**Foreseeable Problems and Solutions**

In the implementation process of an engineering project, facing with problems and difficulties is something expected. The theoretical solutions not always work as expected in practical applications. As a newly formed company we are aware that, in order to develop a robust system, it is necessary for us to consider all the possible problems will harm the operation of system and come up with solutions to handle them. In this part we investigate foreseeable difficulties and problem sources we will face and propose their possible solutions. For the sake of clarity, we stated these possible problems and solutions in four subgroups.

**Communication problems**

* There might be a high level of noise in the communication band, which will decrease the quality of transferred data.
* The range of the communication dependents on the environment condition, and the maximum range might vary under different environment.
* The communication band might be used by another robot or local user, which causes both signals to mix-up and makes it impossible to communicate with robot.

Our communication system is designed to work on different channels. In case of any unexpected intrude to our communication band, we can maintain our communication with robot by changing the band. To withstand various environmental conditions the power of communication system is adjusted to cope with worst scenario.

**Mechanical problems**

* The movement of the robot might not be precision enough. This will make the control of the robot harder.
* The motors of the robot would not be fast enough and that will end up with time violation in attack and weakness in defense.
* If the force applied to the ball in the shooting is not well calibrated, it will decrease our control over the ball and decrease our chance to score.
* The weight of robot will deform the framing of the robot.
* If the sensitive parts and connections take hit from ball, they will be malfunction or lost connection.

To protect the robot from impacts, we add a protective shield covering the robot and all connections are going to be soldered. To increase precision of operation, feedback connections and algorithms will be integrated to system. The choice of motors and other mechanical parts will be done with additional safety margin.

**Field vision problems**

* Due to the limitation of visual angle of sensors, all elements on the field will not be visible at the same time to the operator.
* Location of sensors will create some blind spots around the robot.

To extend the field coverage some sensors will be attached to moving parts. Some of proposed visual systems can be used together to benefit from strengths of each.

**Electrical problems**

* Under continuous operation batteries, motors, development boards might overheat.
* Rapid changes in the current can cause voltage spikes, which will harm voltage sensitive elements such as ICs and sensors.

Heat sinks and fans are going to added to heat sources. Voltage protection circuits will be added in the supply of sensitive elements.