

Augmented Reality – Visual Orientation System Prototype

Client

Abram Balloga, Independent Inventor

Background

Augmented Reality has demonstrated great commercial potential with many fascinating navigational purposes. Several of these uses have resulted in popular smart phone applications such as Augmented Outdoors: <http://peaks.augmented-outdoors.com/>

My goal is to incorporate a similar navigation capability, Visual Orientation System (VOS), into a binocular or monocular viewfinder. Watch this VOS demo video for illustration: http://www.youtube.com/watch?v=Mkd_Qa17HCA&feature=youtu.be. The golf design shown in the demo is more complex than the scope of this project will cover.

Binoculars with integrated sensors, instruments, and digital displays already exist - most recently culminating in the civilian world with the Swarovski EL Range: http://www.swarovskioptik.us/en_us/products/binoculars_el-range

Project Goal/Requirements

The purpose of this project is to provide a proof of concept functional VOS prototype using the Apresys ProBino 3209ic as a basis for development: http://apresys.en.alibaba.com/product/489077487-212341923/Apresys_Laser_rangefinder_Binoculars_ProBino3209ic_w_inclinometer_and_comp_ass.html The resulting navigation enabled binocular will be the first of its kind. NOTE: Client will provide the binocular

The ProBino above contains all of the components required to carry out VOS with the exception of a GPS module. The requirements for the prototype project therefore are primarily to:

1. Hardwire a GPS module into the device circuitry; and
2. Program VOS, both forward and reverse functions/install code to the device

NOTE: The GPS module is just a receiver chip about the size of a dime that needs to interact with the processing unit of the device. Client has a GPS chip that should be suitable for the project, but if a different one is required client can put in the order to be delivered to the team. As for how to connect the GPS chip to the system, client does not know how this is done - that's part of the challenge of this project!

Skills

Able to learn new technology a must!

The device uses a Field-Programmable Gate Array (FPGA) rather than a CPU for processing - more specifically a very common Xilinx FPGA (link to data sheet and user guide: http://www.xilinx.com/support/documentation/spartan-3e_user_guides.htm). The description says the "FPGA programmability permits design upgrades in the field with no hardware replacement necessary". So I believe this processor to be designed for improvisational access on an already assembled device. There is a lot of support on the company website for making a JTAG interface to access and modify code on the FPGA.

Student benefits

Building this start to finish wilderness navigation prototype will be a very dynamic, interesting, and rewarding project. Extensive field testing is to be expected, which will bring the designing team a welcome and well deserved escape from the lab.

Location

Location is flexible.