



**The design and development of a smart building access management system**

**By**

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This Report is submitted in partial fulfilment of the requirements of the master's degree in Electronic and Computer Engineering (MECE) of Dublin City University

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# Project Plan

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## Problem statement

Design a contactless access management application that handles the access and egress of individuals through designated zones via portable wireless data transmitting devices.

## Project Scope

### Areas in-scope

#### Technologies

- UWB data transmission
- Technical architecture design and deployment
- Linux
- Apache tomcat
- MySQL
- HTML webpages
- Java servlets

#### Research Areas

- Decision and data analysis algorithms for indoor location tracking
- Packet security for UWB

### Areas out of scope

Below is a non-exhaustive list to outline some of the areas which will not be part of this project.

- Other wireless technologies not outlined in the above
- Mitigation of packet loss (eg complex analysis and reconciliation)
- Use of machine learning to estimate door actuation

#### Considerations

- While Mechanical control of physical doors will not be implemented use of LEDs will be used to symbolise the actuation of a door which could be used in a full-scale delivery
- For the purpose of illustration, a user interactive web site will be provided as a POC but the security of this will not be in scope nor will specific browser support be explored.

### Scope review

Throughout the project there will be assessments as to each phase and due to the agile nature certain items may be de-scoped or added to the scope. Should this occur, it will be explicitly called out in the project log.

## Design Approach

### Methodology

The approach for delivery will be hybrid waterfall-agile to achieve this it has been broken down into 3 phases, hardware, software and integration. The method will be iterative and agile in the delivery and testing throughout each phase of the delivery.

### Validation

Testing will be conducted based on fundamental testing principles (technical, functional and integration) for operability on a pass/fail basis.

Test cases completed will be outlined within the project log however at present the test cases established will include the following information:

<b>Test Case ID</b>	Identification number for test case
<b>Test Phase</b>	Identify project phase testing occurred
<b>Test Area</b>	<Hardware/Software/Security>
<b>Test Artefact</b>	<UWB Device/Algorithm/Disaster Recovery>
<b>Test Case Description</b>	description of test case to be completed
<b>Expected Result</b>	Out-line expected result
<b>Actual Result</b>	document actual results observed
<b>Status</b>	<Complete/Blocked/Descoped/To Do>
<b>Result</b>	<Pass/Fail/None>
<b>Comments</b>	Space to note any further observations
<b>Issue Class</b>	If test fails class failure as either Major/ Medium/ Minor severity

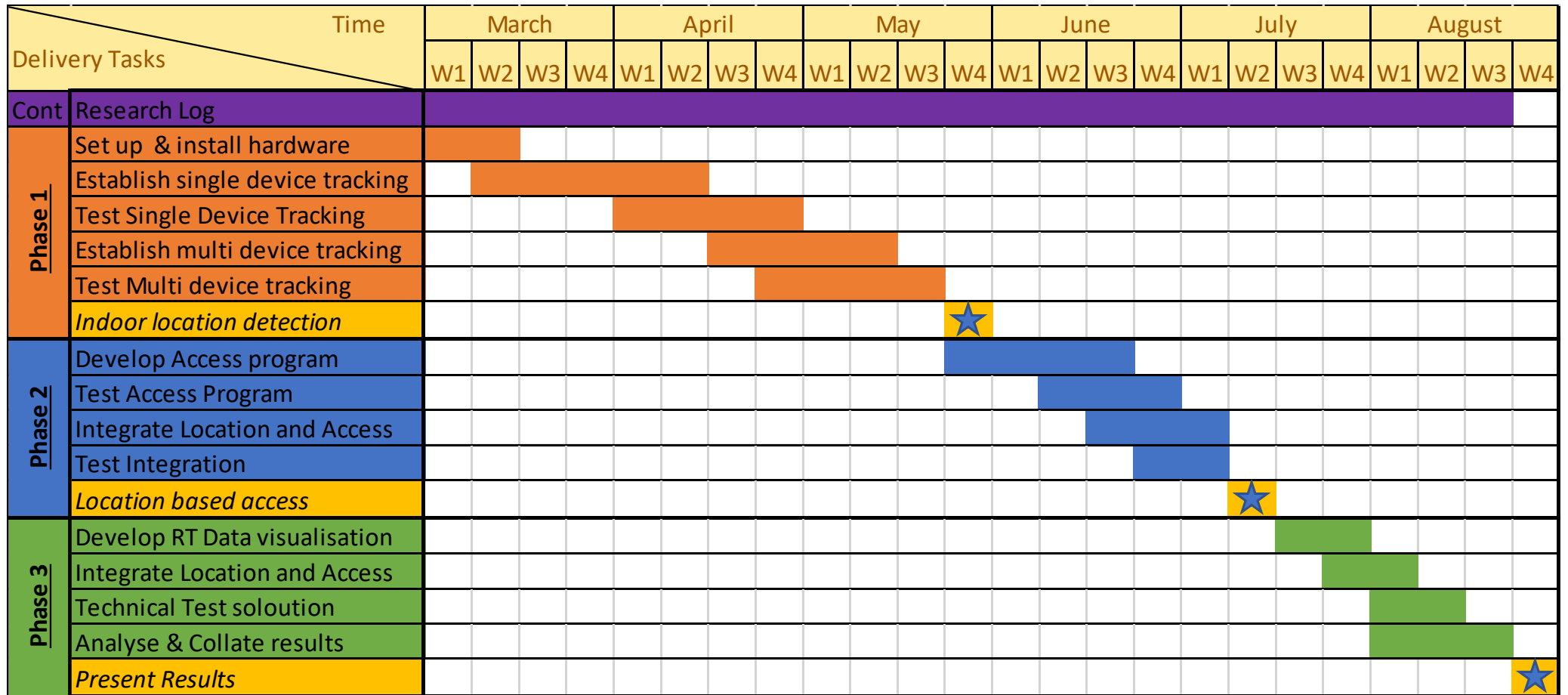
The full suite of test cases will be included in the project portfolio along with the results for same

### Analysis

Iterative testing of the solution will produce empirical data which will be used to identify emerging strategies to best obtain the brief against the success criteria on a pass/fail basis.

Once the most optimal strategy has been defined then it shall be compared to the success criteria and graded on efficiency as well as various technical architecture principles. Areas for this grading will include operability, scalability, performance, availability and disaster recovery as well as reviewing potential future areas of optimisation through surface areas of attack,

## Project timeline



## Success Criteria

This project will be considered successful if the following criteria are met:

1. Academic deliverables:
  - Project proposal submission accepted
  - Literature review completed and submitted
  - Literature review oral presentation completed and submitted
  - Risk assessment completed and submitted
  - Project design plan completed and submitted
  - Research log filled out and submitted
  - Project portfolio completed and submitted
  - Project portfolio presentation Completed
2. Solution deliverables:
  - Phase 1 Criteria
    - Establish ability to communicate with UWB device
    - Determine UWB device location within designated area using bubble analysis
  - Phase 2 Criteria
    - Establish algorithm to determine if device has permission to access location
    - Establish algorithm to determine if device is approaching based on velocity and proximity to a fixed point
  - Phase 3 Criteria
    - Full integration of algorithms (access and approach) and hardware to trigger visual representation of correct decision for each doorway