

Possible Future Technological Developments for Boundary Surveying

1

The purpose of this talk is to give you some food for thought before you sit down this afternoon to discuss procedures for surveying boundaries.



A “laser” Shot in the Dark

2

My odds of getting this right are a lot less certain than my adoptive county of Kerry winning at football.

But getting things wrong has never stopped me before.

So please treat any of the following predictions with a healthy level of disrespect.



What technology are we used to?

*

Next time we visit the moon should be easier.

*

Broad band speeds basic business requirement.

First home comp had 512kb ram 8mb HD.

Sat Nav is everywhere.

Who could have predicted the rise of Bebo + Facebook??

*

All these features are in my phone and many of your handsets!

20 years ago



4

20 years ago phones looked a lot like this.
The nokia Brick

*

And 20 years ago to the month, as I walked into
Bolton streets hallowed halls to begin on what has
turned out to enter the dark world of surveying.

The Latest surveying technology at the time was.

*

One person Surveying... a massive leap forward..

*

GPS RTK fantastic concept but limited by lack of
satellites at the time..

*

Digital Level the biggest leap in levelling yet to be
bettered.

20 years ago



Geodimeter
Robotic



Trimble RTK GPS



Wild Digital Level

5

20 years ago phones looked a lot like this.

The nokia Brick

*

And 20 years ago to the month, as I walked into Bolton streets hallowed halls to begin on what has turned out to enter the dark world of surveying.

The Latest surveying technology at the time was.

*

One person Surveying... a massive leap forward..

*

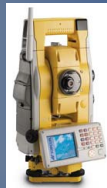
GPS RTK fantastic concept but limited by lack of satellites at the time..

*

Digital Level the biggest leap in levelling yet to be bettered.

Like Mobile phones..
Survey Technology has evolved
hand in hand with today's computers....

Today's Tech.



Faster

Memory Increase
from MB to GB

Field to Finish on
Site

Greater Working
Range

Seamless data
integration

Screen Size &
Quality improved

Lighter

More Intuitive

Lithium Ion Batteries not
Car batteries for a days work

6

20 years on and all aspects of land surveying have benefited from technologies onward march.

Controller Units allow for on site processing.

Memory increased by factors in the thousands.

20 Year ago 1MB considered sufficient for GPS project – today average Scanner job measured in Terabites.

Intuitive software allows you to work the way you want to work and to streamline surveying processes.

Technology Specific Developments

GNSS



Multiple Constellations

COR's

SBAS

Wireless Technology

Network RTK

Today's Tech.

Total Stations



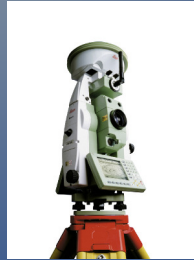
Magnetic Drives

Pizo Electric Drives

Video Technology

Wireless Technology

Today's Surveying Technology is Converging!.



Total Station + GNSS
+ GSM + Internet

8

TPS +GPS = Improved productivity & Work flow – Faster Setups – Single Job Files

*

Imaging TPS = Less work in the field Photogrametry techniques – See what the TPS see's -

*

Scanning TPS = Stepping Stone to full blown Scanner

*

GIS/RTK = Compact Expandable solution.

*

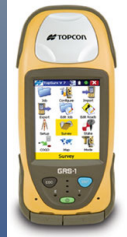
Point Clouds can already be created from Stereo images. From any digital camera..(like the one in your phone).

*

HDS+GPS+TPS = Total integration of hardware & Software. Creating a Virtual 3d World.

So where does technology go from here?

Today's Surveying Technology is Converging!.



GIS + RTK Rover

9

TPS +GPS = Improved productivity & Work flow – Faster Setups – Single Job Files

*

Imaging TPS = Less work in the field Photogrametry techniques – See what the TPS see's -

*

Scanning TPS = Stepping Stone to full blown Scanner

*

GIS/RTK = Compact Expandable solution.

*

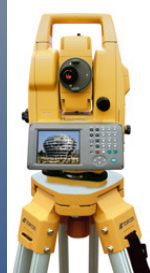
Point Clouds can already be created from Stereo images. From any digital camera..(like the one in your phone).

*

HDS+GPS+TPS = Total integration of hardware & Software. Creating a Virtual 3d World.

So where does technology go from here?

Today's Surveying Technology is Converging!.



Total Station +
Photogrammetry

10

TPS +GPS = Improved productivity & Work flow – Faster Setups – Single Job Files

*

Imaging TPS = Less work in the field Photogrammetry techniques – See what the TPS see's -

*

Scanning TPS = Stepping Stone to full blown Scanner

*

GIS/RTK = Compact Expandable solution.

*

Point Clouds can already be created from Stereo images. From any digital camera..(like the one in your phone).

*

HDS+GPS+TPS = Total integration of hardware & Software. Creating a Virtual 3d World.

So where does technology go from here?

Today's Surveying Technology is Converging!.



Total Station + Scanner

11

TPS +GPS = Improved productivity & Work flow – Faster Setups – Single Job Files

*

Imaging TPS = Less work in the field Photogrametry techniques – See what the TPS see's -

*

Scanning TPS = Stepping Stone to full blown Scanner

*

GIS/RTK = Compact Expandable solution.

*

Point Clouds can already be created from Stereo images. From any digital camera..(like the one in your phone).

*

HDS+GPS+TPS = Total integration of hardware & Software. Creating a Virtual 3d World.

So where does technology go from here?

Today's Surveying Technology is Converging!.



Scanner + GNSS
+ Total Station

12

TPS +GPS = Improved productivity & Work flow – Faster Setups – Single Job Files

*

Imaging TPS = Less work in the field Photogrametry techniques – See what the TPS see's -

*

Scanning TPS = Stepping Stone to full blown Scanner

*

GIS/RTK = Compact Expandable solution.

*

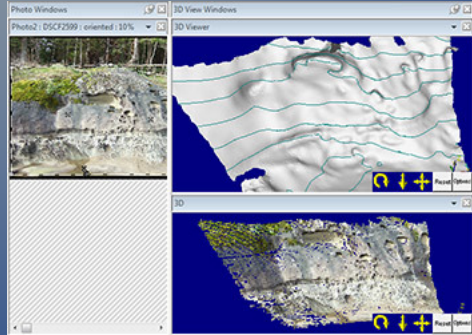
Point Clouds can already be created from Stereo images. From any digital camera..(like the one in your phone).

*

HDS+GPS+TPS = Total integration of hardware & Software. Creating a Virtual 3d World.

So where does technology go from here?

Today's Surveying Technology is Converging!.



Point Clouds from Photos

13

TPS +GPS = Improved productivity & Work flow – Faster Setups – Single Job Files

*

Imaging TPS = Less work in the field Photogrametry techniques – See what the TPS see's -

*

Scanning TPS = Stepping Stone to full blown Scanner

*

GIS/RTK = Compact Expandable solution.

*

Point Clouds can already be created from Stereo images. From any digital camera..(like the one in your phone).

*

HDS+GPS+TPS = Total integration of hardware & Software. Creating a Virtual 3d World.

So where does technology go from here?

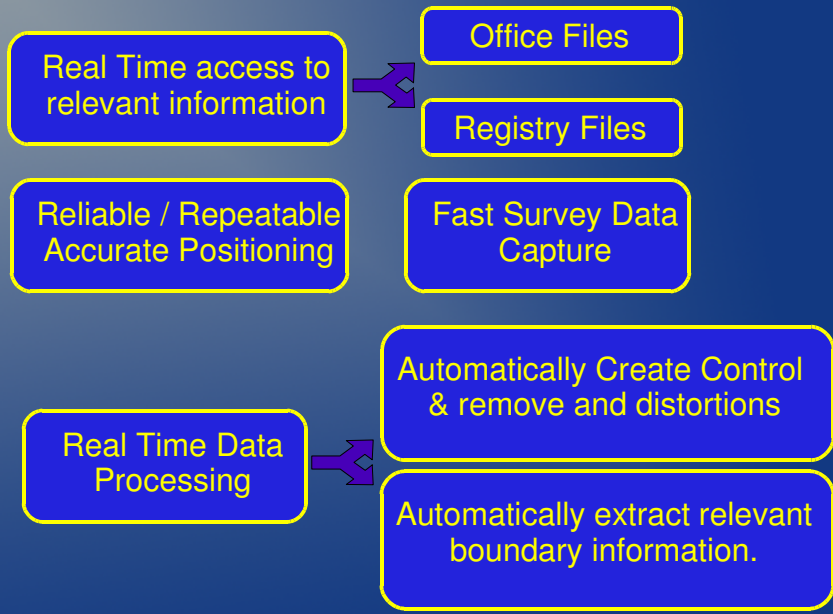
So what does the future hold for
Boundary Surveying
Technology.

This is where the guess work comes in.....

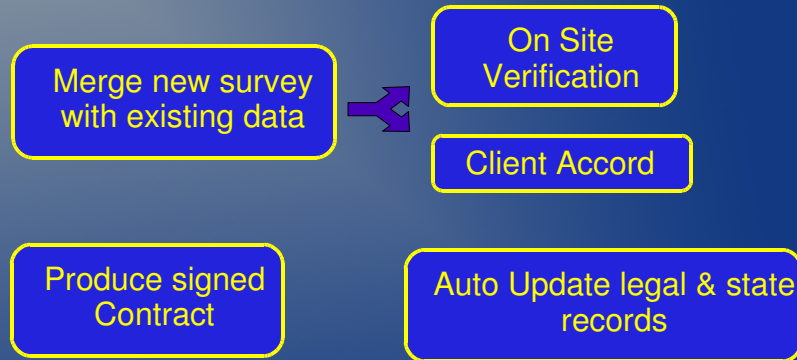
14

This is where the guess work comes in..

What would make life easier?



What would make life easier?



16

This is where the guess work comes in..

What can technology do for us?

17

This is where the guess work comes in..



1: Cloud Computing

18

Cloud Computing is the big Buzz at the moment, people are moving away from purchasing software packages to using it as required.

*

This will reduce the need to have powerful processors / large storage and expensive applications on site.

What is the “Cloud”???

Remote processing files on a internet server in-
stead of a local device

Examples : Checking Gmail / Google Maps / Calendar on phone
Post Processing of Rinex Data On-Line is available

Implications of the “Cloud”

Potentially Unlimited Processing Power
& Application Access

Smaller Batteries & Devices
(Internet capable device only required)

19

Cloud Computing is the big Buzz at the moment,
people are moving away from purchasing software
packages to using it as required.

*

This will reduce the need to have powerful
processors / large storage and expensive
applications on site.



2 :Technological Advancements

20

To use the Cloud we need high speed reliable access to the internet.

4G has been demonstrated and has true potential.

ION conference last week heard about attempts to use GNSS indoors.

Accelerometers & Gyroscopes found in expensive Military IMU's to put rockets where you want them or in the Nintendo Wii to play golf . Could provide position when there is no GNSS signal.

Internet Access:

4G potentially offers 100mb to mobile technology

Nation Wide Wi-MAX??

Technical Specs:

Even Higher Resolution Cameras

Real Time Survey Processing to fit Brief

Smaller Faster "Intelligent" Laser Scanners

Positioning Accuracies:

Improved SBAS & GBAS (eg. phone mast)

GNSS Indoors

More use of IMU's

A Black Swan: Technology No One has thought of yet

21

To use the Cloud we need high speed reliable access to the internet.

4G has been demonstrated and has true potential.

ION conference last week heard about attempts to use GNSS indoors.

Accelerometers & Gyroscopes found in expensive Military IMU's to put rockets where you want them or in the Nintendo Wii to play golf . Could provide position when there is no GNSS signal.

So what technology will Boundary
Surveyors use?

1 : Cloud Computing + 2 : Tech. Advancements =

A device that merges & shrinks existing technologies

A device that knows its position & orientation
instantly indoors & outside to mm's

A device that can identify what it is surveying
and the expected tolerances

A device that can automatically remove
distortions from surveys

A device that automatically calibrates
control & multiple images

A device that provides instant results

A device that allows you to order pizza

In Short a bit like...

Tomorrows
Brick!

Thank You.

