APPENDIX B - SPECIFICATIONS OF CURRENT LiDAR SOFTWARE

Table 9. 2008 LiDAR Software Summary Sets 1 to 5 (*Point of Beginning* website).

Manufacturer	3rdTech	InnovMetric Software Inc	kubit USA	Leica Geosystems	Leica Geosystems
Product	SceneVision-3D	PolyWorks V10	PointCloud 3.2 / PointCloud Pro 3.2	Leica Cyclone Family of Software [1]	Leica CloudWorx for AutoCAD (Basic and Pro versions)
Price (list by modules or components)	Included with DeltaSphere; contact 3rdTech for additional pricing information.	On demand	starts from $1.000	[2]	[2]
Laser scanner brands and models from which data can be imported directly	DeltaSphere-3000IR, also Polhemus, Riegl	All brands	All (ASCII or PTC format)	All [3]	All [3]
Operating systems supported (if one is preferred, please state)	Windows XP/Vista	XP/2000/Vista	AutoCAD application (e.g. ADT, Civil. Map)	Win 200, XP 32 and 64 , Vista 32 and 64	Win 200, XP 32 and 64 , Vista 32 and 64
Minimum CPU requirement	Pentium 4	1 GH	Like AutoCAD	Pentium 4 2GHz	Pentium 4 2GHz
Minimum RAM required	512 MB (1GB recommended)	2 GB	Like AutoCAD (recommended 1 GB or more)	Pentium 4 2GHz	Pentium 4 2GHz
Space required on hard disk to properly run application, including swap space, etc. (list in Mb)	50 MB (512 MB swap)	2GB	Like AutoCAD	[8]	[8]
Other hardware requirements	3D graphics card	Nvidia Quadro FX graphic board	Like AutoCAD	[4]	[4]
Cloud Editing/Analysis					
Can features be defined with user-created code libraries?	Planes, contours, lines, points	Yes	Yes	Yes, Import codes from CAiCE, etc.	Yes [9]
Feature codes exportable to CAD software? (specify which software)	VRML models, lines	MicroStation/AutoCAD	N/A (already in CAD)	Yes, LandXML, ASCII	No, runs in CAD
Can user compare cloud or shapes fitted to clouds to plan or perform theoretical shape and interference checking? (State which, all or none.)	None	All	Clash Detection module (PointCloud Pro)	Yes, all	Yes [9]
Ability to make measurements such as distances, angles, areas, volumes, of lines, planes, shapes and other surfaces from cloud? (State which, all or none.)	Distances between points, lines, planes, perpendiculars; angles between lines and planes.	All	All	Yes, all	Yes [9]
Can user overlay or drape a photograph from an external source (e.g., digital camera) on cloud or elements extracted from cloud?	Yes, fully automatic	No	Yes	Yes, [5]	Yes, [10]
Ability to register scans without the use of targets?	Yes, fully automatic	Yes, using geometry	No (only post-processing software)	Yes [17]	NA
Ability to place several clouds from different scans in coordinated 3D space using total station or GPS survey data that has been used to determine positions of scanner and alignment of scans?	No	Yes	Yes	Yes	NA
Analyze points in a cloud representing shapes such as planes, cylinders and spheres to detect measurement outliers?	Planes only	Yes	Yes	Yes	Yes (Pro planes and cylinders)
Ability to integrate scans with floor plans, engineering drawings of objects and surveyed information? (State which, all or none.)	None	Engineering drawings and surveyed information.	Yes	Yes, all	Yes, all
Automate decimation of points in selectable areas to make data files as compact as possible?	Yes, FA	Yes	Yes	Yes	NA
Is fitting of lines, planes and shapes to cloud done manually or automatically, or both?	Automatic plane fitting. Also automatic intersection of planes to determine lines or contours.	Both	both (planes, pipes)	Both	Both

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Table 9. 2008 LiDAR Software Summary Sets 1 to 5 (*Point of Beginning* website). - continued –

Manufacturer	3rdTech	InnovMetric Software Inc	kubit USA	Leica Geosystems	Leica Geosystems
Product	SceneVision-3D	PolyWorks V10	PointCloud 3.2 / PointCloud Pro 3.2	Leica Cyclone Family of Software [1]	Leica CloudWorx for AutoCAD (Basic and Pro versions)
- For automatic and manual fitting, what techniques are used or available (e.g. least squares, taking average, etc.)?	Least squares	Least squares, minimum circumscribed, maximum circumscribing, orientation-constrained, position constrained.	least square	Least squares; catalog	Least squares
Ability to automatically track lines or limits of areas by color or texture discrimination?	No	Yes	No	Yes, segment by intensity	No
Ability to automatically calculate and list alignment of center line of shapes (such as a pipe) containing straight and curved segments such as elbows?	No	Yes		Yes, calculate	Yes, straight (Pro)
Maximum number of points that can be loaded	100 million	100 million WinXP32 and 200 million WinXP64.	30 Million in one reference, multiple references are possible	N/A [13]	N/A [13]
Automatic removal of noise (e.g., cars on road, vegetation, etc.)?	No	Yes	No	Yes	Yes
Rendering/CAD Model Generation/Viewing					
Does software automatically or manually generate or create CAD models or model segments from point clouds and other known information? (Specify level of automation and intelligence.)	Automatic VRML models from point clouds or color point clouds.	Automatic and Interactive methods	semi-automatic	Yes, [6]	Yes, [11]
Are items (CAD models such as pipes, steel, flanges, elbow) fit to the point cloud using standard object tables/catalogs?	No	Using primitives	No	Yes	No
Create statistical quality assurance reports on the modeled objects?	No	No	Yes	Yes	Yes
Automatically compute, without user interaction, a full 3D polygonal mesh (not view-based) from a point cloud?	Yes, FA	Yes	No	Automatic	No
Perform contour generation?	No	Yes	No	Yes	No
Perform volume calculation capabilities?	No	Yes	No (is a AutoCAD feature)	Yes	No
Perform solid modeling (volume generation) based on user-defined lines, planes and other surfaces as bounds?	No	No	Yes	Yes, volumes	No
Perform profile and cross-section generation along any cutting plane, family of planes or road alignment?	Yes	Yes	Yes	Yes	No
Have edge detection technology to determine boundaries of solids, planes and other shapes?	No	Yes	No	Yes	No
Perform automatic extraction of standard shapes from cloud (e.g. pipe fittings, structural steel members, etc.)?	No	Pipe center-line	No	Yes	Yes {14]
Can user view cloud or generated shapes or models from any viewpoint in 3D?	Yes	Yes	Yes	Yes	Yes
Are fly-throughs or walk-throughs supported?	Yes	Yes (Video generation)	Yes (is a AutoCAD feature)	Yes	Yes
Have intelligent display of detail depending on scale of the view?	No	No	Yes	Yes	Yes
Can user select transparent/opaque surface for cloud and CAD shapes?	Yes	Yes	Like AutoCAD	Yes	No
Which export formats are supported?	RTPI,VRML, ASCI XYZ, OBJ	TXT, IGES,DXF,STL,OBJ, VRML.Microstation plug-ins	Like AutoCAD	11 Formats, [7]	As AutoCAD

Table 9. 2008 LiDAR Software Summary Sets 1 to 5 (*Point of Beginning* website).
- continued –

Manufacturer	3rdTech	InnovMetric Software Inc	kubit USA	Leica Geosystems	Leica Geosystems
Product	SceneVision-3D	PolyWorks V10	PointCloud 3.2 / PointCloud Pro 3.2	Leica Cyclone Family of Software [1]	Leica CloudWorx for AutoCAD (Basic and Pro versions)
Specify other measurement tools (e.g., clearance, cut/fill, table of elevation differences)	Perpendicular point to plane	Heights, lengths, angles, radii, volume.		All	None
Can the pointcloud be rendered with visualization effects (e.g., intensity mapping, elevation mapping, shading, silhouette)?	Yes; laser intensity, range, full color.	Yes	Like AutoCAD	Yes, all and more	No
Can the software automatically detect scan targets?	No	Yes	No	Yes, spherical & planar	N/A
Miscellaneous					
Provide high-speed thumbnail views of scans, clouds, photographic images and generated shapes?	No	No	No	No	No
Can client/server system support multiple users?	No	Yes	Yes	Yes	Yes
Is client/server system supported to enable several clients contributing to a single project?	No, but system includes multiple licenses.	No	Yes	Yes, simultaneously	Yes, simultaneously
Other Features					
Describe	Auto intersection of planes to determine lines or contours. Create full-color, texture-mapped, photo-realistic CG models. Produce panoramic images. Create high-res, photo close-ups in the model.	Grid cell manager to split huge data sets	Image extension: combined evaluation of point cloud and orientated images	[15]	[15]

Table 10. 2008 LiDAR Software Summary Sets 6 to 10 (*Point of Beginning* website).

Manufacturer	Leica Geosystems	Leica Geosystems	Leica Geosystems	Leica Geosystems	Leica Geosystems
Product	Leica CloudWorx for MicroStation	Leica CloudWorx for PDMS	Leica CloudWorx for Intergraph SmartPlant Review	Leica TruView FREE Web Viewer	Leica Cyclone II TOPO
Price (list by modules or components)	[2]	[2]	[2]	Free	[2]
Laser scanner brands and models from which data can be imported directly	All [3]	All [3]	All [3]	All [3]	All [3]
Operating systems supported (if one is preferred, please state)	Win 200, XP 32 and 64 , Vista 32 and 64	Win 200, XP 32 and 64 , Vista 32 and 64	Win 200, XP 32 and 64 , Vista 32 and 64	Win 200, XP 32 and 64 , Vista 32 and 64	Win XP 32 and 64 , Vista 32 and 64
Minimum CPU requirement	Pentium 4 2GHz	Pentium 4 2GHz	Pentium 4 2GHz	Pentium 4 2GHz	Pentium 4 2GHz
Minimum RAM required	Pentium 4 2GHz	Pentium 4 2GHz	Pentium 4 2GHz	Pentium 4 2GHz	Pentium 4 2GHz
Space required on hard disk to properly run application, including swap space, etc. (list in Mb)	[8]	[8]	[8]	12 mb	45 mb
Other hardware requirements	[4]	[4]	[4]	OpenGL Graphics	OpenGL Graphics
Cloud Editing/Analysis					
Can features be defined with user-created code libraries?	Yes [9]	Yes [9]	N/A	N/A	Yes
Feature codes exportable to CAD software? (specify which software)	No, runs in CAD	N/A	N/A	N/A	Yes
Can user compare cloud or shapes fitted to clouds to plan or perform theoretical shape and interference checking? (State which, all or none.)	Yes [9]	Yes, all	Yes, all	No	No
Ability to make measurements such as distances, angles, areas, volumes, of lines, planes, shapes and other surfaces from cloud? (State which, all or none.)	Yes [9]	Yes [9]	Yes [9]	Yes, linear only	Yes, linear only
Can user overlay or drape a photograph from an external source (e.g., digital camera) on cloud or elements extracted from cloud?	Yes, [10]	Yes, [10]	Yes, [10]	No	No
Ability to register scans without the use of targets?	NA	NA	NA	No	No
Ability to place several clouds from different scans in coordinated 3D space using total station or GPS survey data that has been used to determine positions of scanner and alignment of scans?	NA	NA	NA	No	No
Analyze points in a cloud representing shapes such as planes, cylinders and spheres to detect measurement outliers?	Yes (planes and cylinders)	No	No	No	No
Ability to integrate scans with floor plans, engineering drawings of objects and surveyed information? (State which, all or none.)	Yes, all	Yes, all	Yes, all	No	No
Automate decimation of points in selectable areas to make data files as compact as possible?	NA	NA	NA	No	No
Is fitting of lines, planes and shapes to cloud done manually or automatically, or both?	Both	N/A	N/A	No	No
- For automatic and manual fitting, what techniques are used or available (e.g. least squares, taking average, etc.)?	Least squares	N/A	N/A	No	No
Ability to automatically track lines or limits of areas by color or texture discrimination?	No	No	No	No	No
Ability to automatically calculate and list alignment of center line of shapes (such as a pipe) containing straight and curved segments such as elbows?	Yes, straight	No	No	No	No
Maximum number of points that can be loaded	N/A [13]	N/A [13]	N/A [13]	N/A	N/A [13]
Automatic removal of noise (e.g., cars on road, vegetation, etc.)?	Yes	Yes	No	No	No

Table 10. 2008 LiDAR Software Summary Sets 6 to 10 (*Point of Beginning* website).
- continued –

Manufacturer	Leica Geosystems	Leica Geosystems	Leica Geosystems	Leica Geosystems	Leica Geosystems
Product	Leica CloudWorx for MicroStation	Leica CloudWorx for PDMS	Leica CloudWorx for Intergraph SmartPlant Review	Leica TruView FREE Web Viewer	Leica Cyclone II TOPO
Rendering/CAD Model Generation/Viewing					
Does software automatically or manually generate or create CAD models or model segments from point clouds and other known information? (Specify level of automation and intelligence.)	Yes, [11]	Yes, [9]	No	No	No
Are items (CAD models such as pipes, steel, flanges, elbow) fit to the point cloud using standard object tables/catalogs?	No	No [9]	No	No	No
Create statistical quality assurance reports on the modeled objects?	Yes	Yes	Yes	No	No
Automatically compute, without user interaction, a full 3D polygonal mesh (not view-based) from a point cloud?	No	No	No	No	No
Perform contour generation?	No	No	No	No	No
Perform volume calculation capabilities?	No	No	No	No	No
Perform solid modeling (volume generation) based on user-defined lines, planes and other surfaces as bounds?	No	No	No	No	No
Perform profile and cross-section generation along any cutting plane, family of planes or road alignment?	No	No	No	No	Yes, via feature coding
Have edge detection technology to determine boundaries of solids, planes and other shapes?	No	No	No	No	Yes, edges, planes, low, high, painted and flow line
Perform automatic extraction of standard shapes from cloud (e.g. pipe fittings, structural steel members, etc.)?	Yes {14]	Yes	Yes	No	No
Can user view cloud or generated shapes or models from any viewpoint in 3D?	Yes	Yes	Yes	No	Yes
Are fly-throughs or walk-throughs supported?	Yes	Yes	Yes	No	Yes
Have intelligent display of detail depending on scale of the view?	Yes	Yes	Yes	Yes	Yes
Can user select transparent/opaque surface for cloud and CAD shapes?	No	No	No	No	No
Which export formats are supported?	As MicroStation	As PDMS	As SmartPlant	N/A	LandXML, Leica DBX, Custom ASCII
Specify other measurement tools (e.g., clearance, cut/fill, table of elevation differences)	None	None	None	Delta from X,Y or Z	None
Can the pointcloud be rendered with visualization effects (e.g., intensity mapping, elevation mapping, shading, silhouette)?	No	No	No	Yes	Yes
Can the software automatically detect scan targets?	N/A	N/A	N/A	N/A	N/A
Miscellaneous					
Provide high-speed thumbnail views of scans, clouds, photographic images and generated shapes?	No	No	No	No	No
Can client/server system support multiple users?	Yes	Yes	Yes	Yes	No
Is client/server system supported to enable several clients contributing to a single project?	Yes, simultaneously	Yes, simultaneously	Yes, simultaneously	No	No

**Table 10. 2008 LiDAR Software Summary Sets 6 to 10 (*Point of Beginning* website).
- continued –**

Manufacturer	Leica Geosystems	Leica Geosystems	Leica Geosystems	Leica Geosystems	Leica Geosystems
Product	Leica CloudWorx for MicroStation	Leica CloudWorx for PDMS	Leica CloudWorx for Intergraph SmartPlant Review	Leica TruView FREE Web Viewer	Leica Cyclone II TOPO
Other Features					
Describe	[15]	[16]	[16]	TruView is an easy to use, free web based point cloud viewer intended for non-sophisticated and occasional users to have easy access to point cloud data withouth the need for training	Cyclone II TOPO is an easy to learn and use application for CAD techs to feature code topographic maps from 3D point cloud data

Table 11. 2008 LiDAR Software Summary Sets 11 to 15 (*Point of Beginning* website).

Manufacturer	Maptek I-Site 3D Laser Imaging	Maptek I-Site 3D Laser Imaging	Maptek I-Site 3D Laser Imaging	Riegl	Riegl USA
Product	I-Site Studio 3.1	I-Site Forensic 2.0	I-Site Voidworks 2.0	RiSCAN PRO	Phidias
Price (list by modules or components)	Contact Maptek I-Site representative	Contact Maptek I-Site representative	Contact Maptek I-Site representative	$8,750	$7,500
Laser scanner brands and models from which data can be imported directly	Maptek I-Site/Riegl/Optech/Leica/Z+F/MDL	Maptek I-Site/Riegl/Optech/Leica/Z+F/MDL	Maptek I-Site/MDL/Optech	All	All
Operating systems supported (if one is preferred, please state)	Windows Vista 64, Windows XP x64, Windows Vista, Windows XP, Windows 2000, Linux	Windows Vista 64, WIndows XP 64, Windows Vista, Windows XP, Windows 2000	Windows XP, Windows 2000	Windows XP Professional, Windows 2000 SP2	MicroStation
Minimum CPU requirement	2GHz	2GHz	2GHz	1.5ghz Pentium 4	2.5 ghz
Minimum RAM required	1024 MB	512 MB	512 MB	256mb Minimum; 1024mb Maximum	2000 MB
Space required on hard disk to properly run application, including swap space, etc. (list in Mb)	2048 MB	1024 MB	512 MB	700mb project example; 40gb projects	5 GB
Other hardware requirements	Accelerated 3D graphics, 3 button mouse	Accelerated 3D graphics, 3 button mouse	Accelerated 3D graphics, 3 button mouse		No
Cloud Editing/Analysis					
Can features be defined with user-created code libraries?	Yes	No	No	Yes	Yes
Feature codes exportable to CAD software? (specify which software)	Yes (DXF,DWG)	Yes (DXF,DWG)	Yes (DXF,DWG)	Yes	Yes
Can user compare cloud or shapes fitted to clouds to plan or perform theoretical shape and interference checking? (State which, all or none.)	All	All	All	Yes	Yes
Ability to make measurements such as distances, angles, areas, volumes, of lines, planes, shapes and other surfaces from cloud? (State which, all or none.)	Distances, angles, areas, volumes (cut, fill, 2.5D, 3D, 3D differential).	Distances, angles, areas	Distances, angles, areas, volumes (cut, fill, 2.5D, 3D, 3D differential).	Yes	All
Can user overlay or drape a photograph from an external source (e.g., digital camera) on cloud or elements extracted from cloud?	Yes, 4400 series scanner only.	Yes, 4400 series scanner only.	No	Yes	Yes
Ability to register scans without the use of targets?	Yes	Yes	Yes	Yes	Yes
Ability to place several clouds from different scans in coordinated 3D space using total station or GPS survey data that has been used to determine positions of scanner and alignment of scans?	Yes	Yes	Yes	Yes	Yes
Analyze points in a cloud representing shapes such as planes, cylinders and spheres to detect measurement outliers?	Yes	Yes	No	Yes	Yes
Ability to integrate scans with floor plans, engineering drawings of objects and surveyed information? (State which, all or none.)	All (2D plans, 3D CAD models)	All (2D plans, 3D CAD models)	No	Yes	All
Automate decimation of points in selectable areas to make data files as compact as possible?	Yes	Yes	No (manual only)	Yes	Yes
Is fitting of lines, planes and shapes to cloud done manually or automatically, or both?	Both	Both	Manually	Yes	Both
- For automatic and manual fitting, what techniques are used or available (e.g. least squares, taking average, etc.)?	Least squares distance, least median distance, ICP	Least squares distance, least median distance, ICP	Least squares distance, ICP	Yes	Least Squares
Ability to automatically track lines or limits of areas by color or texture discrimination?	Yes	Yes	No	Yes	Yes
Ability to automatically calculate and list alignment of center line of shapes (such as a pipe) containing straight and curved segments such as elbows?	No	No	No	Yes	Yes

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Table 11. 2008 LiDAR Software Summary Sets 11 to 15 (*Point of Beginning* website). - continued –

Manufacturer	Maptek I-Site 3D Laser Imaging	Maptek I-Site 3D Laser Imaging	Maptek I-Site 3D Laser Imaging	Riegl	Riegl USA
Product	I-Site Studio 3.1	I-Site Forensic 2.0	I-Site Voidworks 2.0	RiSCAN PRO	Phidias
Maximum number of points that can be loaded	200 million	200 million	20 million	200,000,000	No limit
Automatic removal of noise (e.g., cars on road, vegetation, etc.)?	Yes	Yes	Yes	Yes	Yes
Rendering/CAD Model Generation/Viewing					
Does software automatically or manually generate or create CAD models or model segments from point clouds and other known information? (Specify level of automation and intelligence.)	Yes, level of automation is high for topographic and irregular 3D surfaces	Yes, level of automation is high for topographic and irregular 3D surfaces.	Yes, level of automation is high for irregular 3D surfaces.	Yes	Yes
Are items (CAD models such as pipes, steel, flanges, elbow) fit to the point cloud using standard object tables/catalogs?	No	No	No	Yes	Yes
Create statistical quality assurance reports on the modeled objects?	Yes	Yes	Yes	Yes	Yes
Automatically compute, without user interaction, a full 3D polygonal mesh (not view-based) from a point cloud?	Yes	Yes	No	Yes	No
Perform contour generation?	Yes	Yes	No	Yes	Yes
Perform volume calculation capabilities?	Yes	Yes	Yes	Yes	Yes
Perform solid modeling (volume generation) based on user-defined lines, planes and other surfaces as bounds?	All	All	All	Yes	Yes
Perform profile and cross-section generation along any cutting plane, family of planes or road alignment?	Yes	Yes	Yes	Yes	Yes
Have edge detection technology to determine boundaries of solids, planes and other shapes?	Yes	Yes	No	Yes	Yes
Perform automatic extraction of standard shapes from cloud (e.g. pipe fittings, structural steel members, etc.)?	No	No	No	Yes	Yes
Can user view cloud or generated shapes or models from any viewpoint in 3D?	Yes	Yes	Yes	Yes	Yes
Are fly-throughs or walk-throughs supported?	Yes	Yes	Yes	Yes	Yes
Have intelligent display of detail depending on scale of the view?	Yes	Yes	Yes	Yes	Yes
Can user select transparent/opaque surface for cloud and CAD shapes?	Yes	Yes	Yes	Yes	yes
Which export formats are supported?	3dp, 3dv, ma, vrml, dxf, dwg, dxb, obj, 00t, dgd, txt, 3di, arch_d, jpg, ireg	3dp, 3dv, ma, vrml, dxf, dwg, dxb, obj, 00t, dgd, txt, 3di, arch_d, jpg, ireg	vrml, dxf, dwg, dxb, obj, 00t, dgd, txt, arch_d	Ascii, Crystalix, 3DD with SOP, Point Cloud, Autocad, Polyworks, Wavefront, VRML, PLY, STL, LAS, Pointcloud for Autocad, XYZ.	Multiple
Specify other measurement tools (e.g., clearance, cut/fill, table of elevation differences)	Many (1)	Many (1)	Many (1)	Point Readout; Altitude Read, Color & Intensity Read	Multiple
Can the pointcloud be rendered with visualization effects (e.g., intensity mapping, elevation mapping, shading, silhouette)?	Yes	Yes	Yes	Yes	Yes
Can the software automatically detect scan targets?	Yes	Yes	No	Yes	No
Miscellaneous					
Provide high-speed thumbnail views of scans, clouds, photographic images and generated shapes?	No	No	No	Yes	Yes
Can client/server system support multiple users?	Yes	No	No	Yes	No

Table 11. 2008 LiDAR Software Summary Sets 11 to 15 (*Point of Beginning* website). - continued –

Manufacturer	Riegl USA	Riegl USA/Phoscan	Spatial Integrated Systems Inc	Topcon Positioning Systems	Trimble
Product	RiScan PRO	Riegl Tool Suite	3 DIS - 3 Dimensional Imaging & Scanning	ScanMaster	RealWorks Survey
Miscellaneous					
Provide high-speed thumbnail views of scans, clouds, photographic images and generated shapes?	Yes	Yes	No	No	Yes
Can client/server system support multiple users?	Yes	Yes	No	No	No
Is client/server system supported to enable several clients contributing to a single project?	Yes	Yes	No	No	No
Other Features					
Describe	Yes			Integrated WiFi control	Station-based navigation - Image-based drawing and modeling - EasyProfile - Google Earth exports

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Table 12. 2008 LiDAR Software Summary Sets 16 to 20 (*Point of Beginning* website).

Manufacturer	Riegl USA	Riegl USA/Phoscan	Spatial Integrated Systems Inc	Topcon Positioning Systems	Trimble
Product	RiScan PRO	Riegl Tool Suite	3 DIS - 3 Dimensional Imaging & Scanning	ScanMaster	RealWorks Survey
Price (list by modules or components)	Included with the Scanner	$9,750	Consult SIS	Contact local Topcon dealer	Contact Trimble dealer
Laser scanner brands and models from which data can be imported directly	Riegl	All	3 DIS 1500	Topcon	All (all brands can be imported via ASCII-based formats; Optimized for Trimble 3D scanners and Survey Equipments
Operating systems supported (if one is preferred, please state)	Microsoft	Windows XP Professional, Windows 2000 SP2	Windows XP	Windows XP	Windows 2000 / XP
Minimum CPU requirement	2.5 ghz	1.5ghz Pentium 4	Pentium 1.6 GH	2GHz	Pentium 4 2 Giga Hertz
Minimum RAM required	2000 MB	256mb Minimum; 1024mb Maximum	512 MB	1GB	1 GB
Space required on hard disk to properly run application, including swap space, etc. (list in Mb)	5 GB	700mb project example; 40gb projects	512 MB	Sufficient to store raw data	2 GB
Other hardware requirements	No		3D Graphic Card Recommended	Video Card w/DirectX 9.0c support	graphic card (minimum 128 MB)
Cloud Editing/Analysis					
Can features be defined with user-created code libraries?	No	Yes	No	Only individual coding	Yes
Feature codes exportable to CAD software? (specify which software)	Yes	Yes	AutoCad/Imageware	Yes via DXF format	Yes
Can user compare cloud or shapes fitted to clouds to plan or perform theoretical shape and interference checking? (State which, all or none.)	Yes	Yes	None	No	All
Ability to make measurements such as distances, angles, areas, volumes, of lines, planes, shapes and other surfaces from cloud? (State which, all or none.)	Yes	Yes	Yes	distances, angles, areas	All
Can user overlay or drape a photograph from an external source (e.g., digital camera) on cloud or elements extracted from cloud?	Yes	Yes	No	No	Yes (from internal scanner camera and external source - digital camera)
Ability to register scans without the use of targets?	Yes	Yes	Yes	Yes	Yes
Ability to place several clouds from different scans in coordinated 3D space using total station or GPS survey data that has been used to determine positions of scanner and alignment of scans?	Yes	Yes	Yes	Yes	Yes
Analyze points in a cloud representing shapes such as planes, cylinders and spheres to detect measurement outliers?	Yes	Yes	None	No	Yes
Ability to integrate scans with floor plans, engineering drawings of objects and surveyed information? (State which, all or none.)	Yes	Yes	None	Yes, all	All
Automate decimation of points in selectable areas to make data files as compact as possible?	Yes	Yes	No	Yes	Yes
Is fitting of lines, planes and shapes to cloud done manually or automatically, or both?	Manually	Yes	Both	Both	Both
- For automatic and manual fitting, what techniques are used or available (e.g. least squares, taking average, etc.)?	Least Squares and others	Yes	Least Squares	Least squares, best fit	Least squares
Ability to automatically track lines or limits of areas by color or texture discrimination?	Yes	Yes	No	No	Yes

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Table 12. 2008 LiDAR Software Summary Sets 16 to 20 (*Point of Beginning* website). - continued –

Manufacturer	Riegl USA	Riegl USA/Phoscan	Spatial Integrated Systems Inc	Topcon Positioning Systems	Trimble
Product	RiScan PRO	Riegl Tool Suite	3 DIS - 3 Dimensional Imaging & Scanning	ScanMaster	RealWorks Survey
Ability to automatically calculate and list alignment of center line of shapes (such as a pipe) containing straight and curved segments such as elbows?	Yes	Yes	No	No	No (see 3Dipsos)
Maximum number of points that can be loaded	No limit	200,000,000	CPU & RAM Dependent	128 million on 32 bit PC	depends on system limits
Automatic removal of noise (e.g., cars on road, vegetation, etc.)?	Yes	Yes	No	No	Yes
Rendering/CAD Model Generation/Viewing					
Does software automatically or manually generate or create CAD models or model segments from point clouds and other known information? (Specify level of automation and intelligence.)	No	Yes	No	No	Yes
Are items (CAD models such as pipes, steel, flanges, elbow) fit to the point cloud using standard object tables/catalogs?	No	Yes	No	No	No (see 3Dipsos)
Create statistical quality assurance reports on the modeled objects?	Yes	Yes	No	No	Yes
Automatically compute, without user interaction, a full 3D polygonal mesh (not view-based) from a point cloud?	Yes	Yes	No	No	Yes
Perform contour generation?	Yes	Yes	No	Yes	Yes
Perform volume calculation capabilities?	Yes	Yes	No	No	Yes
Perform solid modeling (volume generation) based on user-defined lines, planes and other surfaces as bounds?	No	Yes	No	Yes	Yes
Perform profile and cross-section generation along any cutting plane, family of planes or road alignment?	Yes	Yes	No	Yes	Yes
Have edge detection technology to determine boundaries of solids, planes and other shapes?	Yes	Yes	No	No	Yes
Perform automatic extraction of standard shapes from cloud (e.g. pipe fittings, structural steel members, etc.)?	No	Yes	No	No	Yes
Can user view cloud or generated shapes or models from any viewpoint in 3D?	Yes	Yes	Yes	Yes	Yes
Are fly-throughs or walk-throughs supported?	Yes	Yes	Yes	No recording	Yes
Have intelligent display of detail depending on scale of the view?	Yes	Yes	Yes	Yes	Yes (images)
Can user select transparent/opaque surface for cloud and CAD shapes?	No	Yes	Yes	Yes	No
Which export formats are supported?	Multiple	DGN, DWG, DXG, IGES, ACIS SAT, Parasolids, CGM, Step AP203/AP214, VRML World, STL, U3D	ASCII	DXF, CSV, PXA	dxf, dgn, asc, obj, kml, ptc etc.
Specify other measurement tools (e.g., clearance, cut/fill, table of elevation differences)	Multiple		Multiple Inspection Tools Available		Full inspection tools available
Can the pointcloud be rendered with visualization effects (e.g., intensity mapping, elevation mapping, shading, silhouette)?	Yes	Yes	Yes	Yes	Yes, all
Can the software automatically detect scan targets?	Yes	Yes	Yes	No	Yes

Table 12. 2008 LiDAR Software Summary Sets 16 to 20 (*Point of Beginning* website). - continued –

Manufacturer	Riegl USA	Riegl USA/Phoscan	Spatial Integrated Systems Inc	Topcon Positioning Systems	Trimble
Product	RiScan PRO	Riegl Tool Suite	3 DIS - 3 Dimensional Imaging & Scanning	ScanMaster	RealWorks Survey
Miscellaneous					
Provide high-speed thumbnail views of scans, clouds, photographic images and generated shapes?	Yes	Yes	No	No	Yes
Can client/server system support multiple users?	Yes	Yes	No	No	No
Is client/server system supported to enable several clients contributing to a single project?	Yes	Yes	No	No	No
Other Features					
Describe	Yes			Integrated WiFi control	Station-based navigation - Image-based drawing and modeling - EasyProfile - Google Earth exports

Table 13. 2008 LiDAR Software Summary Sets 21 to 22 (*Point of Beginning* website).

Manufacturer	Trimble	Z+F UK LTD
Product	**LASERGen**	**LFM Software**
Price (list by modules or components)	$9000 Subscription Plan	POA
Laser scanner brands and models from which data can be imported directly	All	IMAGER 5003 & IMAGER 5006 & All scanners via ascii
Operating systems supported (if one is preferred, please state)	Windows NT - XPPro	Windows 2000, NT, XP
Minimum CPU requirement	1 gig	2.5GHz processor
Minimum RAM required	512	1GB RAM
Space required on hard disk to properly run application, including swap space, etc. (list in Mb)	Based on project	A small 30-60GByte
Other hardware requirements		GeForce graphics card 128M memory
Cloud Editing/Analysis		
Can features be defined with user-created code libraries?	Yes	No
Feature codes exportable to CAD software? (specify which software)	Yes	Direct pointcloud links to: AutoCAD, Smart Plant Review, PDS, PDMS, Microstation
Can user compare cloud or shapes fitted to clouds to plan or perform theoretical shape and interference checking? (State which, all or none.)	Yes	Yes, interference checking
Ability to make measurements such as distances, angles, areas, volumes, of lines, planes, shapes and other surfaces from cloud? (State which, all or none.)	Yes	Yes, distances and 3D model generation
Can user overlay or drape a photograph from an external source (e.g., digital camera) on cloud or elements extracted from cloud?	Yes	Yes
Ability to register scans without the use of targets?	Yes	Yes
Ability to place several clouds from different scans in coordinated 3D space using total station or GPS survey data that has been used to determine positions of scanner and alignment of scans?	Yes	Yes
Analyze points in a cloud representing shapes such as planes, cylinders and spheres to detect measurement outliers?	Yes	Yes
Ability to integrate scans with floor plans, engineering drawings of objects and surveyed information? (State which, all or none.)	Yes	Yes
Automate decimation of points in selectable areas to make data files as compact as possible?	Yes	Yes
Is fitting of lines, planes and shapes to cloud done manually or automatically, or both?	Both	Both
- For automatic and manual fitting, what techniques are used or available (e.g. least squares, taking average, etc.)?	least squares & Orthoganl Regression	Best fit
Ability to automatically track lines or limits of areas by color or texture discrimination?	Yes	No
Ability to automatically calculate and list alignment of center line of shapes (such as a pipe) containing straight and curved segments such as elbows?	Yes	Yes
Maximum number of points that can be loaded	Unlimited	limited by PC memory
Automatic removal of noise (e.g., cars on road, vegetation, etc.)?	Yes - Rules based	Yes

Table 13. 2008 LiDAR Software Summary Sets 21 to 22 (*Point of Beginning* website). - continued –

Manufacturer	Trimble	Z+F UK LTD
Product	LASERGen	LFM Software
Rendering/CAD Model Generation/Viewing		
Does software automatically or manually generate or create CAD models or model segments from point clouds and other known information? (Specify level of automation and intelligence.)	Automated	Yes, semi/automatic. Level of intelligence depends on target CAD package
Are items (CAD models such as pipes, steel, flanges, elbow) fit to the point cloud using standard object tables/catalogs?	Yes	Yes
Create statistical quality assurance reports on the modeled objects?	Yes	Yes
Automatically compute, without user interaction, a full 3D polygonal mesh (not view-based) from a point cloud?	No	Yes
Perform contour generation?	Yes	No
Perform volume calculation capabilities?	Yes	No
Perform solid modeling (volume generation) based on user-defined lines, planes and other surfaces as bounds?	Yes	Yes
Perform profile and cross-section generation along any cutting plane, family of planes or road alignment?	Yes	Yes
Have edge detection technology to determine boundaries of solids, planes and other shapes?	Yes	No
Perform automatic extraction of standard shapes from cloud (e.g. pipe fittings, structural steel members, etc.)?	Yes	Yes
Can user view cloud or generated shapes or models from any viewpoint in 3D?	Yes	Yes
Are fly-throughs or walk-throughs supported?	Yes	Yes
Have intelligent display of detail depending on scale of the view?	Yes	Yes
Can user select transparent/opaque surface for cloud and CAD shapes?	Yes	Yes
Which export formats are supported?	All standard formats	acis rendering
Specify other measurement tools (e.g., clearance, cut/fill, table of elevation differences)	Too many to list	
Can the pointcloud be rendered with visualization effects (e.g., intensity mapping, elevation mapping, shading, silhouette)?	Yes	Yes
Can the software automatically detect scan targets?	Yes	Yes
Miscellaneous		
Provide high-speed thumbnail views of scans, clouds, photographic images and generated shapes?	Yes	Yes
Can client/server system support multiple users?	yes	Yes
Is client/server system supported to enable several clients contributing to a single project?	Yes	Yes
Other Features		
Describe	Multi-Platform	Bubble view support

Table 14. 2008 LiDAR Software Summary Survey Notes (*Point of Beginning* website).

Survey Notes			
1	3rdTech	SceneVision-3D	Includes additional features for forensics - "Viewpoints", blood spatter trajectory calculation, hi-resolution insets.
2	kubit USA	PointCloud 3.2 / PointCloud Pro 3.2	trial version is available
3	Leica Geosystems	Leica Cyclone Family of Software [1]	1. Suite of 7 modules: Cyclone-SCAN; -REGISTER; -MODEL; -SURVEY; -SERVER, PUBLISHER, VIEWER Pro 2. Contact Leica Representative 3. All brands/makes can be imported via ASCII-based formats; these brands/makes can be imported natively: Leica HDS2500/HDS3000/HDS4500/ScanStation; Z+F - Imager; Riegl; 5003 (ZFS,ZFC); Riegl (3DD). 4. Ethernet adapter for licensing; keyboard; mouse or other pointing device 5. Can use images from internal camera on Leica scanners or any external camera 6. Automatic: Region Grow modeling tools; manual modeling tools; ability to apply attributes to modeled elements. 7. DXF, COE (DWG, DGN), ASCII (XYZ, SVY, PTS, PTX, TXT, Customized format) 8. 130 MB static footprint; swap dependent on size of point cloud and operation. 9. Using CAD tools. 10. From Cyclone 11. Automatic: Region Grow modeling tools; manual modeling tools; ability to use intelligent CAD tools. 12. Clouds are not confined/restricted on a per-scan basis. Engine supports billions of points in a single dataset with interactive performance. Limit box can be changed on-the-fly. Supports multiple windows. Multi-threaded; supports multiple processors. Has 64-bit data engine and virtual 64-bit graphics engine.Data stored in databases. 13. Cyclone based applications could load approx 40 million points at a time if required but the management system dynamically loads all necessary points real-time and never approaches that max 14. Semi-automatic; cylinders,planes. 15. Clouds are not confined/restricted on a per-scan basis. Engine supports billions of points in a single dataset with interactive performance. Limit box can be changed on-the-fly. Supports multiple windows. Multi-threaded; supports multiple processors. Has 64-bit data engine and virtual 64-bit graphics engine. Data stored in databases. 16. Users can place D-Points along pipe run defined by cloud and model pipes in place via D-Points inside PDMS 17. Using cloud-to-cloud registration on data from any scanner and/or via "free stationing" and traversing using scan data from Leica ScanStation
4	Leica Geosystems	Leica CloudWorx for AutoCAD (Basic and Pro versions)	1. Suite of 7 modules: Cyclone-SCAN; -REGISTER; -MODEL; -SURVEY; -SERVER, PUBLISHER, VIEWER Pro 2. Contact Leica Representative 3. All brands/makes can be imported via ASCII-based formats; these brands/makes can be imported natively: Leica HDS2500/HDS3000/HDS4500/ScanStation; Z+F - Imager; Riegl; 5003 (ZFS,ZFC); Riegl (3DD). 4. Ethernet adapter for licensing; keyboard; mouse or other pointing device 5. Can use images from internal camera on Leica scanners or any external camera 6. Automatic: Region Grow modeling tools; manual modeling tools; ability to apply attributes to modeled elements. 7. DXF, COE (DWG, DGN), ASCII (XYZ, SVY, PTS, PTX, TXT, Customized format) 8. 130 MB static footprint; swap dependent on size of point cloud and operation. 9. Using CAD tools. 10. From Cyclone 11. Automatic: Region Grow modeling tools; manual modeling tools; ability to use intelligent CAD tools. 12. Clouds are not confined/restricted on a per-scan basis. Engine supports billions of points in a single dataset with interactive performance. Limit box can be changed on-the-fly. Supports multiple windows. Multi-threaded; supports multiple processors.Has 64-bit data engine and virtual 64-bit graphics engine.Data stored in databases. 13. Cyclone based applications could load approx 40 million points at a time if required but the management system dynamically loads all necessary points real-time and never approaches that max 14. Semi-automatic; cylinders,planes. 15. Clouds are not confined/restricted on a per-scan basis. Engine supports billions of points in a single dataset with interactive performance. Limit box can be changed on-the-fly. Supports multiple windows. Multi-threaded; supports multiple processors. Has 64-bit data engine and virtual 64-bit graphics engine. Data stored in databases. 16. Users can place D-Points along pipe run defined by cloud and model pipes in place via D-Points inside PDMS 17. Using cloud-to-cloud registration on data from any scanner and/or via "free stationing" and traversing using scan data from Leica ScanStation
5	Leica Geosystems	Leica CloudWorx for MicroStation	1. Suite of 7 modules: Cyclone-SCAN; -REGISTER; -MODEL; -SURVEY; -SERVER, PUBLISHER, VIEWER Pro 2. Contact Leica Representative 3. All brands/makes can be imported via ASCII-based formats; these brands/makes can be imported natively: Leica HDS2500/HDS3000/HDS4500/ScanStation; Z+F - Imager; Riegl; 5003 (ZFS,ZFC); Riegl (3DD). 4. Ethernet adapter for licensing; keyboard; mouse or other pointing device 5. Can use images from internal camera on Leica scanners or any external camera 6. Automatic: Region Grow modeling tools; manual modeling tools; ability to apply attributes to modeled elements. 7. DXF, COE (DWG, DGN), ASCII (XYZ, SVY, PTS, PTX, TXT, Customized format) 8. 130 MB static footprint; swap dependent on size of point cloud and operation. 9. Using CAD tools. 10. From Cyclone 11. Automatic: Region Grow modeling tools; manual modeling tools; ability to use intelligent CAD tools. 12. Clouds are not confined/restricted on a per-scan basis. Engine supports billions of points in a single dataset with interactive performance. Limit box can be changed on-the-fly. Supports multiple windows. Multi-threaded; supports multiple processors.Has 64-bit data engine and virtual 64-bit graphics engine.Data stored in databases. 13. Cyclone based applications could load approx 40 million points at a time if required but the management system dynamically loads all necessary points real-time and never approaches that max 14. Semi-automatic; cylinders,planes. 15. Clouds are not confined/restricted on a per-scan basis. Engine supports billions of points in a single dataset with interactive performance. Limit box can be changed on-the-fly. Supports multiple windows. Multi-threaded; supports multiple processors. Has 64-bit data engine and virtual 64-bit graphics engine. Data stored in databases. 16. Users can place D-Points along pipe run defined by cloud and model pipes in place via D-Points inside PDMS 17. Using cloud-to-cloud registration on data from any scanner and/or via "free stationing" and traversing using scan data from Leica ScanStation

Table 14. 2008 LiDAR Software Summary Survey Notes (*Point of Beginning* website). - continued –

Survey Notes			
6	Leica Geosystems	Leica CloudWorx for PDMS	1. Suite of 7 modules: Cyclone-SCAN; -REGISTER; -MODEL; -SURVEY; -SERVER, PUBLISHER, VIEWER Pro 2. Contact Leica Representative 3. All brands/makes can be imported via ASCII-based formats; these brands/makes can be imported natively: Leica HDS2500/HDS3000/HDS4500/ScanStation; Z+F - Imager; Riegl; 5003 (ZFS,ZFC); Riegl (3DD). 4. Ethernet adapter for licensing; keyboard; mouse or other pointing device 5. Can use images from internal camera on Leica scanners or any external camera 6. Automatic: Region Grow modeling tools; manual modeling tools; ability to apply attributes to modeled elements. 7. DXF, COE (DWG, DGN), ASCII (XYZ, SVY, PTS, PTX, TXT, Customized format) 8. 130 MB static footprint; swap dependent on size of point cloud and operation. 9. Using CAD tools. 10. From Cyclone 11. Automatic: Region Grow modeling tools; manual modeling tools; ability to use intelligent CAD tools. 12. Clouds are not confined/restricted on a per-scan basis. Engine supports billions of points in a single dataset with interactive performance. Limit box can be changed on-the-fly. Supports multiple windows. Multi-threaded; supports multiple processors.Has 64-bit data engine and virtual 64-bit graphics engine.Data stored in databases. 13. Cyclone based applications could load approx 40 million points at a time if required but the management system dynamically loads all necessary points real-time and never approaches that max 14. Semi-automatic; cylinders,planes. 15. Clouds are not confined/restricted on a per-scan basis. Engine supports billions of points in a single dataset with interactive performance. Limit box can be changed on-the-fly. Supports multiple windows. Multi-threaded; supports multiple processors. Has 64-bit data engine and virtual 64-bit graphics engine. Data stored in databases. 16. Users can place D-Points along pipe run defined by cloud and model pipes in place via D-Points inside PDMS 17. Using cloud-to-cloud registration on data from any scanner and/or via "free stationing" and traversing using scan data from Leica ScanStation
7	Leica Geosystems	Leica CloudWorx for Intergraph SmartPlant Review	1. Suite of 7 modules: Cyclone-SCAN; -REGISTER; -MODEL; -SURVEY; -SERVER, PUBLISHER, VIEWER Pro 2. Contact Leica Representative 3. All brands/makes can be imported via ASCII-based formats; these brands/makes can be imported natively: Leica HDS2500/HDS3000/HDS4500/ScanStation; Z+F - Imager; Riegl; 5003 (ZFS,ZFC); Riegl (3DD). 4. Ethernet adapter for licensing; keyboard; mouse or other pointing device 5. Can use images from internal camera on Leica scanners or any external camera 6. Automatic: Region Grow modeling tools; manual modeling tools; ability to apply attributes to modeled elements. 7. DXF, COE (DWG, DGN), ASCII (XYZ, SVY, PTS, PTX, TXT, Customized format) 8. 130 MB static footprint; swap dependent on size of point cloud and operation. 9. Using CAD tools. 10. From Cyclone 11. Automatic: Region Grow modeling tools; manual modeling tools; ability to use intelligent CAD tools. 12. Clouds are not confined/restricted on a per-scan basis. Engine supports billions of points in a single dataset with interactive performance. Limit box can be changed on-the-fly. Supports multiple windows. Multi-threaded; supports multiple processors.Has 64-bit data engine and virtual 64-bit graphics engine.Data stored in databases. 13. Cyclone based applications could load approx 40 million points at a time if required but the management system dynamically loads all necessary points real-time and never approaches that max 14. Semi-automatic; cylinders,planes. 15. Clouds are not confined/restricted on a per-scan basis. Engine supports billions of points in a single dataset with interactive performance. Limit box can be changed on-the-fly. Supports multiple windows. Multi-threaded; supports multiple processors. Has 64-bit data engine and virtual 64-bit graphics engine. Data stored in databases. 16. Users can place D-Points along pipe run defined by cloud and model pipes in place via D-Points inside PDMS 17. Using cloud-to-cloud registration on data from any scanner and/or via "free stationing" and traversing using scan data from Leica ScanStation
8	Leica Geosystems	Leica TruView FREE Web Viewer	1. Suite of 7 modules: Cyclone-SCAN; -REGISTER; -MODEL; -SURVEY; -SERVER, PUBLISHER, VIEWER Pro 2. Contact Leica Representative 3. All brands/makes can be imported via ASCII-based formats; these brands/makes can be imported natively: Leica HDS2500/HDS3000/HDS4500/ScanStation; Z+F - Imager; Riegl; 5003 (ZFS,ZFC); Riegl (3DD). 4. Ethernet adapter for licensing; keyboard; mouse or other pointing device 5. Can use images from internal camera on Leica scanners or any external camera 6. Automatic: Region Grow modeling tools; manual modeling tools; ability to apply attributes to modeled elements. 7. DXF, COE (DWG, DGN), ASCII (XYZ, SVY, PTS, PTX, TXT, Customized format) 8. 130 MB static footprint; swap dependent on size of point cloud and operation. 9. Using CAD tools. 10. From Cyclone 11. Automatic: Region Grow modeling tools; manual modeling tools; ability to use intelligent CAD tools. 12. Clouds are not confined/restricted on a per-scan basis. Engine supports billions of points in a single dataset with interactive performance. Limit box can be changed on-the-fly. Supports multiple windows. Multi-threaded; supports multiple processors.Has 64-bit data engine and virtual 64-bit graphics engine.Data stored in databases. 13. Cyclone based applications could load approx 40 million points at a time if required but the management system dynamically loads all necessary points real-time and never approaches that max 14. Semi-automatic; cylinders,planes. 15. Clouds are not confined/restricted on a per-scan basis. Engine supports billions of points in a single dataset with interactive performance. Limit box can be changed on-the-fly. Supports multiple windows. Multi-threaded; supports multiple processors. Has 64-bit data engine and virtual 64-bit graphics engine. Data stored in databases. 16. Users can place D-Points along pipe run defined by cloud and model pipes in place via D-Points inside PDMS 17. Using cloud-to-cloud registration on data from any scanner and/or via "free stationing" and traversing using scan data from Leica ScanStation
9	Maptek I-Site 3D Laser Imaging	I-Site Studio 3.1	(1) Distance from surface, surface areas, 3D extents, angular extents, chained linear distance, point to line/plane distance, line to line/plane angle, cut/fill volumes in 2.5D and 3D, centroids (geometric and intensity weighted), alignment residual errors (plane and feature fitting). (2) Media quality AVI generation, ultra high resolution screen capture, powerful easy-to-use survey location features, instant photo-rendering (4400 series scanners), advanced surface generation and update tools, utilizes x64 processors and multi-core systems, intuitive 3D environment, easy to set-up, learn and use.
10	Maptek I-Site 3D Laser Imaging	I-Site Forensic 2.0	(1) Surface areas, 3D extents, angular extents, chained linear distance, point to line/plane distance, line to line/plane angle, centroids (geometric and intensity weighted), alignment residual errors (plane and feature fitting). (2) Standard crime scene mark-up and analysis tools, scan authenticity verification, media quality AVI generation, ultra high resolution screen capture, powerful easy-to-use survey location features, instant photo-rendering (4400 series scanners), intuitive 3D environment, simple installation.

Table 14. 2008 LiDAR Software Summary Survey Notes (*Point of Beginning* website). - continued –

Survey Notes			
11	Maptek I-Site 3D Laser Imaging	I-Site Voidworks 2.0	(1) Surface areas, 3D extents, chained linear distance, point to line/plane distance, line to line/plane angle, cut/fill volumes in 2.5D and 3D, centroids (geometric and intensity weighted), alignment residual errors (feature fitting). (2) Easy to install and upgrade, easy to learn and use, intuitive 3D environment.
12	Riegl USA	Phidias	This also operates as a close range photogrammetry software
13	Trimble	RealWorks Survey	Station-based navigation provides new productive opportunities to exploit overlaid image and point cloud data. Drawing and modeling can now be performed using image data directly. EasyProfile automatically extracts natural features in a point cloud and generates associated profiles/lines to be exported in CAD packages. KML file generation allows locating of models directly in Google Earth.
14	Trimble	LASERGen	AVEVA PDMS AVEVA Review Autodesk AutoCAD 2002 - 2007 Bentley Systems, Inc. SE/J/V8/XM Intergraph PDS Intergraph SmartPlant Review LASERGen Viewer - 3D and Image viewer
15	Z+F UK LTD	LFM Software	LFM Server supports import of point cloud into standard CAD Packages, to allow users to work in their most familiar environment.