

## Low-Cost GPS Survey System Speeds Survey Work in Developing Countries



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## Low Cost GPS Survey System

### Water Missions International (WMI)

- Environmental consulting firm (seat in South Carolina)
- Non profit organisation, relying on grants and foundations
- Origins in General Engineering Laboratories
- Environmental projects
- 1998: Honduras project – portable water treatment units
- Current projects in Ecuador, Haiti; Mexico, Uganda, Iraq...
- First job: evaluate the site; visiting and surveying existing situation

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## Low Cost GPS Survey System

### Site evaluation before acquisition of low cost GPS

Two phases

1. Rough terrain investigation – viability of the project
2. Thorough survey

>> **Two separate trips to the region necessary**

### After acquisition of GPS

Survey incorporated in the initial visit

>> **No need of second trip into the region**

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## Low Cost GPS Survey System

### Important criteria for WMI's projects in developing countries

- **Speed & efficiency of survey**
- **Cm-level accuracy**
- **Over bridging large distances**
- **Light weight and ruggedness (areas difficult to access)**
- **User friendliness (local operators)**
- **Multilingual language platform**
- **Low cost of system (non-profit organisation, funding limits)**

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## Low Cost GPS Survey System

### Adopted survey method:

- Rough real time terrain mapping using existing maps (sub-3m accuracy)
- Detailed stop&go survey (cm accuracy)
- Post processing and evaluation of results

>> **Can be done with one low-cost L1 GPS receiver system**

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## Low Cost GPS Survey System

### Solution for survey projects in developing countries:

#### ➤ **ProMark2 system from Thales Navigation**

- Small, lightweight professional GPS
- Navigation & mapping mode (real time sub-3m)
- Static, stop&go or kinematic mode (post processing cm)

**Two-receiver configuration with software for ca. 5,600.- €**



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## Low Cost GPS Survey System

### ProMark2 - key features:

- Cm-level GPS static for control surveying
- Cm-level kinematic for topographic surveying
- WAAS/EGNOS aided navigation
- Worldwide maps as background
- Multilingual platform (En, Fr, Ge, NL, Fin, Sp, It, Port, Swe, Rus)
- On-board data collector software (including feature codes)
- Powerful, user friendly PC software
- Initialization using a 20 cm bar possible in 5 minutes or less



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## Low Cost GPS Survey System

### ProMark2 – key benefits for the user:

- Finding AND surveying points with one convenient package
- Very light to carry in difficult terrain conditions
- Rapid survey (1s at one point after initialization is sufficient)
- Enabling traverse legs 100 up to times longer than conventional equipment. (200 m shot vs 20 km baseline with GPS)
- Cm accurate topo point collection comparable to a total station at about 60% of the price



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## Low Cost GPS Survey System

### WMI's projects with ProMark2

#### Site evaluations at six locations in Haiti to define places for:

- Drilling wells
- Solar-powered pumps
- Wastewater treatment systems
- Water storage tanks (supplying water in case of power outages)



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## Low Cost GPS Survey System

### WMI's experience with ProMark2: SUMMARY

- Saving survey acquisition costs (GPS for about 60% of price of a conventional equipment)
- Saving maintenance and transportation costs (ProMark2 lighter than total station with almost no service involved)
- Saving costs of one operator compared to conventional equipment
- Saving one complete trip to the region
- Saving costs for trained surveyors (little use instruction sufficient)
- Shortening the survey work from budgeted 7 to 5 days



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