

Planning Tree Diagram Discussion

Yatong Bai ME 2110-F

For the task of the Mission of Mars competition, the Planning Tree Diagram (Chart 1) is used to plan future designs. This Planning Tree Diagram is first divided by the five tasks of the competition, then by the different procedures required in each task. In the design process, these steps might be further divided depending on the mechanisms that will be used.

Ramifications: Though the mechanisms that will be used in the competitions are still not determined, there are some steps that will be involved independent on the type of mechanisms used. And they together form the ramifications of Chart 1.

For example, “Trigger Control Signal” is a ramification of sub-tasks appeared in several places in the diagram. Though how signals will be triggered, whether it will be a mechanical or electrical system and what the signals will trigger are undetermined, signals will always be needed. Because each task will involve 2-3 steps. So, the starting and ending point of each step must be determined by the signal.

Another example of important but undetermined part is “Gain / Generate Energy” . There are many choices for this step, including using mechanical designs and electric devices, and utilizing the gravity. Though some of them generate linear motion while others generate rotational motion, some mechanisms that provide energy will be needed.

Major Findings: During the process of making the diagram, it became clear that the most challenging part of the design is to “Start with Signal” . As the power sources that can be directly controlled by electric signals (Motors, Solenoids) are limited, some designs that can intermediately control energies need to be considered to make the design more effective and simple (simplicity brings reliability). These will require special considerations.

Impact on future decisions: Due to the important relationship between signals, starting points and stopping points, In the future design process, relationships between sub-tasks will be considered when making decisions. For example, when choosing a mechanism for a sub-function listed in Chart 1, the type of signals (whether physical or electrical) it receives and generates will be taken into consideration.

Conclusions: In a nutshell, this planning tree diagram divides the big competition into small parts that will need to be considered in the future. In the design process of each mechanisms, the Planning Tree will remind designers the subsystems that need to be considered and designed, so that designers can design step by step and combine each sub-mechanism for each sub-task (entries of the diagram) in the robot to achieve the tasks.