

Leica Viva Quick Guide

v5.0, 2013

Leica Viva Unleveled Setup Application Quick Guide



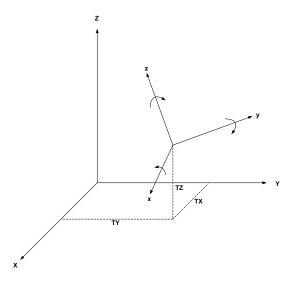
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1- Unleveled Setup Application

About this application

The Unleveled Setup application allows a survey to be completed with a total station that is not leveled and which could be in unstable environments such as on a ship. The application computes the transformation parameters (3 shifts, 3 rotations and 1 scale) from at least 3 measured control points. Thereafter it's possible to survey or stake points in the coordinate systems as defined by the transformation parameters.

The transformation is a 3D Conformal Transformation (also known as 3D Helmert Transformation) which defines the 7 parameters to transform the points measured in the instrument coordinate system (x, y, z) into the object coordinate system (X,Y,Z).



Before you start

The following items need to be completed before the operation of Unleveled Setup can take place:

- The user must have installed SmartWorx Viva version 5.0 firmware or higher on their instrument
- The user must have installed SmartWorx Viva Unleveled Setup application version 5.0 or higher on their instrument

If you do not have the above firmware or application, please contact your local sales representative or visit **myworld.leica-geosystems.com**.

2- Using the Unleveled Setup Application

Preparing the
memory cardBefore using this application, it is desired to have all known control points stored in a
specific job which will be used as the control job.

Creating a new The following steps will guide the user through the creation of a new unleveled setup.

Step	Action	Display
1	Before using Unleveled Setup, insure that the Working Job is properly defined through the Jobs & Data menu	Import data Import data Import data.
2	From the main menu Tap on the Go to Work ! or press the 1 key or use a hot key	Image: Secure Action Survey & stake pts Image: Secure Action Survey & status

Step	Action	Display
3	From the Go to Work! menu	Image: Control work! Image: Control work
	Tap on Survey+	
	or press the 4 key	Setup Survey Stakeout
		Survey+
		Roads
		Hz: 218°44'42" V: 86°59'59" Fn abc 13:12 OK I I I Map
4	From Survey+ menu	€ 2 2 C C C C C C C C C C C C C C C C C
	Tap on Unleveled Setup	1 2 3 3 Ref plane & grid scan Measure to ref line Hidden Point
		4 Sets of angles Determine coord sys Volume calculations
		Unleveled Setup
		Hz: 218°44'41" V: 87°00'00" Fn abc 13:14 OK Image: Contrast of the second secon
5	Select Create a new station setup.	
		Unleveled Setup 5 What do you want to do?
		Create a new station setup
		 View & use current station setup View & export data
		Hz: 218°44'41" V: 87°00'01" Fn abc 13:17 OK 13:17 <

Step	Action	Display
6	Select the Control job . Job that contains the control points to match the measured target points for transformation parameters computation.	Choose Control Job
		Hz: 218°44'41" V: 86°59'59" Fn abc 13:35 OK
7	Enter the Station ID at new setup.	Image: Station ID: Image: Station III Image: Station III Image: Station Im
		Hz: 218°44'41" V: 86°59'59" Fn abc 13:45 OK I I Page
8	Select the first control point then measure target 1. Press the Meas key or the Dist and Store keys to record measurement data.	Image: Contract of the system Image: Contract of the system Measure Target 1 Image: Contract of the system Target Image: Contract of the system Point ID: C1001 Target height: 0.0000 Measure Target height: 0.00000 Measure
		Hz: 240°00'00" V: 90°00'01" Fn abc 13:56 Meas Dist Store Calc I

Step	Action	Display
9	Select the second control point then measure	
	target 2.	
		Measure Target 2
	Do the same for the third and following	Target
	control points. The application needs at least	Point ID: C1002
	3 targets, and it can go up to 20 targets.	Target height: 0.0000 m
	Once all targets are measured then press	Hz: 329°59'59"
	Calc to trigger the transformation parameters	V: 90°00'01"
	computation.	Slope distance: 20.0000m
		Hz: 329°59'59" V: 90°00'00" Fn abc 14:21
		Meas Dist Store Calc
10	The Match Points table displays target points	
	status and related delta values.	
	Points out of tolerance are identified with an	Match Points D Target Use Known point
	exclamation mark (!).	1 Yes C1001
		2 Yes C1002
	Use the More key to see additional	3 Yes C1003
	information.	4 Yes C1004
		5 ! Yes C1005
	Additional targets can be measured by	
	pressing the Add key.	
	In case of a mismatch, use the Get Pt to	Hz: 284°59'59" V: 90°00'00" Fn abc 14:58
	match a measured target point onto another	OK Add Get Pt Use More
	known point.	
		Match Points しつ
		TargetUse Δ northing Δ easting1Yes-0.00060.0013
		1 Yes -0.0006 0.0013 2 Yes -0.0009 0.0005
		3 Yes -0.0004 -0.0001
		4 Yes -0.0004 0.0004
		5 ! Yes 0.0023 -0.0021
		Hz: 285°00'00" V: 89°59'59" Fn abc 14:57
		OK Add Get Pt Use More

Step	Action		Display
11	Press Use key to deactivate erroneous point		
	from the computation. A new transformation	🔂 🗳 🚨	
	is automatically computed and the delta	Match Points	
	values are updated.		Jse Δ northing Δ easting
			/es -0.0000 0.0000
	Press OK to accept the transformation.		Yes 0.0001 0.0001
			Yes -0.0001 0.0000 Yes 0.0000 -0.0001
			No
		Hz: 284°59'59" V: 9	0°00'01" Fn abc 15:01
		OK Add G	et Pt Use More
12	Once the transformation is accepted, the		
	instrument coordinate values and estimated	🔛 🍄 🔛	
	3D CQ are shown.	Station Setup Re	sults 5
	Press Store key to activate and save the	Station Code	
	instrument position.	Station ID:	MyStation1
		Easting:	100.0001m
	If needed, the user can see the	Northing:	100.0001m
	transformation parameters by pressing the	Elevation:	100.0000m
	Param key on the shift level.	Estimated 3D CQ	: 0.0002m
		Date:	13.02.14
		Time: Hz: 284°59'59" V: 9	<u>13·52·48</u> 0°00'00" Fn abc 15:10
		Store	0°00'00" Fn abc 15:10 Page
		🕰 🚷 🛈	4 in <i>r_a</i>
		Transformation F	Parameters 5
		Rotation X:	0°00'00"
		Rotation Y:	-0°00'01"
		Rotation Z:	-30°00'00"
		Shift X:	102.6009m
		Shift Y:	103.4184m
		Shift Z:	100.0000m
		Scale:	1.000003957057
		Scale mode:	Free
			0°00'01" Fn abc 15:11
		ОК	More

Viewing and
using a setupThe following steps will guide the user to survey and stake points from an unleveled
setup.

13 Select View & use current station setup. 13 Select View & use current station setup. 14 The coordinate values at the instrument position are shown for confirmation. Press Check key to perform a check on control points. Press M Pts key to view the target match points defining the current instrument position. Press OK to accept and use the current instrument setup position. Press OK to accept and use the current instrument setup position. Press OK to accept and use the current instrument setup position. Press OK to accept and use the current instrument setup position. Press OK to accept and use the current instrument setup position. Press OK to accept and use the current instrument setup position. OK Check M Pts OK Check M Pts		Display	1	Action	Step
14 The coordinate values at the instrument position are shown for confirmation. Press Check key to perform a check on control points. Press M Pts key to view the target match points defining the current instrument position. Press OK to accept and use the current instrument setup position. 100.0001m Easting: 100.0001m Northing: 100.0001m Elevation: 100.0001m Elevation: 100.0000m Estimated 3D CQ: 0.0002m Date: 01.01.03 Time: 12:00:00 Hz: 2850000° V: 90°0000° Fin ab 0K Check Point Target: Known point: C1001 Target height: 0.0000		co do? tion setup nt station setup	Unleveled Setup What do you want to Create a new state View & use current	Select View & use current station setup.	
Image: Coordinate values at the instrument position are shown for confirmation. Press Check key to perform a check on control points. Press M Pts key to view the target match points defining the current instrument position. Press OK to accept and use the current instrument setup position. Press OK to accept and use the current instrument setup position. Image: Description of the current instrument instrument setup position. Press OK to accept and use the current instrument setup position. Image: Description of the current instrument instrument setup position. Image: Description of the current instrument instrument setup position. Image: Description of the current instrument instrument setup position. Image: Description of the current instrument instr	c 09:54	0'00" Fn abc 0			
Press Check key to perform a check on control points.Station CodePress M Pts key to view the target match points defining the current instrument position.Station ID:MyStation1Press OK to accept and use the current instrument setup position.Easting:100.0001mDate:01.01.03Time: 12:00:0012:00:00Hz: 285°0000" V: 90°0000" V: 90°0000" Fn ab OKOKCheck M PtsCheck Point Target:IKnown point:C1001 C1001 Target height:		G (4	💮 🗳 🚨		14
Press M Pts key to view the target match points defining the current instrument position. Easting: 100.0001m Press OK to accept and use the current instrument setup position. Elevation: 100.0000m Estimated 3D CQ: 0.0002m Date: 01.01.03 Date: 12:00:00 Image: 12:00:00 OK Check M Pts Check Point Target: 1 Known point: C1001 Target height: 0.0000	¢		Station Code		
Press OK to accept and use the current instrument setup position. Date: 01.01.03 Time: 12.00.00 Hz: 285°00'00" V: 90°00'00" Fn ab OK Check M Pts Check Point Target: I Known point: C1001 Target height: 0.0000	=	100.0001m 100.0001m 100.0000m	Northing: Elevation:	points defining the current instrument	
Check Point Target: I Known point: C1001 Target height: 0.0000	c 10:01 Page	01.01.03 12.00.00)'00" Fn abc 1	Date: Time: Hz: 285°00'00" V: 90°0		
Known point:C1001Target height:0.0000			Check Point		
Δ easting: -0.0030m	m		Known point:		
Δ northing: -0.0000m Δ height: -0.0000m		-0.0000m	Δ northing:		
Hz: 239°59'59" V: 90°00'00" Fn ab OK Dist Positn	: 10:08				

Step	Action	Display
15	Once station setup is established, points can be either surveyed or staked. Select Survey points to survey points. Select Stake points to stake points.	Application Selection
16	Survey option. Press the Meas key or the Dist and the Store keys to record measurement data. The application stores the original TPS measurements but applies the transformation before recording point positions. Measure more points. Press Done key when finished.	ОК Survey Code Point ID: TPS0001 Target height: 0.0000 m Easting: 78.2337m Northing: 92.0777m Elevation: 112.3162m
17	Stakeout option. Select the job that includes design points to be staked.	Meas Dist Store Done Page Image Image Image Image Image Image Image Image

Step	Action	Display
18	Select the design point to be staked.	
		🔃 🗳 🕘 🛛 🤹 👘 🖓
	Press the Dist key to measure a distance and	Stakeout: Stake20Ctrl り
	to display new delta values.	Stake Code
	Press the Meas key or the Dist and the Store	Point ID: 2001
	keys to record measurement data.	Target height: 0.0000 m
		∆ easting: 8.3931m
	Stake more points.	Δ northing: 14.7911m
		∆ height: 5.4443m
	Press Done key when finished.	
		Hz: 110°00'00" V: 80°00'01" Fn abc 10:38
	If needed, press Config key on shift level to	Meas Dist Store Done Page
	access the stakeout configuration dialog.	
		Stakeout Configuration つ
		General Checks
		Automatically turn to point
		Store point ID with: Prefix
		Prefix / suffix: STK_
		Hz: 110°00'01" V: 79°59'59" Fn abc 11:13
		OK Page

Viewing and The following steps will guide the user to review and export data recorded from an unleveled setup.

Step	Action	Display
19		Display
13	Select View & export data.	
		Unleveled Setup しつ
		What do you want to do?
		\odot Create a new station setup
		\odot View & use current station setup
		View & export data
		Hz: 65°11'40" V: 65°38'42" Fn abc 13:08
		OK
20	Fach point can be viewed by pressing the	
20	Each point can be viewed by pressing the	
	Edit key.	
		Unleveled Data 5
	Press the More key to view additional	Stations Points
	information.	Point ID Code
		STK_2002
	Press the Exprt key to export all points data.	STK_2003
		TPS0002 TPS0003
		TPS0003 TPS0004
		TPS0005
		TPS0006
		Hz: 71°18'36" V: 68°35'01" Fn abc 13:18
		OK Exprt Edit More Page

Step	Action	D	isplay
21	Points can be exported to an XML file, to a		
	CSV file or to another Job.	🔂 🗳 🚨	
	Suffix or Prefix can be added to the exported	Export Points	5
	points.	From job:	MyJob123
	points.	File type:	XML 🔽
		Export to:	CF card 🔹
		Folder:	Data 🔹
		To file name:	MyXml123
		Store point ID with:	Suffix •
		Prefix / suffix:	_ULS
		Hz: 71°18'37" V: 68°35	01" Fn abc 14:02
		ОК	

3- Notes

Instrument The computed instrument position is stored in the measurement job with an ADJ point class.

🔒 🇳 🕘		
Data: MyJob12	23	5
Points * Lines (0)	Areas (0) Images	Scans Map *
Point	3D CQ	Class
TPS0003	0.0021	Meas 🔺
TPS0002	0.0021	Meas
STK_2003	0.0021	Meas
MyStation1	0.0002	Adj 📃
C1005	0.0000	Ctrl
C1004	0.0000	Ctrl
C1003	0.0000	Ctrl
C1002 Hz: 71°18'37" V	0 0000 : 68°35'01"	Ctrl Fn abc 14:08
OK New	Edit Delete	e More Page

Surveyed and staked points

The surveyed and staked points are stored in the working job.

Each point is recorded with 2 point classes: NONE and MEAS.

The untransformed position is stored in the NONE point class while the transformed position is stored in the MEAS point class.

This way, transformed points are immediately available in the job, and can be used with COGO by example.

🔒 🗳 🚨) () ()
Data: MyJob1	23	C
Points * Lines (0) Areas (0) Image	es Scans Map *
Point	3D CQ	Class
STK_2002	0.0022	Meas 🔺
TPS0006	0.0022	Meas
TPS0005	0.0021	Meas
TPS0004	0.0021	Meas
TPS0003	0.0021	Meas
TPS0002	0.0021	Meas
STK_2003	0.0021	Meas
MyStation1 Hz: 71°18'36"	0 0002 V: 68°35'00"	Adi Fn abc 14:11
OK New.	Edit Dele	te More Page

Point filtering By setting the **Filter** to **Highest class**, the measured points of class NONE will not be displayed and the points of class MEAS have priority.

🔂 🗳 🚨	¢ 📫 🔞	
Sorts & Filters		5
Points Lines Areas Images		
Sort by:	Backward time	•
Filter by:	Highest class	•

Hz: 71°18'36"	V: 68°35'01"	Fn abc 14:15
ОК		Stake Page