

Bill Farnham, Course Manager at London Beach Golf Club, gives some advice on charting your golf course

MAP IT OUT



Above: Tools of the trade

GPS, Global Positioning System, was first developed for military use in guidance and navigation. It now has a wide range of applications, being most widely used in recent years for marine navigation. Early systems offered accuracy to around one metre; today's state of the art equipment is capable of sub centimetre accuracy.

I was first introduced to the benefits of GPS during my time in golf course design. We had previously been using conventional surveying techniques in the form of Total Stations with Data Loggers. The time and manpower savings that can be realised with GPS are quite remarkable. Time taken to complete a typical survey can be reduced by as much as 50%. GPS requires only one-man operation, compared to two for conventional methods. Other benefits are that there is no need to set of a number of stations over a survey site to achieve a line of site between instrument and target. Also the range of GPS is much greater, up to 10km from a base station.

GPS works by way of a network of ground control stations, a radio link with an operator controlled rover and a system of satellites, 24 in number at this time, orbiting the Earth in eight orbital planes, some 20,000km above the Earth's surface.

Varying degrees of accuracy are obtainable depending on the GPS sys-

Right: The view from the back of the 3rd green at London Beach



Above: Bill Farnham

tem and processing mode used. We use RTK (Real Time Kinetic) processing. This is the most accurate method available, producing sub centimetre accuracy.

The survey is conducted over the required area; the operator on the system controller records points. This is a hand held PC. The system controller can be customised by the operator, and programmed with a user-specified menu. A point can be recorded, processed and stored in less than one second. The method of recording point data can be manual or automatic.

We found automatic mode most useful when surveying the London Golf Club. With its extensive network of cart paths, some 16.4km. Survey time for this element was greatly reduced by mounting the rover on the front of a golf buggy, with the mode of record set to automatic and configured to record points at 3.00 metre intervals. It was simply a case of the operator driving along the perimeters of the cart paths.

GPS however is not the only accurate means of producing accurate surveys. In fact in some cases GPS will not be an option, because the system needs to be in communication with a minimum of five satellites to function to the required accuracy.

Some sites may not be suitable for GPS equipment. If the site is heavily wooded for example, and the necessary satellite signals cannot be received an alternative must be used.

The solution would be in the form of a Total Station and Data Logger. This method is more time consuming and requires two operatives, as opposed to GPS being a one-man operation.

For a course like Royal St. George's, Sandwich, Kent, where I produced a survey to assist with the planning of the proposed new irrigation system and set-up for the forthcoming Open Championship, GPS was the perfect choice. With only a handful of trees on the entire site; there was no problem with receiving signals. On the other hand a course such as, say Wentworth,

may require a different approach using a combination of GPS and Total Stations. Whichever system is used, the end product will be the same.

The survey of the London Golf Club is, I believe, one of the most extensive carried out to date of a golf complex. Anyone familiar with the LGC site will appreciate the amount of legwork involved in such a task. During the survey over 53,000 individual points were recorded, taking some two weeks. To say I now know every inch, or should I say centimetre of the site, is somewhat of an understatement. Every detail has been accurately recorded, golf course features, trees, irrigation system, including every individual head and valve.

Having recorded all this survey data, what do we do with it? Upon completion, the data stored in the system controller is downloaded to a desktop PC. This may be done on final completion of complete survey, or as I personally prefer, at the end of each days surveying. Mainly as a safety precaution to avoid loss of data, should



a problem occur with the system controller, not that it ever has in my experience, but better safe than sorry!

Another reason for daily down loads, one is able to print out a map of the day's survey to monitor progress.

Downloaded data files are transferred to the CAD (Computer Aided Design) programme.

It is here the final maps are produced in hard copy, as well as stored for easy access.

A full range of maps are produced from the co-ordinate data, including generating a full topographic contour map of the site.

This is where what I set-up at The London Club takes the process further. By customising the CAD software installed in the Golf Course Superintendents office, to provide a data bank of maps and calculations that will allow an operative to access any given entity of the golf course, and determine location size, exact area, length and three dimensional co-ordinates, at the click of a mouse button.

Why do you need such a survey?

When I first began to consider the possibilities of carrying out such an extensive project. We first looked at what the club could get out of it and how it would benefit. What we could foresee were enormous possibilities and as time goes by the benefits are becoming increasingly evident.

In the majority of cases, Course Managers have to guesstimate, to a degree, the measurements of their golf course. This was highlighted recently when I took up the position of Course Manager at London Beach Golf Club & Hotel, at Tenterden, in Kent. It had been my intention to produce accurate mapping of the course, at my earliest opportunity, having carried out the survey during the winter. I had been informed upon taking over at the club, that when the course was constructed, three years ago, surveys, and I use the term survey loosely, had been carried out and areas of greens, tees, etc had been calculated. Taking the greens as an example, these totalled 5500m², and were supposedly accurate to within plus or minus

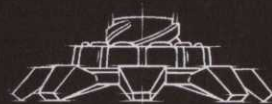
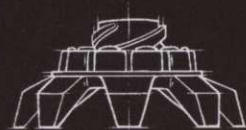


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Above: The view from fifth tee at London Beach

10%. My survey revealed that they actually total 3549m², considerably less than the figure originally suggested.

From this we can see that since the course's completion, if application rates have been calculated based on the original figures then the greens have received excessively high rates of application, poor, not only from an agronomic point of view, but also from a financial one.

Conversely, the opposite could be the case and the original areas had been under calculated, resulting in under dosing on applications.

Assuming that calculations for other areas such as tees, approaches, etc, are equally wrong, one can see the overall effect this could have.

There are numerous other benefits of having accurate mapping of our golf courses. For example; any future construction works can be accurately planned and costed from accurate plans with contours and levels. Because these surveys are three

dimensional, we can ask the programme to give us volumetric calculation for earthworks, etc, or maybe you want to calculate the amount of sand required for filling bunkers. Also yardage marker placement can be done with accuracy, and guesswork eliminated.

Another is the linking of the data with other software, such as Trims - or Epani - Spreadsheets and Databases, irrigation controllers, etc. In fact the London Golf Club has recently installed a 'Rainbird' Nimbus 2 control system, utilising my survey data.

Any future alterations or modifications to the golf course can readily be incorporated into the system. The system also allows for archiving historic data of the golf course. Of course, not every club will necessarily want, or need to, go to the same degree as the London Club. GPS and the system are so versatile it can be tailored to the individual club's requirements and budgets.

By enabling confident determina-

tion of golf course elements, we can be more cost effective and efficient in our use of resources and in purchasing, thus providing a valuable management tool.

OK, you're saying, but what is it going to cost? Well I am sure it will be a lot less than I am going to save, by confidently knowing exact measurements for my golf course, and the associated saving that can be made.

I am currently in the process of setting up a computer application at London Beach, similar to the one at the London Club. I believe it to be an essential tool in the Course Managers armoury. Although some clubs on the other side of the pond in the USA are switched on to the possibilities of GPS as a tool for golf course management, in Europe it is still very much in its infancy. I feel sure as the greenkeeping industry becomes more switched on to the benefits of GPS & Mapping of our golf courses, we will see more and more clubs taking advantage of the technology now available to us.