

# 3D Laser Scanning Software Solutions



[www.lfm-software.com](http://www.lfm-software.com)

# LFM Software - Overview

## Realise the true value of your laser scan data.

Outside the EPC environment, Owner Operators are now also recognising the benefits of 3D laser scanning. Laser scanning facilitates compliance with Health and Safety regulations, remote data capture is possible, and less working at height is required. Rapid data collection reduces the amount of time and the number of people exposed to potential hazards on site.

Off site, Owner Operators continue to benefit from 3D laser scanning as the accurate, high-resolution, high-quality data forms an integral part of their asset management resources and downstream work processes. Laser scanning data enables the management of asset and Building Information Management (BIM) data throughout its lifecycle. It aids communication and collaboration between architects, engineers, constructors and owners.

For brownfield projects, the use of laser scanning mitigates project risks and reduces costs by providing the designer with detailed, accurate knowledge of the 'as-built' site.

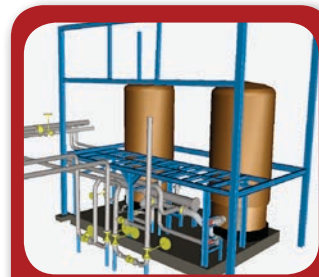
Compared with traditional means, laser scanning enables an 80% reduction in the cost of capturing as-built data. Project timescales can be reduced during the design and construction phases by up to 80% and 20% respectively. Overall schedule compressions of 10% have been reported.



Register



Connect CAD



Model



Share

## LFM Software - Key Features

- The BubbleView™ provides a 360° high-resolution 3D image. It is so powerful that the user has the impression of being on site.
- Using LFM's InfiniteCore™ technology, an unlimited number of registered scans can be stored in a single dataset, without compromise. Access speed and quality of laser scan data are unaffected.
- LFM is hardware neutral. This has cost-saving implications for LFM customers since only one software solution is required, even when using multiple hardware systems.
- LFM is CAD neutral. Users can interface seamlessly with their preferred CAD package and 'clash check' a proposed design against an existing installation.



# LFM Software - Business Benefits

## **Open System Without Compatibility Restrictions**

LFM aims to be neutral at both ends: neutral with respect to capture devices, and neutral with respect to CAD and modelling technologies

## **Minimised Project Risks and Costs**

3D laser scanning mitigates project risks and reduces design rework through detailed knowledge of the as-built plant, thereby also reducing costs.

## **Support for the Entire Plant Lifecycle**

LFM Software provides a complete solution from registration of laser scan data to as-built modelling; it is considered by many to be a turnkey solution

## **Reduced Time Spent on Site**

The speed of capturing as-built information dramatically reduces time spent on site; once captured by 3D laser scanning, users can review the as-built installation at any time, in detail, from their desktop

## **Project Collaboration**

Comprehensive and easy-to-use tools help project collaboration, even when multiple users are in different parts of the world



“Compared with traditional means, laser scanning enables an 80% reduction in the cost of capturing as-built data”

# LFM Software - Product Portfolio

LFM provides the most powerful and open technology for processing laser scan data.

## LFM Modeller™

LFM Modeller enables users to produce intelligent 3D models from as-built laser scan data with only a few clicks, and to export the models into a wide range of 3D CAD systems.

3D laser scanning offers considerable benefits to plant revamp and plant asset management projects. However, modelling 3D laser scan data can be time-consuming, as fitting structural elements and modelling individual pipe runs can be slow and error-prone. LFM Modeller enables users to rapidly create 3D models at an unsurpassed rate, without compromise.

3D models created in LFM Modeller are also exceptionally accurate and are relied upon by leading Owner Operators to document their as-built conditions for safety, inspection, maintenance and training purposes.

### Key Features

- BubbleView modelling enables rapid creation of intelligent and geometrical, accurate 3D models.
- A wide range of standards and components are included in the standard library.
- Intelligent as-built models can be exported smoothly into the CAD system.
- Extensive CAD manipulation and editing facilities enable the user to manipulate the model until the modelling objectives have been achieved.

## LFM Server™

LFM Server enables users to access and work with pre-registered 3D laser scan data from any scanner vendor, to clash detect a proposed design against as-built data, and to interface with CAD packages from AVEVA, Autodesk, Bentley or Intergraph.

With LFM Server, not only can users create and manage huge point cloud databases from a large range of laser scanners, they can also link seamlessly to almost all the major CAD packages, using just one piece of software. Users require training in only one laser scanning software package, even where multiple CAD deliverables are required.

LFM customers are also able to benefit from InfiniteCore technology. This unique technology enables an unlimited number of registered laser scans to be stored in a single dataset, without compromise. Access speed is unaffected and individual laser scans remain unaltered and intact. Every measured coordinate is stored ready for rapid retrieval by the user.

### Key Features

- Import data from any laser scanner – export to any CAD package.
- Load an unlimited number of scans without compromise.
- Clash detect proposed CAD design against the as-built environment.
- Navigate inside the photorealistic BubbleView as if present on site.

## LFM NetView™

LFM NetView enables users to securely access remote 3D laser scan data. More than an online viewing package, it provides tools that enable users to work collaboratively with laser scan data over the Internet. LFM NetView is innovative in its approach to sharing 3D laser scan data online, as it connects back to the master LFM Server dataset. This ensures that the full resolution of 3D laser scan data is available to the remote user, avoiding any loss of resolution incurred by the transfer of compressed data over the Internet.

LFM NetView is intuitive and requires no formal training. It offers more functionality than simple web-enabled viewing packages. For example, annotations and measurements can be made at any time during a live session, enabling full project collaboration.

LFM NetView also operates in a stand-alone mode. This enables users to operate via the Internet and then switch easily to a file-based local or Intranet mode.

### Key Features

- Extensive mark-up and measurement facilities enable efficient collaboration.
- Master/slave mode enables remote reviews of live projects with colleagues or clients.
- The full database can be reviewed in the intuitive BubbleView™.
- Stand-alone mode enables operation without Internet access, in a file-based local or Intranet mode.

## LFM Gateway™

LFM Gateway offers unparalleled connectivity to terrestrial 3D scanners. It can also import other types of data from mobile, hand-held or aerial scanners and enables data export in open, industry-standard formats.

LFM Gateway exploits the latest advances in computer hardware architecture, employing multi-threaded and non-blocking processes for the most rapid and efficient handling of scan datasets.

Any 3D laser scan data format can be imported for use throughout the entire LFM Software portfolio. Supported formats include .ptx, pts, .zfs, .zfc, .fls, .ptz, .3dd, .rdb and .rxp

## LFM Register™

(in Gateway Mode)

LFM Register amalgamates raw data from individual 3D laser scanning positions into a fully aligned framework faster and more efficiently than any other software. LFM Register ensures accurate data registration and moves the registration process off the project's critical path so that users can quickly begin to work with the scan data. Sophisticated features deliver the high levels of accuracy that, until now, have been associated only with traditional survey instruments.

Users are provided with tools that eliminate the need to search for targets, providing additional opportunities to save time and cost. For example, when used on live projects, the bundle adjustment feature has been shown to achieve as much as a 50% reduction in control work.

Data registered in LFM can be used with downstream packages from other laser scanning software vendors.

### Key Features

- Automatic scan-to-scan registration.
- Traffic-light metrics immediately display the quality of registration.
- Inter-cloud registration enables accurate scan registration without the use of targets.
- Target prediction algorithms enable LFM Register to automatically fit the remaining targets once one or two have been located in the scan data.

## LFM Generator™

(in Gateway Mode)

These enable seamless creation of LFM NetView™ projects and LFM Server datasets.

## LFM Server Generator™

LFM Server Generator creates InfiniteCore datasets for use in LFM Server and AVEVA Everything3D™. It takes registered scans, from any registration tool, and produces added-value datasets that are widely used throughout industry.

An updated user interface, with enhanced user assistance, reporting and licensing features, makes the process simple and efficient.

## LFM NetView Generator™

This is used to organise and create LFM NetView projects. These can be online or file based.



# LFM Software - Applications



**Engineering**



**Construction**



**Owner-Operator**

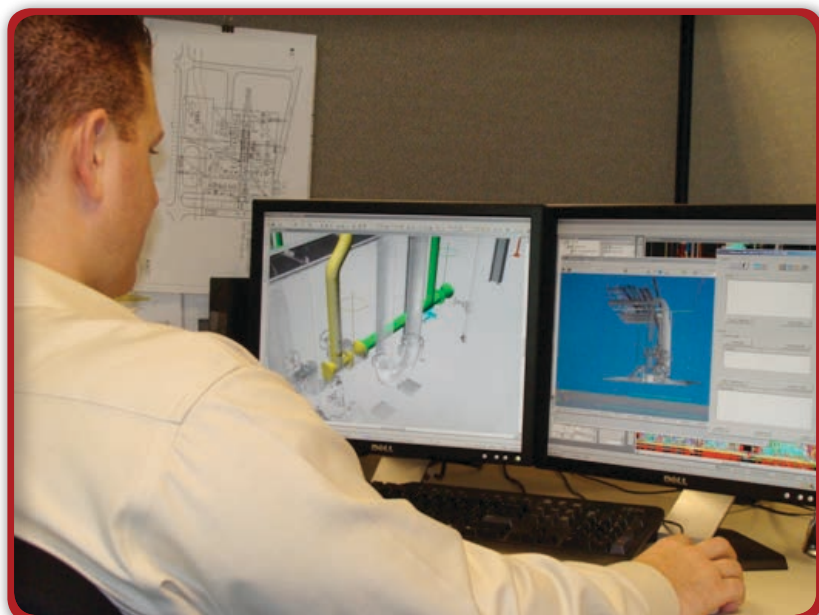


**Service Provider**

Whether you are a service provider looking for rapid dataset generation, an Owner Operator looking for an effective asset management tool, or a plant designer working on a major upgrade, the use of LFM Software brings valuable business benefits to brownfield and as-built documentation projects.

LFM can be used on a wide variety of applications, including:

- Design verification
- Tie-in location
- Clash detection
- Project collaboration
- Bid document preparation
- Demolition definition
- Verification against a design model
- Quality assurance
- Registration
- Modelling
- Verifying survey control
- Work package planning
- Collaboration with engineering and vendors
- Asset management
- Decommissioning
- Change management
- Quality control
- Work sharing
- Dataset generation



# LFM Software - Comparison Matrix

## Key

- ✓ Base product
- ✓ Clash Module
- ✓ Register Module
- ✓ Generator Modules
- ✓ CAD link/export option



	LFM Modeller	LFM Server	LFM NetView
<b>Navigation View</b>	3D view	✓	
	Plan navigation	✓	✓
<b>BubbleView Technology</b>	LFM BubbleView	✓	✓
	Objects in BubbleView	✓	✓
	Hotspots in BubbleView		✓
	Clash in BubbleView		✓
	Inter-BubbleView measurements		✓
	Neighbouring scan site map		✓
<b>LFM Software Core Technologies</b>	InfiniteCore technology		✓
	3D point measurement	✓	✓
	Tie-in extraction/visualisation	✓	✓
	Scan registration vs survey	✓	✓
	Scan to scan registration	✓	✓
	Target prediction	✓	✓
	Orthophoto generation	✓	
	3D model generation	✓	
	Robust fitting algorithm	✓	✓
	CAD standard library	✓	
	Comparison with CAD models	✓	✓
	Cell library models	✓	
	Create LFM Server datasets		✓
	Create AVEVA Everything3D™ datasets		✓
	Intelligent piping & structural export	✓	
	Clash reporting		✓
	Internet sharing*		
Automatic target recognition	✓	✓	
Create NetView Projects		✓	
<b>CAD Link Modules</b>	Autodesk - AutoCAD		✓
	Autodesk - AutoPlant 3D		✓
	Autodesk - Navisworks		✓
	Autodesk - Revit		✓
	AVEVA - Plant / Marine		✓
	AVEVA - Review		✓
	Bentley - AutoPLANT		✓
	Bentley - Microstation	✓	✓
	Intergraph - CADWorx		✓
	Intergraph - PDS	✓	✓
	Intergraph - SmartPlant 3D		✓
	Intergraph - SmartPlant Review		✓
	VR Context - Walkinside		✓
<b>Intelligent Model Export</b> .pcf and .pxf	✓		

## LFM Scan Gateway

LFM Scan Gateway allows users to import any 3D laser scan data format into the LFM suite. Scan data imported into LFM Scan Gateway is relevant throughout the entire LFM Software portfolio.

This includes .ptx, .zfs, .zfc, .fls, .ptz, .3dd, .rdb, .trim, .astm57 and .rxp. It also allows export of .ptx and .astm57 files.

\*applicable to Internet-based NetView

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