Table of Contents

1 Executive Summary i
List of Tables vi
Glossary vii
List of Symbols and Units ix
2 Introduction 1
2.1 Background 1
2.2 Statement of Problem 1
3 Project Description 1
3.1 Project Goal 1
3.2 Mount Feasibility Criteria 1
3.2.1 Technical Feasibility 2
3.2.2 Payload Feasibility 2
3.2.3 Operational Feasibility 2
3.3 Mount Merit Criteria 2
3.3.1 Aesthetics 2
3.3.2 Material Density 2
3.3.3 Arm Length 2
3.3.4 Ease of Attachment 3
3.3.5 Cost of Material 3
3.4 System Feasibility Criteria 3
3.4.1 Technical Feasibility 3
3.4.2 Financial Feasibility 3
3.4.3 Operational Feasibility 3
3.5 System Merit Criteria 3
3.5.1 Data Processing Rate 3
3.5.2 Weight/Size 4
3.5.3 Memory 4
3.5.4 Cost 4
4 Design Alternatives 4

4.1 SLAM System Alternatives 4
4.1.1 System 1 – ZED and Jetson TX1 4
4.1.2 System 2 – GMapping 5
4.1.3 System 3 – eDVS 6
4.2 Mount Design Alternatives 6
5 Evaluation of Design Alternatives 8
5.1 Feasibility of Mount Designs 8
5.2 Merit Evaluation of Mount Designs 9
5.2.1 Aesthetics 9
5.2.2 Material Density 9
5.2.3 Arm Length 10
5.2.4 Ease of Attachment 10
5.2.5 Cost 11
5.2.6 Conclusion 11
5.3 Feasibility of Systems 12
5.4 Merit Evaluation of Systems 12
5.4.1 Data Processing Rate 12
5.4.2 Weight and Size 12
5.4.3 Memory 13
5.4.4 Cost 13
5.4.5 Conclusion 13
6 Work Accomplished 14
6.1 Designing the mount 14
6.2 Mount Design Analysis 14
6.3 Battery Supply Analysis 15
6.4 ZED Mapping and Localization Capability 15
6.5 Jetson Ability to Process Data 16
6.6 Size of Area Able to Map 16
7 Final Design Specifications 16
7.1 System Requirements 16
7.2 Mount 16

8 Budget and Costs 17
8.1 Financial 17
8.2 Guidance 18
9 Proposed Test 19
9.1 Mount Operation 19
9.2 Mount Strength and Endurance 19
9.3 Safe Thumper Navigation 19
9.4 SLAM by ZED 19
9.5 SLAM in Different Environments 19
10 Team Talents 20
11 Project Management 21
11.1 Scheduling 21
11.2 Internal Management 21
11.3 External Management 21
12 Conclusion 22
13 References 23