Esri International User Conference | San Diego, CA

Technical Workshops | July 2011

Road Ahead: Lidar

Clayton Crawford

Outline

- 10.1
- Direct support for LAS
- QA/QC
- First responders

LAS Dataset

- New data type
- File based (i.e., doesn’t live in a geodatabase)
- Stores references to LAS files on disk
- Optionally reference breakline data
- Treats a collection of LAS files as one logical dataset

ArcCatalog - ArcInfo - D:\Data\NC_Charlotte_Airport
File Edit View Go Geoprocessing Customize Windows Help
D:\Data\NC_Charlotte_Airport
Catalog Tree
Data
CA_Redlands
CA_San_Diego
FL_Hillsborough
NC_Charlotte_Airport
NC_Kinston
Contents Preview Description
Name Type Modified
CharAirportLAS Folder 2/9/2011 8:36:04 AM
char_airport.gdb File Geodatabase 4/6/2011 9:48:13 AM
charlotte airport.lasd LAS Dataset

LAS Dataset Properties

General | LAS Files | Surface Constraints | Statistics | XY Coordinate System | Z Coordinate System

Show: File

Show full path of LAS files

LAS File	Version	Point Count	Point Spacing	Z Min	Z Max	Statistics
4512-01.las	1.0	2,020,084	3.245	590.420	2842.830	...
4512-02.las	1.0	1,666,465	3.542	603.330	2589.330	...
4513-01.las	1.0	1,940,772	3.294	601.670	843.000	...
4513-02.las	1.0	1,080,166	4.211	650.080	838.830	...
4513-03.las	1.0	1,816,176	3.382	612.000	830.750	...
4513-04.las	1.0	1,278,076	3.947	610.920	813.500	...
4514-01.las	1.0	2,041,337	3.225	567.000	823.330	...
4514-02.las	1.0	1,376,597	3.812	629.830	895.920	...
4514-03.las	1.0	1,951,863	3.283	564.080	869.250	...
4514-04.las	1.0	1,108,822	4.185	675.670	897.420	...
4522-01.las	1.0	1,846,979	3.337	596.330	2310.330	...
4522-02.las	1.0	1,238,635	3.870	571.330	841.330	...
4523-01.las	1.0	1,366,594	3.825	614.670	839.580	...
4523-02.las	1.0	1,429,072	3.713	600.670	834.670	...
4523-03.las	1.0	1,457,039	3.715	611.750	847.250	...
4523-04.las	1.0	1,403,807	3.747	580.170	1519.750	...
4524-01.las	1.0	1,702,973	3.474	703.420	875.080	...

Add | Remove

OK | Cancel | Apply

LAS Dataset Properties

General | LAS Files | Surface Constraints | Statistics | XY Coordinate System | Z Coordinate System

Returns

Return	Point Count	%	Z Min	Z Max
First	23,186,358	75.34	567.00	2842.83
Second	7,589,412	24.66	-178.50	868.33
Last	23,168,198	75.28	-178.50	897.42
Single	17,047,489	55.39	567.00	897.42
First of Many	6,138,869	19.95	577.92	2842.83
Last of Many	6,120,709	19.89	-178.50	864.50

Attributes

Name	Min	Max
Return No.	1	2
Intensity	0	255
Class Code	1	7
Scan Angle	0	0
User Data	0	0
Point Source	1	11

Classification Codes

Classification	Point Count	%	Z Min	Z Max	Min Int...	Max Int...	Synthe...
1 Unclassified	14,581,112	47.38	568.67	2842.83	0	255	0
2 Ground	12,422,648	40.37	567.00	785.17	0	255	0
7 Low Point (noise)	3,772,010	12.26	-178.50	2297.42	0	255	0

Classification Flags

Name	Point Count
Model Key	0

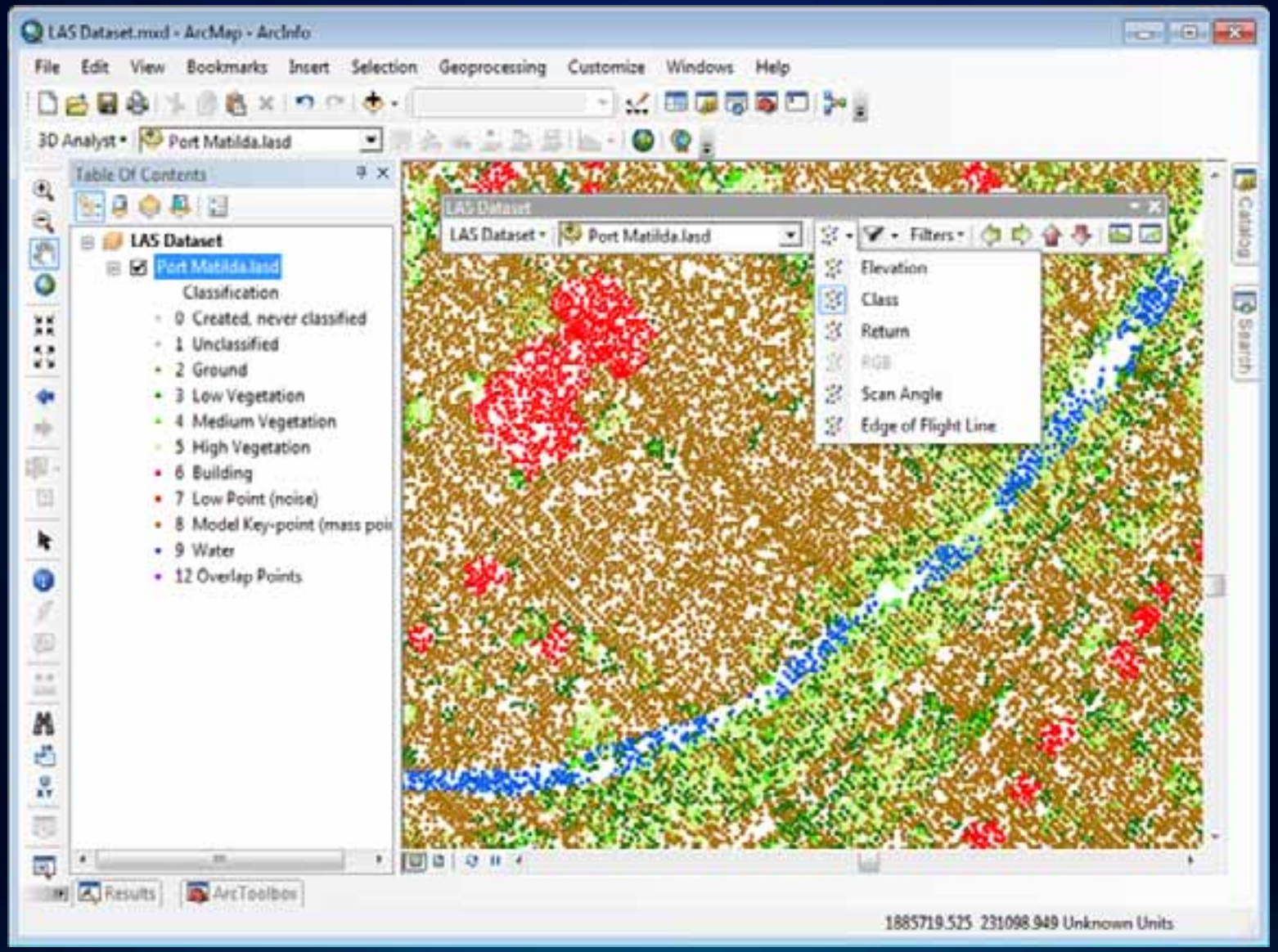
Check Status | Update | Force recalculate

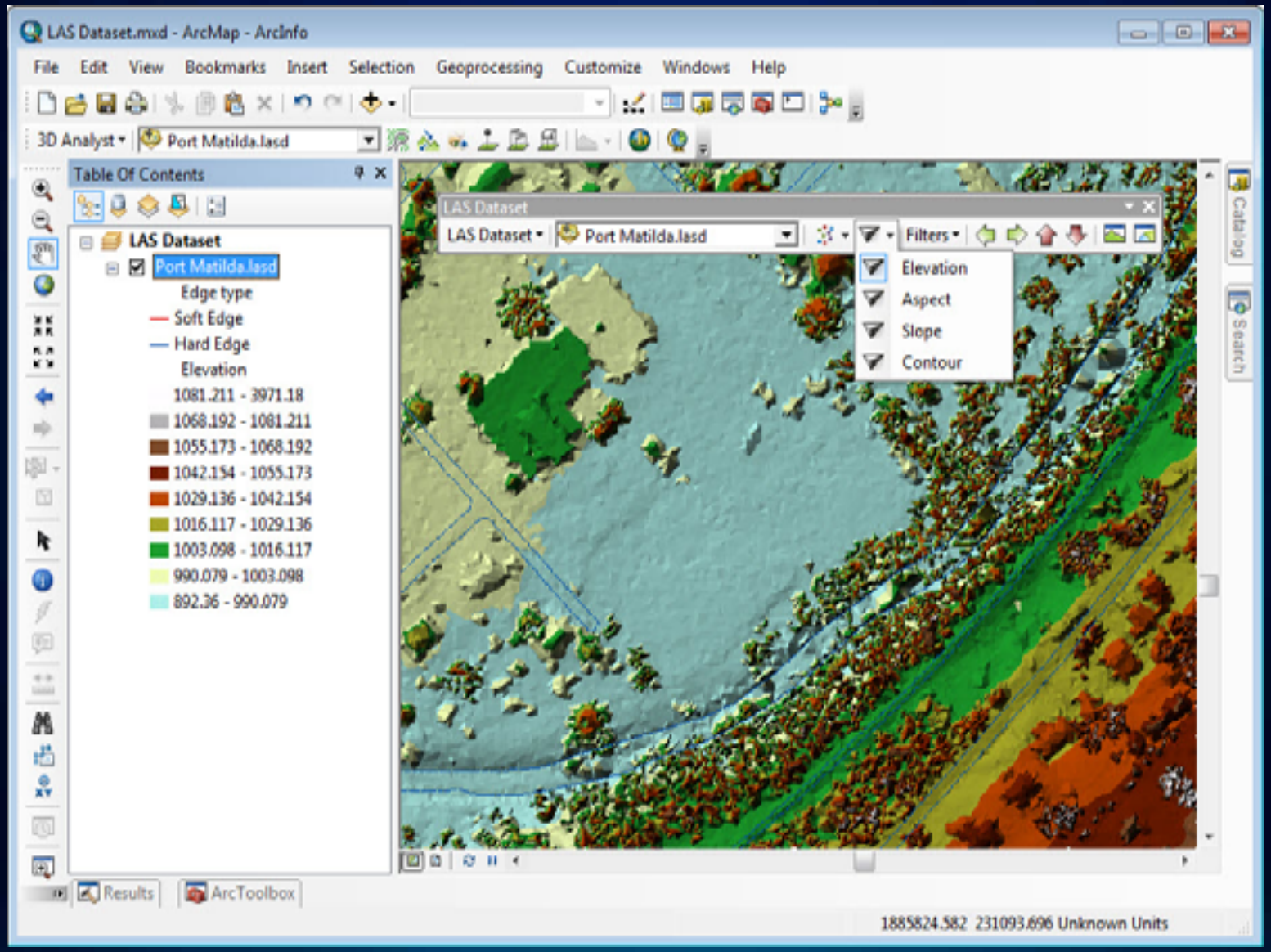
0 file(s) have outdated or no statistics

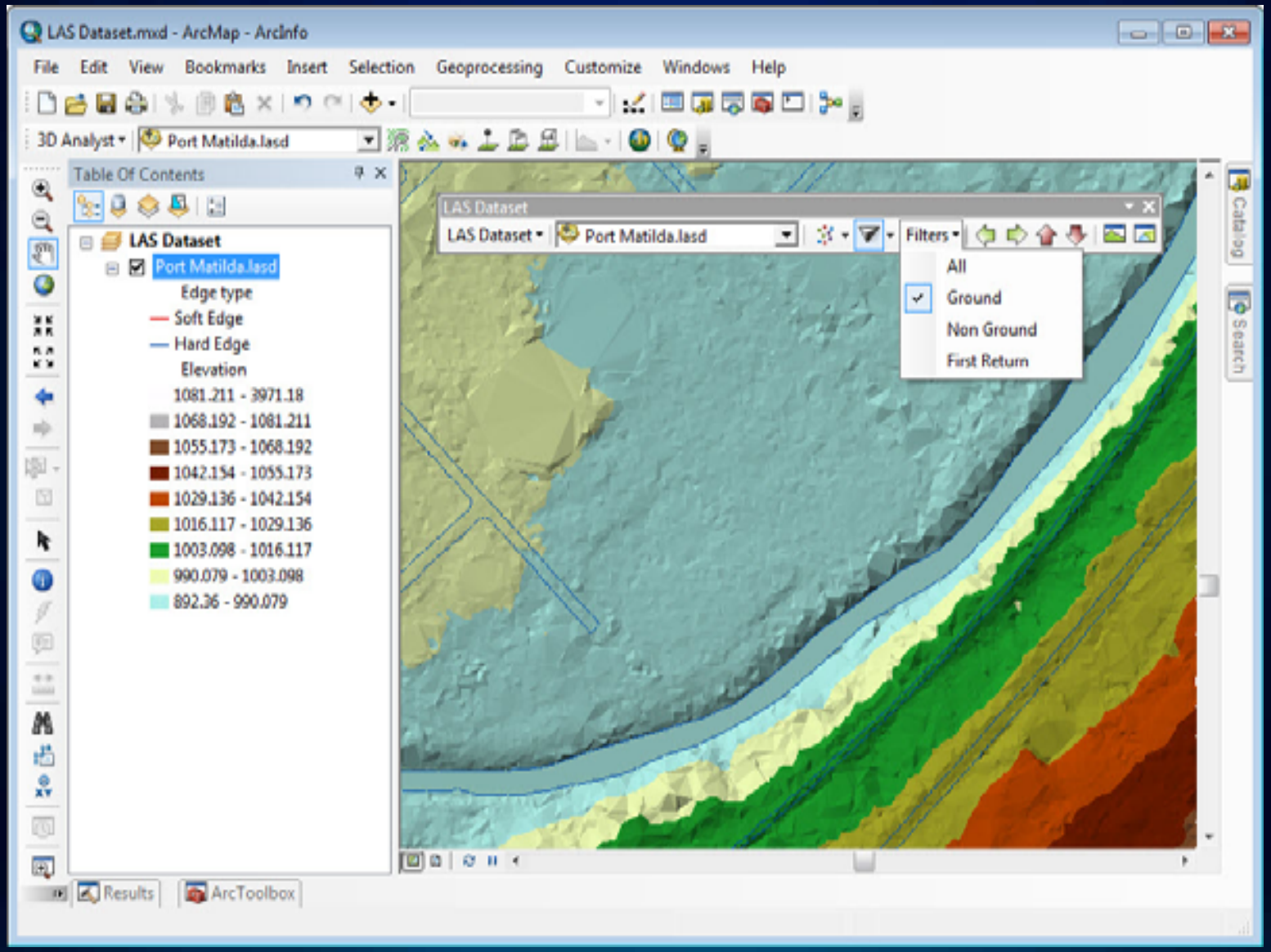
OK | Cancel | Apply

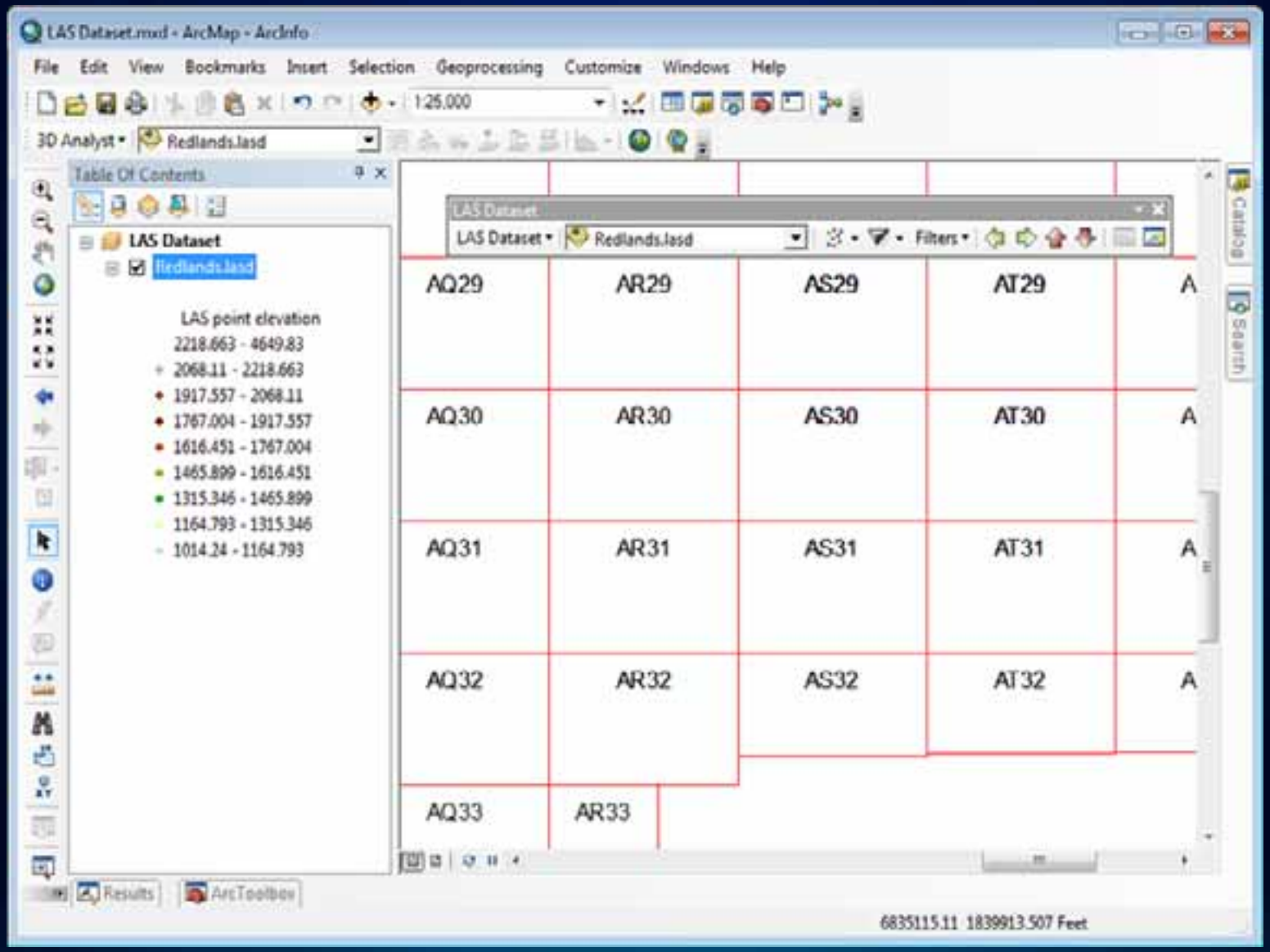
LAS Dataset – Display and Query

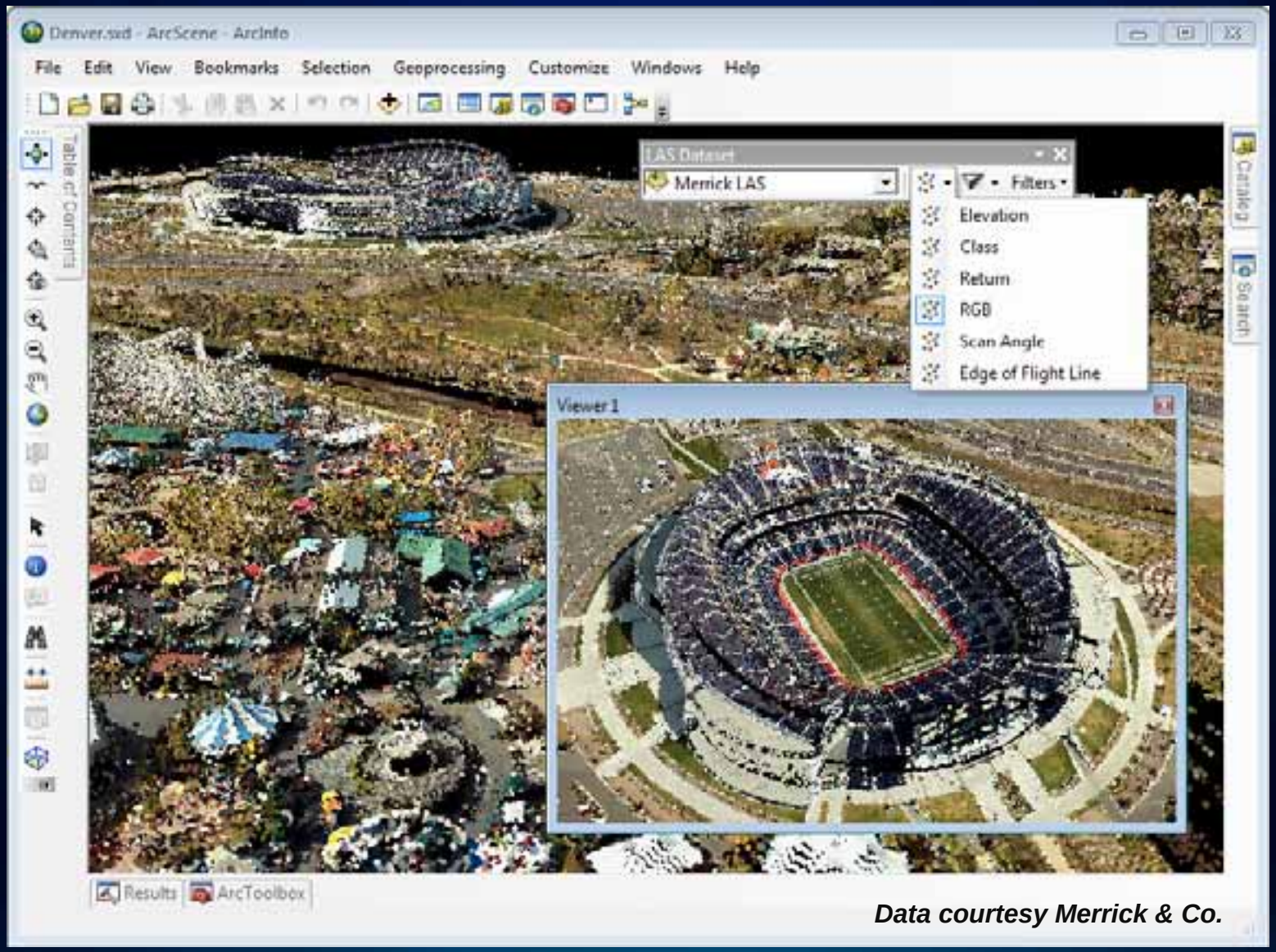
- Quick Preview of point data in LAS format
- Display and query both as surface and as points
- Symbolize points by LAS attributes
- Support for breaklines
- Map and scene (2D and 3D)


LAS Dataset.mxd - ArcMap - ArcInfo
File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help
3D Analyst
Port Matilda.lasd
Table Of Contents
LAS Dataset
Port Matilda.lasd
Classification
0 Created, never classified
1 Unclassified
2 Ground
3 Low Vegetation
4 Medium Vegetation
5 High Vegetation
6 Building
7 Low Point (noise)
8 Model Key-point (mass poi
9 Water
12 Overlap Points
LAS Dataset
LAS Dataset
Port Matilda.lasd
Filters
Elevation
Class
Return
RGB
Scan Angle
Edge of Flight Line
Catalog
Search
Results
ArcToolbox
1885719.525 231098.949 Unknown Units


LAS Dataset.mxd - ArcMap - ArcInfo
File
Edit
View
Bookmarks
Insert
Selection
Geoprocessing
Customize
Windows
Help
3D Analyst
Port Matilda.lasd
Table Of Contents
LAS Dataset
Port Matilda.lasd
Edge type
Soft Edge
Hard Edge
Elevation
1081.211 - 3971.18
1068.192 - 1081.211
1055.173 - 1068.192
1042.154 - 1055.173
1029.136 - 1042.154
1016.117 - 1029.136
1003.098 - 1016.117
990.079 - 1003.098
892.36 - 990.079
LAS Dataset
LAS Dataset
Port Matilda.lasd
Filters
Elevation
Aspect
Slope
Contour
Catalog
Search
Results
ArcToolbox
1885824.582 231093.696 Unknown Units


LAS Dataset.mxd - ArcMap - ArcInfo
File
Edit
View
Bookmarks
Insert
Selection
Geoprocessing
Customize
Windows
Help
3D Analyst
Port Matilda.lasd
Table Of Contents
LAS Dataset
Port Matilda.lasd
Edge type
Soft Edge
Hard Edge
Elevation
1081.211 - 3971.18
1068.192 - 1081.211
1055.173 - 1068.192
1042.154 - 1055.173
1029.136 - 1042.154
1016.117 - 1029.136
1003.098 - 1016.117
990.079 - 1003.098
892.36 - 990.079
LAS Dataset
LAS Dataset
Port Matilda.lasd
Filters
All
Ground
Non Ground
First Return
Catalog
Search
Results
ArcToolbox

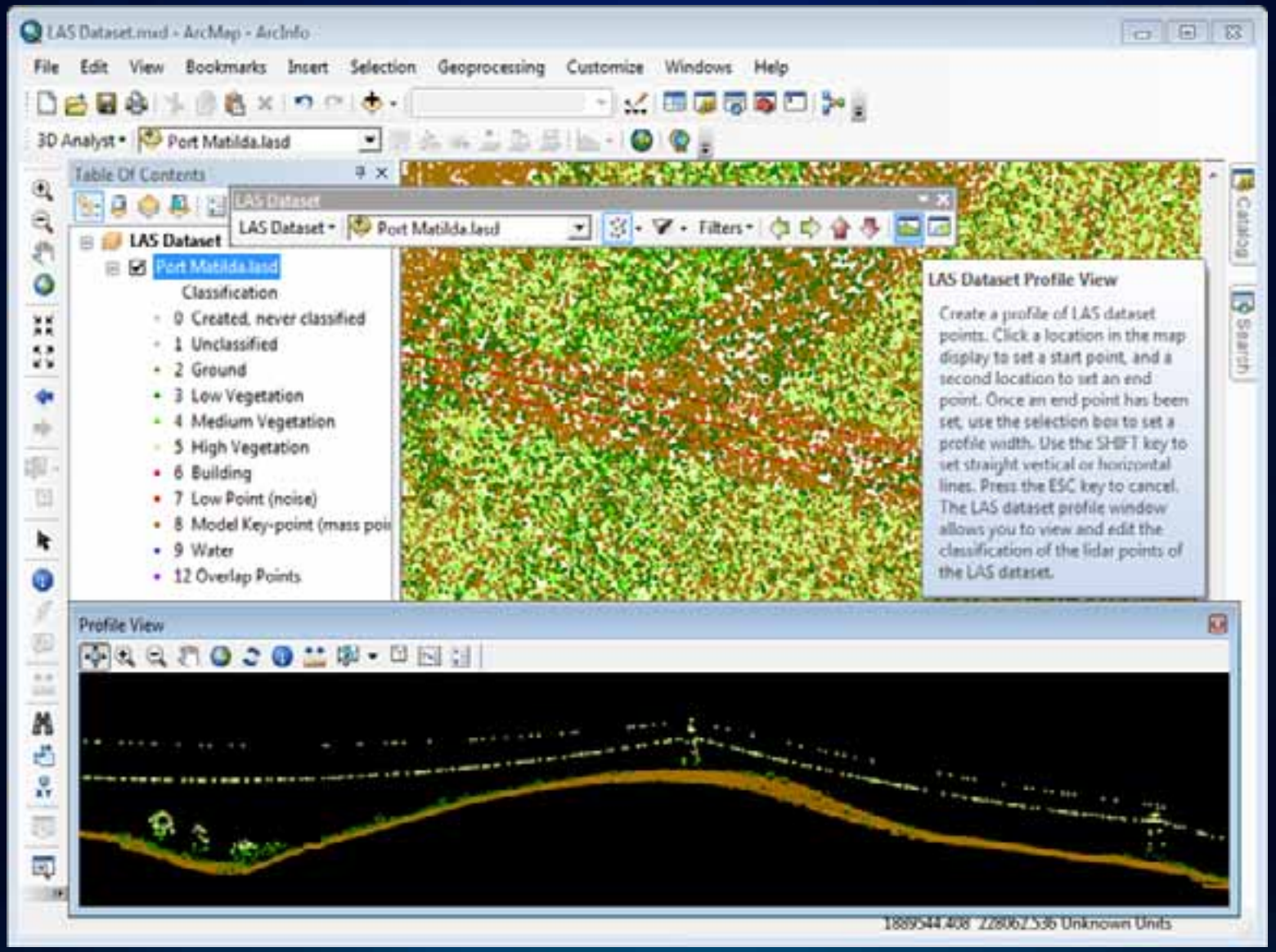

LAS Dataset.mxd - ArcMap - ArcInfo
File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help
1:25,000
3D Analyst
Redlands.lasd
Table Of Contents
LAS Dataset
Redlands.lasd
LAS point elevation
2218.663 - 4649.83
2068.11 - 2218.663
1917.557 - 2068.11
1767.004 - 1917.557
1616.451 - 1767.004
1465.899 - 1616.451
1315.346 - 1465.899
1164.793 - 1315.346
1014.24 - 1164.793
LAS Dataset
LAS Dataset
Redlands.lasd
Filters
AQ29
AR29
AS29
AT29
AQ30
AR30
AS30
AT30
AQ31
AR31
AS31
AT31
AQ32
AR32
AS32
AT32
AQ33
AR33
Catalog
Search
Results
ArcToolbox
6835115.11 1839913.507 Feet

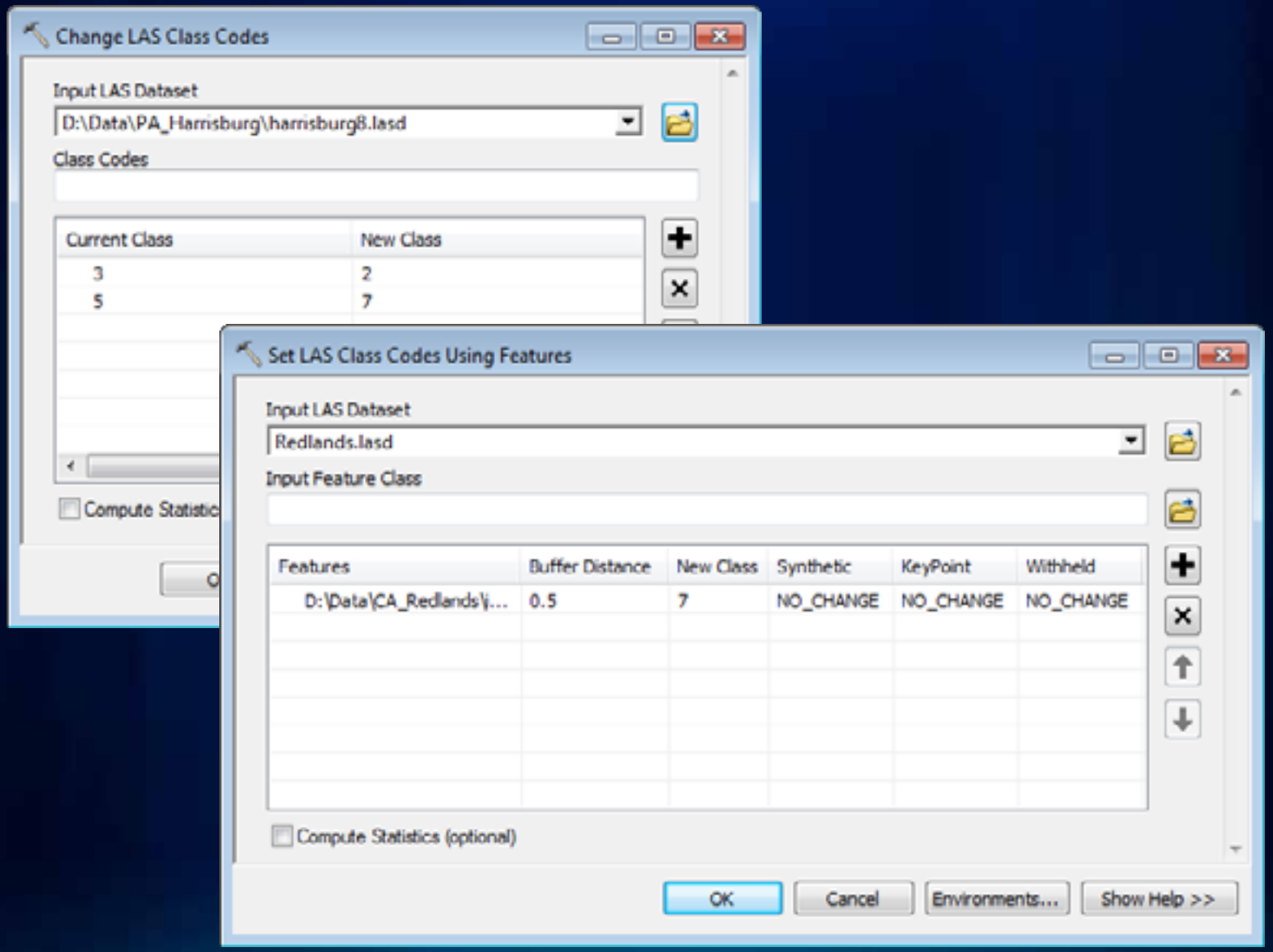


Data courtesy Merrick & Co.

LAS Dataset – Editing Class Codes

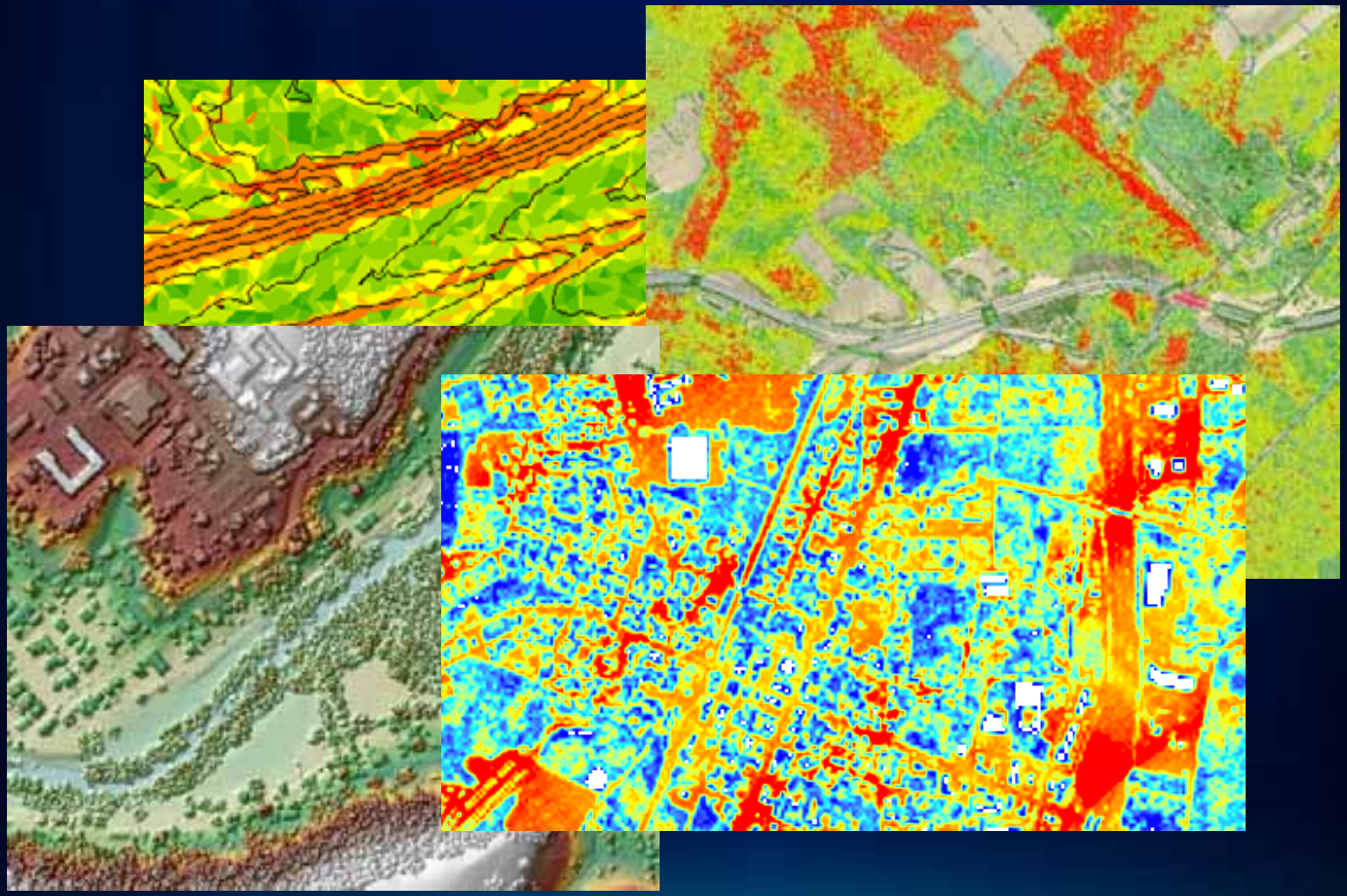
- Fixing data anomalies, misclassifications
- Reclassify relative to other feature data
- Reclassify to standard LAS spec


LAS Dataset.mxd - ArcMap - ArcInfo
File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help
3D Analyst
Port Matilda.lasd
Table Of Contents
LAS Dataset
LAS Dataset
Port Matilda.lasd
Filters
LAS Dataset
Port Matilda.lasd
Classification
0 Created, never classified
1 Unclassified
2 Ground
3 Low Vegetation
4 Medium Vegetation
5 High Vegetation
6 Building
7 Low Point (noise)
8 Model Key-point (mass poi
9 Water
12 Overlap Points
LAS Dataset Profile View
Create a profile of LAS dataset points. Click a location in the map display to set a start point, and a second location to set an end point. Once an end point has been set, use the selection box to set a profile width. Use the SHIFT key to set straight vertical or horizontal lines. Press the ESC key to cancel. The LAS dataset profile window allows you to view and edit the classification of the lidar points of the LAS dataset.
Catalog
Search
Profile View
1889544.408 2280627.536 Unknown Units


Change LAS Class Codes
Input LAS Dataset
D:\Data\PA_Harrisburg\harrisburg8.lasd
Class Codes
Current Class
New Class
3
2
5
7
Compute Statistic
Set LAS Class Codes Using Features
Input LAS Dataset
Redlands.lasd
Input Feature Class
Features
Buffer Distance
New Class
Synthetic
KeyPoint
Withheld
D:\Data\CA_Redlands\j...
0.5
7
NO_CHANGE
NO_CHANGE
NO_CHANGE
Compute Statistics (optional)
OK
Cancel
Environments...
Show Help >>

LAS Dataset - Analysis

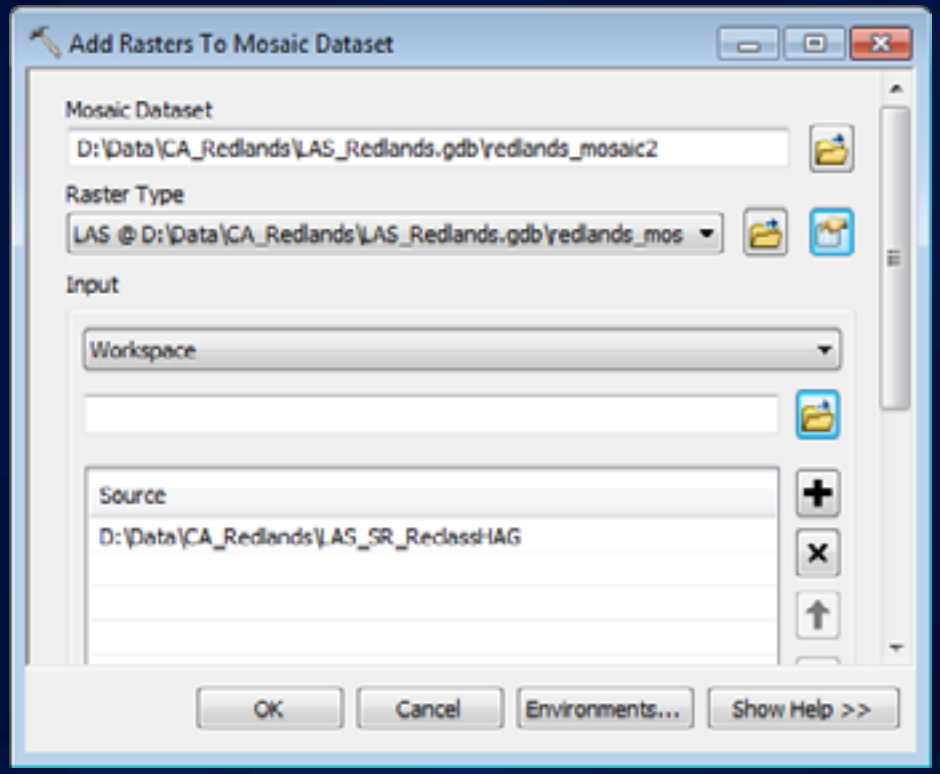
- Derive surfaces
  - LAS Dataset As Raster
  - LAS Dataset As TIN
- Direct analysis
  - Interpolate Shape
  - Line Of Sight
  - Locate Outliers
- Rasterize on point metrics
  - LAS Point Statistics As Raster

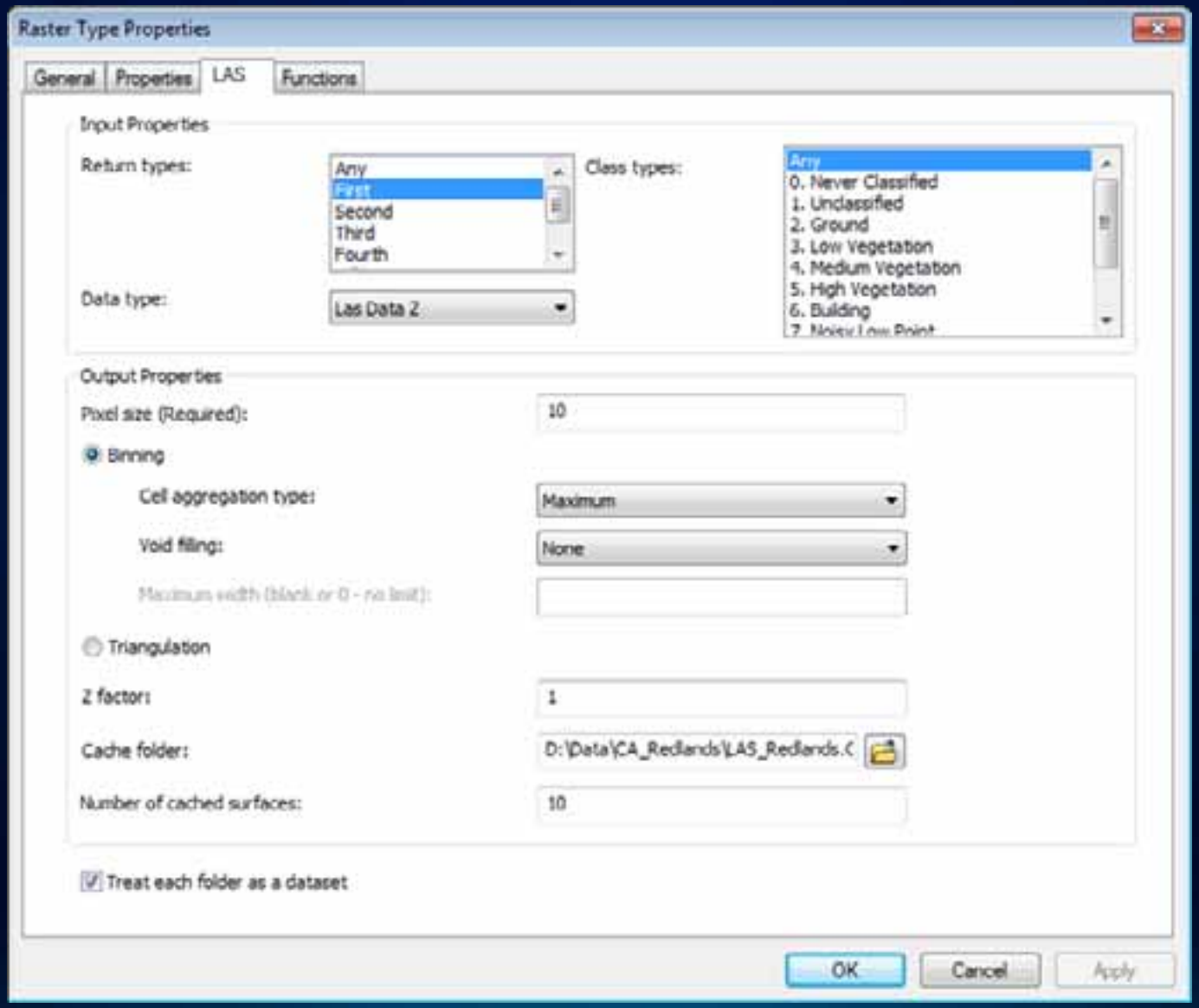


Mosaic Dataset

- Catalog and share lidar data
- Support for:
  - LAS files
  - LAS datasets
  - Terrain datasets
- Dynamic rasterization
- Can serve rasterized derivatives or source LAS files

Mosaic Dataset – LAS Treated as Raster Type




Raster Type Properties
General
Properties
LAS
Functions
Input Properties
Return types:
Any
First
Second
Third
Fourth
Class types:
Any
0. Never Classified
1. Unclassified
2. Ground
3. Low Vegetation
4. Medium Vegetation
5. High Vegetation
6. Building
Data type:
Las Data Z
Output Properties
Pixel size (Required):
10
Binning
Cell aggregation type:
Maximum
Void filling:
None
Triangulation
Z factor:
1
Cache folder:
D:\Data\CA_Redlands\LAS_Redlands.C
Number of cached surfaces:
10
Treat each folder as a dataset
OK
Cancel
Apply

Questions?

Please provide feedback in this workshop:

www.esri.com/sessionevals

esri