

## **PROSURVEY 1000 LASER RANGEFINDER FOR SURVEYING FORESTRY ROADS**

### **BACKGROUND**

The ProSurvey 1000 Laser Rangefinder developed by Laser Atlanta is a hand-held surveying instrument that measures distance, bearing and slope at the pull of a trigger (Figure 1). This instrument replaces the cloth tape, clinometer and compass typically used when surveying forest road lines. Connecting an external data recorder to the ProSurvey enables survey measurements to be electronically stored for subsequent transferral to appropriate road design software.



*Figure 1 - ProSurvey 1000 with the Sokisha SDR33 data recorder*

### **PROSURVEY 1000 LASER RANGEFINDER**

The ProSurvey contains a laser range sensor, an electronic flux gate compass, and a fluid tilt sensor. Other features include a head up display for targeting, and display of range, bearing and slope. A LED

display on the rear panel also displays range, bearing and slope.

For surveying forest road lines, the ProSurvey is interfaced with a Sokisha SDR 33 data recorder. The SDR 33 is commonly used by surveyors and engineers using a theodolite and EDM (electronic distance measuring device). This recorder has built in software for recording survey measurements (total of 3,500 points).

To record survey measurements, the information required is prompted for, and any errors in the data are notified as soon as it is entered. For each surveying shot, the target height can be changed and the point coded for future recognition.

The surveying data in the SDR 33 data recorder can be downloaded for road design using surveying and engineering software, such as SDR Mapping and Design™, Geocomp™ or Civilcad™. Alternatively, communication software, such as Kermit™ or the options available in Microsoft Windows™, can be used to download the raw survey data from the SDR 33. Software will need to be written to convert the raw data file to a format suitable for import into common forestry road design packages that may be used, such as Roadeng™ or Lumberjack™.

The ProSurvey has numerous other applications, such as a effective offsetting tool if a link is established to a GPS receiver for mapping areas.

## FIELD USE

The ProSurvey can be supported with a monopod or tripod. Hand-held operation is possible, although inaccuracies may result due to unsteadiness. The SDR33 data recorder requires only one button to be pressed to record the next survey measurement. This enables very quick survey measurements.

For more important shots, such as traverse measurements, a attenuator (filter lens cap) should be placed on the ProSurvey and measurements made to a reflective prism. This ensures that the laser beam is hitting the intended target. Side shots can be measured to trees or the ground (provided the target height is recorded as zero). Typically, 1 km of proposed road line can be surveyed per day.

## LIMITATIONS

- Azimuth readings become inaccurate if the laser is tilted greater than 30° or if large metal objects are nearby.
- To ensure accurate azimuth readings, an on site compass calibration is needed before starting a survey.
- An attenuator fixed to the lens is considered essential as small branches and shrubs are often picked up by the instrument as the intended target.

## LASER ADVANTAGE

A new survey laser called the Laser Advantage is due for release in October 1995. This unit is smaller than the ProSurvey but has similar capabilities. There is 2 MB of onboard memory available that can be programmed for recording survey shots, eliminating the need for a data recorder. The price will be approximately \$10,000 +G.S.T.

## SPECIFICATIONS

There are currently no known independent tests of the accuracy of the ProSurvey 1000 Laser Rangefinder. The manufacturers claim the following:

|                 |                                 |                   |
|-----------------|---------------------------------|-------------------|
| Weights:        | Total (excluding chords)        | 1.9 kg            |
| Range:          | Minimum                         | 2.0 m             |
|                 | Max. (building)                 | 610 m             |
|                 | Max. (reflector prism)          | 3000 m            |
| Accuracy:       | Azimuth                         | $\pm 0.5^\circ$   |
|                 | Range                           | $\pm 15.2$ cm     |
|                 | (+/- 7.6 & 2.5cm models avail.) |                   |
|                 | Vertical angle                  | $\pm 0.2^\circ$   |
| Sealing:        | Water resistant                 |                   |
| Safety:         | No damage to eyes               |                   |
| Communications: | RS-232 serial port              |                   |
| Battery:        | Type                            | 4 Ah Nicad        |
|                 | Life                            | 4 hrs. per charge |

## ACCESSORIES AND COSTS

The New Zealand distributor of the ProSurvey 1000 and accessories is Geosystems Limited, Auckland and Christchurch. The following prices are exclusive of G.S.T and are estimated.

|                              |          |
|------------------------------|----------|
| ProSurvey 1000 Laser         | \$15,115 |
| Mono-pod                     | \$ 150   |
| Tri-pod                      | \$ 250   |
| Attenuator                   | \$ 50    |
| Pole and prism               | \$ 500   |
| (or use a bicycle reflector) |          |
| External data logger, SDR33  | \$ 4,700 |

For further information, contact LIRO or the supplier.

Greg Arnold,  
Researcher.  
August, 1995