

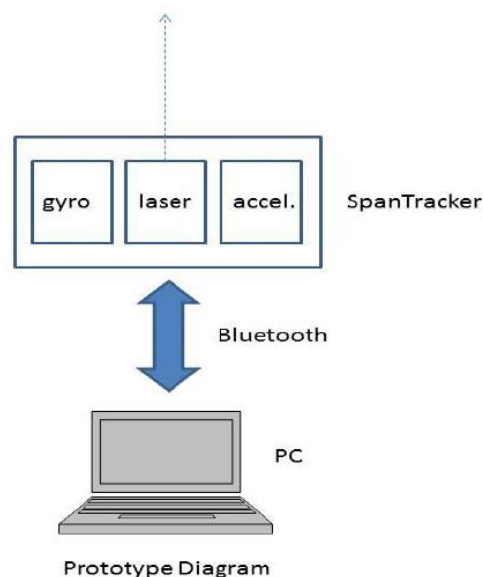
# SpanTracker Prototype Proposal

## Description

I am seeking to build a prototype for a hand-held device that I have given the project name SpanTracker. The device allows a user to measure the distance between two remote endpoints by directing a distance-measuring laser beam successively at each of the endpoints. The distance between the endpoints can be calculated by keeping track of the movement and orientation changes of the device in the interval between the laser measurements. This would be done by components such as an accelerometer and a gyroscope. This would allow a user to measure distances between endpoints that possibly are not even mutually visible, such as on either side of a wall. Here is the abstract from the patent application (No. 13/423,278, also see application):

A portable distance measuring device that works by spanning separately targeted endpoints is described. The device contains a laser distance measuring component and sensing components that track changes in position and orientation of the device, such as accelerometers and gyroscopes. Distance is measured by pointing the laser at an endpoint and measuring the distance to it. Once this measurement is confirmed, the device can be moved to a different vantage location to measure a second endpoint with the laser. The orientation and position of the device for the second distance measurement relative to the first measurement are calculated by the position and orientation sensors. Together these values are sufficient to calculate the distance spanning the endpoints. This calculation is performed by a computer contained in the device and the distance displayed to the user.

## Prototype



The prototype would embody the above diagram. The laser distance measuring component captures distance measurements, the gyroscope orientation changes, and the accelerometer position changes.

Bluetooth can be used to send the individual sensor readings to a computer for combined processing. I estimate that all of the parts can be purchased for several hundred dollars. For example, the *Leica Disto A6 Classic Plus Laser Distance Measurer* appears to have suitable accuracy and communication capabilities. The gyroscope and accelerometer could be obtained from a company such as *SparkFun Electronics*.

### **Related devices**

All of the components are of course available currently in various forms and products. There are numerous laser distance measuring devices on the market, some that even perform 3D mappings from a stationary position. However, I have found none that combine all of the sensors for the mobile measuring technique described here. Possibly the robotics method for Simultaneous Localization and Mapping (SLAM) is most related to the device, although SLAM has not been applied as a user device to my knowledge.

### **Risks**

With the menagerie of similar devices on the market and, as it must be expected, on the way to market, it is not a sure bet that this is a unique device; although to my knowledge it is. Also, from a technical point of view, whether the sensor signals can be combined with acceptable accuracy is unknown. Finally, with an eye toward possible production, can the device be manufactured at a marketable price point?

### **Uses**

In addition to straightforward measurement scenarios, SpanTracker could be used to create computer models of objects and buildings by combining a set of measurements. For example, walking about the interior of a house and either taking a set of individual measurements or perhaps “waving” the device at walls and corners might supply data to build a computer mesh model. And combining these measurements with video from a possible camera accessory could be used to texture the model with image data.

### **Proposal**

I am looking for a collaborator that has the expertise, facilities, funding, and interest to build a prototype. In return, if there are commercial gains to be made from the device, a negotiable division of these is offered. I can supply or assist with the software programming portion of the project, as that is my field of expertise. I would expect as an outcome to produce a prototype that is suitable for demonstration to device manufacturers in relevant sectors.

### **About me**

I am in the computer software field, having worked for Lucent Technologies, Microsoft, and Citrix Labs. I have a background in AI, pattern recognition, and to some extent in robotics. I also taught undergraduate computer science at Illinois State University for several years. I have a few open source projects online and have written a couple of game apps for Android phones and the Kindle Fire as well as a project for the Second Life virtual world.

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