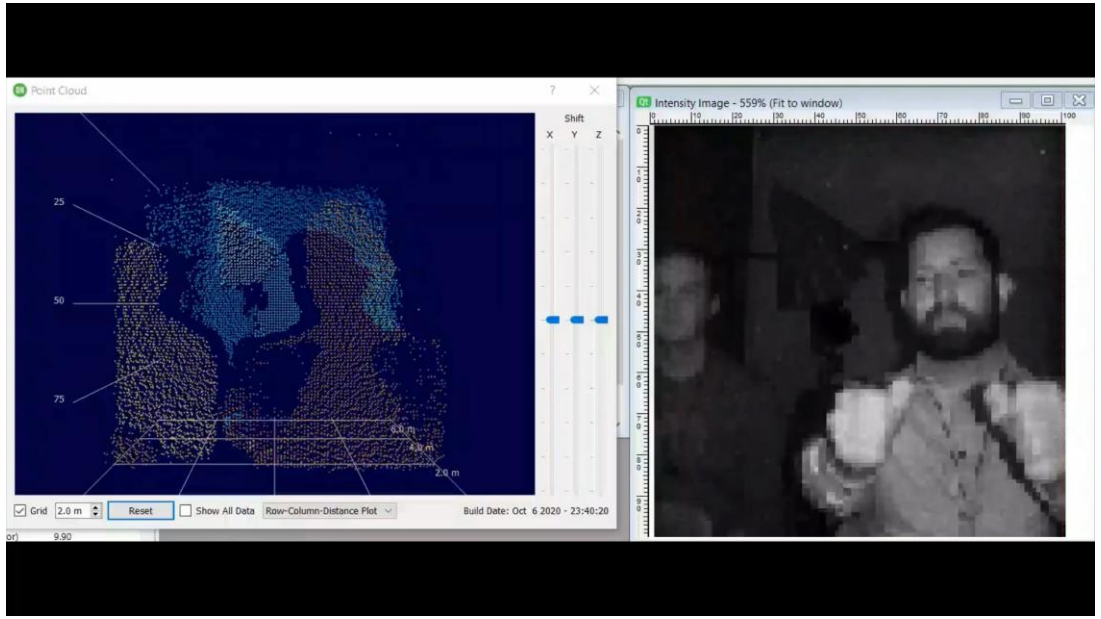
- Using Pandion EVK with a flash mode illumination source
- Due to the sequential readout of the Pandion chip, only a single column is detecting light at any one time
- Laser power that falls outside of the active column FoV during each detection cycle is not detected
- This is inefficient in terms of required laser power but short range operation is possible in this mode



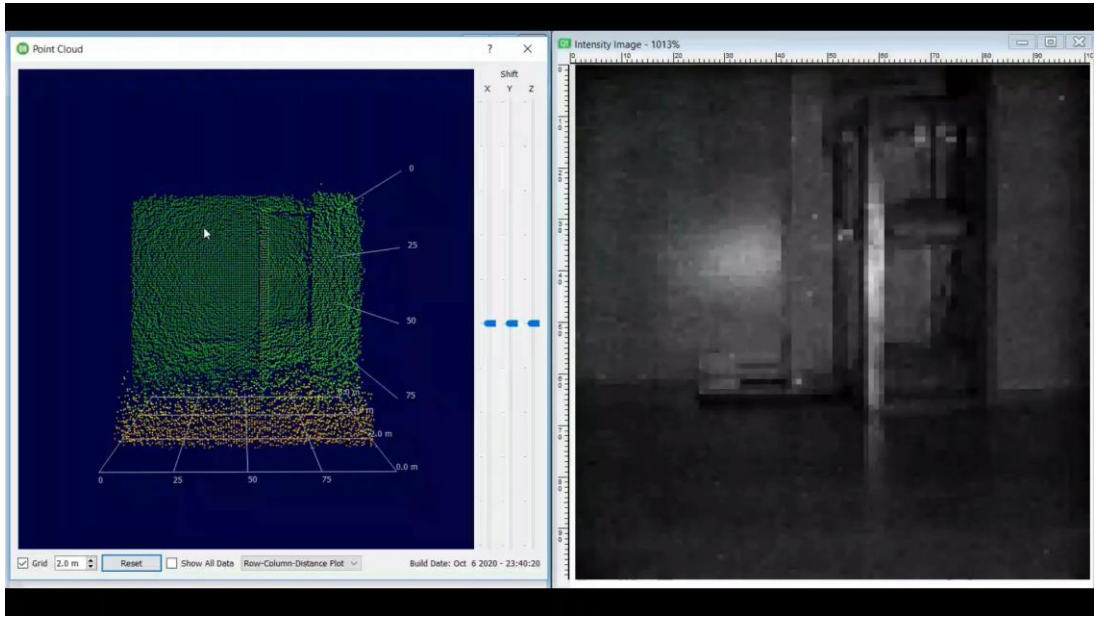
Pandion SR Demo

Parameter	Pandion SR Demo
LiDAR Method	Direct ToF
Configuration	Rolling shutter flash
AoV x	27.2°
AoV y	27.2°
Laser Wavelength	808 nm
Laser Peak Power	37 W
Laser Pulse Width	2.5 ns

Example Scenes Taken with Pandion Demo



In Cabin Monitoring and Gesture Control



Industrial AGV

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