

Leica SurvCE Training



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1.0 Introduction

Objectives

In this exercise you will learn how to collect data with a Robotic Total Station in Leica SurvCE.

At the end of the exercise you should be able to perform the following on Leica SurvCE:

- Setup over a point and backsight an azimuth, establishing coordinates for the BS.
- Collect topographic survey points with a code list in Leica SurvCE.
- Create a surface inside Leica SurvCE using the collected points.

Tasks to complete

We need to set up the 1200 over an assumed control point and create coordinates for a BS point from an azimuth. We will then collect twenty topographic survey features using a codelist with Leica SurvCE and create a surface from the collected points.

2.0 Before Going Outside

Objectives

The course instructors will advise each student which control point to occupy with the RTS for the field exercise. Assign equipment to students. Review setup procedures for Leica SurvCE

Selecting the Job



This is the Leica SurvCE Main menu. From the File menu tap the **Job** button or press the **1** key on the keyboard and select the **Survey.crd** file created in Exercise 10.

3.0 Setting up the 1200 over the assumed point.

Objective

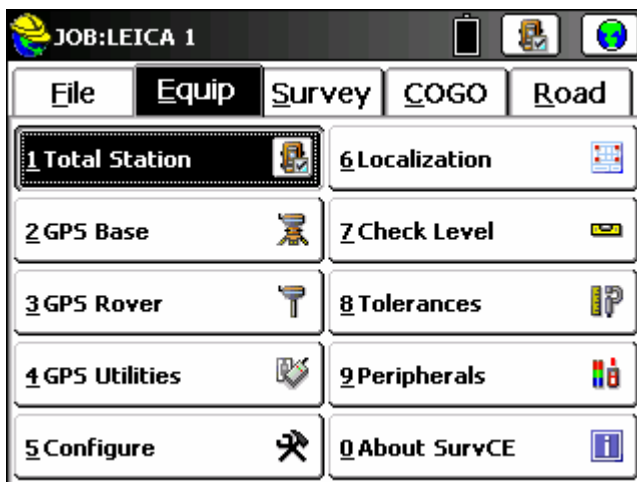
We need to setup the Robotic Total Station over the assumed control point, configure the 1200 and SurvCE for communication.

Getting started

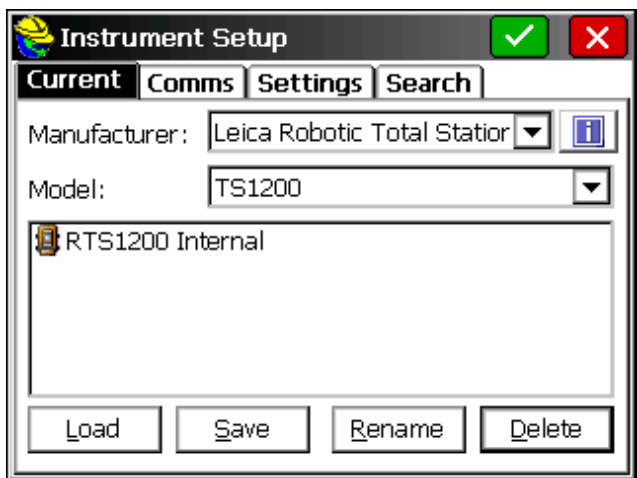
Setup the tripod over the point. The Instructor will advise you which point to occupy.

- Attach the tribrach and instrument onto the tripod - Level the tribrach.
- Press the ON/OFF button of the 1200 to turn the RTS on.
- Measure the height of the 1200 above the survey mark.

Configuring SurvCE for communication with the 1200

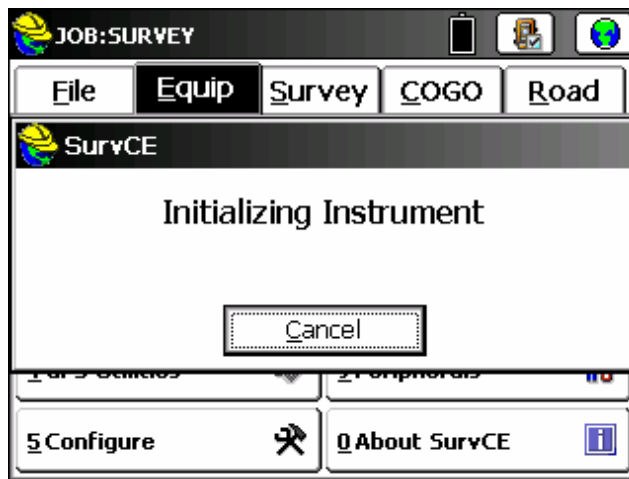


From the **EQUIP** tab press **1** or tap the **Total Station** button on the RX1200 screen.



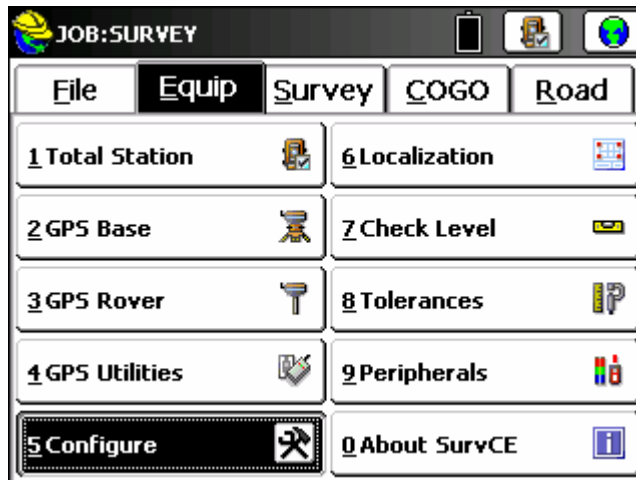
Select the **RTS1200** Internal configuration created in Exercise 11 and tap the Load button.

Press the  key on the RX1250 or tap the  on the screen to accept the selection.



This screen will appear as communication is established and configuration settings are applied within the 1200.

Configuring SurvCE for Data Collection



On the **EQUIP** menu tap the **Configure** button or press the 5 key to access the Configure screen.

Defining the general behaviour of SurvCE

Configure [✓] [✗]

General | View Pt | Sets | Settings | Search

☒ Store Fixed Only (GPS)

☐ Prompt for Total Station Setup

☐ Prompt for Height & Description

☐ Prompt for Point Notes

☒ 3D Mode

☐ Use Virtual Keyboard

No. of Readings to Avg - TS: 1 GPS: 1

Enter/Store Icon - TS: Read & Store

Enter/Store Icon - RTS/GPS: Read & Store

Verify the following settings for this exercise

- **Store Fixed Only (GPS)** is enabled
- **3D Mode** is enabled
- **Use Graphic Icons in Survey** is enabled
- **Use Audible Alerts** is enabled
- **New Job Use Alphanumeric Format** is enabled

Configure [✓] [✗]

General | **View Pt** | Sets | Settings | Search

☒ 3D Mode

☐ Use Virtual Keyboard

☒ Use Graphic Icons in Survey

☒ Use Audible Alerts

☒ New Job Use Alphanumeric Format

No. of Readings to Avg - TS: 1 GPS: 1

Enter/Store Icon - TS: Read & Store

Enter/Store Icon - RTS/GPS: Read & Store

Tap the **View Pt** tab to proceed

Defining the view point reference

Configure [✓] [✗]

General | **View Pt** | **Sets** | Settings | Search

Method:
In-Out & Left-Right

Ref. Object:
Instrument

Point ID: []

Directions From:
Ref. Object

☒ Use CL for Ref. Object (when applicable)

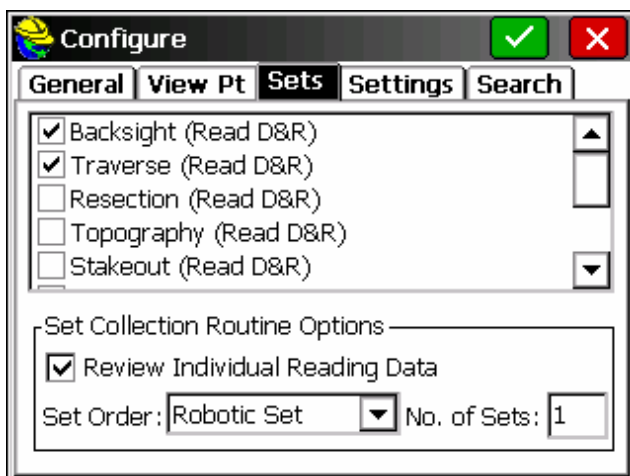
☐ Use Horizontal Clock System

Verify the following settings:

- **In-Out & Left-Right Method**
- **Instrument Ref. Object**
- **Ref. Object Directions From**
- **Use CL for Ref. Object (when applicable)** is enabled

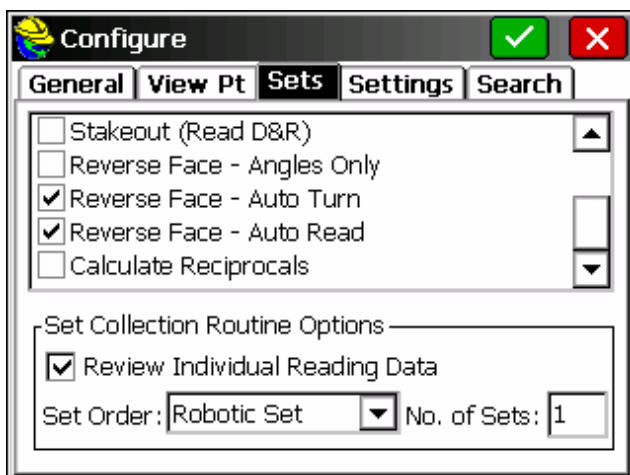
Tap the **Sets** tab to proceed.

Defining how sets are collected



Verify the following settings:

- **Backsight (Read D&R)** is enabled
- **Traverse (Read D&R)** is enabled
- **Reverse Face – Auto Turn** is enabled
- **Reverse Face – Auto Read** is enabled
- **Review Individual Reading Data** is enabled
- **Robotic Set** Set Order
- **1** No. of Sets

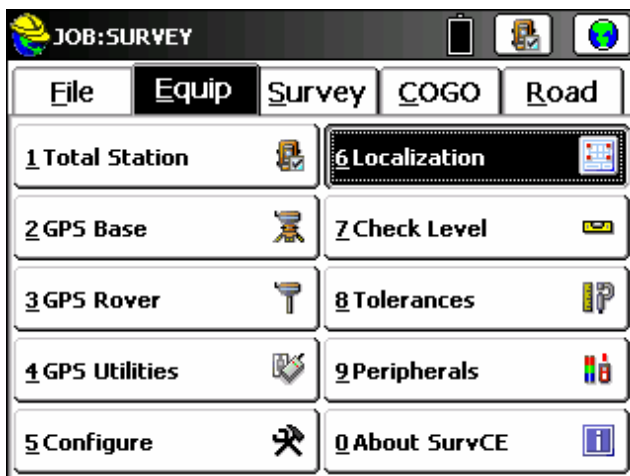


Note that for this exercise we opted to turn robotic sets to our BS and Traverse FS points only. We will only record a single direct measurement for our topographic data collection.

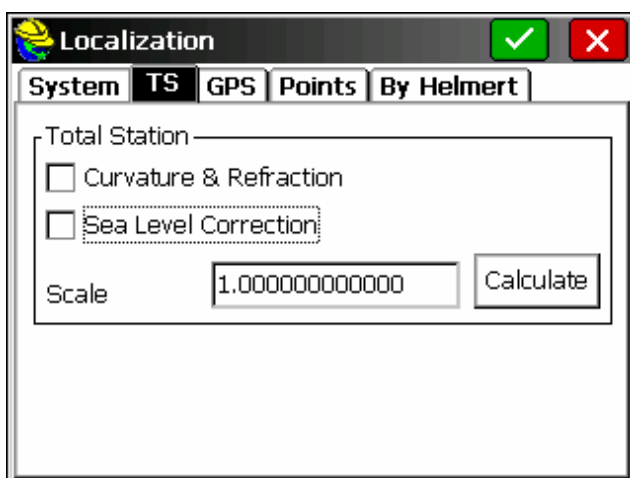
We will not revisit the **Settings** and **Search** tabs because they were previously configured during the instrument configuration process.

Tap the  on the screen to accept the selection.

Applying Curvature and refraction corrections



We will not apply curvature and refraction corrections for this exercise, but if we wanted to we could tap the **Localization** button on the **EQUIP** menu to access that option.



From the **TS** tab we see the options. Let's tap the  on the screen to accept the selection as it currently is configured.

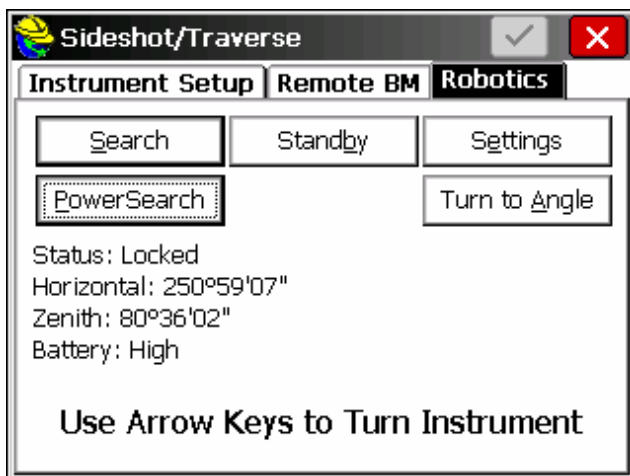
Configuring the Setup



Now that we have established communication with the instrument, let's walk to the Backsight point.

Go to the **Survey** menu and tap the **Store Points** button or press the **1** key on the keyboard.

Finding the prism



The first thing we need to do is point the instrument at the prism. Go to the **Robotics** tab tap the **Power Search** button.

The instrument will perform a Power Search and lock onto the prism. When this is accomplished you will see a screen similar to this one.

Look for **Locked** Status.

Tap the **Instrument Setup** tab.

Defining the Setup

The screenshot shows the 'Sideshot/Traverse' dialog box with the 'Instrument Setup' tab selected. The fields are as follows:

Field	Value	Unit
Occupy Point:	2	
Instr. Height:	1.715m	ft
Backsight Point:	1	
Backsight N Azi:	0°00'00"	
Target Hgt:	6.5617	ft

Below the fields, the checkbox 'Use Backsight HT for Foresights' is checked. At the bottom are three buttons: 'Confirm NEZ', 'Configure', and 'Backsight'.

Since point 2 is the only coordinate in the job file, let's **Occupy Point 2**. We'll measure the instrument height using a **GHT196** and a **GHM007** combination. Notice that the GHM007 has metric graduations, but our job is configured in feet. Conversion is easy inside SurvCE. Simply enter the measured distance in meters and suffix the numeric entry with the letter "m". We are using a 2m pole and can enter the Target Height in the same manner. Populate the **Instrument Setup** tab of the **Sideshot/Traverse** page with the following information, **except for the Instrument height, which should be the distance you measure on your setup**.

- 2 Occupy Point
- X.xxxm Instr. Height
- 1 Backsight Point
- 0°00'00" Backsight N Azi
- 6.5617 Target Hgt
- **Use Backsight HT for Foresights** is enabled

Plumb up the pole and prism and tap the **Backsight** button on the **Sideshot/Traverse** screen.

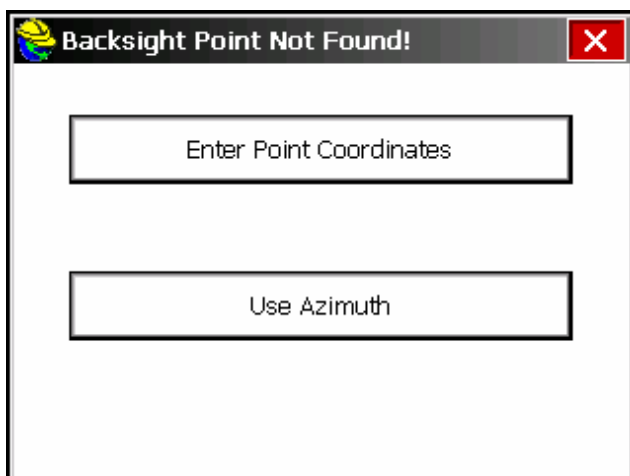
Backsighting to an Azimuth

The screenshot shows the 'Backsight Method' dialog box. It contains the following text:

Known Station and Backsight Azimuth to Backsight Point of unknown coordinates. A Backsight Point will be calculated.

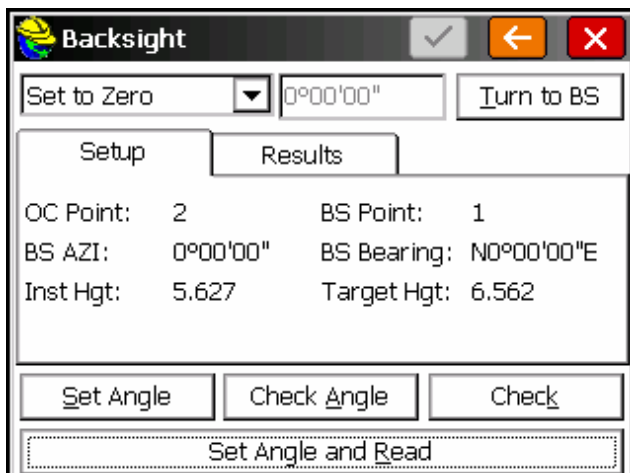
At the bottom are two buttons: 'Continue' and 'Go Back'.

At the **Backsight Method** screen tap **Continue**.

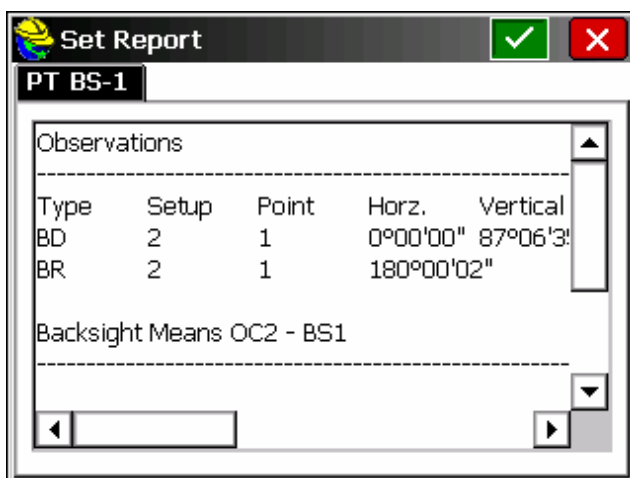


Select **Use Azimuth**.

Setting Zero to the BS



Note that our Instrument Height was converted from 1.715m to 5.627ft automatically. Tap **Set Angle and Read** to measure the distance to the BS and set the horizontal angle to zero as indicated in our BS setup. The instrument will measure a distance and set the angle to zero and will then automatically turn 180, plunge the scope, and take the Reverse measurements.



A set report will be displayed.

Press the  key on the RX1250 or tap the  on the screen to accept the report.

Backsight [Check] [Back] [Close]

Set to Zero [v] 0°00'00" [Turn to BS]

Setup Results

	Angle:	Dist:	Elv (Z):
Calculated:	0°00'00"	N/A	N/A
Measured:	0°00'00"	30.837	104.168
Delta:	0°00'00"	N/A	N/A

[Set Angle] [Check Angle] [Check]

Set Angle and Read

Press the key on the RX1250 or tap the on the screen to accept the backsight.

Storing the BS

Backsight [Check] [Back] [Close]

Set to Zero [v] 0°00'00" [Turn to BS]

Store Point [Check] [Close]

Point ID: 1

Description: Assumed Nail

[Set Angle] [Check Angle] [Check]

Set Angle and Read

At the prompt give point 1 a description of **Assumed Nail**

and press the key on the RX1250 or tap the on the screen to accept the newly created point.

STORE PTS [Close]

90 ft

Pt: 4 Desc: point HT: 6.562

AR: 32°55'23" ZA: 88°12'55" SD: 127.160

Enter the proper description and tap the icon or press the key on the RX1250 to take a reading and store the point.

Collecting Topo

Now collect 20 points. Remember that we will use the points collected to create a topographic surface. Use the codes EP, BC GS and PP. Line work will automatically be created for the EP and BC coded points.

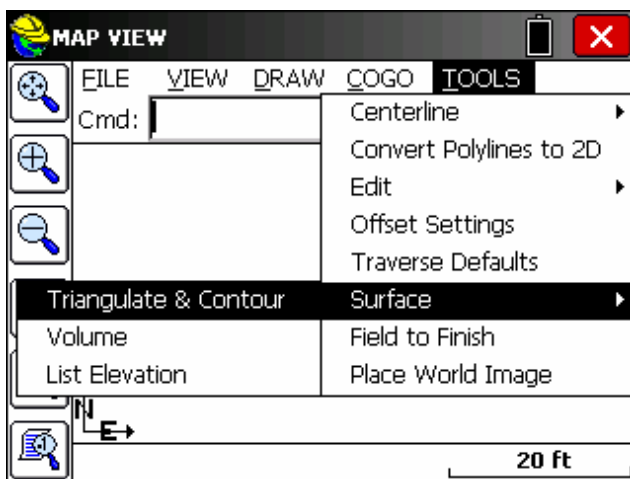
Accessing the Map



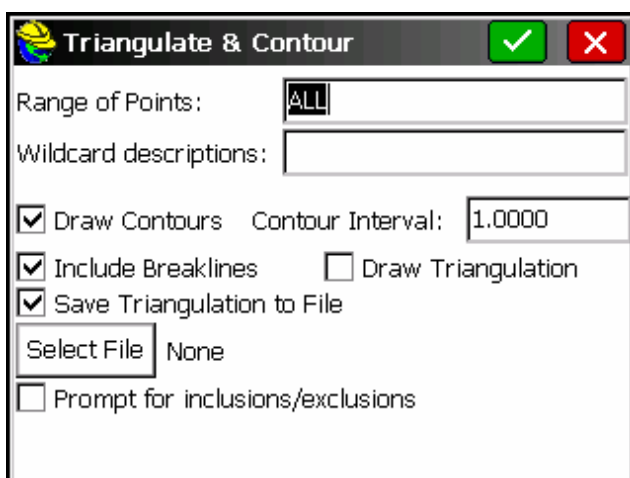
After collecting the measurements for our twenty points, let's return to the main SurvCE menu.

Tap the  icon in the upper right corner of the screen to access the map.

Creating a Surface



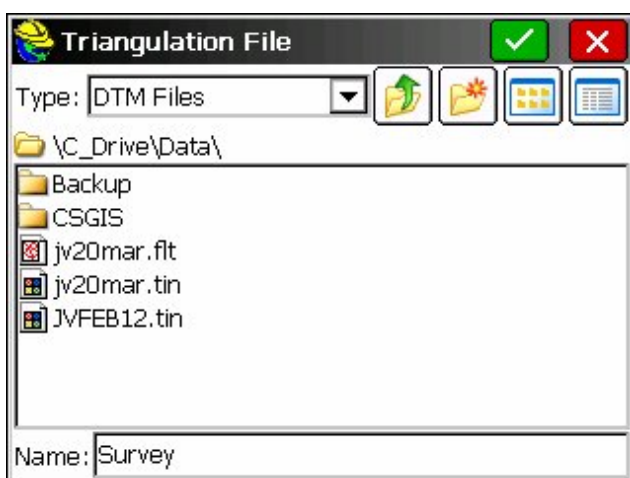
Go to **Tools>Surface>Triangulate & Contour**.



Let's apply the following:

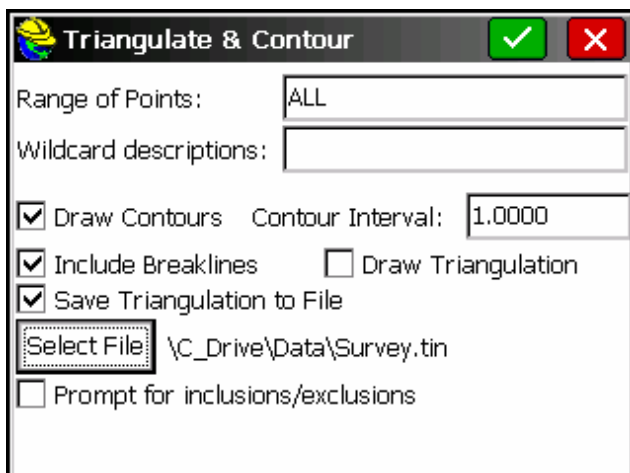
- **ALL** Range of Points
- **Draw Contours** is enabled
- **1.0000** Contour Interval
- **Include Breaklines** is enabled
- **Save Triangulation to File** is enabled

Tap the **Select File** button

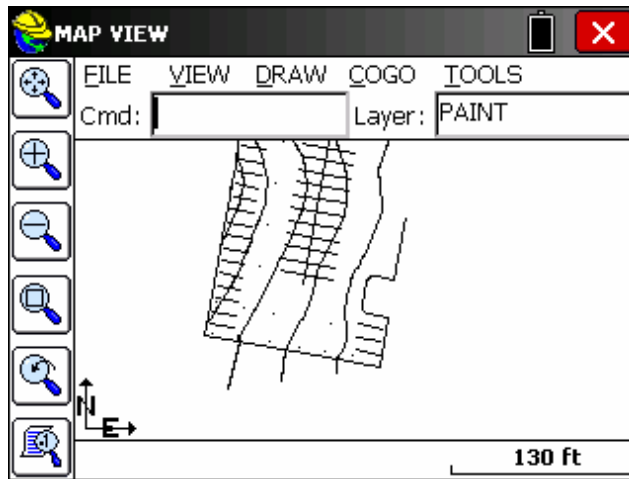


Name the file **Survey**. An extension of **TIN** will be applied by default.

Press the  key on the RX1250 or tap the  on the screen to accept the file name.



Tap the  on the screen to create the surface.



Your map will now have topographic contour lines displayed.

You have successfully completed Exercise 12.

Tap the  on the screen to exit the map.