



Integrated Surveying

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Why Integrated Surveying?

- **Surveyors have saved time by combining GPS with optical surveying for many years now**
- **Field software to support both techniques introduced in 1990**
- **Integrated Surveying solutions continually developing**
- **Even more time savings possible today**



What are those time savings?

- **We will illustrate increased productivity from today's Integrated Surveying solutions on a typical job**
- **We will compare three techniques:**
 - **A total station survey**
 - **A “typical” combined total station and GPS survey with supporting field software**
 - **An advanced Integrated Surveying technique using an integrated rod**



Case study: the job site

- **A site partly covered with canopy and vegetation, no nearby control.**
- **Road to be built on site. Coordinates and alignments supplied by county.**
- **As per a typical job:**
 - **Control survey**
 - **Topographic survey**
 - **Stakeout**





Approach 1: Total Station Only

- **Job description:**
 - **Traverse into site from nearby control points**
 - **Lay out new control points that are intervisible and also provide visible lines of sight to majority of area to be topo surveyed.**
 - **Traverse through the new points and gather topo data of entire site as we visit each point.**
 - **Adjust traverse**
 - **Provide topo data to County**
 - **Receive new road alignment from County**
 - **Return to site and stakeout road at appropriate cross sections.**



Time taken

Task	Time taken
Control	12 hours
Topo	13 hours
Stakeout	6 hours



Approach 2: Total Station and GPS

- **Job description**
 - **Perform GPS site calibration**
 - **Establish new control with GPS and conventional techniques**
 - **Gather topo data**
 - **First with GPS in open areas**
 - **Then fill gaps with total station**
 - **Provide topo data to County**
 - **Receive new road alignment from County**
 - **Return to site and stakeout road at appropriate cross sections.**



Time-Saving of Approach 2 (IS) over Approach 1 (Total Station)

- **Traverse in to job not required.
Used GPS site calibration instead.**
- **Using GPS for the topo = fewer
traverse points required**



Time taken: comparison

Task	Time taken	
	TS only	I.S.
Control	12 hours	8 hours
Topo	13 hours	7 hours
Stakeout	6 hours	4 hours



Question:

By using the traditional I.S. technique, you still need multiple control points and extensive traversing.

With a Trimble® I.S. Rover, how much time can you expect to save with fewer control points and less traversing?



Using both sensors at the same time

- **The Trimble I.S. Rover combines a GPS and robotic total station on the rover pole**
- **Powered by the field software, Trimble Survey Controller**
- **Using both sensors integrated saves time in every surveying task: control, topo, and stakeout.**



Video 1 - Control

Time taken

Task	Time taken		
	TS only	I.S.	Trimble I.S. Rover
Control	12 hours	8 hours	6 hours



Video 2 – Topo



Topo using both sensors at the same time

- **Cover more ground with fewer instrument setups**
- **Dual sensor connections allow instant switching**
- **Software is seamless for measuring points and feature codes**



Stakeout using both sensors at the same time

- **The integrated system helped in stakeout with:**
 - **Switching sensors as the environment changed**
 - **Fewer total station setups**

Task times, all techniques

Task	Time taken		
	TS only	I.S.	Trimble I.S. Rover
Control	12 hours	8 hours	6 hours
Topo	13 hours	7 hours	5 hours
Stakeout	6 hours	4 hours	3 hours



Overall Totals

	Job Totals
TS only	31 hours
I.S.	19 hours
Trimble I.S. Rover	14 hours



Conclusion

- **Developments in Integrated Surveying over the last few years = significant time-saving and productivity increasing benefits.**
- **Returns on investment (ROI) easily measurable through time savings.**
- **For more information on ROI:**
 - **Download the complementary white paper**
 - **Request a no-obligation Trimble I.S. Rover demo from your local dealer.**



Thanks for Attending!