



4D AI Imaging Radar: New Service Enabler for Telco

SMART RADAR SYSTEM

Paul Y. Kim, CEO
August 2022



About Smart Radar System

CEO: Dr. Paul Y. Kim



LG group (LG Electronics, LG Holdings, LG U+) Vice President: head of business units, new business development, global partnership, and investment

Cisco Systems and AT&T Lab (formerly SBC Technology)

Ph.D. of Electrical and Computer Engineering - University of Texas at Austin
MS and BS of Dept of Control and Instrumentation (now Electrical and Electronics Eng.) - Seoul National University

Founded: Oct 2017



- **HQ** : Bundang-gu
- **Labs** : Seongnam-si and Siheung-si
- **US subsidiary** : Irvine, CA

AI (ML & signal processing)



KOREA AI STARTUP 100

AIIA
100 "AI + X" companies
2020~2021

Korea Economy
Newspaper +KT
KOREA AI STARTUP 100

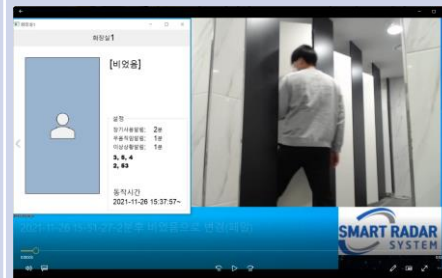
R&D facilities located in Siheung Lab (SNU FMTC)



Test track



Simulated hospital room



Test area for safety

Global investors incl. Silicon Valley



Secured many global customers and investors

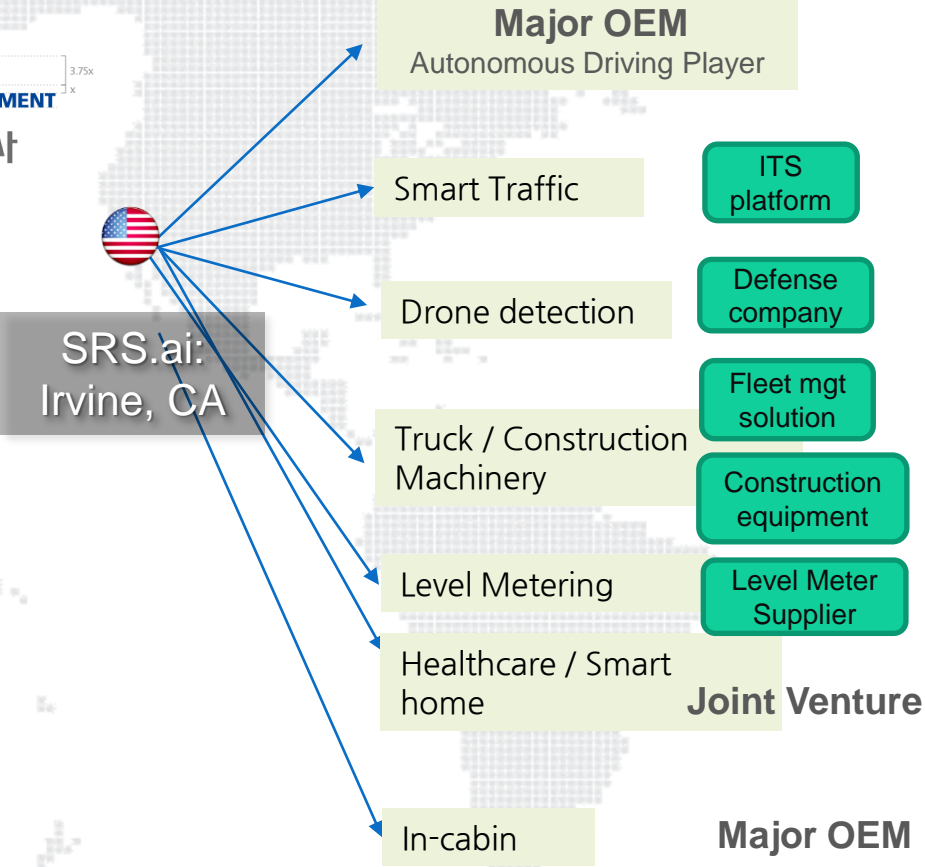
Many revenue-generating customers / strategic partners in Korea



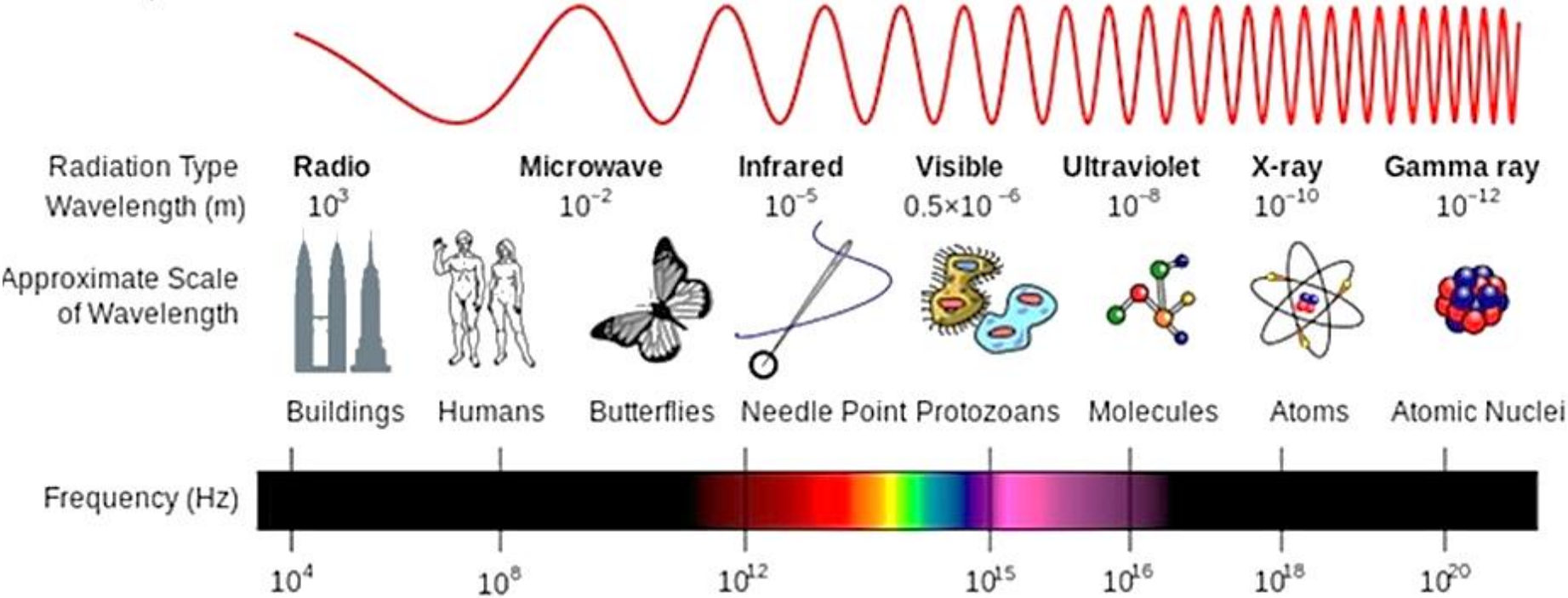
Partners in Japan



Strategic partners and revenue-generating customers in US



Time to have imaging capabilities in mmWave spectrum



Sonogram



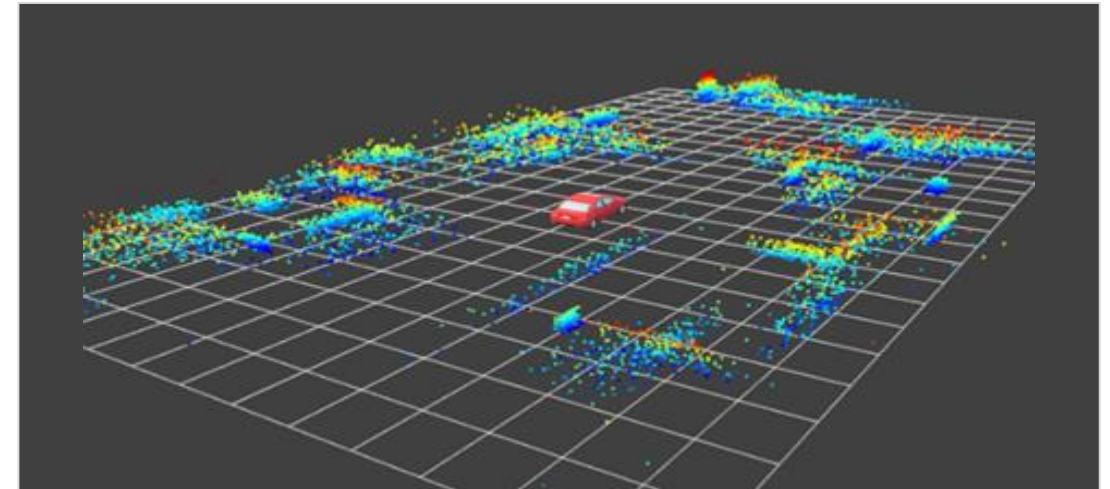
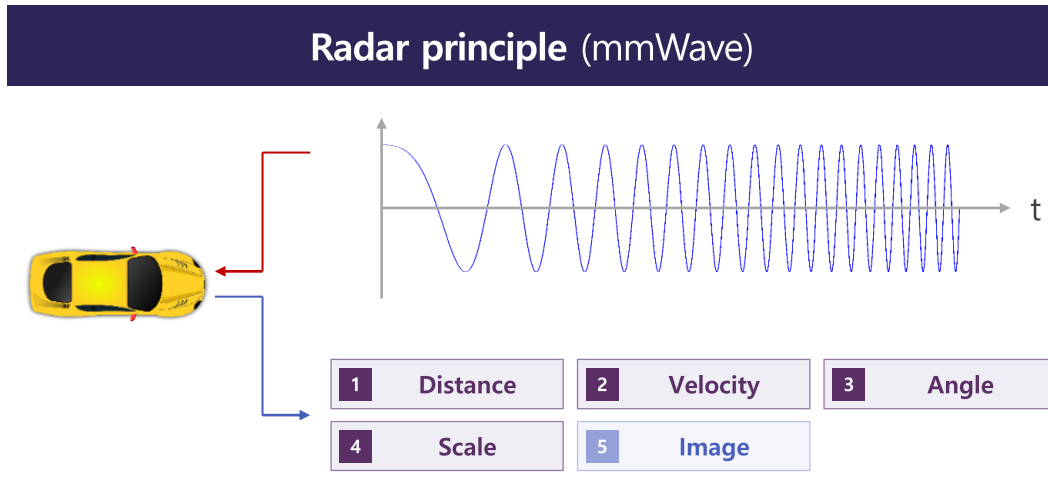
Infrared camera



X-ray scanner
Alibaba.com

By Inductiveload, NASA - self-made, information by NASA. Based off of File:EM Spectrum3-new.jpg by NASA. The butterfly icon is from the P icon set, File:P biology.svg. The humans are from the Pioneer plaque, File:Human.svg. The buildings are the Petronas towers and the Empire State Buildings, both from File:Skyscrapercompare.svg, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=2974242>

High-resolution 4D* imaging radar: Essential sensor for autonomous driving and smart cities



**Requirements for autonomous driving:
LiDAR performable Radar**

- 1° or sub 1° angle resolution
- Long distance object detect: 250~350m
- 360° object detect and classification
- Work even in bad weather

*4D: x, y, z, Velocity

Rain

Snow

Flare

Night

Dust

Fog

SRS: Leader in high-resolution 4D AI Imaging Radar

SRS developed 4D AI Imaging Radar for both automotive and other applications:

- Shipped more than 100,000 units of radars in real applications



Non-contact

Privacy Protected

No need of LIGHT

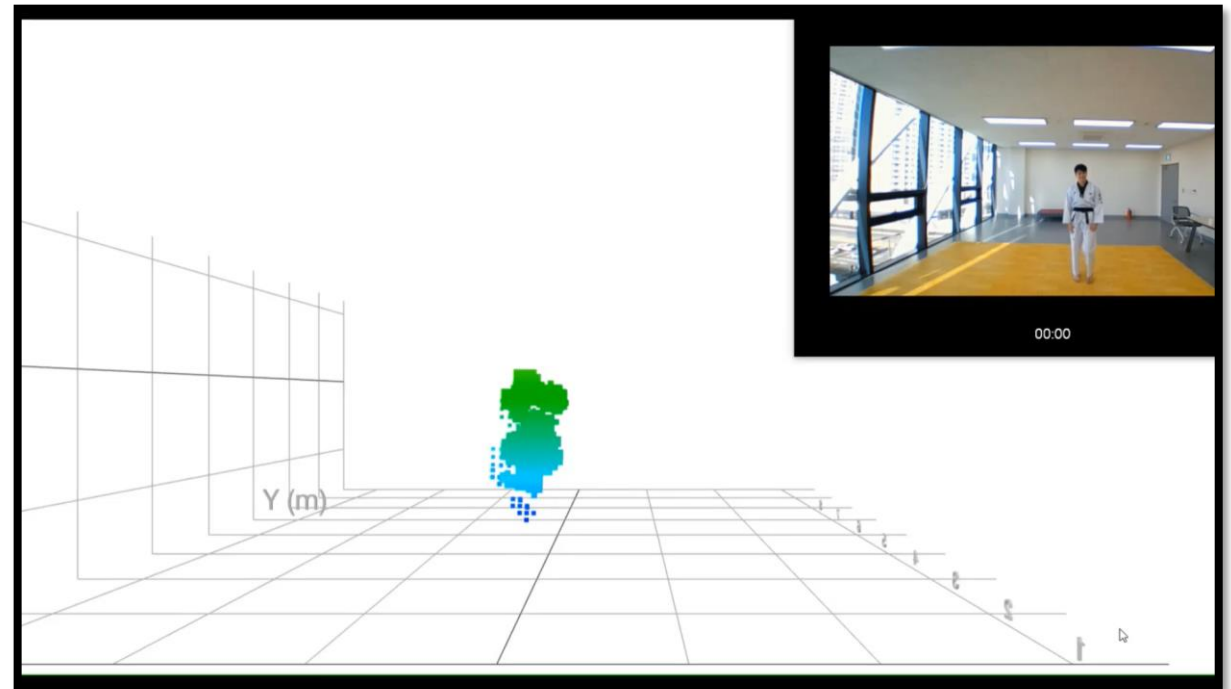
Built-in AI engine



RETINA*

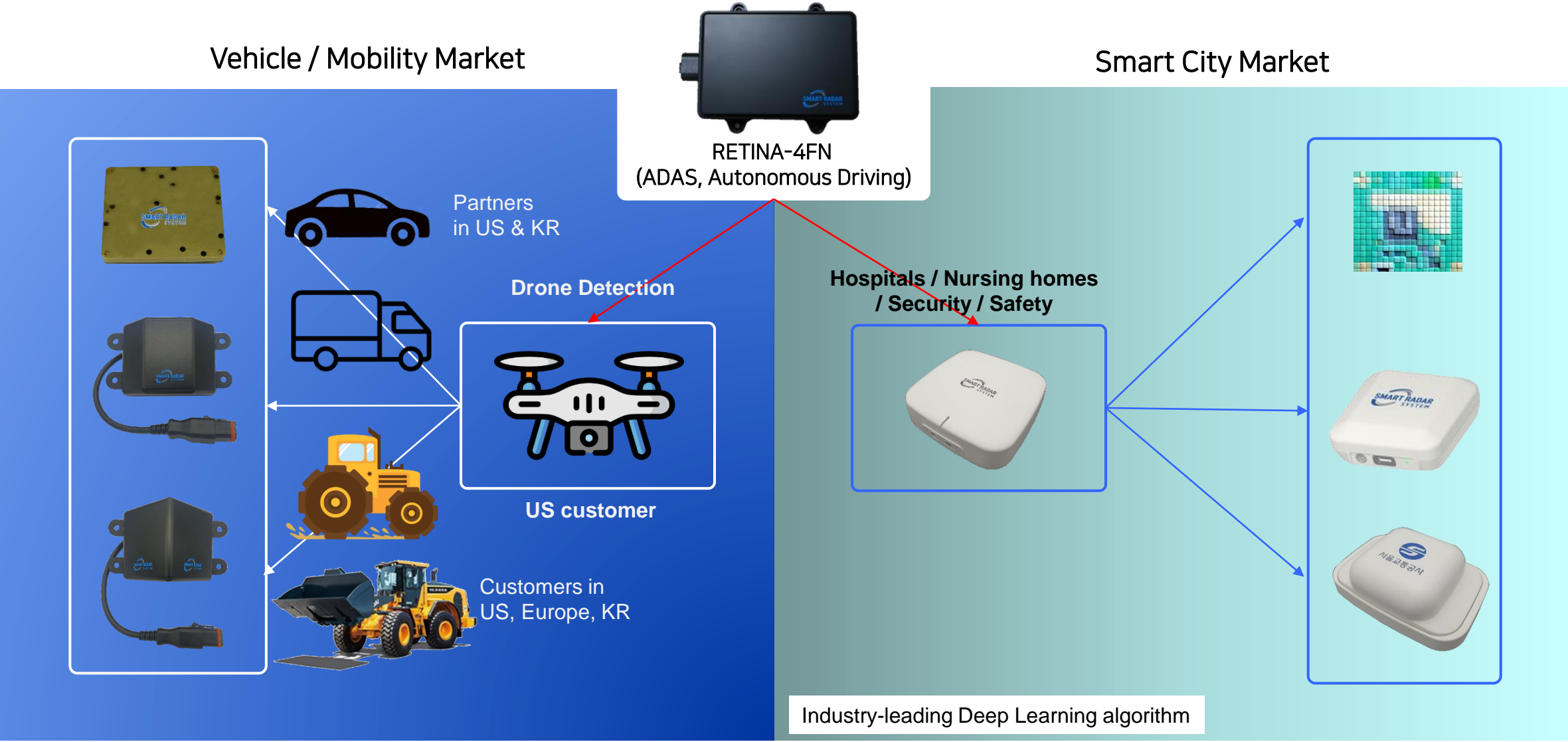
Affordable

- Built-in AI engine
- Agnostic to radar chipsets
- In-house HW and SW algorithms
- Embedded & Satellite architecture



*RETINA: SRS' 4D Imaging Radar

Commercialization with modular architecture



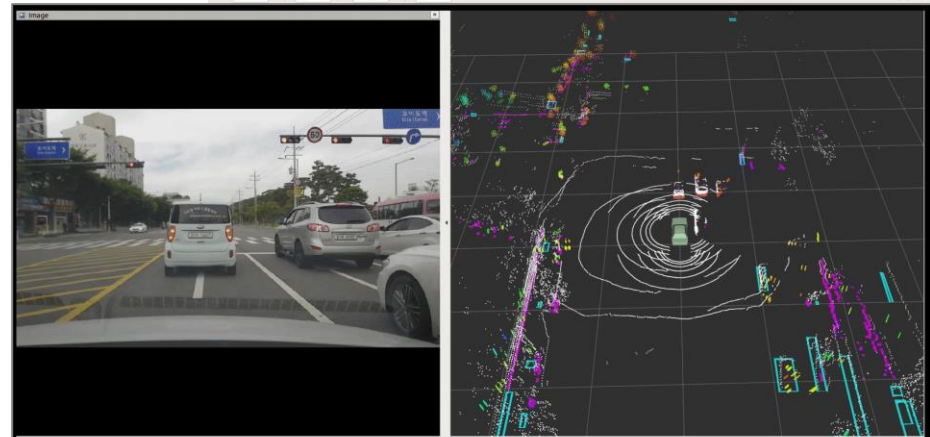
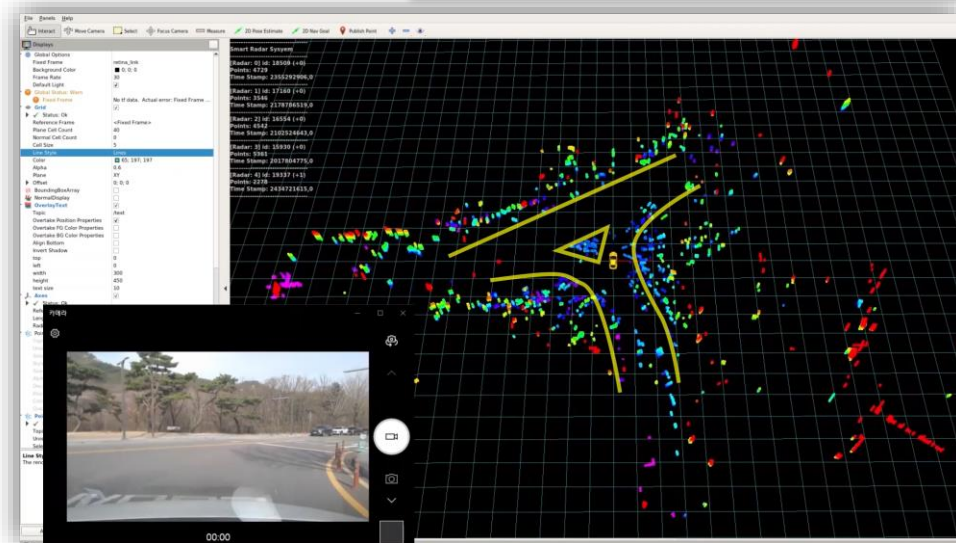
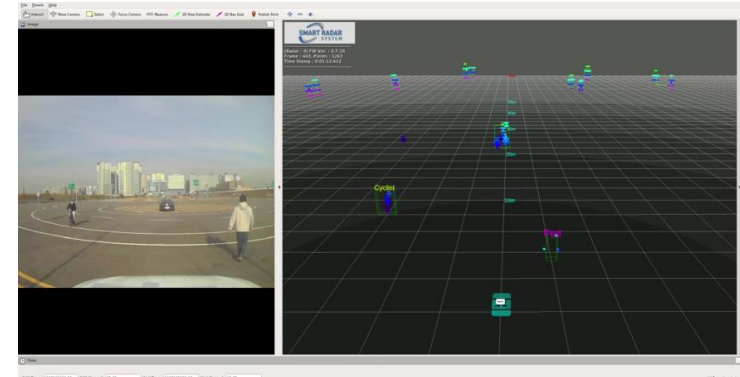
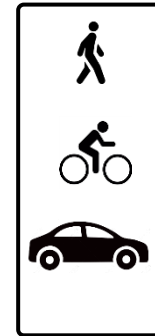
4D AI Imaging Radar will bring Autonomous Driving

In-house development of innovative HW and various SW algorithms

RETINA-4F:
SRS' 4D imaging radar



Realtime object classification by embedded machine-learning algorithm

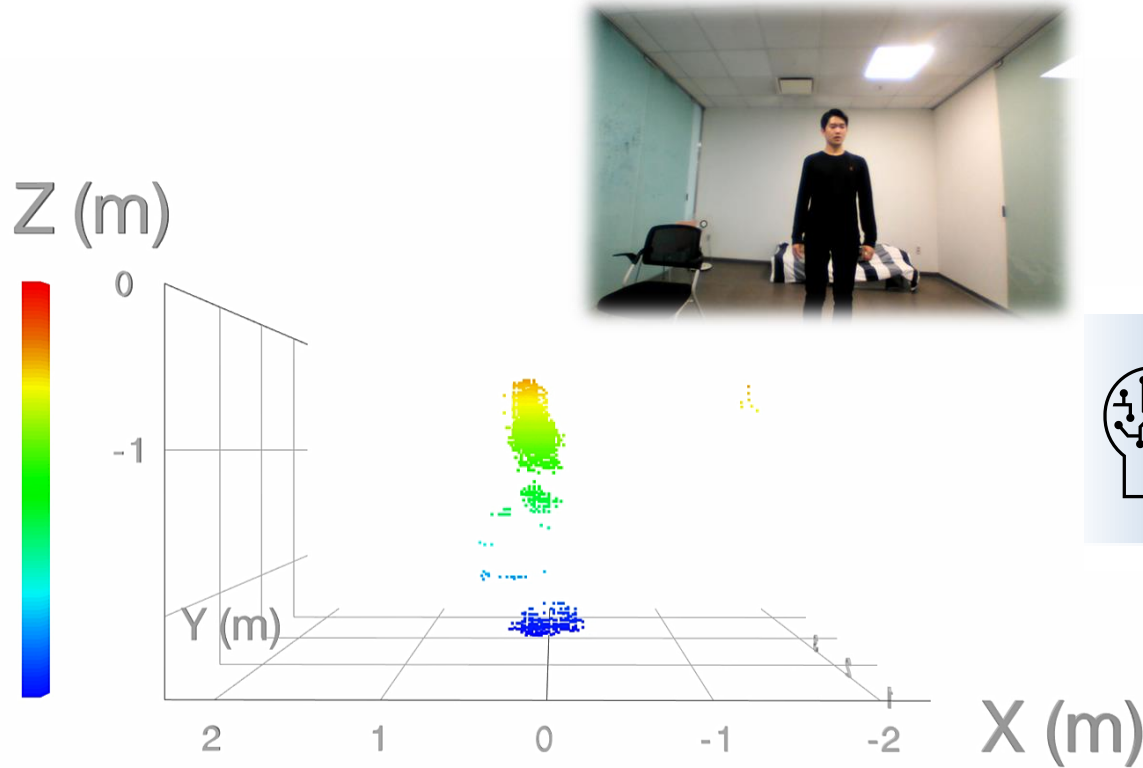


Imaging radars on public roads

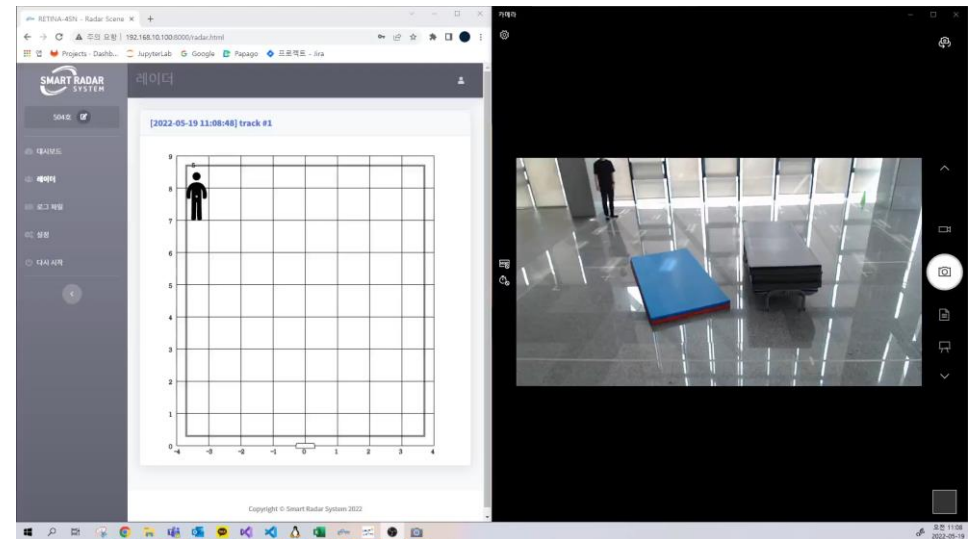
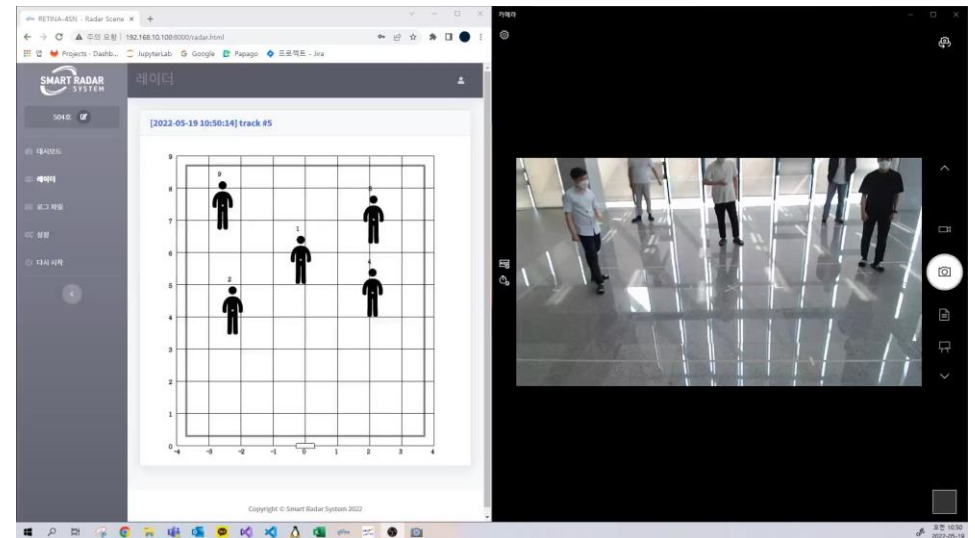
Rainbow Point : Radar
White Point : LiDAR
Blue Box : Moving Object Tracking
Purple Area : Static Obstacle Map

“4D Imaging Radar + AI” for healthcare and Security

Utilizing deep-learning algorithm and time-information of Image Radar, we developed Fall detection solutions



4D* point cloud



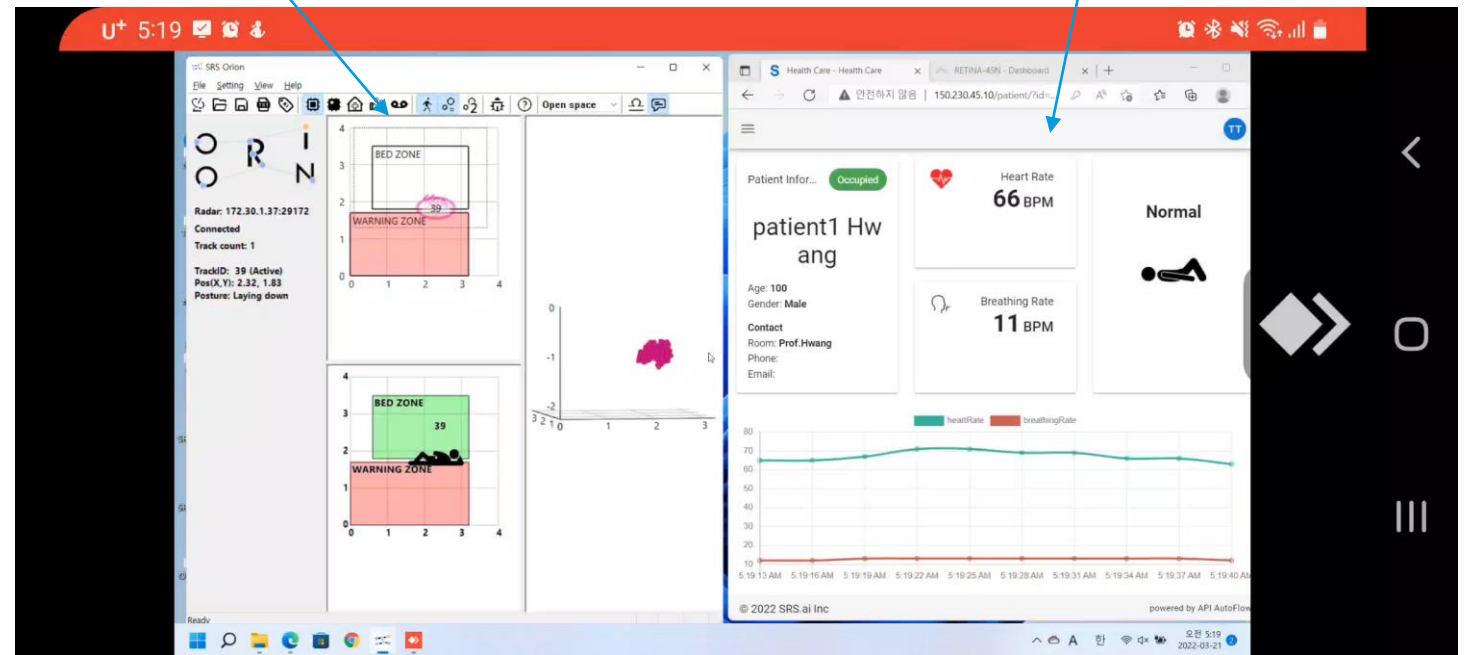
5D: x, y, x, velocity

Solutions: Hospitals / Care homes Monitoring System



Source: depositphotos.com

- Already delivered more than 100,000 units of radars for senior care
- Working with a major hospital in Korea for pre-fall detection
- Working with a Telco in Korea in Senior care



Traffic Monitoring

Traffic flow measurement and detection of speeding cars



“40% car accidents occur at the intersection”
Yet 99% of signaled intersections are on fixed timing plan

Business case 1

Measurement of traffic flow in US



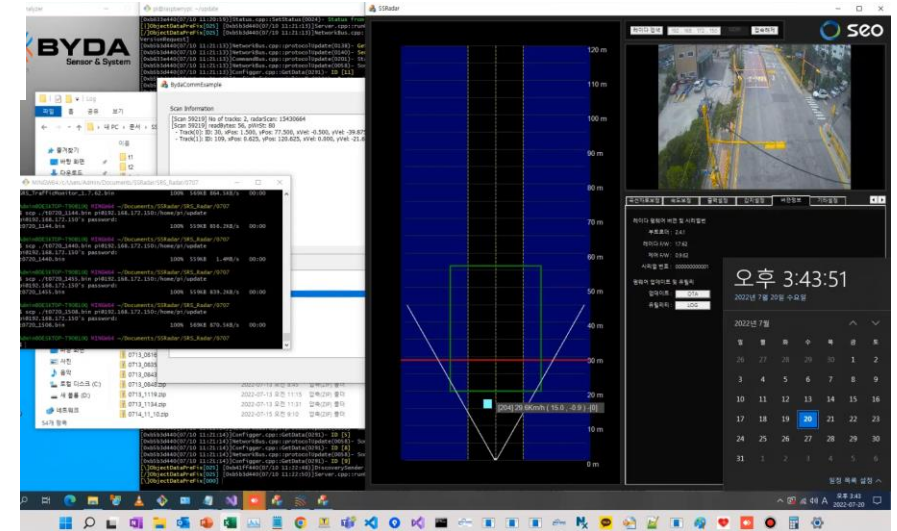
| UTC Time | Local Time | Objects | Total Delay |
|-------------|-------------|---------|-------------|
| 16:13:46 PM | 09:13:46 AM | 1 | 0 |

| Vehicles Counters | | | | | | |
|-------------------|-----|-------|-----|------------|---------|---|
| person | car | truck | bus | motorcycle | bicycle | |
| 0 | 7 | 3 | 0 | 0 | 0 | 0 |



Business case 2

Speed detection with a CCTV partner in Korea



Industrial applications



Business cases



SRS' solution

- 2 types of automotive-grade radars



IRISr (180° FoV)



IRISc (100° FoV)

Construction Machinery





SRS' solution

- 2 types of automotive-grade radars



IRISr (180° FoV)



RETINA
(Imaging Radar)

Anti-Drone



"Drone attack, Saudi"

Source : The Times of India,
Author : AP 14 Sep 2019

Outperformed vision-based detection



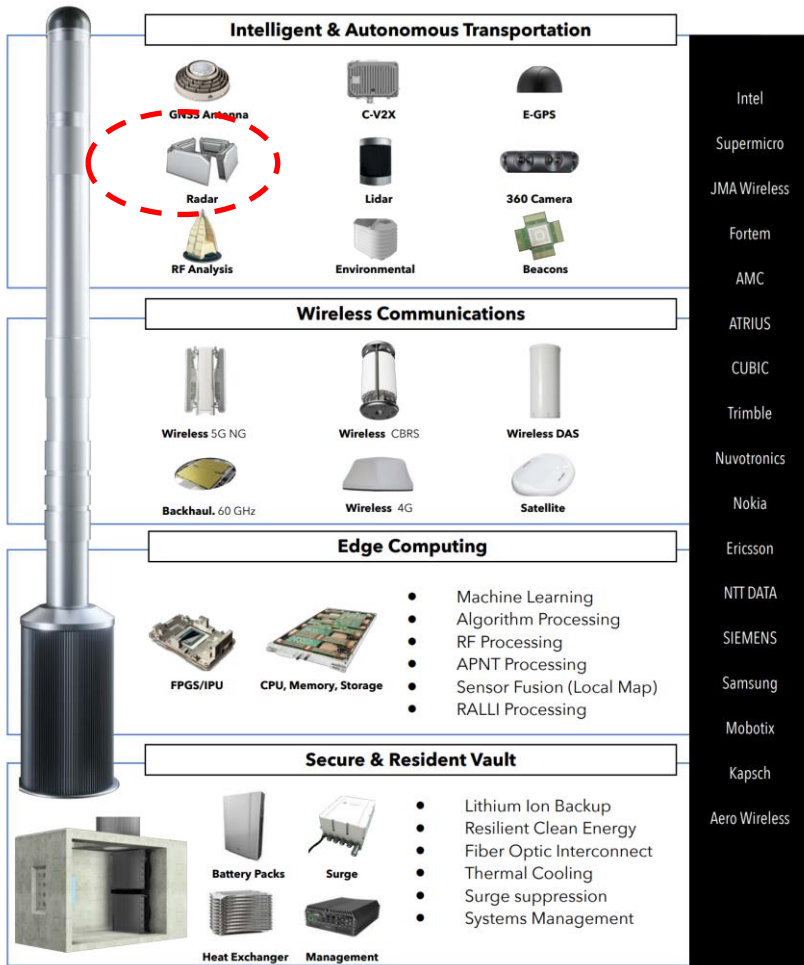
SRS RETINA

~ 100m



Radar for Infrastructure and ordinary life

PUBLIC INFRASTRUCTURE NETWORK NODES



Thank You from All SRS members!

Contact Information: eaglekim@srs.ai

Please note that SRS' radars are becoming building blocks of smart cities

