# AI Classroom Monitoring for Safety & Productivity

All Safe City OÜ is developing an AI-enabled system to indirectly monitor classrooms, creating safer and more productive learning environments through air quality control and anomaly detection.

# The Science Behind Air Quality & Behavior

## Cognitive Impact

Poor air quality directly affects student concentration and academic performance.

## Health Effects

Inadequate ventilation increases illness-related absences and respiratory issues.

## Behavioral Link

Scientific studies show a correlation between air pollution and negative teenage behavior.

# Current Market & Technology Gap

## Market Growth

Air quality sensor market: $9.4B in 2023, projected to reach $13.8B by 2030 (CAGR 5.6%).

Smart sensor market: $53.9B in 2023, growing to $227.6B by 2032 (CAGR 17.9%).

## Existing Solutions

Current systems focus on energy efficiency rather than safety and performance.

Most solutions lack situational awareness and direct air quality control capabilities.

## Estonian Context

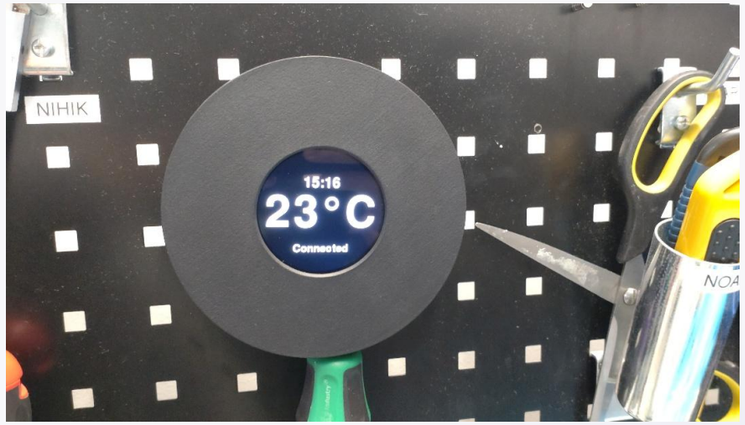
DigiAudit platform monitors indoor climate in schools.

Thinnect deploys $CO_2$ sensors to assess ventilation systems.

# All Safe City's Innovative Solution

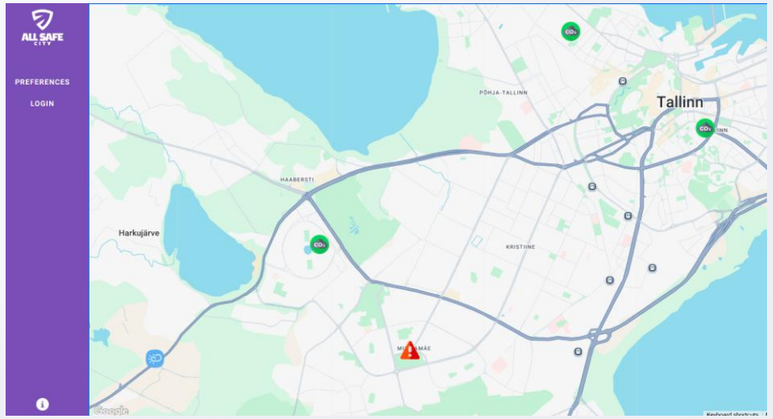
## AAPS

Active Air Protection System with UV-C light, HEPA filter, and controllable EC-fan.




## Pod

AI-capable device with cameras, sensors for CO2, temperature, humidity, and VOCs.




## Software

User app and data platform for monitoring, control, and analysis.

# Key Project Challenges

## Data Privacy

Strict GDPR compliance with edge processing to protect sensitive information.

## Technology Readiness

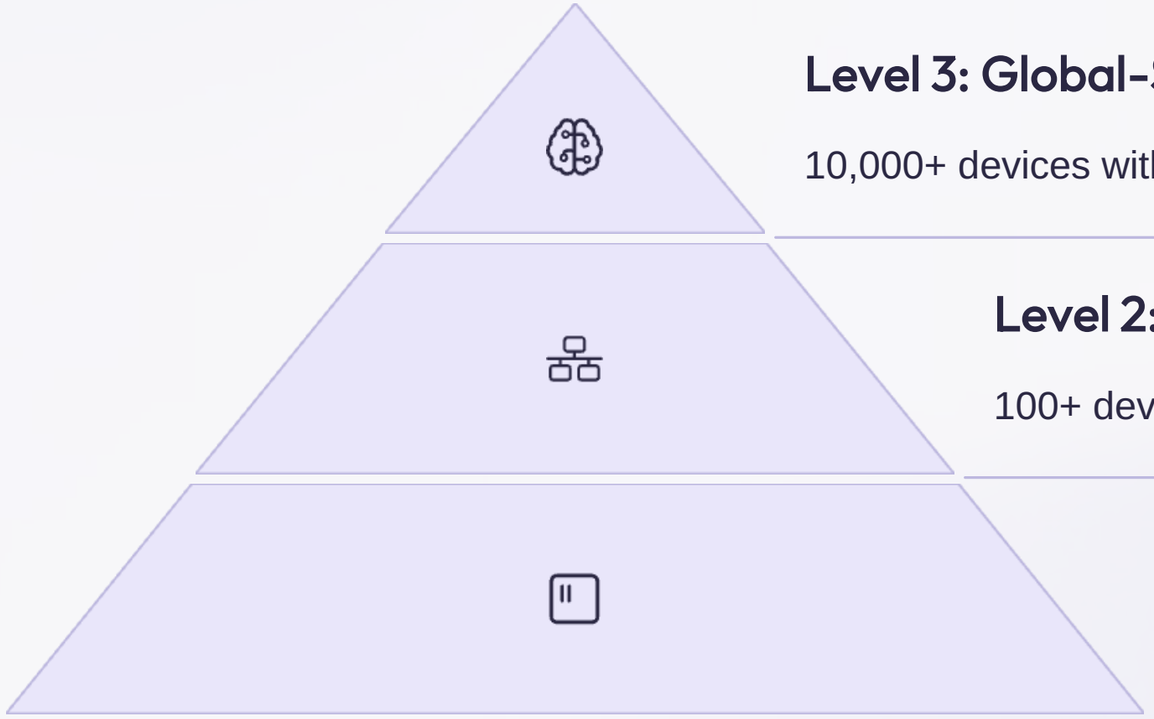
Developing suitable hardware with adequate processing capabilities.

## User Acceptance

Overcoming resistance from school administration, teachers, parents, and students.

The project will focus on mitigating these challenges through edge AI processing, robust testing, and clear communication that emphasizes helping, not monitoring.

# AI Development Roadmap



## Level 3: Global-Scale AI

10,000+ devices with advanced sorting mechanisms

## Level 2: Advanced Patterns

100+ devices with complex pattern recognition

## Level 1: Basic Detection

Current focus: hazard detection and classification

# Phase 1 Implementation Tasks

### Specification

Define hazardous conditions, environmental parameters, and human activity markers.

### System Testing

Validate sensors, air purification, and connectivity performance.

### Data Collection

Simulate use cases and annotate data for AI training.

### AI Implementation

Develop cloud and edge AI models for hazard detection.

# Project Timeline & Deliverables

1

## Phase 1: Q2 2025

Basic detection models and system validation

2

## Phase 2: Q3-Q4 2025

Advanced pattern recognition with 100+ device network

3

## Phase 3: Q1-Q4 2026

Global deployment with 10,000+ devices and open API platform