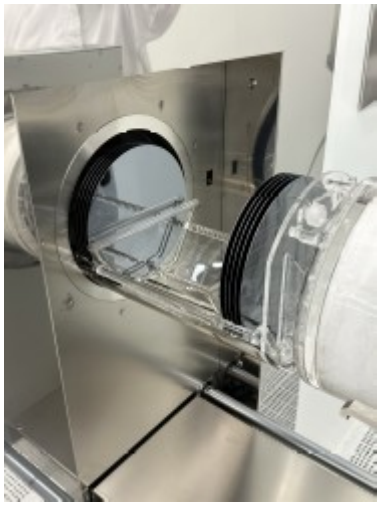
ESPROS Photonics Corporation

Ultra Fast and High Sensitive Spectral Sensing

Beat De Coi
ESPROS Photonics

Author(s): Beat De Coi

About ESPROS



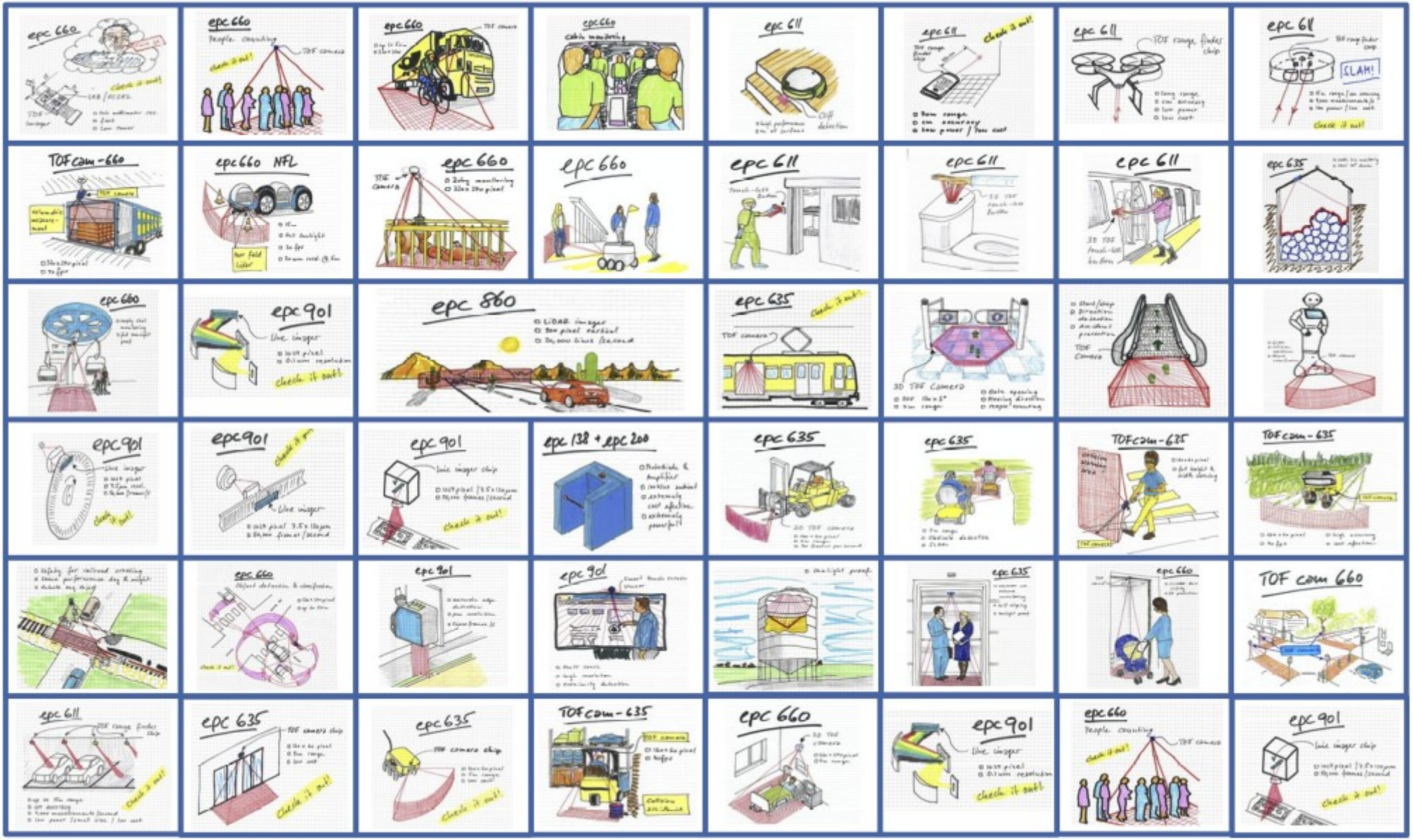
Foundation 2006

HQ Sargans, Switzerland

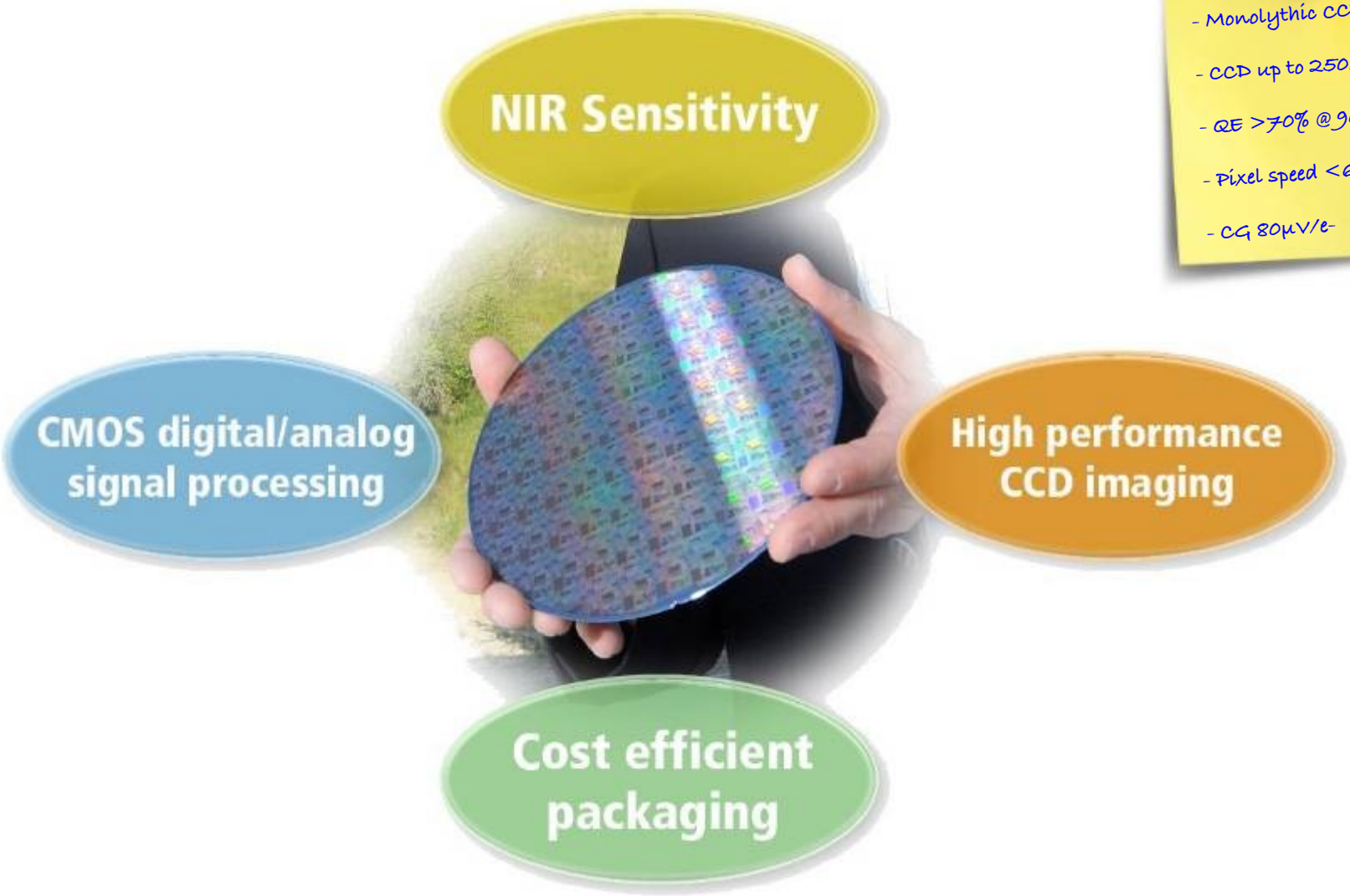
Activities

- Mixed signal / photonics chip design
- Camera module design
- Manufacturing
- Marketing & Sales

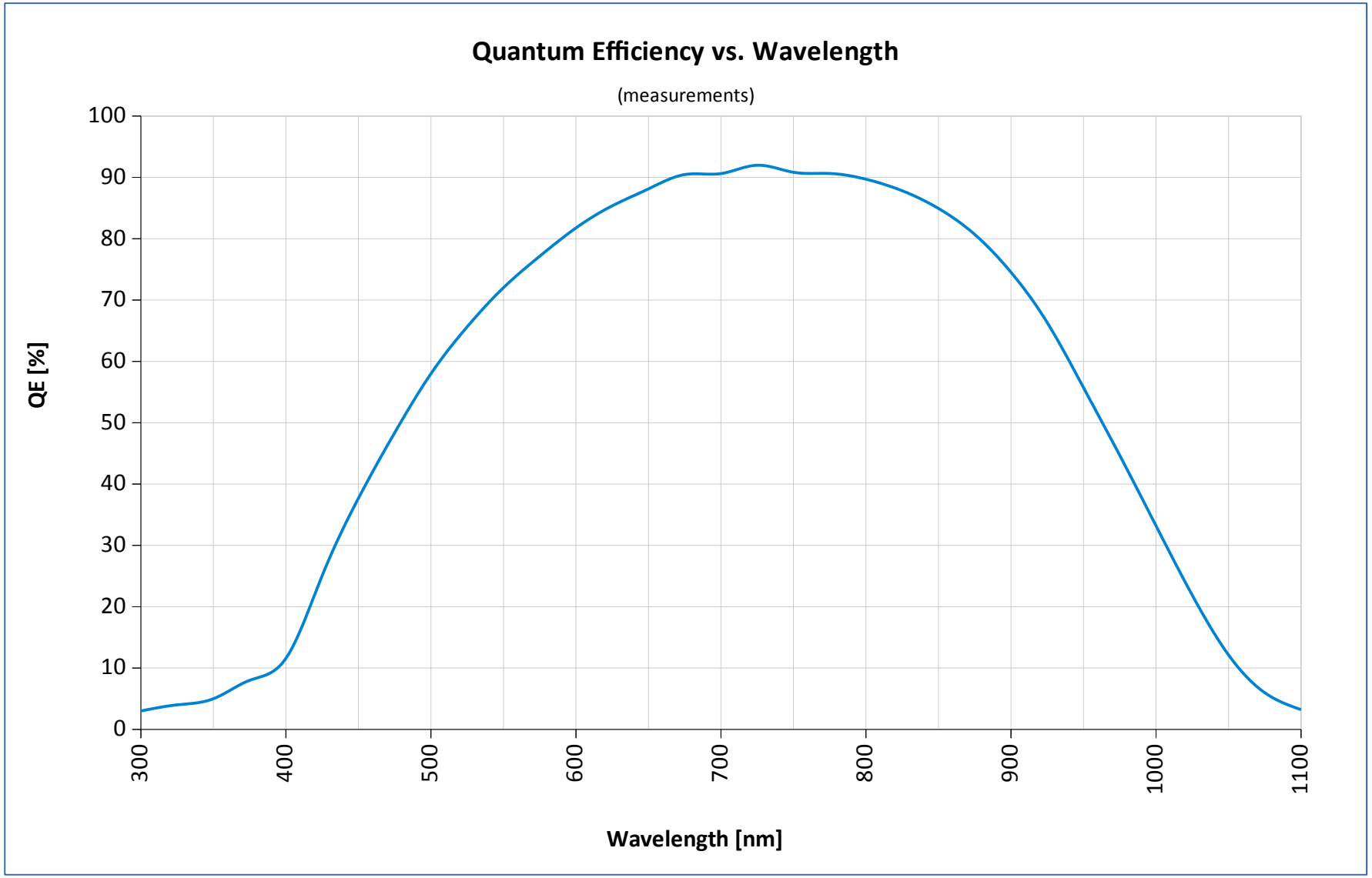
Products & Applications



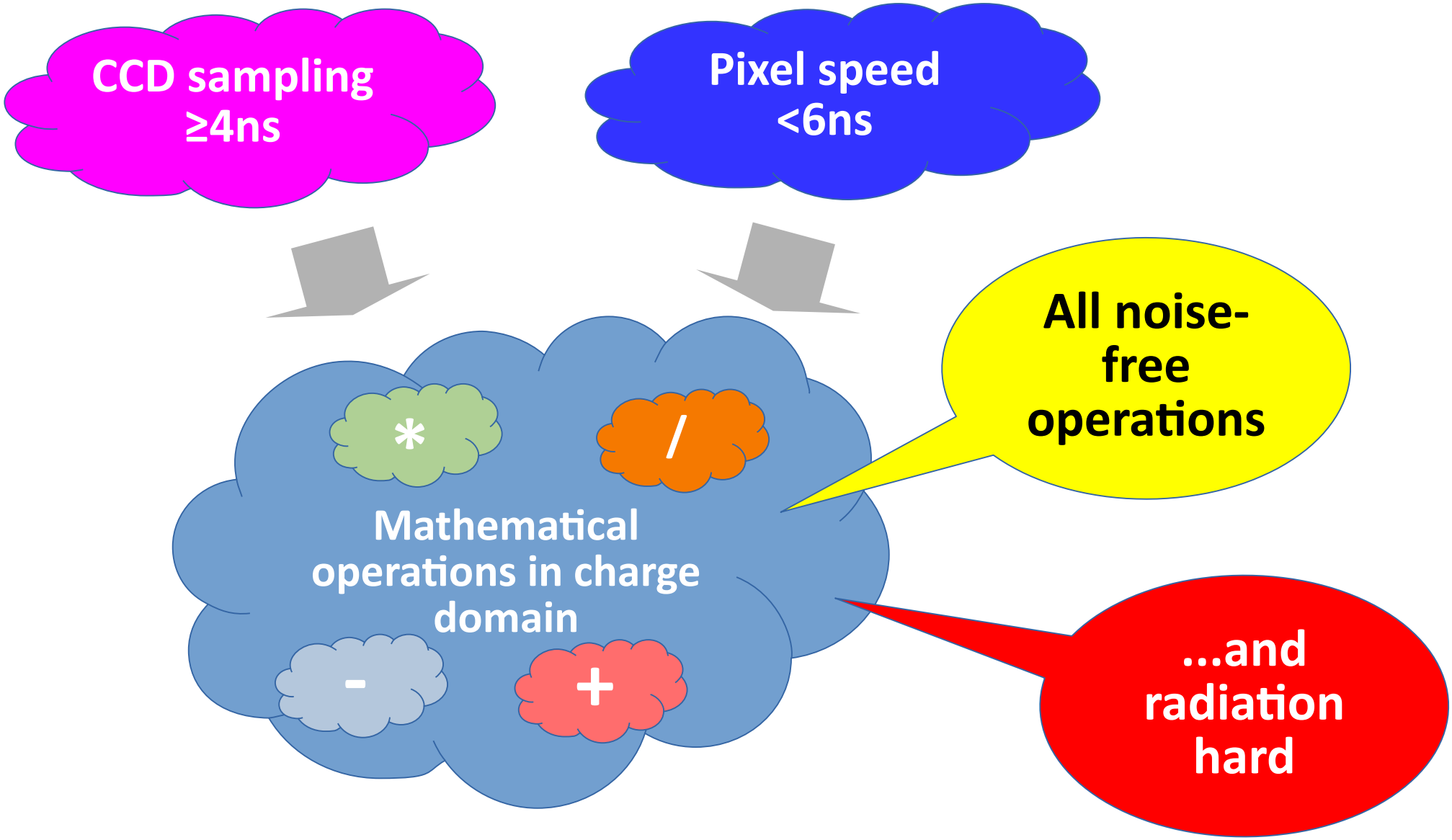
Key ingredients for high performance TOF & LiDAR imaging



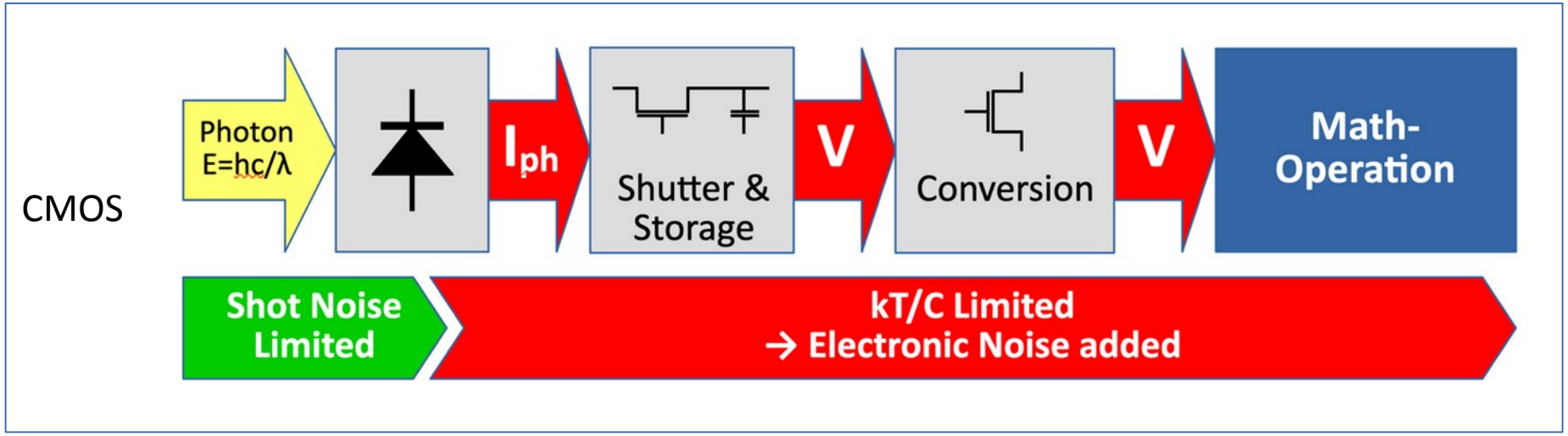
...lead to incredible properties: QE



...lead to incredible properties: Speed and math ops in charge domain



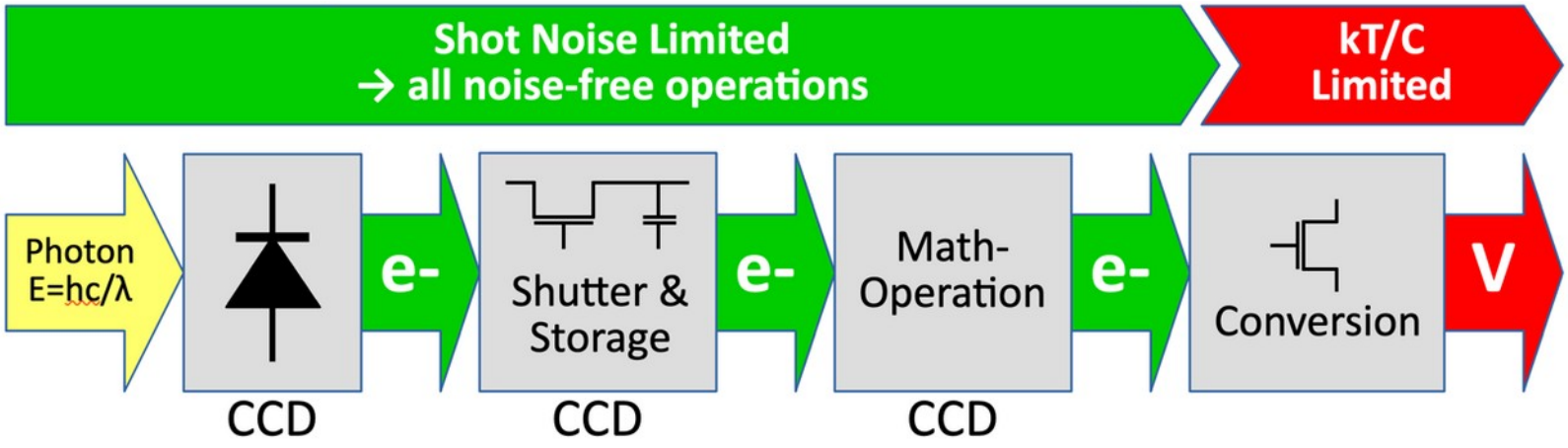
Signal flow in a **typical** photonics chip



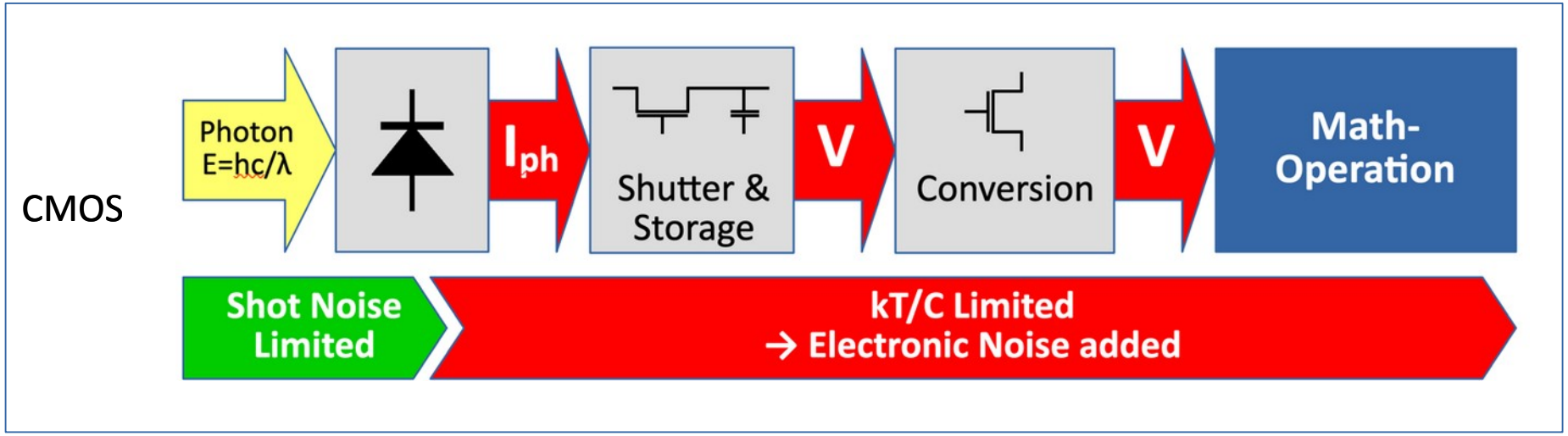
Signal flow in **ESPROS** photonics chip

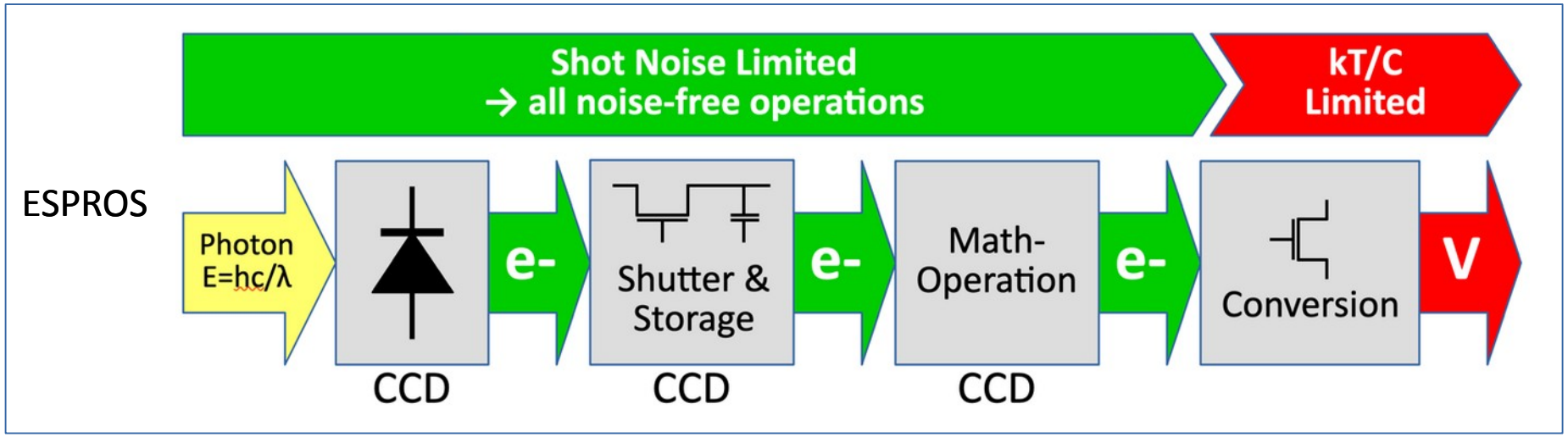
CMOS

ESPROS

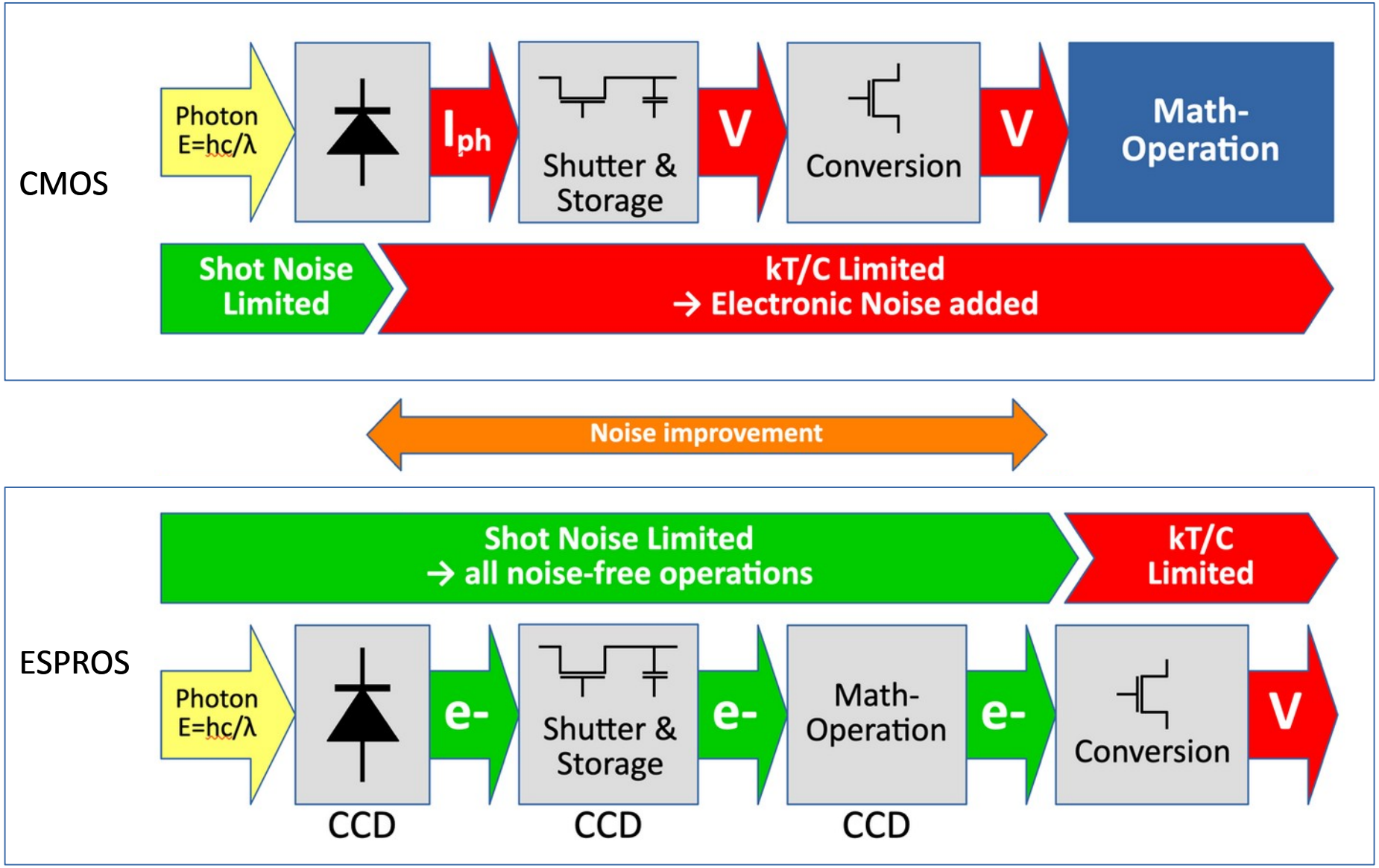


Signal flow comparison

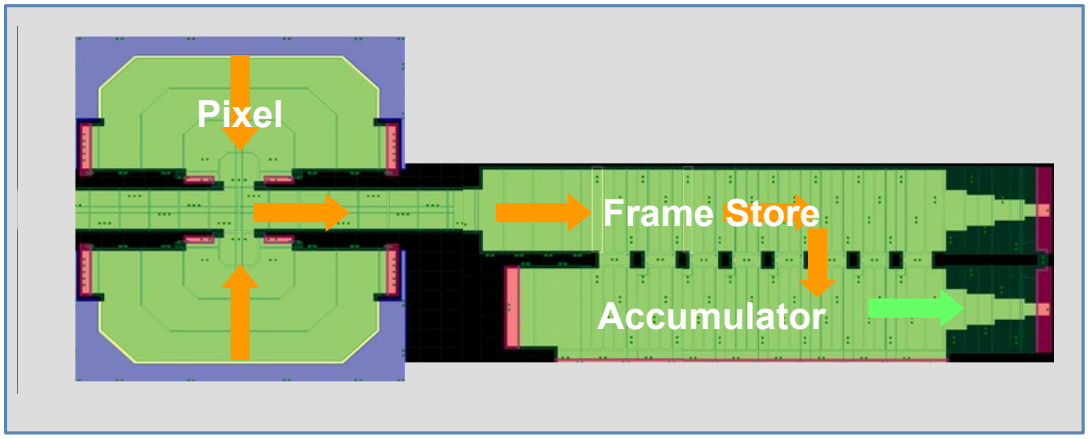


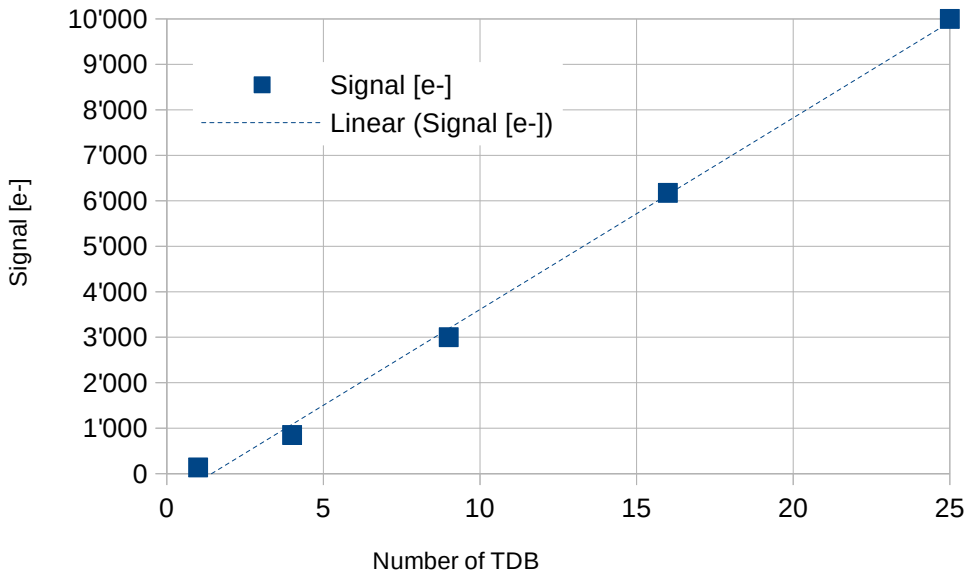


Signal flow comparison

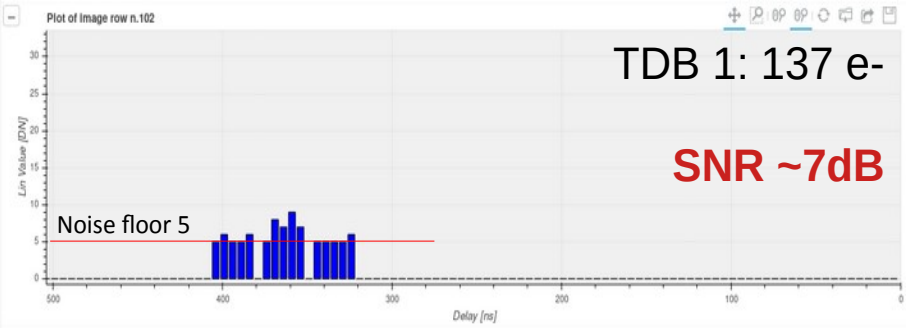


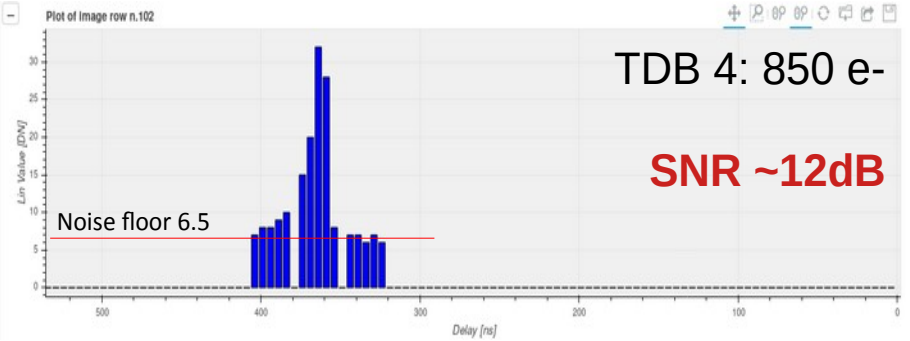
Example: Time Domain Binning (TDB)

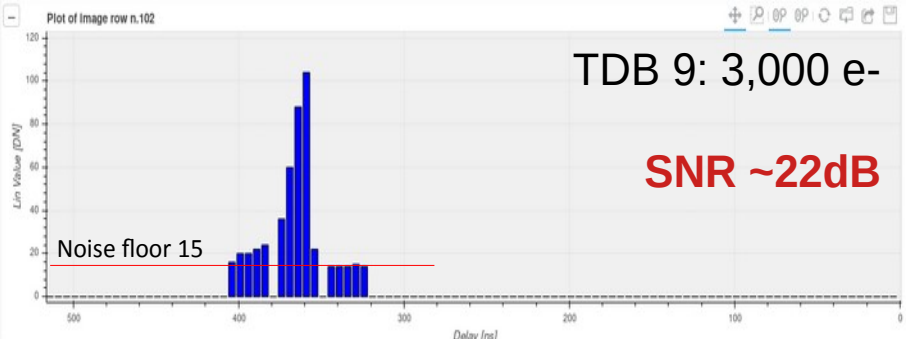




pTOF Measurement on 75% target at 30 meters

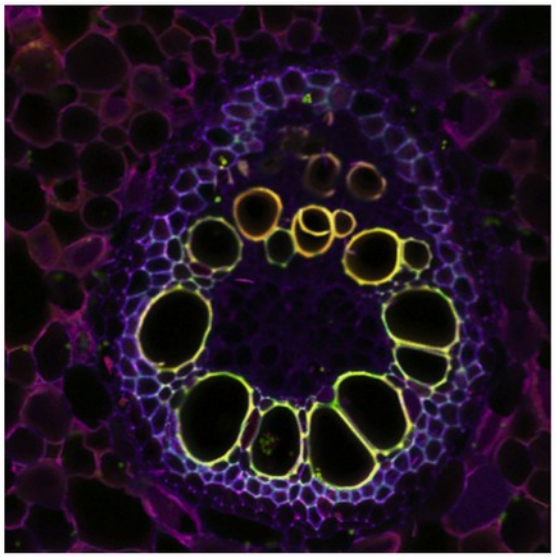




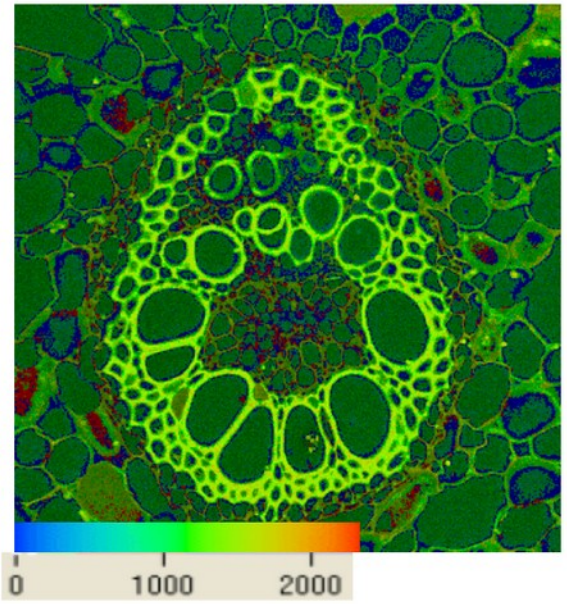


Example: Fluorescent Lifetime Imaging (FLIM)

- Analysis of the lifetime of the excited state of fluorescent molecules
- Spatially resolved distribution of fluorescent lifetimes
- Needs a ultra fast imager



Conventional confocal intensity image



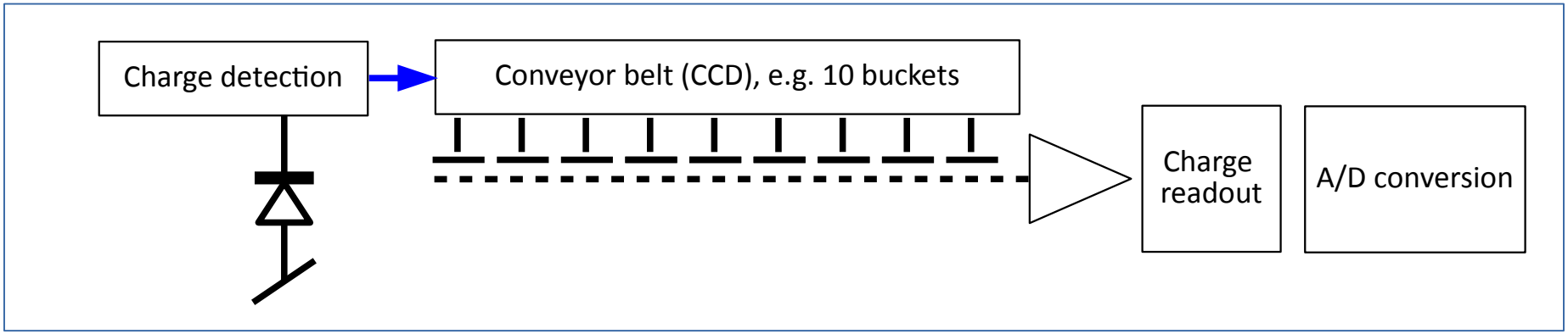
Fluorescence lifetime image /ps

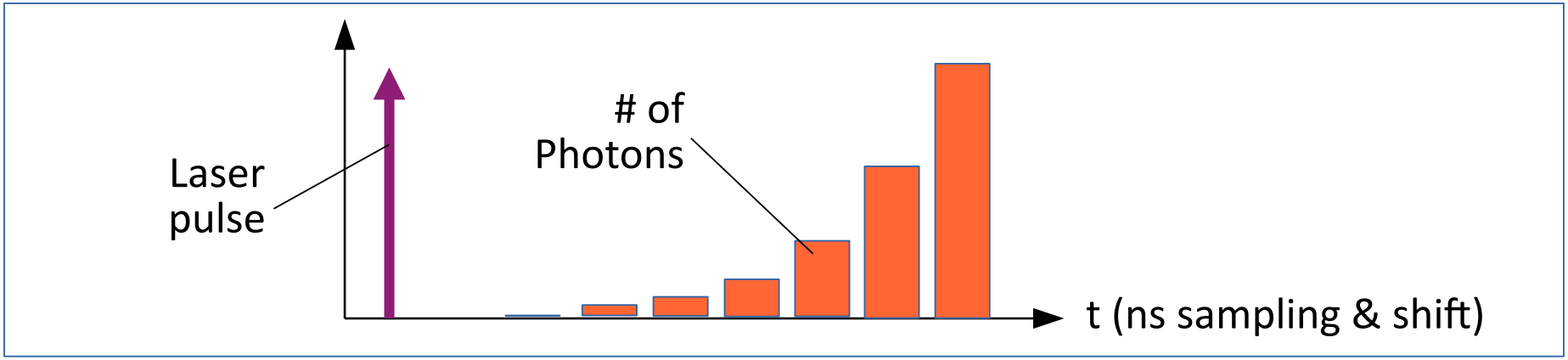
Sample: Prionium, stained with Safranin and Fast green

Source: Haridas Pudavar, PhD, Application and Technology Support, Leica Microsystems Inc., 10/25/09

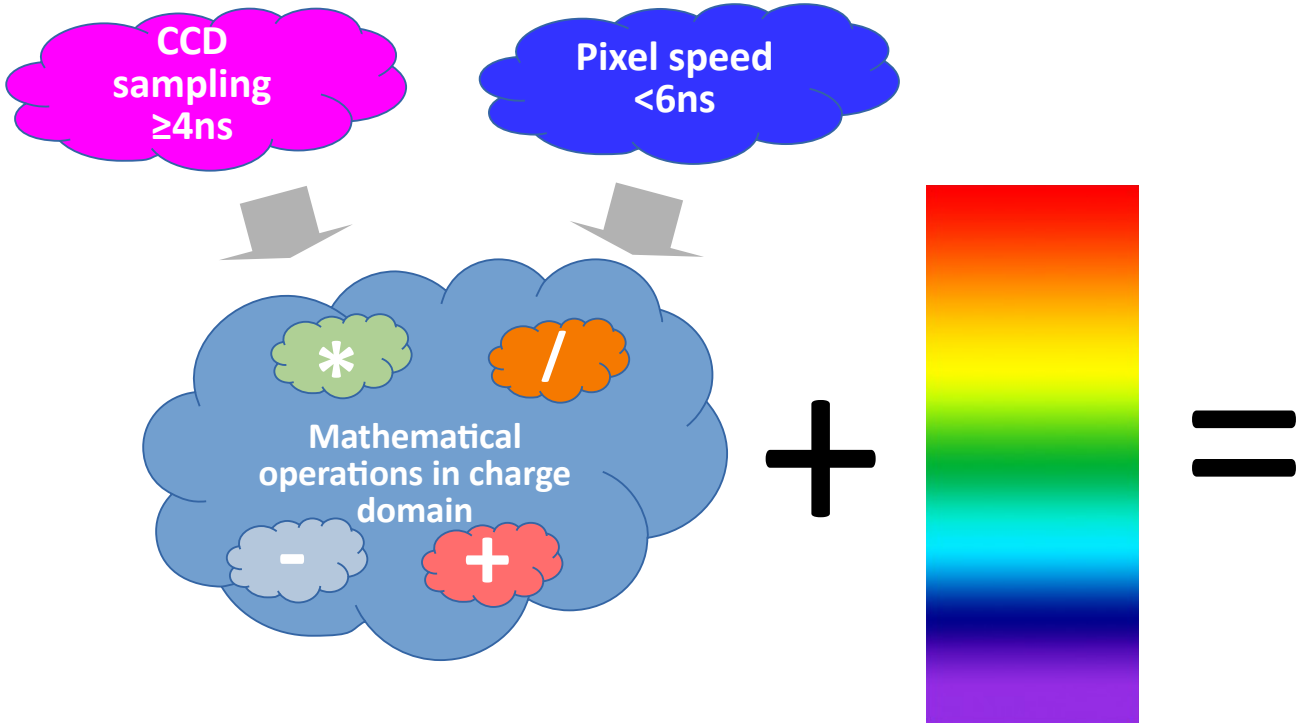
Example: FLIM Implementation

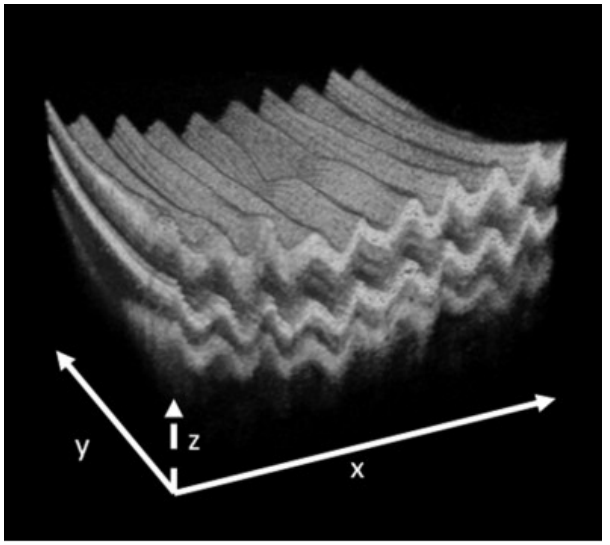
- Photo gate for charge detection
- Charge sampling on a conveyor belt
- Sampling in 4 ns steps (or more)
- Conversion gain 80µV/e-
- 250 Million frames per second





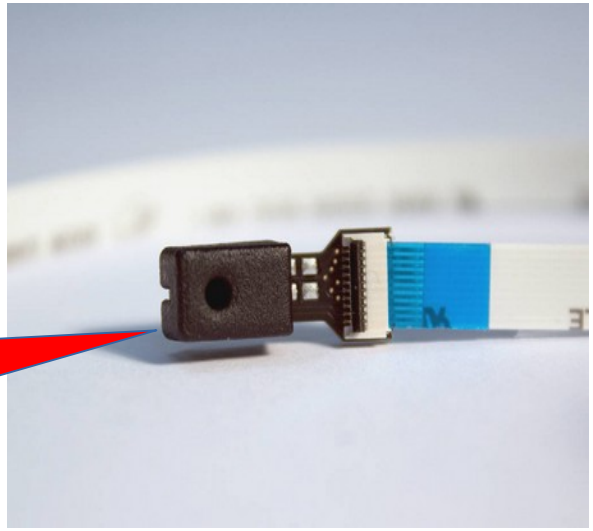
Summary





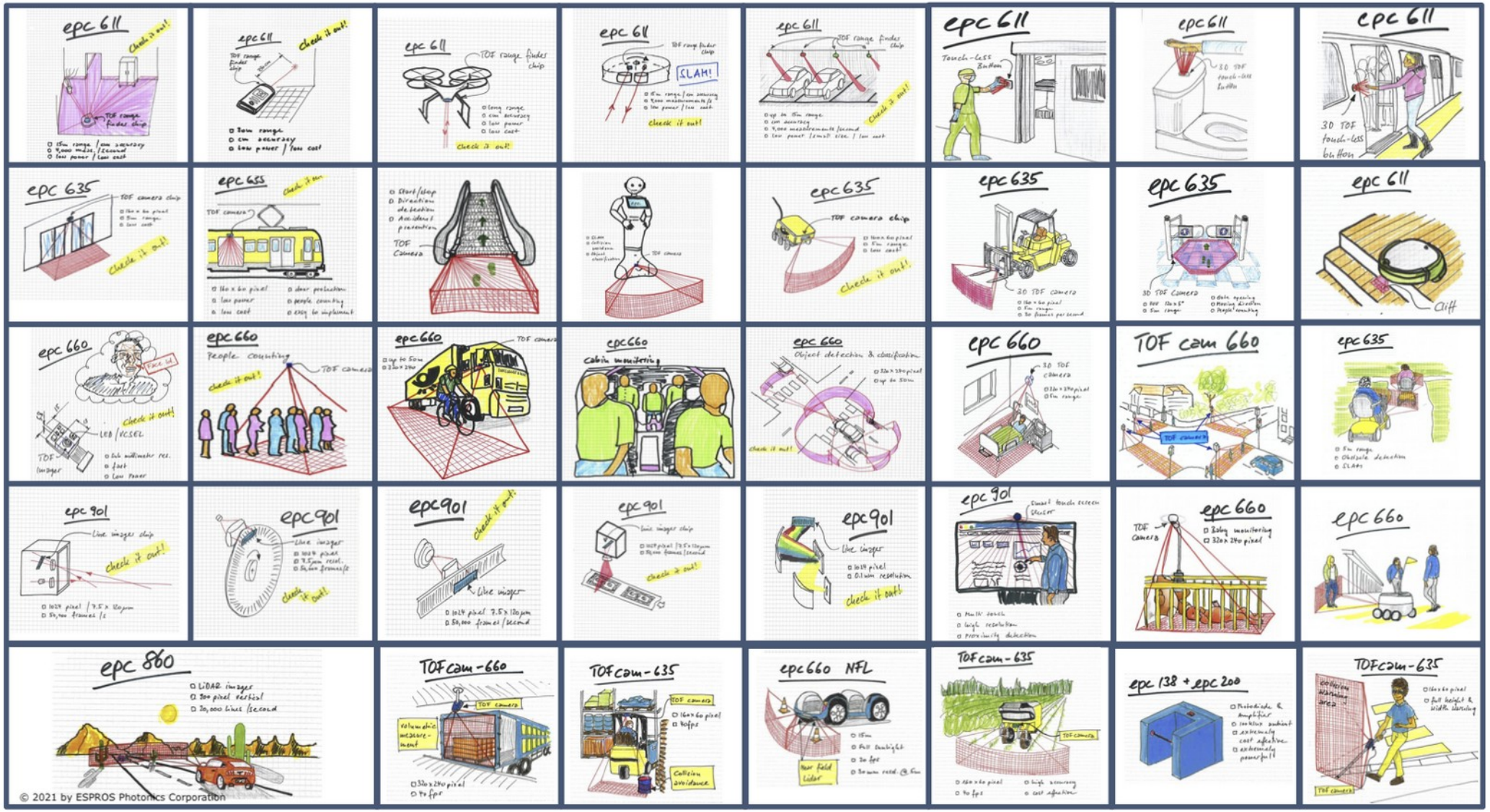
OCT image of a human retina
Source: Philophos, Inc., 2023

…for radiation exposed applications



Spectral sensor (ESPROS)

Thank you for your attention!



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