About the LFM HyperBubble™

1. Introduction

The HyperBubble is an immersive, advanced-rendering of laser scan data that delivers photorealistic visualisation with the ability to freely navigate a project. As visualisation of laser scan data is paramount to effective consumption the HyperBubble can be utilised alongside the BubbleView and point cloud viewing capabilities to provide the customer with total flexibility to combine the different views to suit their activity.

HyperBubble technology enables a solid view of each laser scan in the 3D view, giving similar levels of details to that seen in the classic BubbleView but with the ability to fly through the data.

In this version, the HyperBubble view is available in LFM Server; Server Mode. The LFM workflow has been extended to include the necessary preparation steps to make HyperBubble™ resources available.

2. Prerequisites

Graphical Requirements

HyperBubble publishing and rendering requires a reasonably powerful graphics card with the very latest drivers. It has been developed using NVidia graphics cards, and LFM recommends using these where possible for optimum performance and reliability. LFM have also tested with a selection of alternate cards which are detailed below.

Do not rely on Windows graphics driver properties to update to the latest version, instead use the NVidia tools. Visit http://www.nvidia.com/download/scan.aspx?lang=en-us to obtain the latest version.

The supported OpenGL version information is saved in the LFM log file on start-up which can be found in the Temp folder as shown below which reports v4.5. The minimum needed is v4.3.

12: GL Major version supported: 4 115
13: GL Minor version supported: 5 127

Supported Cards

NVidia GeForce/Quadro, or AMD FirePro W Series, with at least 1GB memory and capable of supporting OpenGL version 4.3 or later.

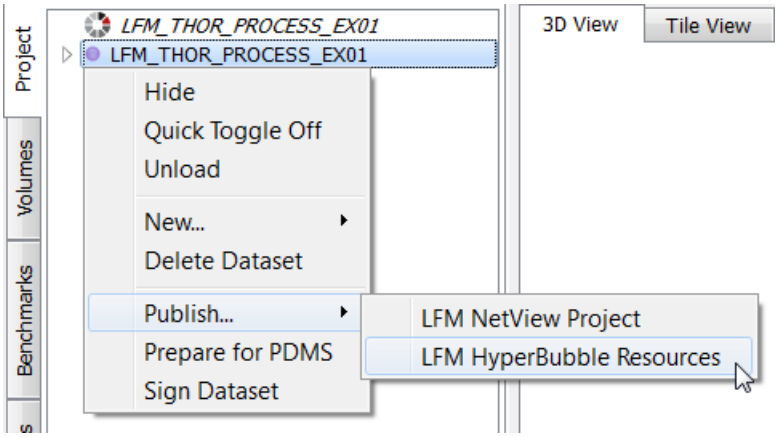
Please note that updated graphics drivers may be needed to meet the OpenGL requirement.

Licensing Requirements

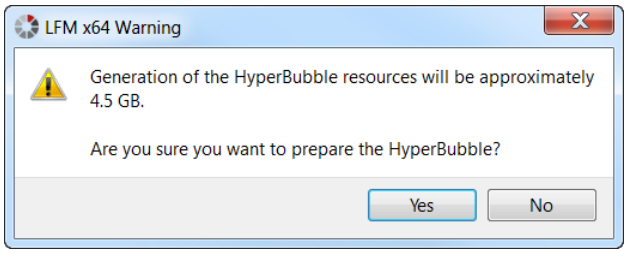
In order to publish HyperBubble data an LFM Generator license must be available. For further information about LFM licenses please contact license.request@lfm-sotware.com. LFM Server must also be installed in Advanced Mode in order to publish HyperBubble data.

Note that in order to only view HyperBubble data, only an LFM Server license is required and LFM Server is not required to be installed in Advanced Mode.

3. Publishing HyperBubble Data

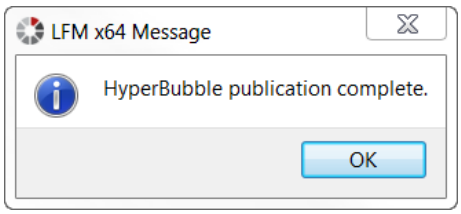


Once the LFM Server Dataset has been produced HyperBubble data can be created by simply right clicking on the Dataset node in LFM Server and selecting *Publish > LFM HyperBubble Resources* as shown left.



A message will appear stating how much disk space is required. Click *Yes* to continue.

A browser will then appear asking you to locate the folder containing the .zfc files. Browse to the appropriate folder and click *Open*.



Once the process is complete the message shown left will appear.

Note that this process may take some time depending on the number of scans in the dataset.

4. Viewing HyperBubble Data

Click the button shown left to show HyperBubble data in the 3D view in place of the 3D points. The 3D view will now display HyperBubble data:

By default this will activate the steering mode flying controls as detailed below:

Left Mouse Button

Clicking on the left mouse button and holding it down while moving the mouse upwards will move the viewpoint forward through the data at a rate determined by the distance the mouse has moved from the clicked point. Once moving forward, if you hold the mouse stationary with the left button pressed down, movement will continue until you release the button. There is a minimum movement of the mouse that must be exceeded for the view to move at all.

If you move the mouse left or right with the left button pressed down, the view will rotate about the viewpoint in the corresponding direction. If you are already moving forward then a combined move and rotate will take place.

This can be combined with the right mouse button to achieve simultaneous forward and vertical movement.

Middle Mouse Button

Drag the cursor vertically to translate the observation point along the vertical axis. (Moves up / down)

Right Mouse Button

Clicking on the right mouse button and holding it down while moving the mouse up and downwards will change your elevation up and down.

Pressing the space bar will level your view so you are looking at the horizon. Clicking on the middle mouse button and holding it down while moving the mouse up and downwards will pitch your view up and down. If you then move forwards the viewpoint will move in the x-y plane. Scrolling the mouse wheel will move in the direction of view.

This can be combined with the left mouse button to achieve simultaneous forward and vertical movement.

For colour datasets the user may toggle between colour and monochrome by selecting the button shown left which is accessible by clicking on the HyperBubble drop down on the View tab.

5. Parked HyperBubble

When viewing HyperBubble data users can “park” at the closest scan site by using the Park button on the Control Toolbar as shown left. In use, parked HyperBubbles offer a high clarity user experience not unlike a standard BubbleView. Users may also park the HyperBubble by right clicking on a scan site marker and selecting “Park HyperBubble Here”.

All the measurement capability and model overlay is the same as a BubbleView. However, there are several clear advantages to use these in preference to a BubbleView which are identified below.

- **Performance:** Movement is much more direct and unconstrained. Diagonal movement is now possible.
- **Colour:** Enhanced colour definition giving better colour depth to the images. HyperBubble resources offer 24-bit colour variation, whereas standard BubbleViews offer 16-bit. In practice this means a palette of >16 million colours are used for viewing HyperBubble data.
- **Colour/Mono:** Users may choose to switch between greyscale and full colour (if colour resources are available).
- **Demolition:** Demolition volumes are respected when viewing HyperBubble data, having previously been limited to the 3D points. When a volume is demolished, the HyperBubble data will reflect the removal of that volume, similar to the 3D points. This means if a hole in a wall is demolished, the user will be able to see through the hole to the data behind it.

6. Options

Under the Options > User tab there are two new options that will affect the display of HyperBubble data:

- **HyperBubble Quality:** This option controls the maximum number of scans that LFM will try to render simultaneously when using HyperBubble. Toggle between *Normal* and High. It is recommended to start using *Normal*. If you experience good performance with this option then you may wish to switch this option to *High*. However, this may result in LFM running slowly or the graphics card running out of memory. If this occurs, switch this option back to *Normal*.

- **Show HyperBubble Horizon:** Toggle the display of the horizon when viewing HyperBubble data. So users may find this a useful navigational aid to get a better picture of height.

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