## Movement System

The following information composes the justifications that were made to make a decision on the method of movement, more specifically the wheels of the entire system.

### Items Considered

|  |  |
| --- | --- |
| **Item** | **Vendor** |
| Mecanum Wheels 4" | VEX Robotics |
| Omni-Directional Wheels 3.25" | VEX Robotics |
| Heavy Duty Wheels 4" | SparkFun |

### Decision Matrix

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Weight | 0.1 | 0.2 | 0.15 | 0.45 | 0.1 |  |
| Factor | Cost | Ease | Stability | Mobility | Availability | Total |
| VEX Robotics Mecanum Wheels 4" | 2 | 4 | 5 | 5 | 5 | 4.5 |
| VEX Robotics Omni-Directional Wheels 3.25" | 3 | 4 | 4 | 5 | 5 | 4.45 |
| SparkFun Heavy Duty Wheels 4" | 4 | 4 | 4 | 3 | 5 | 3.65 |

### Justifications

#### Cost

Within the decision matrix, the scale was based so that 1 was the most expensive on the scale and 5 was the least expensive. The prices of each as a set of 4 wheels were as follows: The mechanum wheels are $59.99, the omni-directional wheels are $39.99, and the heavy duty wheels are $27.96.

#### Ease

The ease category related to the ease of assembling and mounting the wheels to the chassis of the system. It also pertains to how easy they would adapt to a different system design. Luckily enough, the mecanum and omni-directional wheels can easily act as standard differential wheels if a design change is made.

#### Stability

The stability of each wheel relates to how effective each will be on a consistent basis. The mechanum wheels rated slightly above the others because of the ability to make finer adjustments when moving near an obstacle.

#### Mobility

The mobility relates not only to the effects the wheels have when in coordination with the motor and the ground, but also to which axis of movement they can use. The mecanum and omni-directional wheels rated above the heavy duty wheels because of their ability to strafe.

#### Availability

The availability of each wheel relates to how easy the wheel and any possible repair/replacement parts are to obtain. SparkFun and VEX Robotics are both commonly known distributers, and one can obtain parts for each on a multitude of retail sites in addition to the SparkFun and VEX Robotics sites themselves.

### Overview

It seemed that the main factor when selecting the wheels came to be the price and mobility options. Current design options lean toward a system that can strafe. It is fortunate also that the mecanum wheels, which came out with the highest rating on the decision matrix, can be used in any design.