The GAISS project (Geographically Aware Information Support System)

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The availability of powerful portable computers, and live position reporting technology for field search teams opens up a new area of computer-aided search management. In this article, we discuss software developed as an aid to search management.

The background for this project is a chance meeting between one of its developers and members of the South Eastern Mountain Rescue Association (SEMDA). John Ronan, one of the researchers in the project, has had an interest in amateur radio for many years. John is an active member of the Tipperary Amateur Radio Group, which often provided communications support to the yearly Cahir Mountain Walking Festival in the Glen of Aherlow. The other developer of the software, Kevin Welsh, is also a regular at the same festival. Also regular at the event were SEMDA members, and it was during a casual conversation between all of these people that the seeds of what became the GAISS project were sown.

What first impressed the SEMDA members was John's operating a radio from a base at the foot of the mountain, while able to tell them exactly where each group was on the hill, without ever needing to call for a position.

The secret was that there were several Amateur radio operators in each walk, and these people could be tracked remotely. For several years now, Amateur radio operators have been using a system called APRS ("Amateur Packet Reporting System") which allows operators with suitably equipped radios to broadcast their position. In over a decade, APRS has grown to a worldwide network of thousands of stations, some mobile, and some stationary. With suitable software, or even by looking at special websites [www.aprs.fi] you can quickly find out where in the world a particular operator was last active, once you know their call-signs to long-suffering "mobile" station operators, maybe: - more importantly - APRS is a fairly functional system for tracking and information reporting network.

Despite its many useful features, the APRS system has one major disadvantage from a mountain rescue perspective: the system is only accessible to the people with APRS receivers. Other disadvantages are that the radio equipment required is quite specialised, is not licensed to operate on the Mountain Rescue channels, and also how long ago the search was (areas are considered to be less relevant to the statistical model the longer the search goes on).

At this point, it is necessary to talk about the deficiencies of this approach. First, and most important, this model is only useful if the missing person is correctly categorised and the Point Last Seen (PLS) is correct. As with any system, good outputs depend on good input. No software is ever going to replace a thorough search of the PLS. The software provides information - decision making still rests solely in human hands.

The second point is that the GAISS software is only one interpretation of how search area modelling could work. The software has been developed with considerable valuable input from SEMDA members and Dave Perkins from CSR, but it still remains in a very early stage of development.

Future Directions

This project was funded by Enterprise Ireland under their Proof of Concept programme, which aims to support academic researchers to explore concepts with commercial potential. The area we sought to explore was how the algorithmic allocation of search resources over large area to maximum effect. Mountain rescue was chosen as a test-case because it illustrated a "worst-case" environment.

Unfortunately the project has now finished, and while the developers are still looking for an avenue for further research work in the area, this has not been found as yet. GAISS shows one direction in which computer-aided search management could go in future. With development, the system could provide a useful tool in the search and rescue arena to help in planning of searches and locations of teams.

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