

Terrestrial Laser Scanners

This is our third Product Survey (PS) on Terrestrial Laser Scanners (TLS). The first was published in January 2001 and the second in December 2004. A lot has changed since the turn of the millennium.

First of all, the number of systems on the list has more than doubled, from nine to nineteen. Secondly, two formerly listed companies, Mensi and Cyra Technologies, have since been taken over respectively by Trimble and Leica Geosystems. Neither company was included in the 2001 survey but have been since 2004. Optech was already present with the ILRIS-3D, and Callidus, Zoller+Fröhlich and Riegler were also listed with respectively one, two and three systems in 2001. The application areas from which manufacturers diverge into production of TLS fall into three categories:

- high-precision measurement and detailed 3D reconstruction of industrial objects such as cars
- measurement of outdoor scenes featuring objects of complicated shape (construction, architecture, civil engineering)
- land survey; the Trimble VX is based on the total-station concept, modified in an advanced way.

One of the most important features of a TLS is measurement range because range determines to a large extent types of application. In the December 2004 PS a distinction was made between short-range (up to 25m), medium-range (up to 250m) and long-range (larger than 250m). Products from 3rdTech and Basis Software fall into the short-range category, as do the CP3200 from Callidus precision systems and the LS 420/440 from Faro. The Imager 5006 from Zoller+Fröhlich focuses on the medium-range. Manufacturers too recognise range as a decisive factor, some therefore encoding it in the name of the system. For example, the CPW 8000 has a range of 8000cm or 80m, the CP3200 a range of 32m, and the ranges of Faro's LS 420, 440 and 480 are 20m, 40m and 80m respectively. Maximum range does not depend only on the TLS itself but, since laser scanners operate in non-contact mode, also on object reflectivity. Some manufacturers indicate this by accompanying the range with a reflectivity percentage, also called Albedo. Only time-of-flight systems, which make use of pulsed laser, are suited for long-range applications. Phase-shift systems are particularly suited for high-precision short-range and medium-range applications, for which high point densities are required. More details on TLS technology may be found in this month's [Pinpoint](#) and [Technology in Focus](#) pages.

In contrast to the PS on high-end total stations (June 2007), no TLS products of Chinese origin are listed here, but perhaps we will have some to welcome next time.

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