uSMART
Mass Data Module

Handles & Manipulates Billions of Lines, Points, etc

SmartTech's Mass Data Module is designed to efficiently manage large amounts of data.
Not only can large datasets be imported, the system is also capable of storing and displaying the data highly effectively. Once the data has been imported into the internal database, refresh times are typically 1 SECOND or LESS no matter what the zoom ratio is or size of the data.
e.g. 14 BILLION points

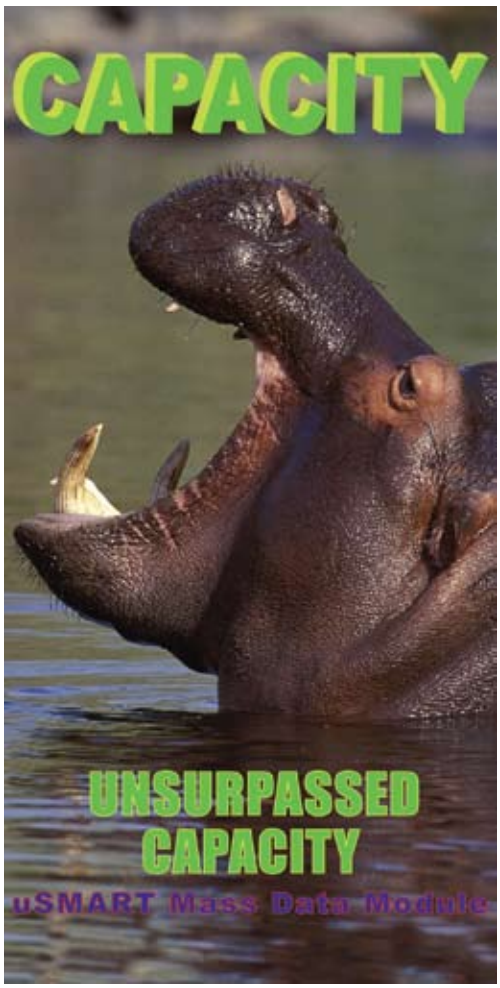
A portion of a ship consisting of 14 million points. uSMART allows users to dynamically rotate the entire ship in any direction smoothly and without flicker.
All coordinates are in absolute so measurements, sections, etc can easily be obtained.

SmartTech

SmartTech
34 Firgrove Way
Constantia Hills
Cape Town
South Africa
7806

Phone: +27-21-7130126
Fax: +27-21-7130127
Cell: +27-82-7882223
E-mail: sales@smarttech.co.za
Website: www.smarttech.co.za

uSMART Mass Data Module



A few facts about uSMART Mass Data Module

SPEED

- Imports approximately 189 thousand points per second (including resampling).
- For example; 3 files totalling 964GB open within 2 seconds.
- Data is then accessible in any area within approximately 1 second or less.

MEMORY

- Not limited by 32 bit Windows architecture i.e. 2 or 3GB.
- Fully user scalable.
- Automatic memory defragmentation.
- MDM controls disk access by location.
- Oldest data is cleared from memory.

CAPACITY

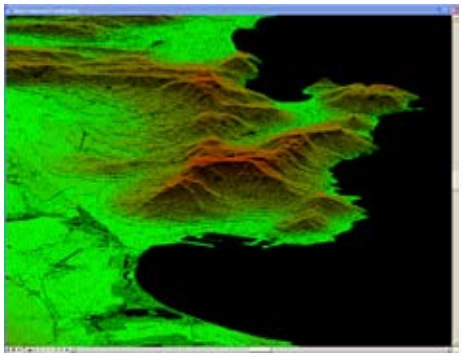
- Unlimited data capacity.
- Each file size limited to 9,223,372 Terrabytes.
- However, you can open (read/write) as many files as the OS can handle in a single Project.
- Each Element has a unique ID (sized 32 bytes), which is important for GIS purposes.

APPLICATION

- Airborne Laser (Lidar).
- HDS (High Density Surveys or Close Range Laser).
- Conventional/Historical applications.

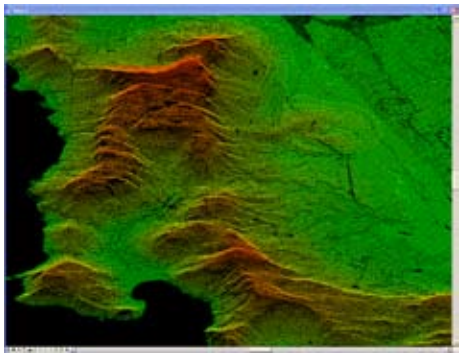
Technology you can rely on

WESTERN CAPE

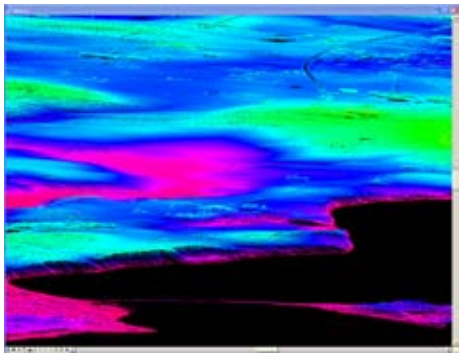


Number of Points	7.28 Million
Time to Import MPoints	00:00:57
Time to Resample	00:00:47
File Size	0.674 GB
Number of Break Lines	7.29 Million
Time to Import Break Lines	00:00:34
Time to Resample	00:00:43
File Size	0.743 GB
Number of Tin Lines	52.26 Million
Time to Create TIN	00:12:13
Time to Resample	00:05:21
File Size	4.909 GB

Break lines and Points were captured using the uSMART Softcopy System. The information from the separate DGN files was exported and re-imported into the MDM as a complete dataset. Thereafter the TIN was created.

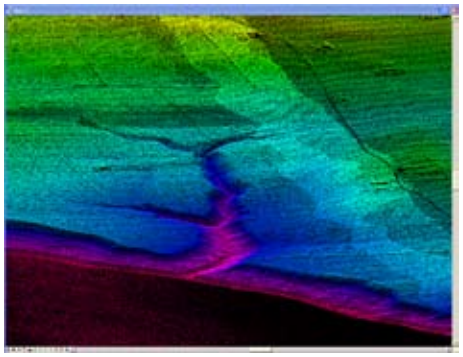


THISTED

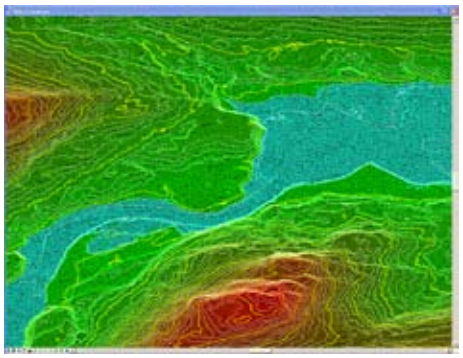


Number of Points	720.65 Million
Time to Import MPoints	00:52:09
Time to Resample	01:05:19
File Size	52.984 GB
Number of TIN Lines	1 319.75 Million
Time to Create TIN	06:30:47
Time to Resample	06:08:11
File Size	162.554 GB

Points were imported from LAS format binary files. They contain metadata e.g. scan time, return and number of returns, intensity, scan angle, etc.



ÅMOT (2.3 Billion points and more...)



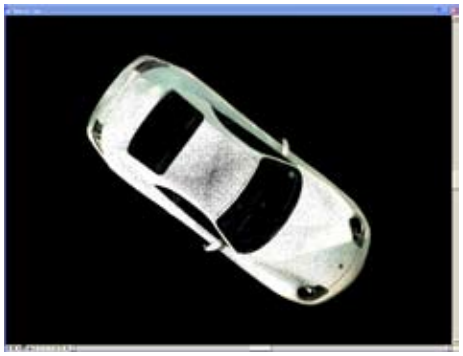
Number of Points	2 316.869 Million
Time to Import MPoints	02:46:53
Time to Resample	02:43:46
File Size	165.326 GB
Number of TIN Lines	8 679.391 Million
Time to Create TIN	48:47:58
Time to Resample	23:56:38
File Size	605.867 GB
Image Information	Vexcel RGB images
Number of Orthophotos	1019
Ground Pixel Size	20cm
Time to Create Orthophotos	52:00:00
Average Size of OT files	250 MB

Points were imported from LAS files and a TIN was created for the entire area. Orthophotos were created without any user intervention.

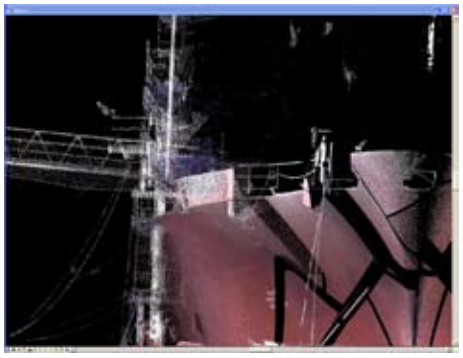
PORSCHE

Number of Points	2.14 Million
Time to Import MPoints	00:00:15
Time to Resample	00:00:05
File Size	0.116 GB

Points were imported from PTS ASCII and contain RGB and Intensity metadata.



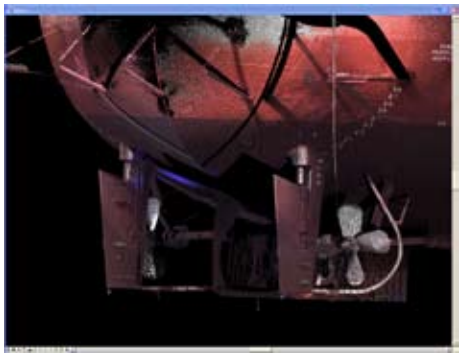
SHIP



Number of Points	12.48 Million
Time to Import MPoints	00.01.52
Time to Resample	00:01:05
File Size	0.862 GB

Points were imported from a PTX ASCII file and contain RGB and Intensity metadata. Sections were then created from the TIN of the hull.

SmartTech



uSMART

Mass Data Module

uSMART is a modular mapping system co-existing with MicroStation. The uSMART Mass Data Module, the latest in the uSMART suite, is designed to overcome the speed, capacity and memory problems of handling billions of elements (e.g. point cloud data, TINs, etc.). Not only can large datasets be created but the system is also capable of manipulating and displaying the data highly effectively.

The unlimited data capacity and the ability to open as many files as the operating system will allow in a single project, makes the Mass Data Module a must for large data projects. Coupled with this is the speed at which the points are imported (approximately 189 thousand points per second) and the speed of manipulating the data.

uSMART's Mass Data Module is unhindered by the 2 or 3GB virtual memory limit of the 32bit Windows architecture. The use of memory is controlled by the user and memory defragmentation is automatically incorporated.

Elements in the uSMART MDM files are stored in a hierarchical cubical structure and are therefore searched for by location when required e.g. for display and editing. Cubes are resampled, effectively generalising the data for optimum display speed.

Laser Ranging Survey techniques are becoming more popular and this will no doubt increase as these systems become more affordable. A major "problem" with these systems is the massive amount of points that are created. The Mass Data Module works seamlessly in MicroStation and points can be snapped to in the same way as you would to normal MicroStation elements.

MDM elements are saved in a *.md file. The file can consist of an unlimited number of groups and layers. Groups are similar to MicroStation's Models and Layers are the equivalent of MicroStation's Levels. When creating the elements, the user specifies whether it must be stored in DGN or MDM but this is completely transparent i.e. the user cannot see the difference between DGN or MDM elements, they all display in the MicroStation View.

There are very few systems that can for example handle billions of points efficiently. Even if a system is capable of importing the points, a simple refresh of the screen can take up to a few hours. Once the data has been imported into the internal database, accessing, viewing and manipulating large files e.g. 964GB is fast, taking 1 second or less to open the file and sub seconds to fit the view, zoom in/out or pan into a new area. Restarting the system from scratch takes less than a second.

Technology you can rely on.

34 Firgrove Way
Constantia Hills
Cape Town
7806, South Africa

Phone: +27-21-7130126
Fax: +27-21-7130127
Cell: +27-82-7882223
E-mail: sales@smarttech.co.za

Visit our website at: www.smarttech.co.za

SmartTech