CALUMINO
Smart Thermal Sensing

AFFORDABLE THERMAL IMAGING + A.I. =

NEW DATA SOLUTIONS

Presentation

2020

WHAT WE INVENTED

Low-Cost
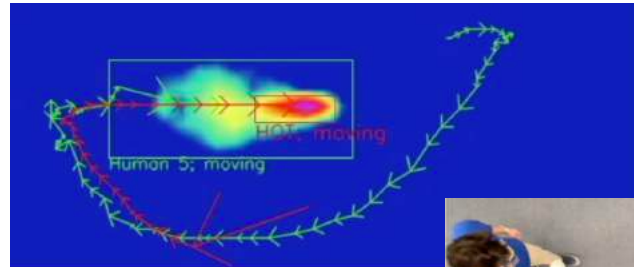**Thermal Image Sensor**

+

A.I.

Ceiling mounted CTS

IP cam reference

=

Unprecedented,
extremely valuable,
privacy non-intrusive

DATA

CTS = Calumino Thermal Sensor

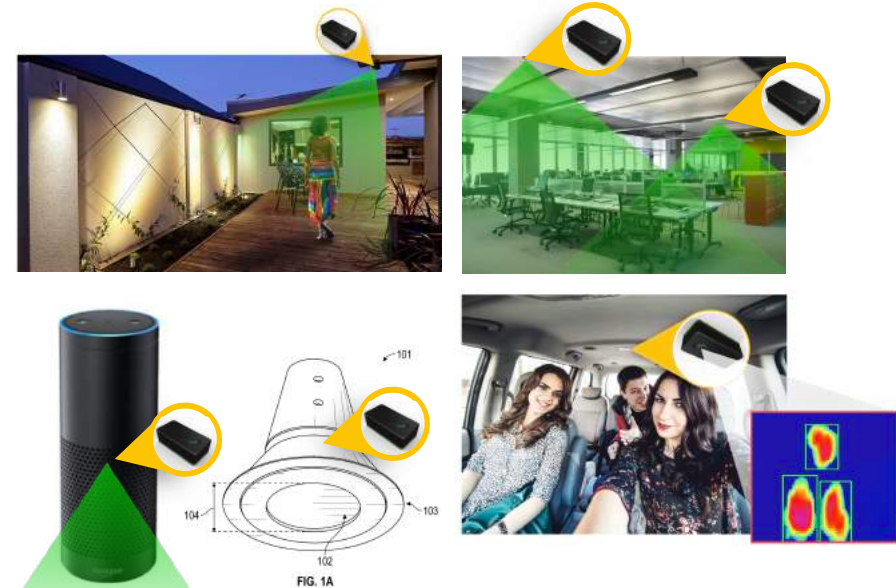Own developed and manufactured
disruptive nanotech sensor module

Own developed proprietary Artificial Intelligence

HOW IT WORKS

Where sensor sits?

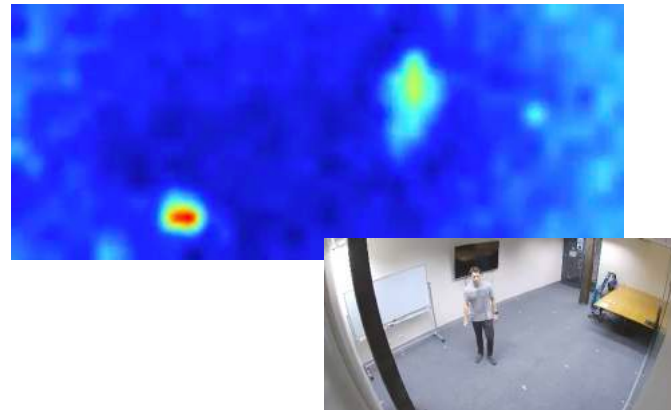1 sensor per room / space / device

→ **Human presence & activity information desire**

What it "sees"?

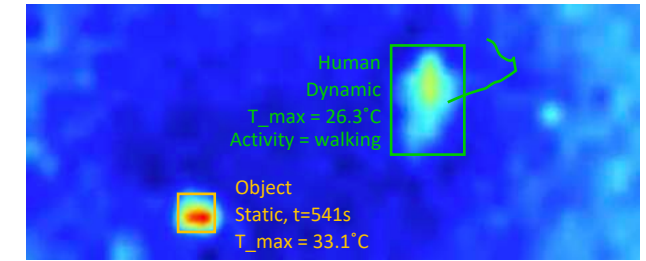Low-res thermal image with accurate temperatures

→ **Privacy is protected**

IP cam reference

What A.I. extracts?

Real-time, low-cost, on-edge or in-cloud

→ **Automated data interpretation**

Human
Dynamic
T_max = 26.3˚C
Activity = walking

Object
Static, t=541s
T_max = 33.1˚C

- Human & object presence
- Human count
- Location and tracking
- Human activity
- Precise temperatures (<±0.3˚C)
- Hotspot / fire

CALUMINO
Smart Thermal Sensing

PRICE vs PERFORMANCE
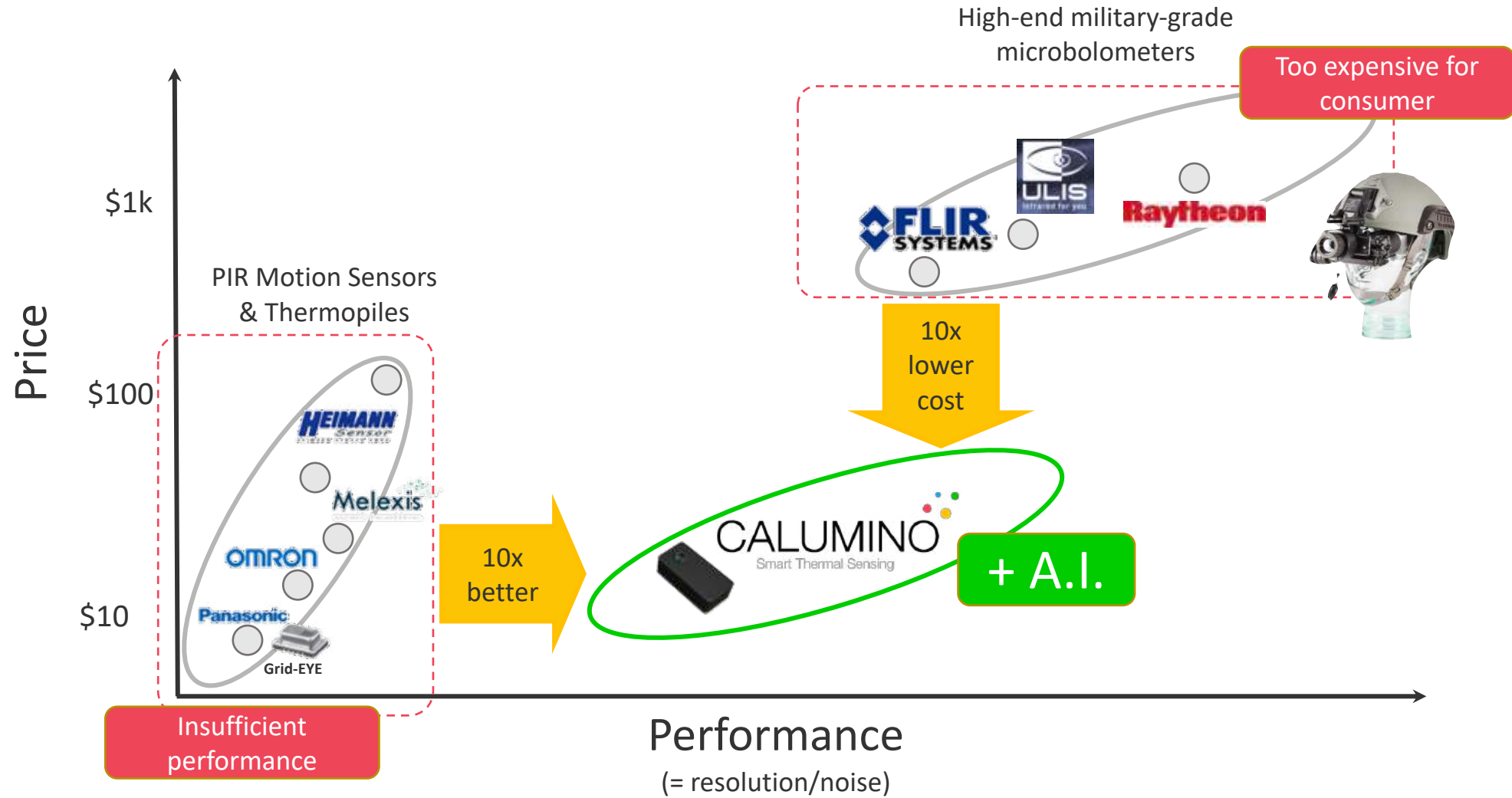
OUR BUSINESS MODEL (pre COVID-19)

Sensor Module + A.I.

Focus:

Platform:

SaaS solution for Aged, Home, Health Care

"Recurring revenue"

Platform for SaaS vision:
2023: home Care (B2C)

$9 - $49 one-off OEM B2B sensor for product integration to 3rd parties

"Sensors + A.I. in volume"

Solving 12+ problems for 20+ industries

OUR BUSINESS MODEL NOW: During COVID-19

100% focus

Sensor Module

- **Most accurate and affordable solution for thermal pre-screening of people for fever indications**

- **Does not require reference source**

- **Mass deployable**

- **Key reference customers around the globe**

- **Our problem: we don't have yet mass manufacturing setup and cannot keep up with extreme demand**

CALUMINO
Smart Thermal Sensing

Highly accurate and affordable temperature pre-screener

A single person human temperature pre-screener which is:

– Affordable
– Mass deployable
– Plug & play
– Instantly deployable, no additional purchases required
– Easy to use
– Requires no training
– Fast
– Has accuracy of a $10k+ system

Created for:

– Hotels
– Airports
– Schools
– Hospitals
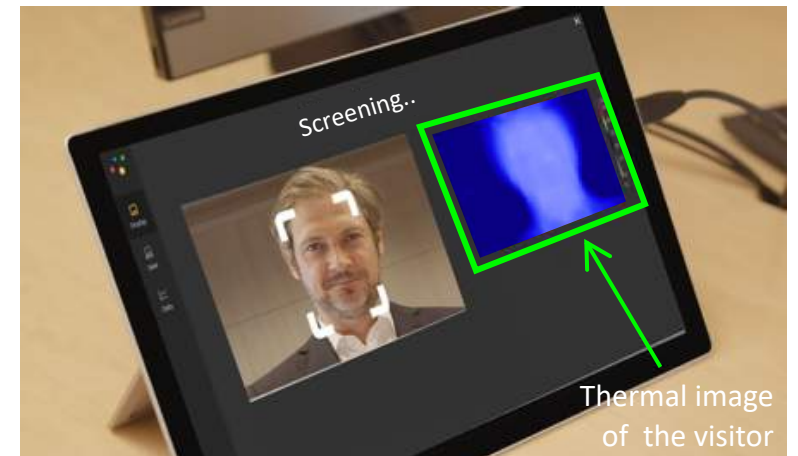– Offices
– Nursing homes
– and other populated areas.

Display Screen

RTS
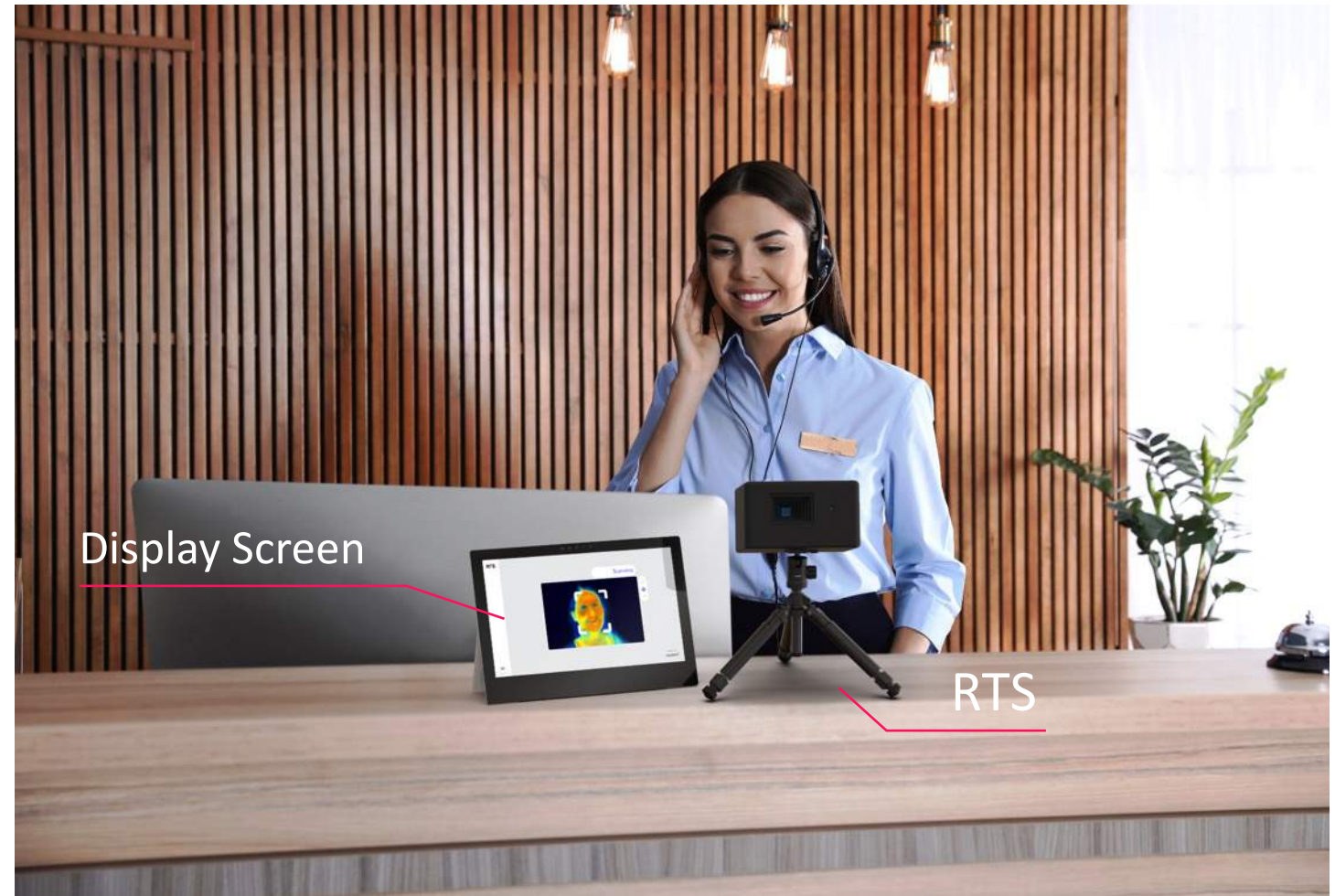
Extremely simple operation


1. Person approached reception or check-in point

0.5-1.2 m

Display screen   RTS device

2. Person's face is detected by A.I. cam within 0.2 sec

Screening..

3. The RTS pre-screens a person's face temp. in < 1 sec

Screening..

Thermal image of the visitor

4. The device shows "PASS (next, please)" if the person facial temperature is below the set threshold – or will show "High Temperature" and have an acoustic alarm if above a set threshold. Images and data can be saved automatically.

PASS (next, please)

High Temperature

Temperature too high alarm
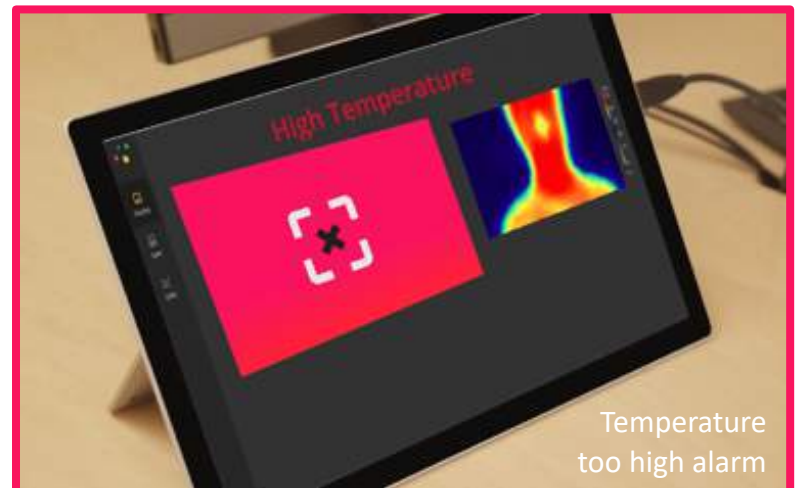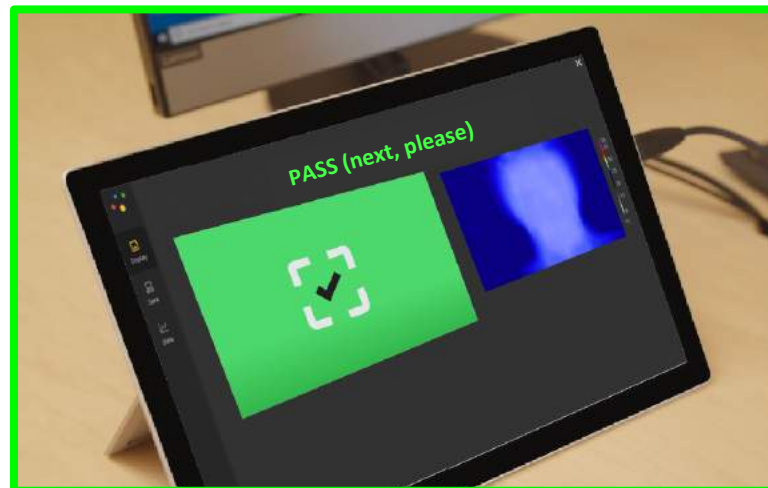
Implementation

'Plug & Play' product

OEM sensor module for integration

The RTS is a plug & play device which can be purchased as a stand-alone system. It is easy-to-use and mass-deployable.
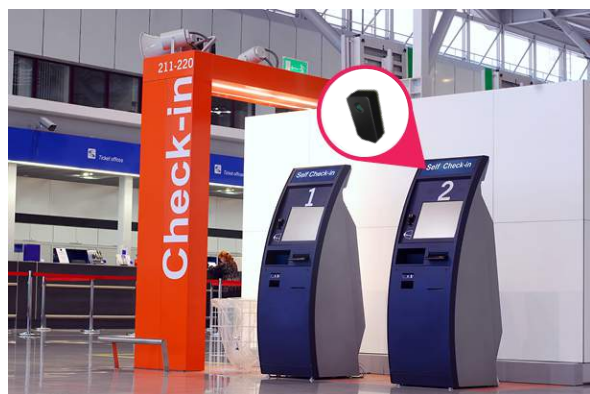
The RTS OEM module, based on our own proprietary Calumino sensor, can integrate into kiosk check-ins and retrofit into other devices.

RTS is a disruptive innovation

Calumino's solution is:
- highly accurate
- low-cost
- simple to use
- mass-deployable

Calumino also offers a mass-deployable OEM sensor module for integration

Parameters	Calumino RTS	Competing face-temperature screening systems[1]
Price of system	Affordable (less than $999 in volume)	$8,000 … $20,000+ USD[2]
Price of OEM sensor module (incl. IR lens)	10x less expensive than microbolometers	Microbolometer + IR lens: ~$3,000 … $6,000 at volume
Calibrated reference source (in distance)	**Not required** – greatly enhances application use cases and ease of use	**Required** – added expense and limits installation environment
OEM sensor module	CALUMINO's own proprietary MOMS sensor	Bolometer mainly from either FLIR or Lynred
Accuracy	Sub ±0.5˚C	±0.1[3] … ±5˚C
Throughput	1 person per second	Small crowd, 1 or 2 people in line

[1] See https://tinyurl.com/s77wn6n for an extensive competitor comparison.
[2] Systems advertised for less often have very poor accuracy and are not suitable for human face-temperature screening.
[3] Only for one specific $20k USD system which includes a high-end reference source.

Problems of today's systems: cost & calibration reference source

Today's temperature pre-screening systems, with an accuracy of ±0.5˚C:

- Need to use a calibrated reference source which needs to be extremely stable because the thermal image sensor is not accurate enough (typically ±2…5˚C accuracy of competing sensors),

- Source the OEM thermal imager sensor from a global duopoly (FLIR [US] or Lynred [FR]) which costs in the $ks,

- Requires a professional setup of the reference source,

- Require a skilled operator and may not be simple to use,

- Is cumbersome and costly, typically between $8k…$20k.

Calibrated reference source of today's cumbersome systems

Less than ±0.5˚C accuracy is critical for pre-screening human face temperature