

# 9. Signalton & Cobalt Speech





# Sound Analysing IoT Network for Smart City Sensing

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R&D partnership in the Smart Cities sector

Catherine Breslin Ph.D., Machine Learning Scientist, Cobalt Speech

Nail Cadalli Ph.D., Founder, Signalton

# Who we are



**Catherine Breslin, Ph.D.**

**Sector:** Audio and speech applications

**Specialty:** Speech processing, natural language understanding, sound analysis

**Size:** 20

**Established:** 2014, Tyngsboro, MA



**Nail Cadalli, Ph.D.**

**Sector:** Smart digital systems and applications.

**Specialty:** Electronics, embedded SW, algorithms, signal processing R&D.

**Size:** 5 (core team)

**Established:** 2017, Ankara

**Team's experience:** 120+ years



# Why?

## Sound Analysing IoT Network For Smart City Sensing

Advanced signal processing algorithms can reveal critical **information** in sound data.

Signalton's edge-computing platform + Cobalt's sound processing algorithms forms a **smart** IoT sensor network throughout a city.

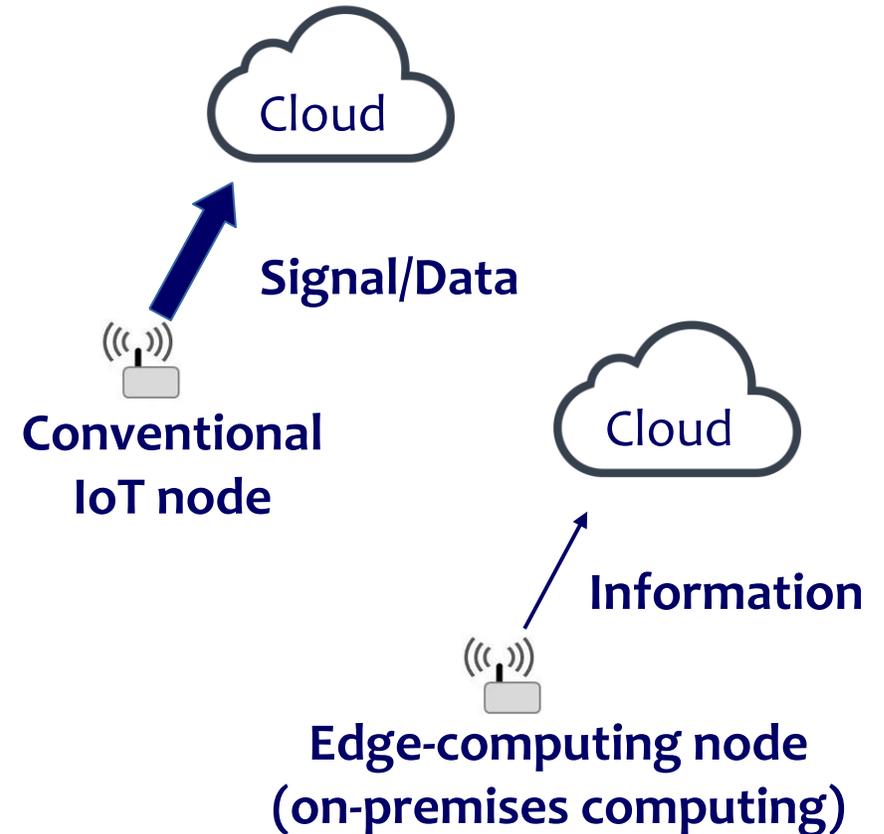
- **Sound event identification** (gunshot, scream, social disturbance, etc.), audio source tracking, and situation analysis.
- **Audio surveillance** for security via word spotting and speech recognition.
- **Traffic monitoring**, vehicle identification and tracking.



# The Problem:

## Complexity of sound + shortcomings of cloud computing

- Sound is a highly complex signal.
- Necessary to employ **advanced** digital signal processing techniques and algorithms to analyse sound for the targeted use cases.
- With conventional cloud computing all data is **uploaded** to cloud for analysis.
- **Privacy, bandwidth and latency** issues.



# The solution:

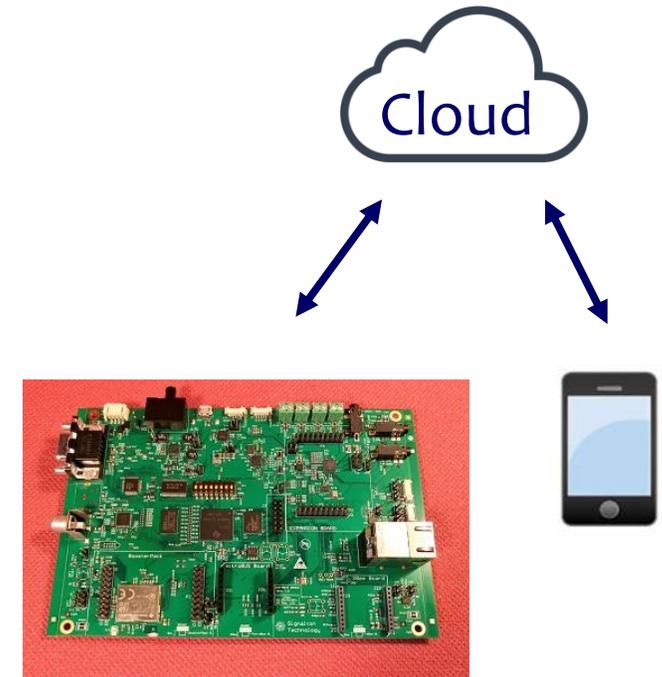
## Advanced sound analysis + edge-computing IoT network

Signalton's edge-computing sensor platform **SigMote**:

- sensor data collection,
- real-time embedded signal processing,
- wireless connectivity.

Cobalt's sound analysis algorithms to be run on SigMote in real-time.

- **R&D work** includes algorithm customization for the use cases, embedded programming and system integration.
- Deployment and testing sound analysing IoT networks.



SigMote



# The technology

Our **sound analysis** is based on advanced concepts of

- Machine learning and pattern recognition
- Time-frequency analysis
- Speech recognition, word spotting, speaker/gender identification
- Speech understanding (NLU)
- Sound classification



**SigMote Platform:** Electronics, embedded SW, algorithms.

**40x** powerful than a usual IoT device.

Have run ML based **audio scene classification** and **electric motor testing** algorithms in real-time.



# Competitors / Competitor analysis

**Audio Analytic** (Cambridge): Sound event / acoustic scene recognition for smart home (glass break, car alarm, baby cry, etc.).

**Sound Intelligence, CLB** (Netherlands): Acoustic monitoring for healthcare, sound recognition (gunshot, car alarm, glass break, aggression).

**Abilisense** (Israel): Sound recognition for baby/elderly care, security, smart home.

**Shotspotter** (Newark, CA) : Gunshot detection, localization, analysis.

**Speechmatics** (Cambridge), **Trint** (London) : Speech recognition for speech-to-text.

## HOW WE ARE DIFFERENT

- Use cases requiring **full-stack advanced sound processing**.
- **Product platform:** Algorithms + software + edge-computing HW + IoT network.
- Targeting smart city applications, **customizable/scalable** to other potential use cases.

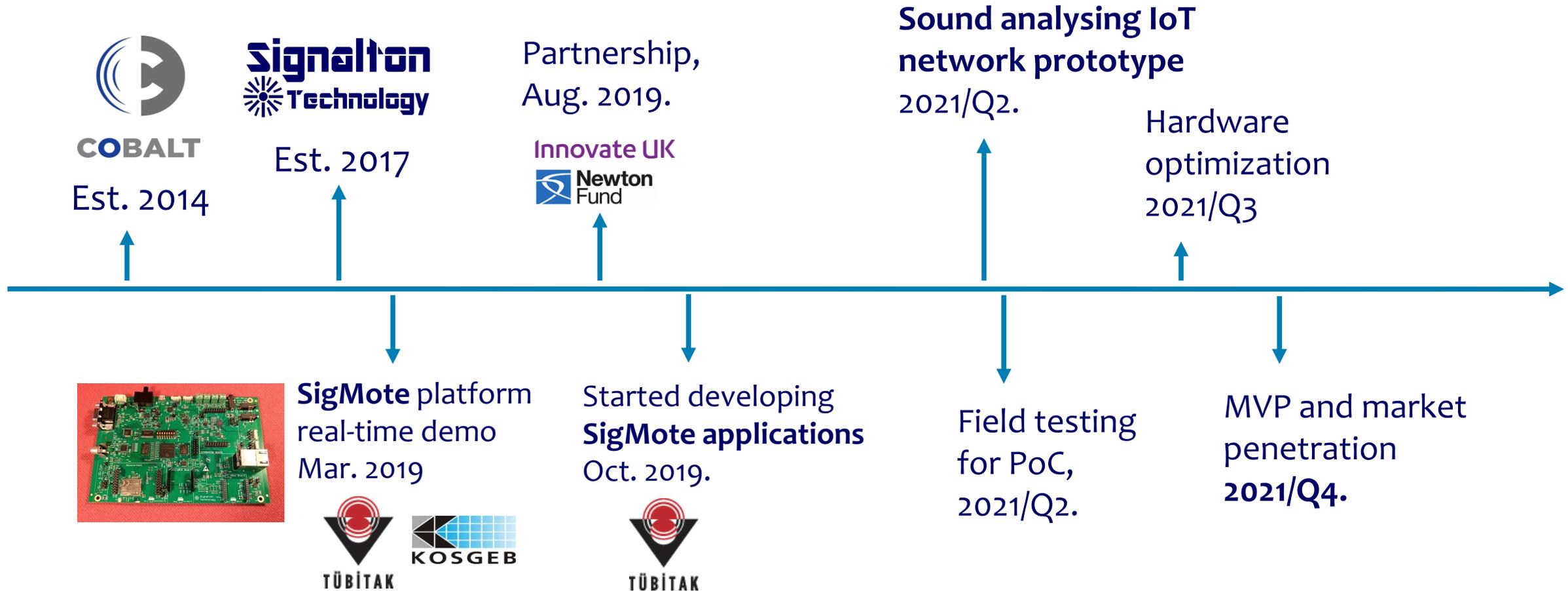


# Traction or market opportunity

- **Security and traffic** authorities are potential customers, as well as **citizens**.
- **Large** sensor networks producing valuable **information** with **less cost** (than video monitoring).
- **Already** have customers interested in sound analysis applications.
- **Scalable to other sectors:**
  - Smart manufacturing (audio monitoring, preventive maintenance).
  - Healthcare (elderly/patient monitoring, audio diagnosis).
  - Security of buildings, businesses, or production plants by using smaller scale networks.



# Timeline



TÜBİTAK: Scientific and Technological Research Council of Turkey  
KOSGEB: SME Development Organization of Turkey



# What we need

- Signalton is being funded partly by a TÜBİTAK grant and is continuing to develop SigMote platform further.
- Cobalt is a bootstrap company so far.
- We need
  - Funds to help accelerate the development - £300k.
  - Funds for the first phase of production – later stage.
  - Funds for deployment and marketing – later stage.

TÜBİTAK: Scientific and Technological Research Council of Turkey



# Thank you!

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