TopoBot Design Requirements

Name _____ Date _____

Overview:
The TopoBot is a LEGO Mindstorm NXT robot adapted for a special purpose. The Bot will simulate topographic data gathered by a satellite. The function of the TopoBot is to carry an ultrasound motion detector pointing vertically downward. The motion detector collects vertical distance data which is exported to an Excel spreadsheet for map making.

Specifics:

- The Bot must be designed to travel horizontally along a PVC pipe (~1-1/4 inch inner diameter or ~ 1-1/2 inch outer diameter-– English units because that is the way the pipe is sold) which is attached at either end by vertical PVC supports with a height of approximately 60 cm.
- The Bot's motion must be smooth, stable, and continuous.
- The Bot must be programmed to travel a horizontal distance of approximately1.5 m in 15 seconds while the motion detector collects data, and then return to its starting point.
- The motion detector must be attached to the Bot so that it points vertically downward and remains stable throughout each run.
- The motion detector, when attached to the Bot, must be at least 20 cm above the highest point of the terrain that is being mapped.
- How ever the motion detector is attached to the Bot, it must be centered such that it can scan a horizontal distance on the floor of exactly 1.5 m for each run.
- The motion detector will collect data at the rate of two samples per second for 15 seconds, yielding 30 pieces of data for each run.