

By George Greene IV
 Water Missions International
 Charleston, South Carolina



GPS Helps Speed Survey Work In Haiti Water Projects

As a Christian, non-profit organization dedicated to helping solve a variety of water problems in developing countries around the world, Water Missions International custom-designs community systems for water treatment and distribution, wastewater management and storm water control. We have active current projects in North and South America, Africa and the Middle East.



Our experience with these projects has convinced us that non-profit groups like ours are uniquely able to deliver these critical infrastructures efficiently and with minimum waste and bureaucracy. On the other hand, as a non-profit, we're often faced with tight funding situations and find ourselves looking for ways to do more with less.

Recently, for instance, we've begun to use Global Positioning System (GPS) survey equipment in site evaluations and for mapping and navigating in potential project areas. The result has been significant time savings, which ultimately means lower overall project costs. In terms of our overall effectiveness as an organization, that means solving more water problems within existing funding limits.

WATER MISSIONS INTERNATIONAL: WHO WE ARE

Water Missions International had its origins in General Engineering Laboratories, a small environmental consulting firm founded by my parents, Molly and George Greene III, in Charleston, South Carolina, in 1981. That company grew to become one of the top ten environmental testing laboratories in the United States and one of the largest environmental engineering consulting firms in South Carolina.



In 1998, General Engineering Laboratories responded to the devastation in Honduras caused by Hurricane Mitch by designing, constructing and delivering six portable water treatment units, each capable of producing safe drinking water at the rate of ten gallons per minute. Within three weeks, 16 company volunteers were in remote parts of Honduras setting up the water treatment units. Other projects followed, and in 2001, the Greenes sold General Engineering and used proceeds from the sale to establish Water Missions International. We're currently involved in important projects in Haiti and Honduras, and we recently teamed with FedEx to provide portable water treatment units to war-torn areas in Iraq.

Like most non-profits, we rely on funding from a variety of sources: government grants, churches, foundations and individuals. Suggestions for potential projects come to us from various groups and agencies. Our first job is to evaluate the site and the project to determine whether there's a feasible solution to the problems and then put together a plan and a cost estimate.



Each project WMI considers entails a thorough site evaluation. That means visiting the site and gathering all the relevant information about the current water problems and available resources.

CONSOLIDATING SITE EVALUATION TRIPS SAVES TIME AND MONEY

Until our recent acquisition of a ProMark2™ GPS unit from Thales Navigation, we did site evaluations in two phases, with each phase involving a separate trip to the site – typically a difficult and expensive undertaking, given the remoteness of the sites. The first phase was to determine whether the project was viable – that is, whether there was any practical solution, based on available water resources and funding, to the existing problem. If we determined that the project was viable, we returned on a second trip to gather more information and survey the site.

Since the arrival of the ProMark2 we've been able to eliminate the need for a second trip by incorporating the survey into the initial visit. The reason, of course, is speed. Unlike our old line-of sight survey equipment, the ProMark2 can be set up quickly and operated by a single person. Among its many advantages for our purposes is its Stop and Go survey mode. This feature, which requires the use of two receivers, gives us the ability to check our data as we go along. One of the systems is fixed as a base station while the other, called the rover, is used to collect relevant data points. The data from the base station is then used to correct the error in the GPS data received by the rover. Once the base station is set up, the rover can collect data anywhere within a 25-kilometer radius and achieve centimeter-level accuracy relative to the base station.

SURVEY ACCURACY IS CRITICAL IN CALCULATING COST ESTIMATES

Accuracy is critical in our site surveys. Distances between points and elevation changes are all part of our cost estimate calculations, taking into account piping requirements or the need for pumps or towers to overcome pressure drops, for instance.

ProMark2 is small, lightweight, and is exceptionally affordable for a professional system, offering high-quality results at the lowest cost – less than half the cost of competitive products for a two-receiver configuration with software. In addition, the ProMark2 delivers a combination of post-processed, centimeter-level static survey capabilities with stand-alone, real-time, sub-three-meter reconnaissance, navigation and mapping capabilities, all in a single system.

We gave the ProMark2 its first workout in site evaluations at six locations in Haiti last August. The sites were all densely populated areas on the outskirts of Port-au-Prince, in many cases consisting of compounds housing churches, schools and community buildings.



The sites had various, typically inadequate, potable-water supplies, and in most cases, waste water dumped directly into holes in the ground was seriously contaminating such drinking water sources as did exist. The projects are all being funded by the Rotary Clubs of South Carolina.

POTABLE WATER: 40,000 GALLONS A DAY

We also proposed various types of wastewater treatment systems, from septic tanks and drain fields to oxidation ponds. At many of the sites, we also recommended elevated storage tanks to provide water during the communities' frequent and regular power outages. In all, the six water systems – at Croix-des-Bouquets, Crochu, Fond Parisien, Gorman, Lilavois and Thomazeau – are designed to provide some 40,000 gallons of potable water to about 6,000 people a day.

The site surveys provided by the Thales Navigation ProMark2 units were invaluable. We were able in every case to check our data by interfacing the ProMark2 with a laptop PC in the field to create a map. The maps, of course, act essentially as blueprints for the overall projects. The bottom line? We originally budgeted seven days in the field for the survey work. With GPS technology, we were able to complete it easily in five.

Nearly all our income is from charitable sources, and we feel we have an obligation to our donors to efficiently account for all expenses and to economize wherever we can. Our tax-exempt status and volunteerism go along way in that direction. So does the research and development we do to seek out the most cost-effective technologies in our field. But important savings are also in the details: the tools and systems we use every day. The ProMark2 and the GPS technology it embodies is one of those systems. We just wish we'd discovered it sooner.

George Greene IV is a process engineer with Water Missions International www.watermissions.org, headquartered in Charleston, South Carolina.



The site evaluations produced a number of recommendations, from drilling deep wells to disinfecting and distributing existing supplies from springs and other sources. We also proposed solar-powered pumps for some of the sites, a technology requiring a significant initial investment, but one that tends to be sustainable and requires little in the way of maintenance and operating expense. Sustainability is a key requirement at all the sites, since reliable maintenance is difficult to guarantee, and equipment that breaks down often remains unrepaired.

Thales Navigation, Inc.

Corporate Headquarters, Santa Clara, CA, USA

+1 408 615 5100 • Fax +1 408 615 5200

Toll Free (Sales in USA/Canada) 1 800 922 2401

Email professionalsales@thalesnavigation.com

In South America +56 2 234 56 43 • Fax +56 2 234 56 47

In China +86 10 6566 9866 • Fax +86 10 6566 0246

European Headquarters, Carquefou, France

+33 2 28 09 38 00 • Fax +33 2 28 09 39 39

Email professionalsalesemea@thalesnavigation.com

In Germany +49 81 6564 7930 • Fax +49 81 6564 7950

In Russia +7 095 956 5400 • Fax +7 095 956 5360

In UK +44 870 601 0000 • Fax +44 208 391 1672

In the Netherlands +31 78 61 57 988 • Fax +31 78 61 52 027

Web site www.thalesnavigation.com