WHY YOU NEED MILLIMETRE-LEVEL POSITIONING IN YOUR LIFE
MATTHEW LOWE
Co-founder & CEO

• 15+ years software dev.
• 5 years head of IT (NA) of Wilo ($2b global rev.)
• 7 years product R&D & PM
• University of Calgary

Native Calgarian with a passion for tech and entrepreneurship. As the original inventor behind ZeroKey’s Smart Space technology, Matt holds over 22 patents, and is responsible for taking a back-of-the-napkin idea and building it into a rapidly scaling tech company. Prior to founding ZeroKey, Matt worked as the head of IT (North American subsidiaries) of Wilo, a major manufacturing company with global revenue of over $2 billion USD. Over the course of a 15+ year career in the tech industry, Matt has contributed to several mega projects including Linux and Arduino. Linux is used by over 2 billion devices worldwide including all Android smartphones, and Arduino is the preeminent electronics prototyping platform.
ABOUT ZEROKEY

- Calgary-based
- Indoor positioning tech startup
- Rapidly growing
- 10x growth in 2019, continued into 2020
- New 20,000 sq. ft. facility
- Growing from 30 to 60 staff in the next 12 months

Dr. Guojiang Gao  Dr. Chris Leskiw  Changhai Li  Dr. Sheriff Abdelkader  Dave McNab
THE VISION

Digitize the real-time 3D position of every product, pallet, cart, box, AGV, smart phone, and person, to power a whole new world of machine intelligence and productivity solutions.
WHAT CAN MM-POS DO?
Introducing Smart Space Technology from ZeroKey
INTRODUCING SMART SPACE TECHNOLOGY

- Breakthrough 3D track & trace tech
- Ultrasonic-based sensors
- Millimetre-level accuracy
- Wide-area scalability
- Real-time 3D tracking (RTLS)
- Extensive IP - 22 patents globally
HOW IT WORKS

1. ZeroKey's patented anchors are deployed throughout the client site

2. Sensors are attached to objects and personnel of interest

3. High accuracy position data is collected and processed in real-time

4. Insights drive previously impossible workflow automation and analytics solutions
1. Place the IMPELLER component of the pump onto the HOUSING component in the proper orientation.
2. Grab a BOLT from BIN 3.

Workflow Health Check

Cycle Time
Current: 0.02
Last: 0.02

Time: 0:00:04
Completed Cycles: 0
Avg. Cycle: 0.00
Errors Detected: 3
ZEROKEY
PRODUCT FAMILY
**USE CASE 1**
**HEALTH & SAFETY**

**Problem**
Despite sophisticated modern tech-based solutions, injuries and deaths are regular occurrences in industrial environments.

**Solution**
ZeroKey Smart Space is deployed across target facilities and tracker tags are carried by workers during their normal activities.

**Outcome**
ZeroKey’s Smart Space tags proactively notify employees if they are entering a dangerous or prohibited location.

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**USE CASE 2**
**MANUFACTURING**

**Problem**
A large manufacturer experiences high error rates in their assembly processes due to the complexity of their products and stringent compliance requirements.

**Solution**
ZeroKey wristbands are utilized to digitally track the wrists of the assembly line worker and enable digital workflow monitoring, automated compliance reports, and real-time quality-control.

**Outcome**
Assembly errors are dramatically reduced and data of the production environment leads to targeted data driven optimization of production processes.

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**USE CASE 3**
**AGV’S & FORKLIFTS**

**Problem**
A major automotive OEM makes use of Automated Guided Vehicles (AGV’s) in their production environment. Changes to AGV routes requires shutdown of the plant to rework guide strips.

**Solution**
ZeroKey sensors are deployed on the AGV’s to replace the magnetic strip based navigation system. Navigation routes are updated digitally without any down-time to the production facility.

**Outcome**
Expensive plant shutdowns are eliminated and AGV’s are monitored in real-time from a centralized dashboard. Captured data is used to drive analytics-based optimization.

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**USE CASE 1**
**SCM & LOGISTICS**

**Problem**
Due to supply chain inefficiencies, major distributors are experience an eroding bottom line in the face of increased competition from large vertically integrated companies (e.g. Amazon).

**Solution**
ZeroKey Smart Space technology paired with Google Glass heads-up displays eliminates inefficiencies by leveraging guided “just-in-time” picking processes with digital path routing.

**Outcome**
Picks per hour by manual pick staff is increased by 35%, order latency is reduced by 30%, and the training cost of new staff is reduced by 90%.
Core Technology

- Acoustic + RF = point to point ranging
- Multiple ranges -> true range multilateration
- Some secret sauce involved

ZeroKey Accuracy Test
Core Technology

Structure
- Anchors act like GNSS satellites
- Many of the same principles apply
- Infinitely expandable
- Mesh networking data layer

Timing
- As with GNSS, timing is important
- Requires accounting for several sources of signaling latency
- Most sources are deterministic with low noise
- Acoustic signal propagation speed is slow, so noise has minimal impact
Video (Wide area tracking)
ZEROKEY
PLATFORM

Connected Clients

ZeroKey Services

External APIs
- User API
- Tracker API
- Zone API

Real-time notifications
- Notification Hub

Business Rules
- Zone Collision Detection
- Route Optimization
- Statistics Engine

Hardware connector
- ZeroKey Network Gateway

External Systems

Hardware connector
- ZeroKey Network Gateway

Business Rules
- Zone Collision Detection
- Route Optimization
- Statistics Engine
Why we really need mm-positioning
# PRODUCT COMPARISON

<table>
<thead>
<tr>
<th></th>
<th>Accuracy</th>
<th>2D or 3D</th>
<th>Infrastructure Spacing</th>
<th>Detection</th>
<th>Tracking</th>
<th>Self-Calibrating</th>
<th>Unit Cost</th>
<th>Scalability</th>
<th>Battery Life</th>
<th>Annual Maintenance</th>
<th>Total Cost of Ownership</th>
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<tbody>
<tr>
<td>ZEROKEY</td>
<td>1.5mm</td>
<td>3D</td>
<td>30m</td>
<td>Precise</td>
<td></td>
<td>✓</td>
<td>$</td>
<td>Wide-area</td>
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<tr>
<td>RFID</td>
<td>1m</td>
<td>1D</td>
<td>1m</td>
<td>Spot</td>
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<td>$</td>
<td>Limited</td>
<td>Passive</td>
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<td>UWB</td>
<td>15cm</td>
<td>3D</td>
<td>35m</td>
<td>Coarse</td>
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<td>Limited</td>
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<td>BLE</td>
<td>1m</td>
<td>2D</td>
<td>6m</td>
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WE’RE HIRING!

- Algorithm engineers
- Software developers
- Embedded developers
- FAE’s
- Sales associates
- Summer internships

Apply @ zerokey.com/careers