**DUNDALK INSTITUTE OF TECHNOLOGY**

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**Alpha Release Technical Documentation On**

**AEROSENSE – SMART HUB FOR AIR QUALITY MONITORING**

Project Carried Out

**By**

**D00251785 PATRICK ORJIEH**

**D00244618 ROBERT NUGENT**

**D00261104 CONOR MC GINN**

**D00240060 HANNAH MC ELROY**

Under the Supervision of

**DR. JOHN LOANE**

DEPARTMENT OF COMPUTING AND MATHEMATICS

**SCHOOL OF INFORMATICS AND CREATIVE ARTS**

**DEPARTMENT OF VISUAL AND HUMAN-CENTRED COMPUTING**

**EXECUTIVE SUMMARY**

The Alpha release of the Aerosense project represents a key phase in the development of our Smart Indoor Air Quality Hub. This initial release is a comprehensive prototype that demonstrates the capability of our system to assist individuals with asthma in monitoring the air quality within indoor environments.

Our system's architecture is detailed through clear diagrams that illustrate the interactions between the IoT components, the cloud-based web server, and the user interface. These diagrams serve to clarify the flow of data and the security measures in place to protect it.

The prototype, hosted on an AWS cloud server, showcases the core functionalities that will be present in the final product. It includes a working model of the IoT hardware, the software on the web server, and the database that stores and processes the gathered data. The use of PubNub ensures secure and efficient communication between the IoT devices and the web server.

We have taken significant steps to secure the application, with particular attention to the protection of data while it is stored and as it moves through the system. The security protocols we have implemented are critical in maintaining the privacy and integrity of user data.

The documentation for the Alpha release reflects the steps to creating a user-friendly and secure system. It outlines our approach to addressing the needs of asthma patients by providing them with actionable insights into their indoor air quality.

In summary, the Alpha release documentation shows the need of the Aerosense project and sets a clear direction for future development. It shows the first step to delivering a product that is of value to users, particularly those managing asthma in their daily lives.

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## **GLOSSARY**

* **Aerosense**: A project aimed at developing a portable device (Smart Indoor Air Quality Hub) for monitoring indoor air quality, particularly beneficial for individuals with asthma.
* **Smart Indoor Air Quality Hub**: A portable device designed to provide real-time data and insights about indoor air quality, helping individuals, especially those with asthma, to understand and manage their environment better.
* **Raspberry Pi**: A small, affordable computer used for various digital projects, here employed as a data collection and processing unit for the Aerosense system.
* **PubNub**: A cloud-based service that provides real-time data streaming and messaging solutions, used in Aerosense for real-time communication between the device and the server.
* **AWS (Amazon Web Services)**: A comprehensive and widely adopted cloud platform that offers various services such as computing power, database storage, and content delivery. In Aerosense, it's used for data processing and storage.
* **Alpha Prototype**: An early version of a product that is functional enough to demonstrate the concept and design but may not have all the final features and polish of the final product.
* **Cloud Server**: Remote servers accessed over the internet used to store, manage, and process data, as opposed to a local server or personal computer.
* **User Interaction**: The process and experience of a person engaging with the Aerosense system, particularly through its mobile application.
* **Sensor Data Acquisition**: The process of collecting data from various sensors (like those measuring air quality) used in the Aerosense system.

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## **1. INTRODUCTION**

The Aerosense project is an initiative designed to offer an innovative solution to air quality monitoring, specifically addressing the needs of individuals with asthma. The project aims to develop a portable "Smart Indoor Air Quality Hub" that provides real-time insights into indoor air quality, which is crucial for people who suffer from respiratory conditions.

This documentation outlines the development process, architecture, and functionalities of the Aerosense system. It details the collaborative effort put forth to design a system that combines sensor data acquisition, cloud-based processing, and user interaction through a mobile application.

Our goal is to create a system that is user-friendly, aligning with our educational objectives and the practical needs of asthma patients. The project leverages the capabilities of the Raspberry Pi as a data collection point, PubNub for real-time communication, and AWS cloud services for data processing and storage.

The other sections will provide an overview of the system architecture, describe the alpha prototype, discuss security measures, demonstrate the deployment on a cloud server.

As the developers of Aerosense, we have committed ourselves to a practical and simplified approach, ensuring that the end product is not only functional but also accessible to our target users. We believe that the integration of real-time environmental data with health management tools can significantly improve the daily lives of asthma patients, and this belief has been the driving force behind our project as well as the academic part.

## **2. SYSTEM ARCHITECTURE**

A diagram of a cloud computing system

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Diagram 1: System Architecture Diagram of Aerosense Application

## **CONCLUSION**

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