

## Tips and Tricks for the Mission Possible Event 2025

The Science Olympiad Event “Mission Possible” is one of the most interesting, yet difficult events. It involves building a machine (The Device) with many moving parts (Actions) each performing an “Action”. Each “Action” has to work perfectly in order to trigger subsequent “Actions”. For maximum scores, mechanical sand timers must also be built into the Device.

Assume we have two Devices called Device 1 and Device 2. Device 1 uses every possible Action to get a maximum score of 1535. There are all 12 Actions plus the Start and Final Actions which must all work sequentially and flawlessly. This comes to 11 interactions from the Start to the Final Action. If we assume that each interaction works with a 90% success rate can we expect the machine to win? If we multiply 90% (0.90) by itself 11 times we get  $0.90 \times 0.90 \times 0.90 \times 0.90 \times 0.90 \times 0.90 \times 0.90 \times 0.90 \times 0.90 \times 0.90 \times 0.90 \times 0.90 = 31\%!!!$  Thus, such a device would work perfectly less than ONE THIRD of the time.

For beginning teams, I recommend that they start by building a Device which does the BARE minimum to score the EASIEST points. Below are two hypothetical Devices. Device 1 is the perfect Device designed to score the maximum points possible (1535 by my understanding of the 2025 rules). Device 2 is the BARE minimum Device which gets the most points for the least amount of work (Drop a golf ball to raise a STOP sign and do the ASL and labels).

Device 1	Device 2	Scoreable Items
50	50	Set up Device in 30 minutes or less.
25	25	Action Sequence List (ASL) 2 copies at the proper time.
25	25	ASL in proper format.
25	25	Original actions in ASL are properly labeled in the Device
25	25	All scorable Actions are included and accurate.
600	0	All 12 Actions work perfectly for 50 points each.
100	100	The Start Action is completed.
250	250	The Final Action is completed.
90	0	Golf ball cm swing to hit the release button for Final Action
120	0	2 pts. for each second of Target Time (Assume Target = 60 sec.
60	0	1 point for each second Sand Timer operates. Assume 60 sec.
90	0	Reduced size of Device in all three dimensions. (90 pts. max)
75	75	No Device adjustments made during operation.
<b>1535</b>	<b>575</b>	<b>TOTAL POSSIBLE POINTS</b>

The START and FINAL actions are required for both Devices, so I recommend the following steps for new Mission Possible teams:

0 Before you start building, think, think, think and draw lots and lots of pictures and plans with dimensions.

1 Build the Device's "box" make it sturdy. Duct Tape, cardboard and PCV pipe are not good box materials. Wood, glue, and screws are best unless you are skilled in steel fabricating.

2 Build in the START ACTION that you carefully drew on paper.

3 Build the FINAL ACTION that you carefully drew on paper.

4 Test your DEVICE 100 times with each team member doing it 50 times. Learn your Device and how to set it up so it works every time.

5 Add the labels to the DEVICE making sure they do not interfere with its operation. Make two copies of your ASL and check it against the labels in the Device.

5 Put your DEVICE in a car / truck and drive it to a friend's house. Does it still work reliably after transport?

6 If you still have time, start adding the other ACTIONS and TIMERS that will earn you more points. Be careful not to reduce the reliability of correct operation when adding new Actions.

