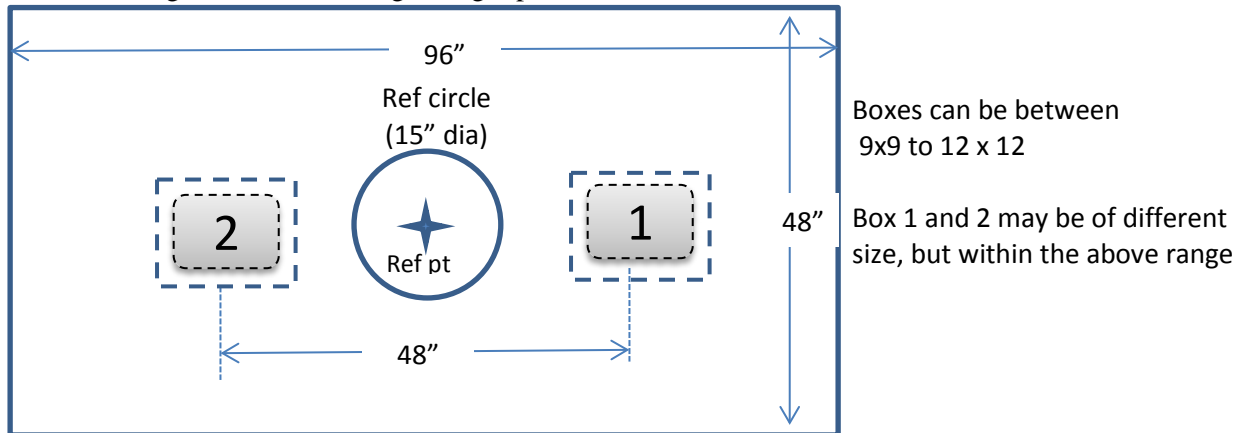A company is interested in developing an autonomous surveillance vehicle to automatically and periodically tour the perimeter of their two buildings. They desire that the vehicle start and stop at a point midway between the two buildings and travel in a figure eight pattern.

Design and build a vehicle which meets the following requirements:

1. The vehicle must start at and stop at or near the reference indicated in the diagram.
2. The vehicle must fit within a 6x6xl2 inch box
3. The vehicle must be powered by one or two Radio Shack DC motors (part number 273-223, 258 or 047) and compatible batteries. No other energy source shall be included within the vehicle. You can substitute motors from our collection in gwc 465.
4. The vehicle must have an index mark which is to be used to position the vehicle in the starting position and will be used to measure the distance between the index mark and the reference when the vehicle stops.
5. A contestant will be called to the starting position with his or her vehicle in the 6x6x12 inch box. Within one minute the vehicle must be placed in the starting position and motion initiated by a "switch" on the vehicle. Once started, no communication of any kind shall be transmitted to the vehicle.
6. The vehicle must travel around building 1, cross the reference circle, and travel around building 2, then come to a stop at or near the reference point.
7. Micro-controllers or any type of CPU is NOT allowed; however non-programmable electronic or electrical components can be used
8. You are NOT allowed to place any guide chutes or tracks on the plywood outside the 6x6x12 envelope.
9. All work must be your own; no collaboration allowed.
10. There can be only ONE index mark; it will serve as a ref for the start, intermediate crossing and end
11. the same ref point must go around both buildings
12. you cannot lay any tracks or latch on to any part of the playing filed or buildings (even if the tracks get laid automatically after the device starts)

Both the time to complete the circuit and the accuracy of the stopping point will be used to evaluate the design. The shorter the time and the more precise the stopping position the better. The two criteria will be equally weighted. A vehicle will be disqualified if it contacts either building or if any part of it departs from the plywood sheet.

Logistics
You can use any material or component, such as LEGO parts, foamcore, wood, aluminum sheets, etc, but power sources are limited and no programmable device is allowed
The department will reimburse you for up to $100 (receipts will be required and re-usable materials, such as motors, will need to returned)

The prototype will be inspected and certified prior to the contest; if any rules are violated you will need to fix the problem and return for re-inspection

The device must be your own design and construction; you cannot just retrofit an RC car and use it for the contest, for example. You can, however, use parts from existing devices.

Your device will be inspected on Nov 24th and fabrication grade determined. If you change the design it will need to be re-certified. However, repair and maintenance are allowed.