|  |  |  |  |
| --- | --- | --- | --- |
|  | Requirement List | Unit | More information |
| NO | Requirement Description |  |  |
| **1** | **Geometry (Dimension)** | m |  |
| 1.1 | Length-L | 1.5 |  |
| 1.2 | Width-w | 1.5 |  |
| 1.3 | Height-H | 0.8-1 |  |
| 1.4 | Axel-Width |  |  |
| 1.5 | Tire-Width | 0.1-0.15 |  |
| **2** | **Kinematics** |  |  |
| 2.1 | The vehicle has 4-wheels including steering wheels |  |  |
| 2.2 | The vehicle has camera |  |  |
| 2.3 | The vehicle has braking system |  |  |
| 2.4 | The vehicle has tank for pesticide |  |  |
| 2.5 | The vehicle has heat radiator for killing weed |  |  |
| 2.6 | The vehicle has Battery |  |  |
| 2.7 | The vehicle has Engine |  |  |
| **3** | **Performance** |  |  |
| 3.1 | speed |  |  |
| 3.2 | accuracy |  |  |
| 3.3 | torque |  |  |
| 3.4 | response time |  |  |
| 3.5 | Energy efficiency |  |  |
| 3.6 | system failure |  |  |
| **4** | **Safety** |  |  |
| 4.1 | user safety |  | Address safety considerations to ensure the system operates without causing harm to users-user safety, operators safety , or the environment. |
| 4.2 | operators safety |  |
| 4.3 | Environment safety |  |
| 4.4 | protective enclosures |  |  |
| 4.5 | fail-safe systems |  |  |
| 4.6 | emergency stop mechanisms |  |  |
| 4.7 | compliance with safety standards |  |  |
| **5** | **Power and Energy** |  |  |
| 5.1 | power source |  | energy efficiency goals for the mechatronic system |
| 5.2 | power consumption |  |
| 5.3 | battery life |  |  |
| 5.4 | charging requirements |  |  |
| 5.5 | solar panel |  |  |
| 5.6 | energy regeneration capabilities |  |  |
| **6** | **Control and Communication** |  |  |
| 6.1 | input/output interfaces |  | Define the control interfaces and communication protocols needed for the system to interact with users or other devices |
| 6.2 | networking capabilities |  |
| 6.3 | data exchange formats |  |
| 6.4 | compatibility with existing systems |  |
| **7** | **Reliability and Maintenance** |  |  |
| 7.1 | redundancy |  |  |
| 7.2 | fault detection mechanisms |  |  |
| 7.3 | predictive maintenance capabilities |  |  |
| 7.4 | reliability goals for the system |  | including mean time between failures (MTBF), mean time to repair (MTTR), and the ease of maintenance or replacement of components |
| **8** | **Cost Constraints** |  |  |
| 8.1 | manufacturing costs |  | Establish the budgetary limitations for the mechatronic system, considering factors |
| 8.2 | material expenses |  |
| 8.3 | the total cost of ownership over the system's lifecycle. |  |