

Hunted! With GPS...

Principle Goal(s): Design and implement a web-based interactive tool to support navigation and expedition planning. Also develop a simple GPS tracking phone app that supports a 'hunted!' style game for Duke of Edinburgh Award Scheme, Scout, Guide and other youth groups to use to improve navigation skills.

(Note – this was a project for two people, one on the web interface, the other on the phone app and integration)

Young people in a variety of organisations including Scouts, Guides and/or Duke of Edinburgh (DoE) award scheme routinely use traditional paper maps from Ordnance Survey (OS) to plan and execute remote multi-day expeditions across Scotland and elsewhere in the UK (typically backpacking/camping hikes). **These maps are now readily available online through the OS APIs.** GPS devices with transmitters (for simplicity think of a phone tracking app) can now be used to **track individuals and these positions** can be viewed live.

There are some online tools to help with navigation planning but nothing that really works that well and none of it is **integrated with logged GPS tracking.** This project is part of a multi-year programme of work to research and develop a linked suite of online and mobile based tools to help young people plan expeditions and to help them learn how to use both the online and the paper based mapping tools effectively. We expect future students to develop these tools further possibly involving the young people directly in code development as the programme matures.

Sub Project 1: **Planning / Management Toolkit (web project)**

There are already some tools for route planning that are web enabled. Ordnance Survey and Google for example have **route planning systems.** This provides a simple but reasonably effective tool for marking waypoints on the online versions of standard maps that young people can view then translate. We want to expand the functionality either by developing a new system or extending the existing one (OS have an API and open development environment).

From a planning/management perspective, **all routes need to be risk assessed.** There are hard/legal rules dictated by the organisations running expeditions, for example, maximum altitude allowed, maximum distance from a road or habitation. We want to be able to **overlay digital maps** with colour coded regions as defined by these sorts of rules (the data required are already available but may require some additional computation/processing). The rules can be pre-defined allowing the data to be calculated in advance and a raster overlay produced.

As an extension we want to be able to **link the planning tool to one or more live GPS tracking devices.** This will be used to enable games based on tracking and navigation such as Hunted! It will also be used to monitor progress of groups during training and during live expeditions.

Sub Project 2: **Training / Execution (mobile app & integration with web project above)**

Training and practise at navigation using paper maps and compasses is an essential component of these activities - it is traditionally recognised as a fairly boring activity. There are ways to exploit tracking and communications technologies to make it more interactive and fun for the young people involved. An example is a Hunted style game done in small teams with radio comms. In brief, there is a hunted team carrying a GPS tracker with transmission functions but otherwise trying to evade capture. The device sends GPS coordinated back to base (e.g once per minute). There is a

coordination team at the base who can see the GPS location overlaid onto a map or provided with coordinates that they need to find on a map. Using radios or other communication devices they can explain to hunter teams how to try and capture the hunted team. The hunter teams have maps and radios but not the live GPS feed so the groups need to learn how to communicate and use map based navigation skills and methods.

Outcomes

- Perform a requirements analysis with instructors and young people to inform the design of navigation tools needed.
- Build the navigation tool (ideally web based) that supports route planning, overlays of safety meta data onto maps/routes and overlaps of live GPS signals from mobile devices.
- Build a phone app that records and transmits GPS signals in a format acceptable to the navigation toolkit.
- Test the route planner on a training expedition involving a group of young people under the supervision of qualified instructors from the youth organisation.
- Test the game mode with three or four teams of young people, one team being hunted and trying to escape, one team coordinating the hunters and one or more teams hunting.
- Gather feedback data from instructors and from young people.

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