Your World, Our Canvas

The Future of Spatial Computing

Spatial Computing

SPATIAL COMPUTING

Data   +   Processing   +   Physical Context

TRADITIONAL COMPUTING

3D WORLD   PERSON

EPIC Online Technology Meeting on LIDARs on Chips.
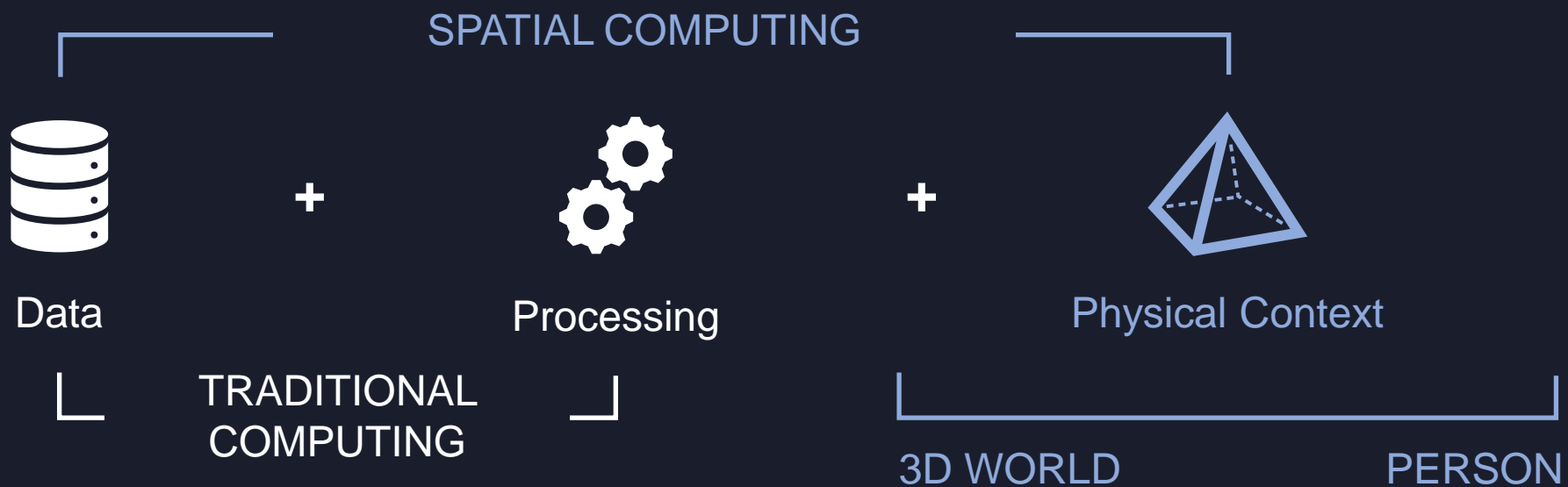
Contextual Sensing is a Long-Standing Topic

Contextual Sensing is a key enabler for many crucial functions

- SLAM and general odometry for environment navigation (mobile, XR, robotics, automation)

- Object identification for virtual content occlusion and anchoring (mobile, XR)

- Hand and object tracking for interaction and manipulation (XR, robotics, automation)

- Segmentation, indexing and environment understanding (mobile, XR, robotics, automation)

- Biometric Authentication and Vital Signs (mobile, XR)

- Metrology, Volumetric (XR, industry, automation)

Contextual Sensing is a Long-Standing Topic

Major considerations for Mobile and XR, but also for robotics, etc.

1. Power efficiency ➡	Lightweight wearable, decent battery life
2. Latency ➡	No lag between system and real world
3. Accuracy ➡	Quality of the data directly impacts quality of the function. E.g., in XR anchoring stability and correct virtual object dynamics
4. Robustness and durability ➡	Working with other concurrent system; Operation in any light condition [darkness and daylight] Environment agnostic

VoxelSensors Approach

A **new sensing technology** for efficiently generating the **new type of data**.

1) Reduction of power & compute
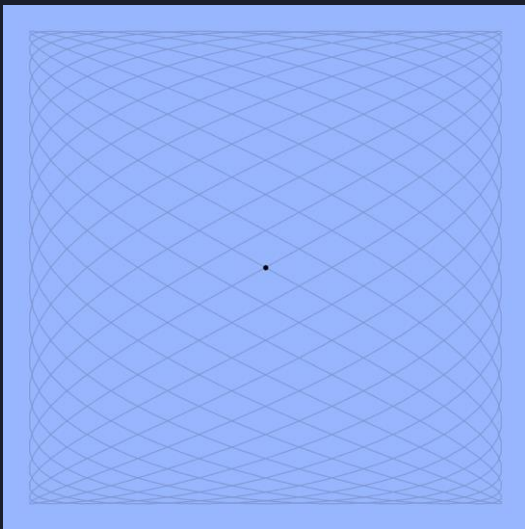2) Reduction of latency

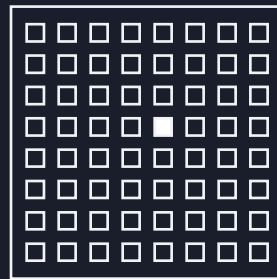| Low-power, low-latency sensing	Low-power, low-latency, progressive processing

Patented Switching Pixels® Fundamentals

Laser Beam Scanner

scans the world at high speed
(e.g., 2D MEMS mirror)

Active Event Sensor
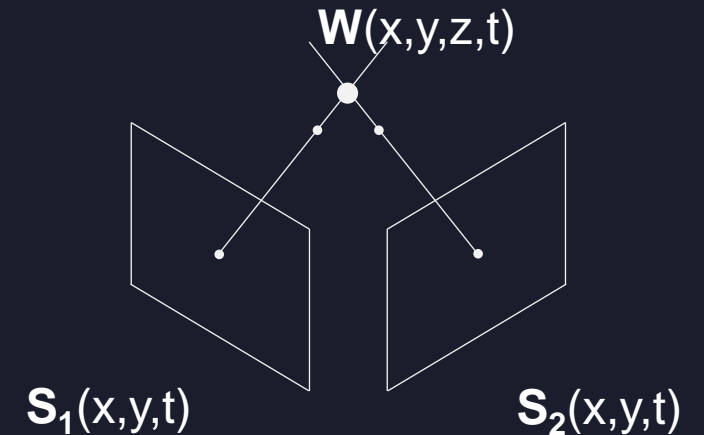
Single Photon Sensitive
Output: dot position (x,y,t)
Sample Rate: up to 100MSps

Serialized triangulation

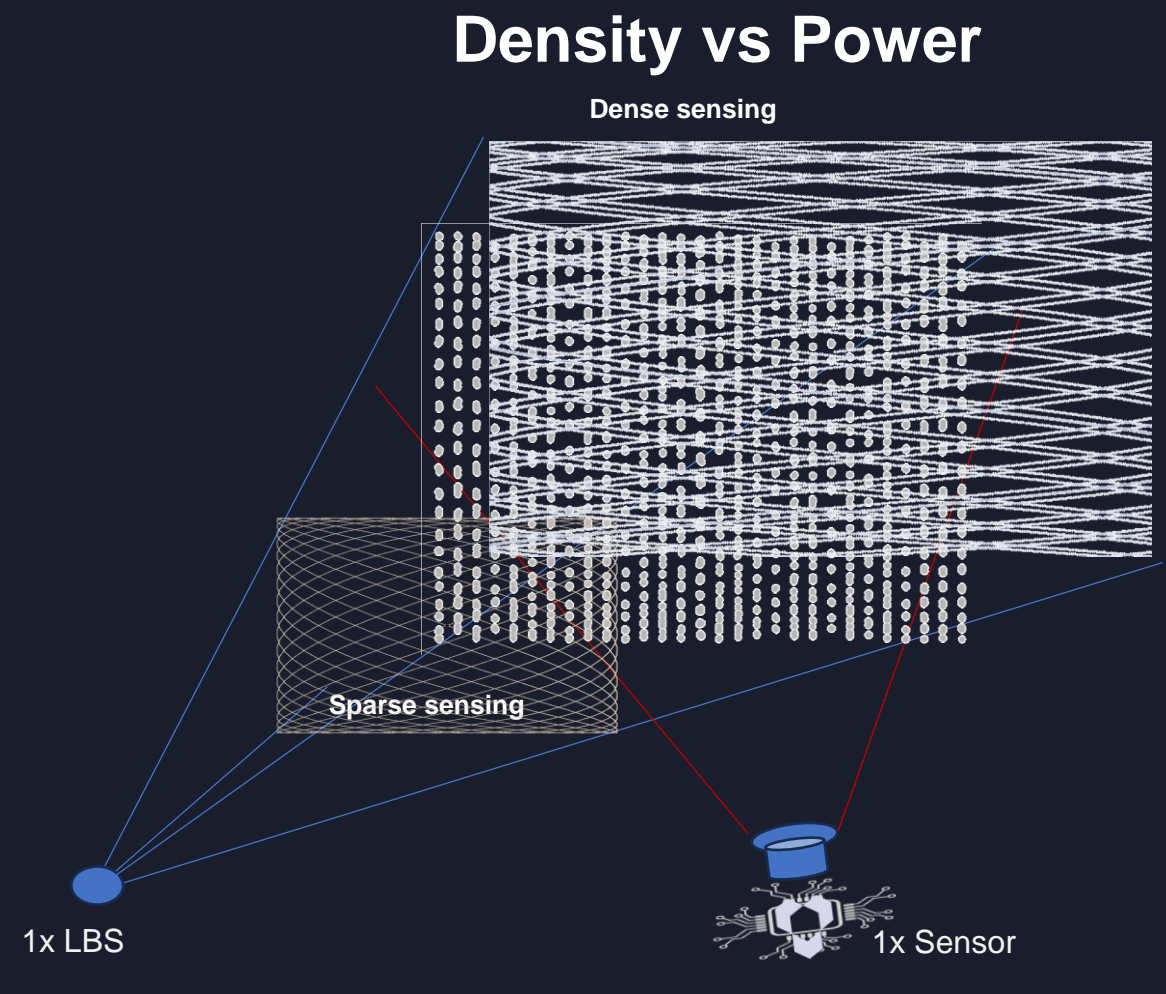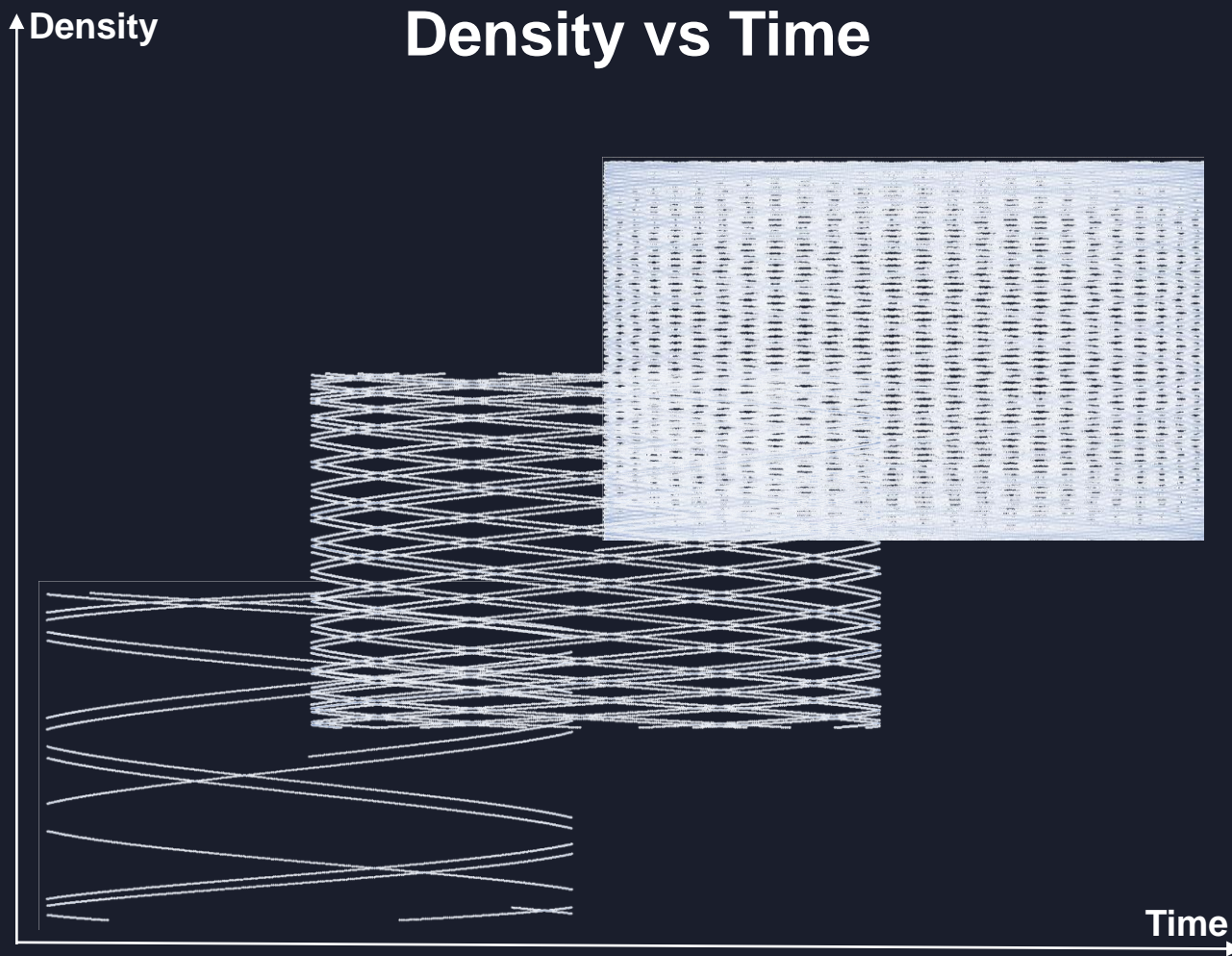based on S_1 & S_2
generating a 3D datapoint at
up to 100Mpts/s

$\mathbf{W}$(x,y,z,t)

$\mathbf{S}_1$(x,y,t)

$\mathbf{S}_2$(x,y,t)

➡ $\mathbf{S}_1$(x,y,t)

➡ $\mathbf{S}_2$(x,y,t)

➡ $\mathbf{W}$(x,y,z,t)

Patented Technology Fundamentals
Low-latency, low-power sensing

Density vs Time

Density

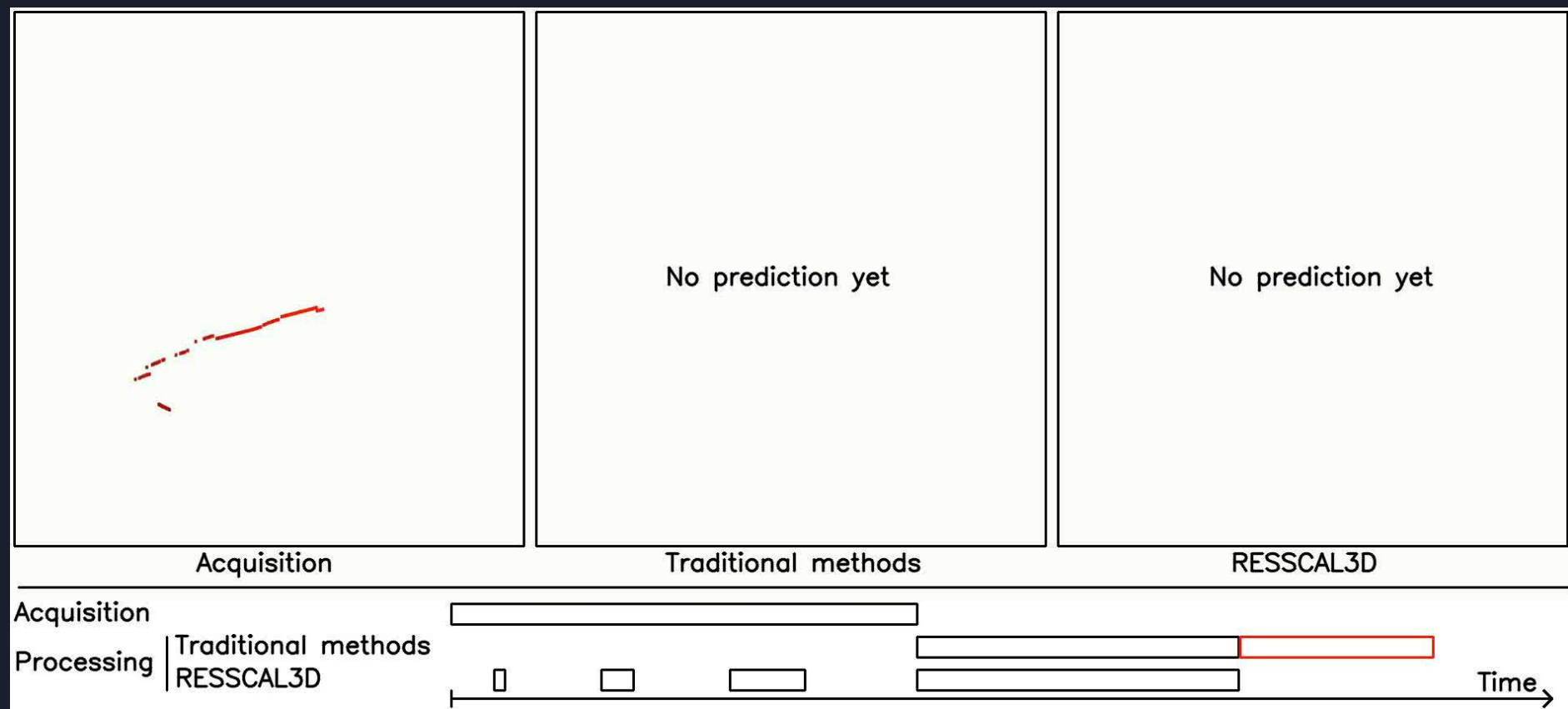Time

Density vs Power

Dense sensing

Sparse sensing

1x LBS

1x Sensor

Low-power, Low-latency Sensing

Pipeline
architecture

RESSCAL3D: Resolution Scalable 3D Semantic Segmentation of Point Clouds
https://ieeexplore.ieee.org/abstract/document/10222338

EPIC Opportunities
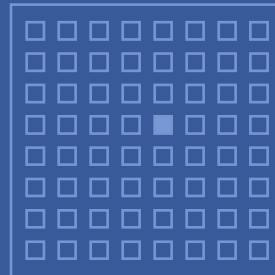
Laser Beam Scanner

scans the world at high speed
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**LBS
Solution
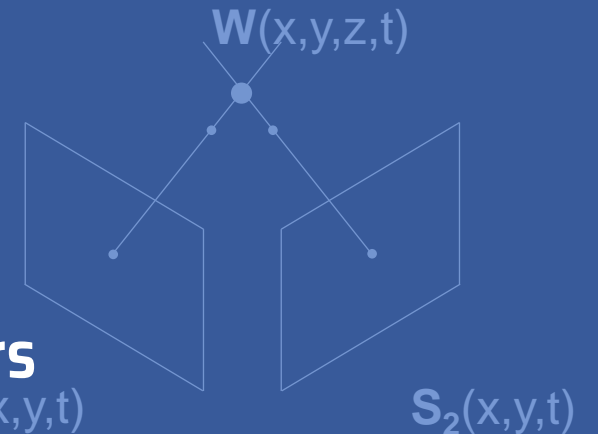- FoV
- ScanRate
- Cost/Size**

Active Event Sensor

Single Photon Sensitive
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Serialized triangulation

based on S_1 & S_2
generating a 3D datapoint at
up to 100Mpts/s

$W(x,y,z,t)$

VoxelSensors

$S_1(x,y,t)$

$S_2(x,y,t)$

VoxelSensors

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