

# Virtual Survey User Manual

Author: Zheng-Xuan Li, Jen-Yu Han

## System requirement:

OS / browser: Microsoft Windows and Mac OSX with the following web browsers are supported.

Browser	Chrome	Safari	Firefox	Microsoft Edge	Opera	Internet Explorer
Support	V	V	V	V	V	X

Integrated graphics card support, discrete graphics card is recommended.

Length of the game: 10-15 min approx.

## User Control:

- 1) Game view is controlled by mouse and keyboard.

Press and hold left mouse button and move with your mouse to any side.

This will change the game camera view.

Moving in the game is done by pressing the keys as follows:

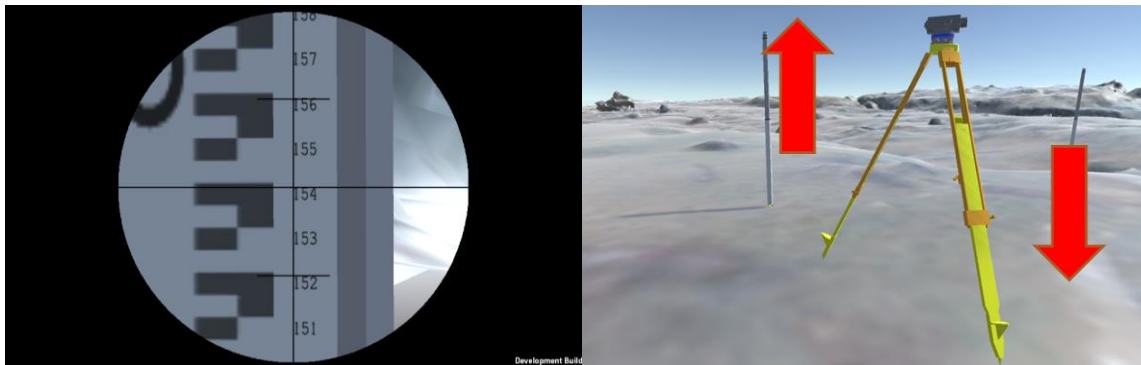
'W' to go forward, 'S' to go backward, 'A' to go leftward, 'D' to go rightward.



- 2) Level view control is done by pressing '<-(left)', '->(right)', level turns right or left.



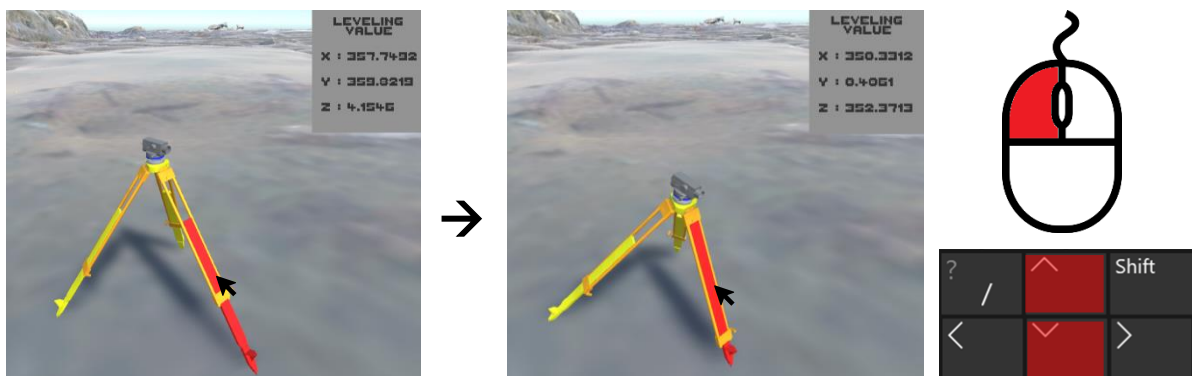
- 3) Pressing the **'C' key** switch the camera to the level's telescope.
- 4) Lifting up the level and putting it down by pressing **'T' key**.



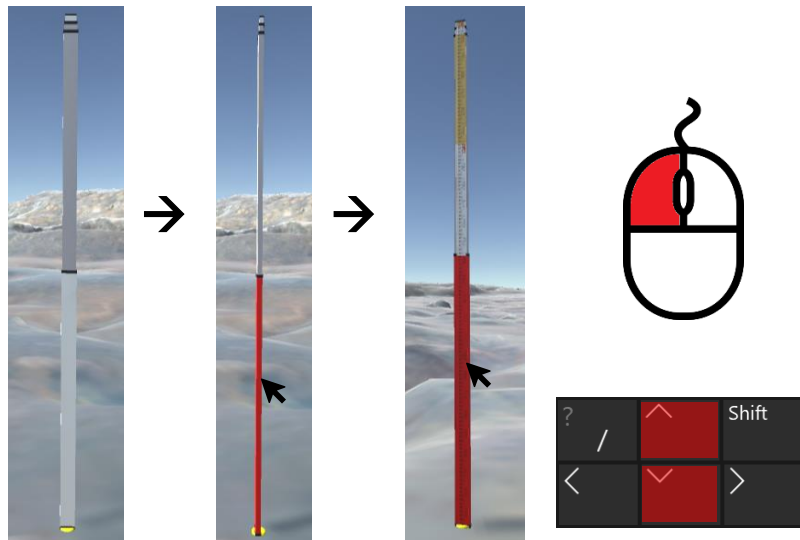
#### 5) Tripod height and rod rotation:

The selected object (tripod's leg or leveling rod) turns red when you click on it with left mouse button and hold it.

**Click** on the tripod's leg and press **'up' and 'down'** keys to control the length of its leg and therefore change the height of the tripod.

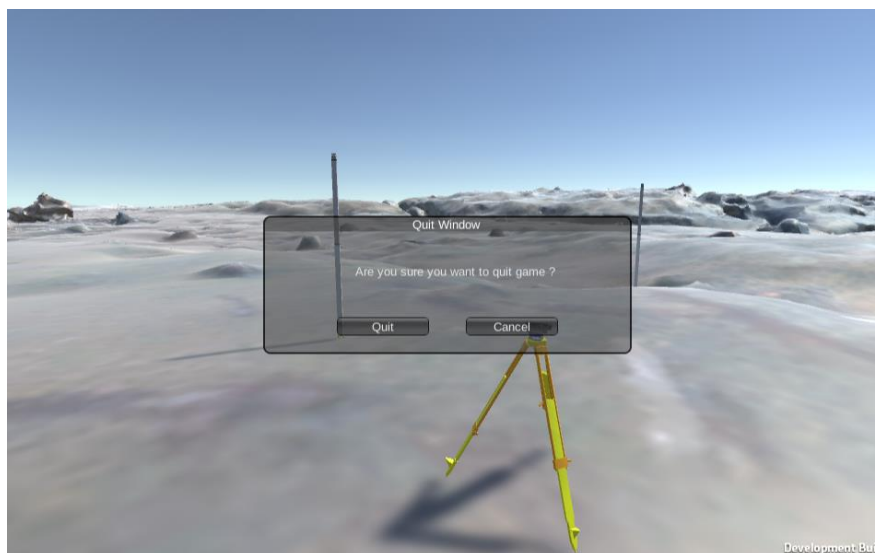


**Click** on the rod and press the **‘up’** and **‘down’** to rotate the rod.



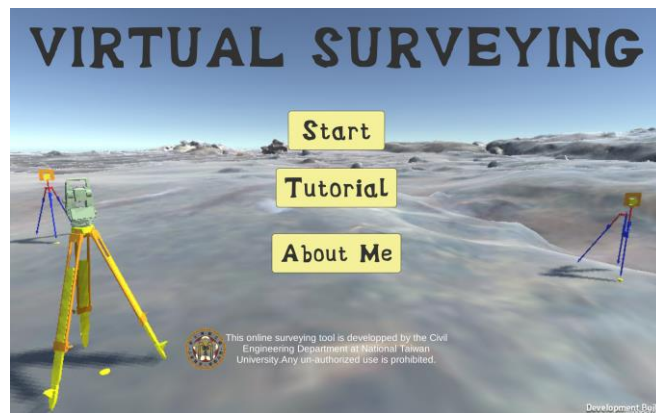
## End of the game

When the whole surveying is finished, and the error was evaluated in the allowable range, **please check your screenshots** and quit the game by pressing the **“ESC”** key. The “Quit Window” will show up, click on the “Quit” button with mouse to end the game.

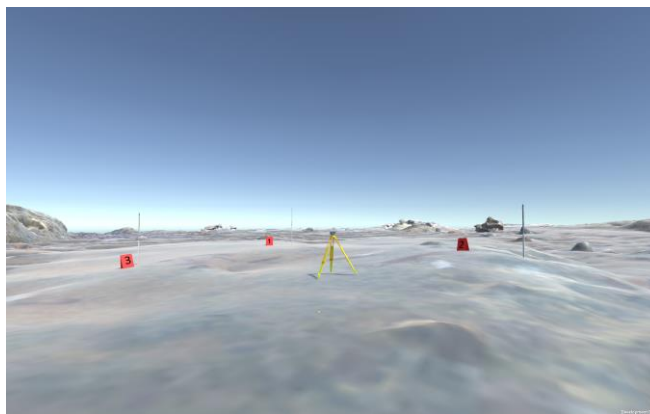


## Operation Steps:

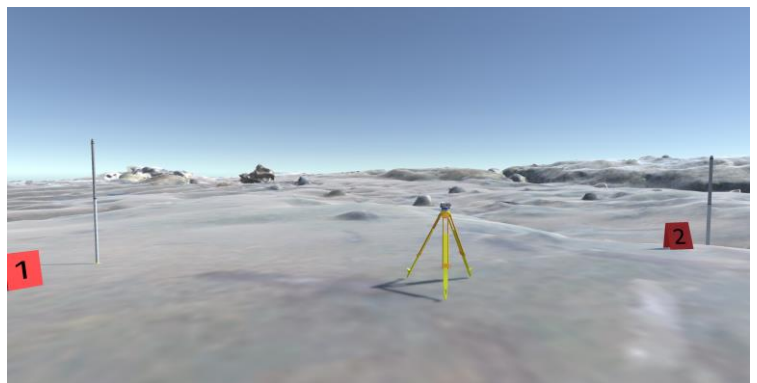
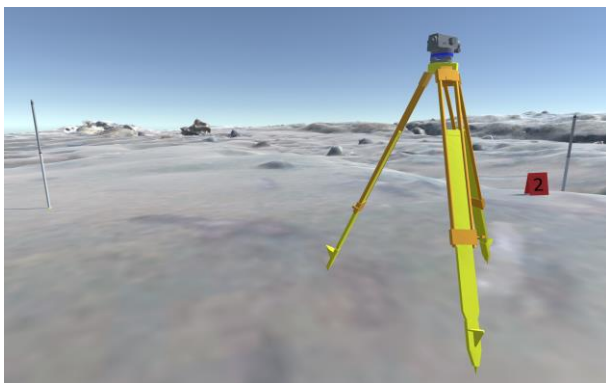
- 1) Press 'Start' to enter the game.  
Press 'Tutorial' to open this user menu.



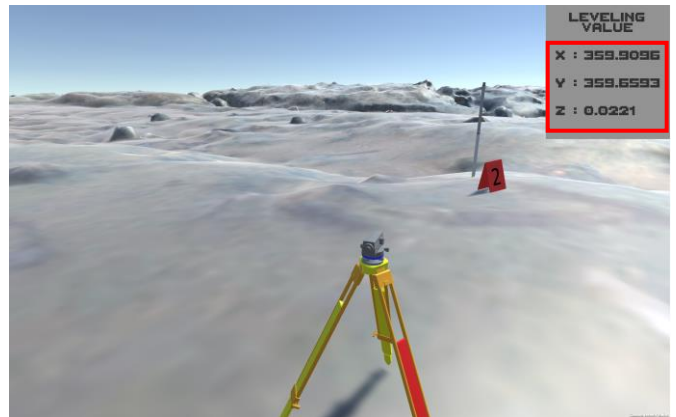
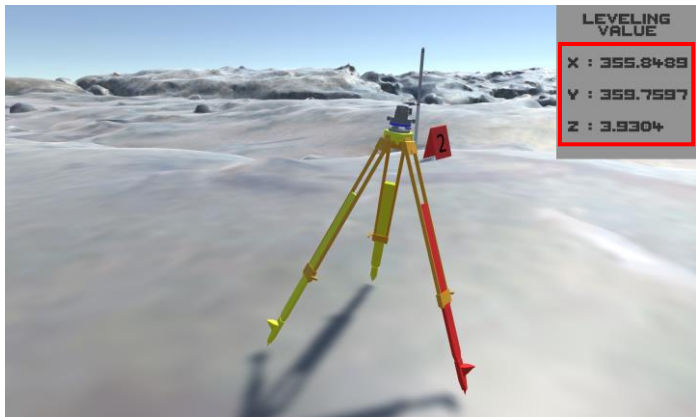
- 2) There are three levelling rod and one levelling on the tripod in the original scene



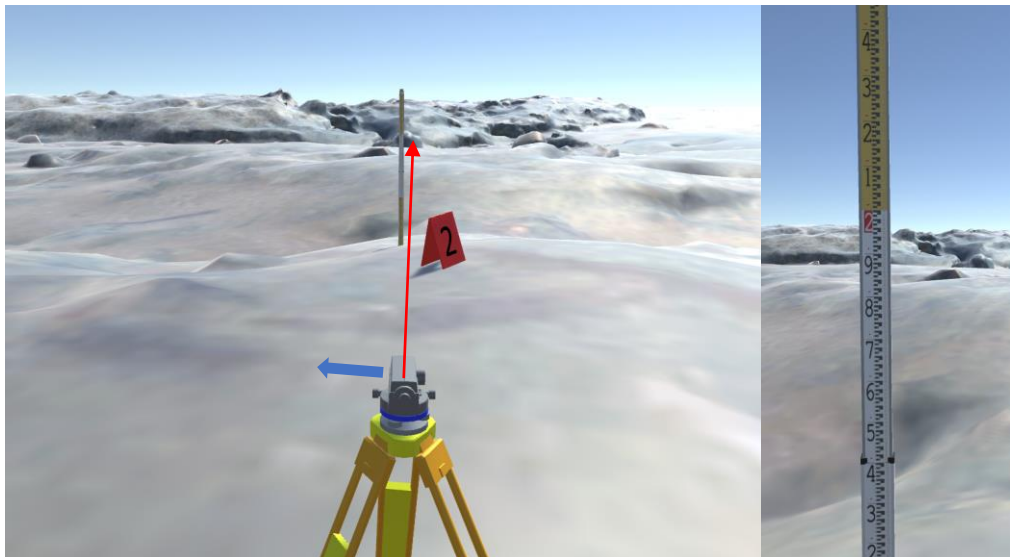
- 3) Take the instrument and put the place in the middle between two rods.



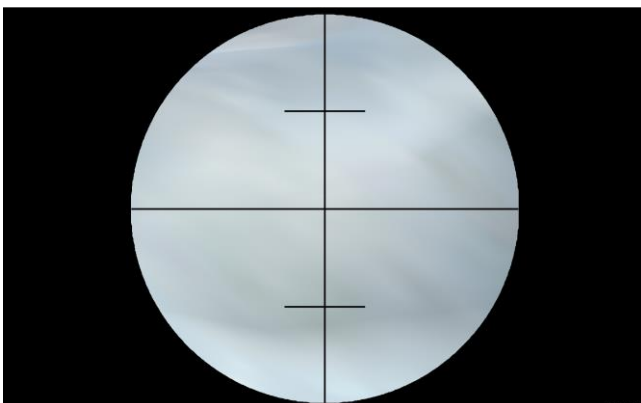
- 4) Adjust the level with three tripod legs, and try the best to make the x, y, z axis value close to zero.



- 5) Rotate the rod front to the levelling and align the telescope to the rod.



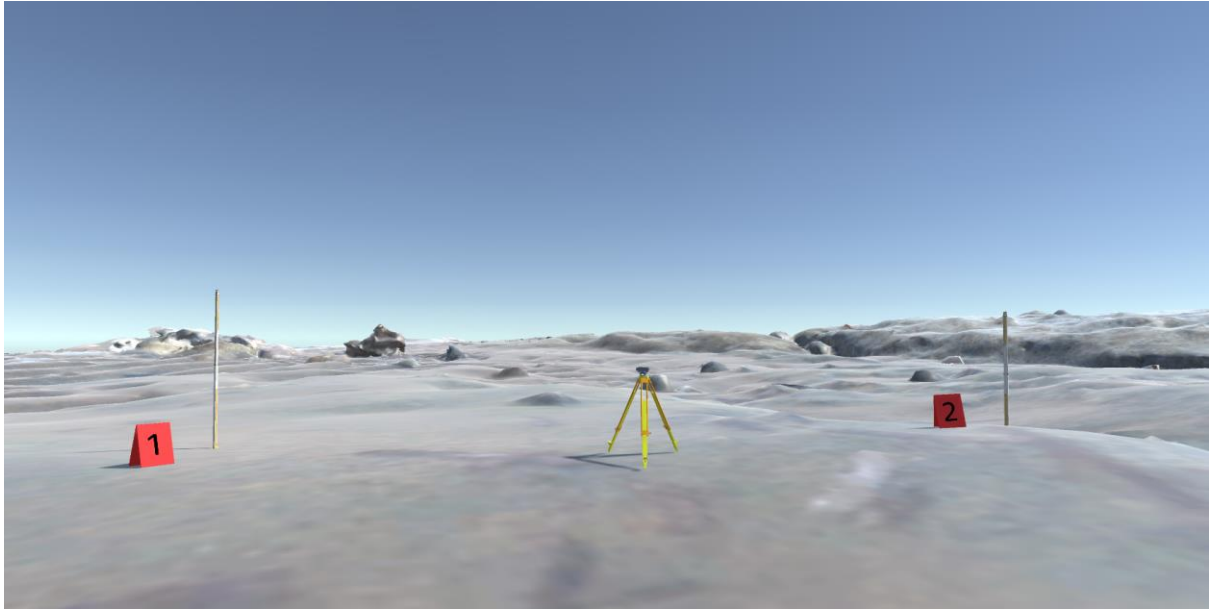
- 6) Press 'c' enter the camera of the scope, adjust the camera by the left and right arrow slightly. Record the value of cross hair, and take a screenshot like right picture.



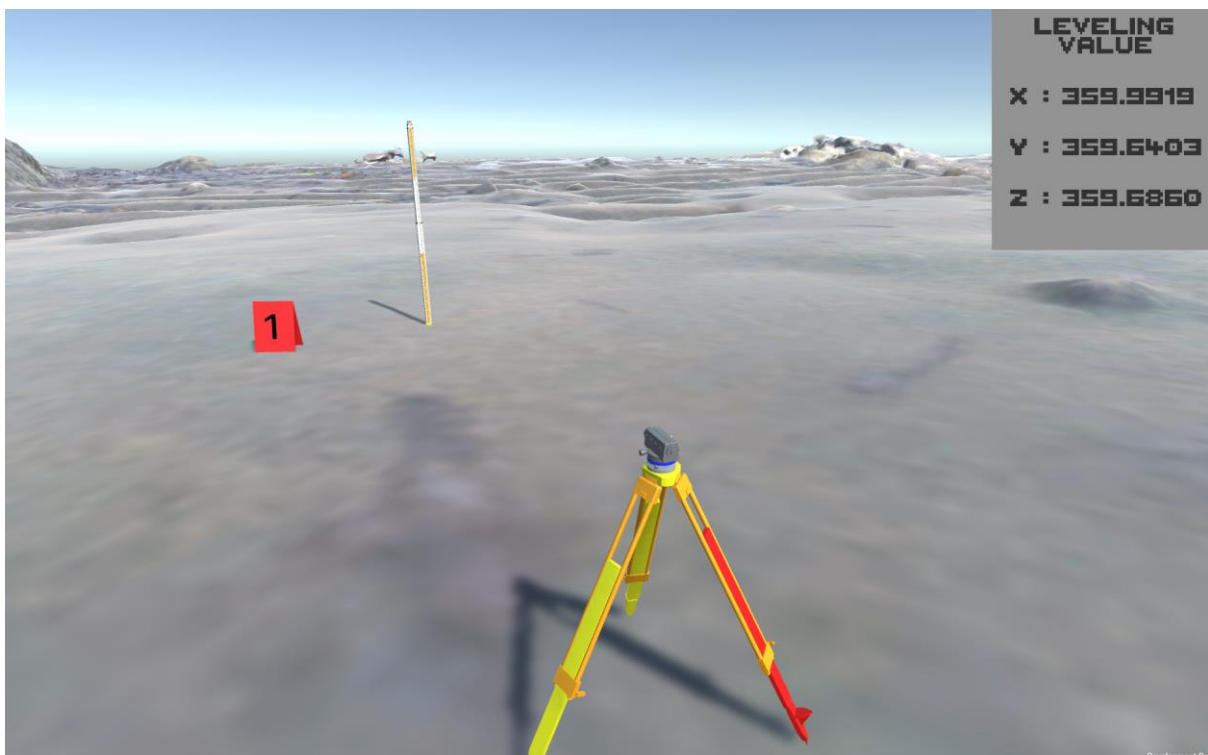
**Example:**

**Measure difference of elevation between the rod 1 and rod 2**

- 1) Put the tripod in the middle of rod 1 and rod 2.

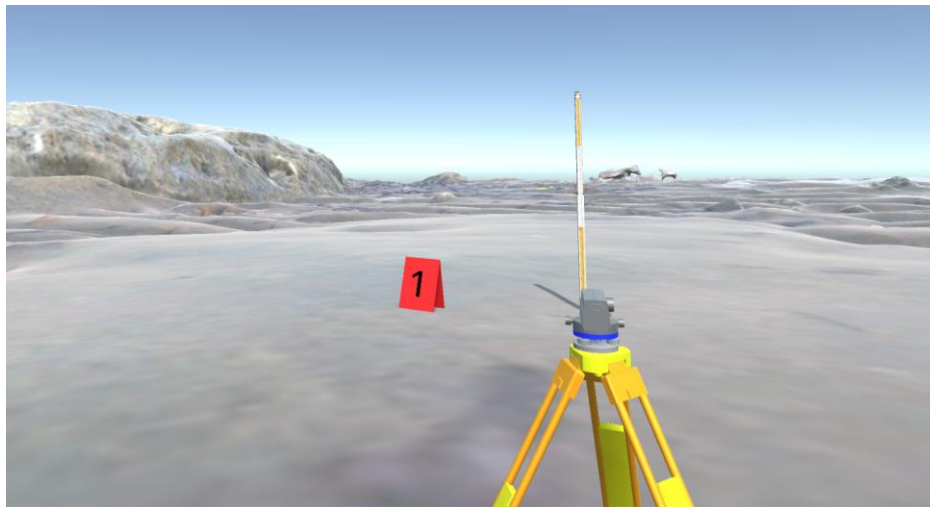


- 2) Adjust x, y, z value to close to zero.

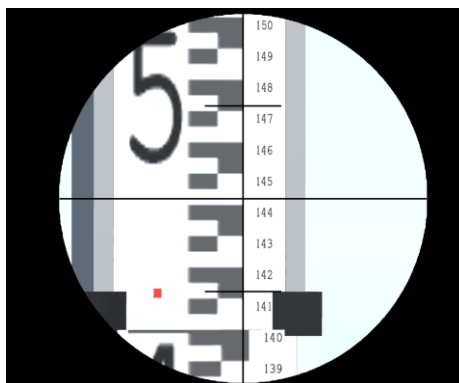




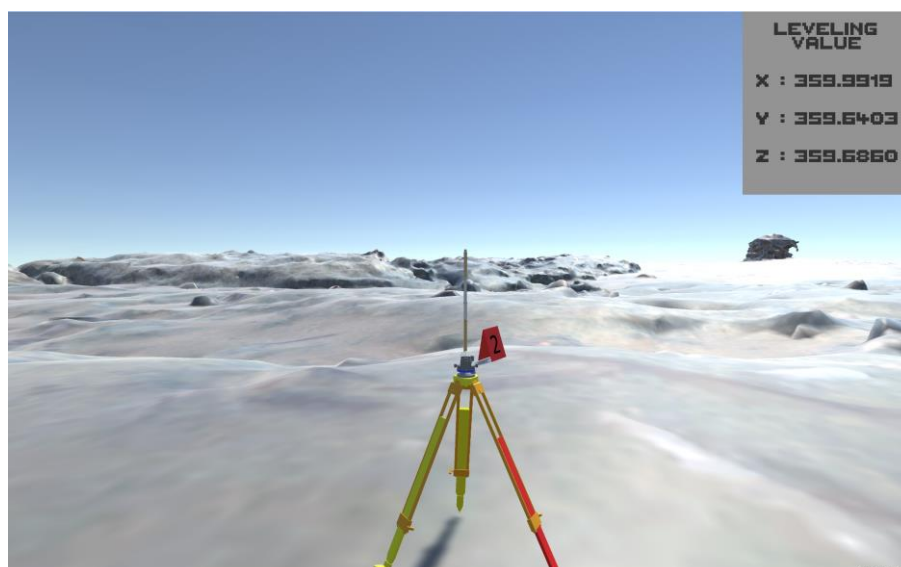
3) Align to the rod1.



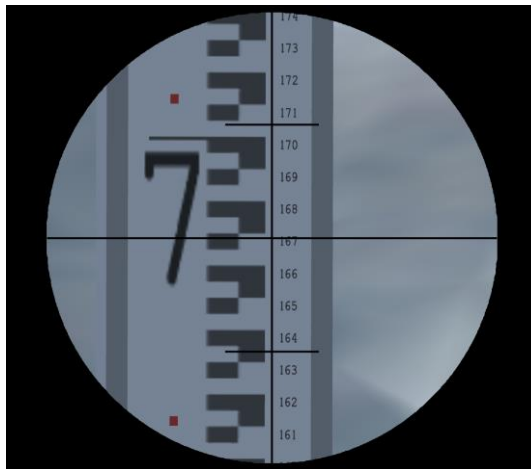
4) Record the value of cross hair, up stadia hair: 1.471m, middle cross hair: 1.441m, down stadia hair: 1.411m



5) Align to rod2, rotate the rod front to the tripod, and check the level again.



- 6) Record the value of cross hair, up stadia hair: 1.704m, middle cross hair: 1.669m, down stadia hair: 1.634m



Station	Points	Differential Leveling Rod Readings (m)						Difference in Elevation	
		B.S. +			F.S. -				
		Dis.	Up Stadia Hair	Middle Cross Hair	Dis.	Up Stadia Hair	Middle Cross Hair	+	-
Down Stadia Hair	Down Stadia Hair								
A	1	7m	1.704	1.669	6m	1.471	1.441	0.228	-
	2		1.634			1.411			