Leica GS20

Professional Data Mapper

Ted MacKinnon
Jonathan Murphy
AGRG 2003

Contents

For more information on this and other related geomatics documents see tmackinnon.com

Equipment List

- GS20 PDM GPS unit

- Soft Protective Pouch

- 2 Batteries

- Battery Charger and transformer

- Bluetooth Dongle

- USB and serial cables

- Carrying Case

Office Preparation

- Ensure that your batteries are fully charged.

- Plan your survey.
    - Know what type of data you plan to collect

    - Check the GPS Almanac to ensure you will have good Satellite Coverage

    - Gather all relevant materials for the project, Air Photos, Imagery, Topographic base maps, etc (optional)

- Create your Codelist (optional)
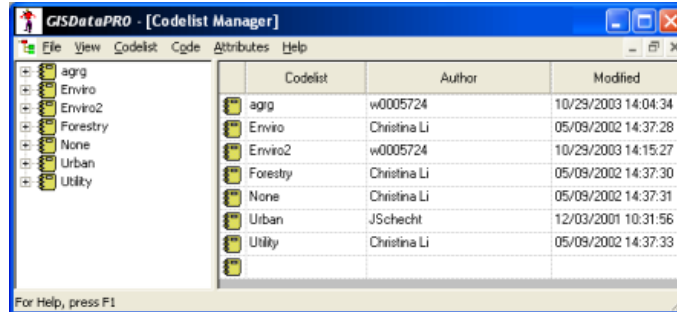
Codelist Manager

Overview
1. Create a new Codelist in GISDataPro
2. Create Codes
3. Create Attributes
4. Assign Symbology to your codes
5. Save Codelists
6. Transfer Codelist to GS20

Codelists are used to help describe the data features that you collect GPS data for, in the field. Leica GISDataPro software package is used to create or edit codelists for use with the GIS20.

- Open the GISDataPro program.

- Create or open an existing Project File, by selecting **New** or **Open** from **File** in the Main Menu. Give your New Project a name, select a Coordinate System, and set the Sensor Type to GS20. Set the codelist selection to none (only when you plan on creating your own), or select an existing codelist. Press OK.

- Select the **TOOLS** menu from the Main Menu, and then choose Codelist Manager.

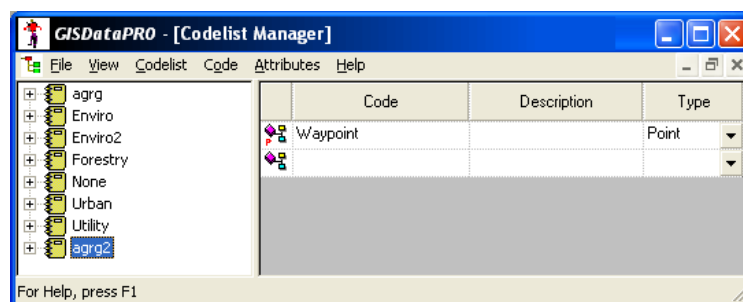**For more information on this and other related geomatics documents see tmackinnon.com**
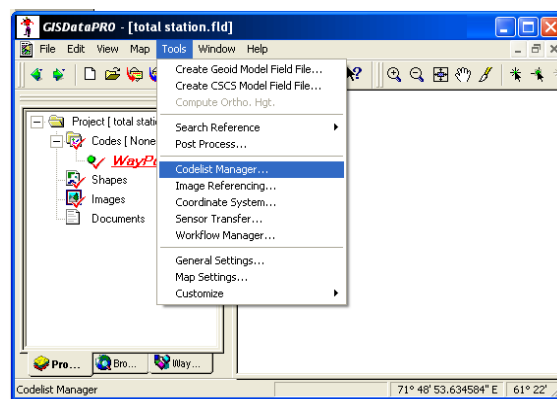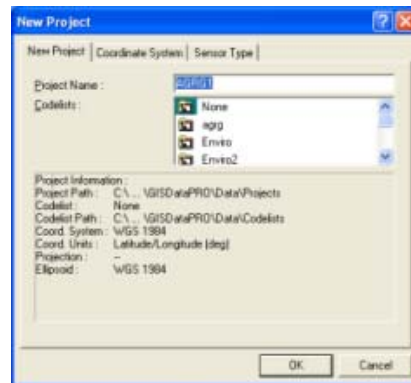
Your window should switch from the Main GISDataPro window to the Codelist Manager window.

- Choose **Codelist** from the Main menu and then select **New Codelist**

- Enter a Codelist Name and Author. Click OK
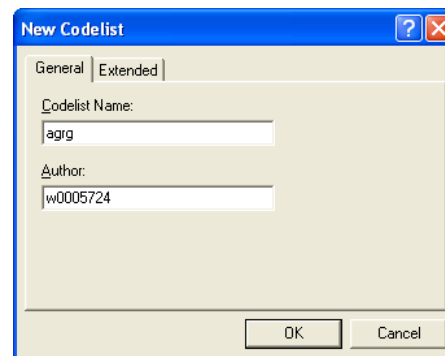
- Your new Codelist file is now created and will be highlighted in the list of Codelists in the left hand frame of the Codelist window.


Note: When a new codelist is created the first code will always be Waypoint by default and can not be changed.

6

- Your new Codelist file is now created and will be highlighted in the list of Codelists in the left hand frame of the Codelist window.
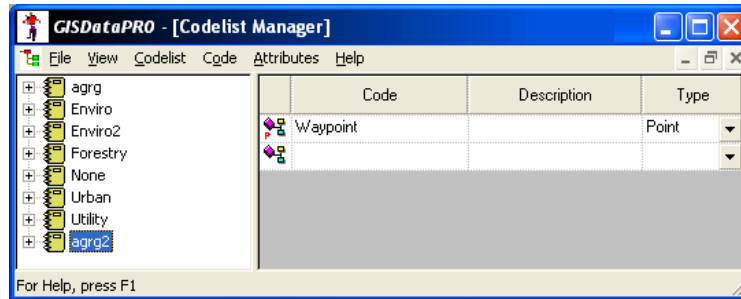

Note: When a new codelist is created the first code will always be Waypoint by default and can not be changed.

- To add new codes select **New Code** from the **Code** pull down menu. (Or right click on the right hand side of the window and select **New**)

- Enter your new Code Name, Feature Type and a Description, and select Ok.

- Continue adding the rest of your codes.
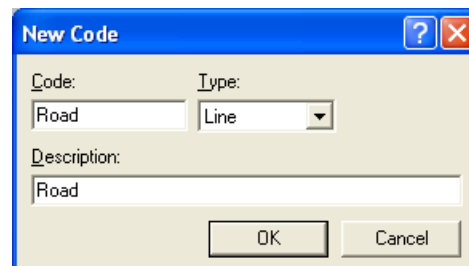
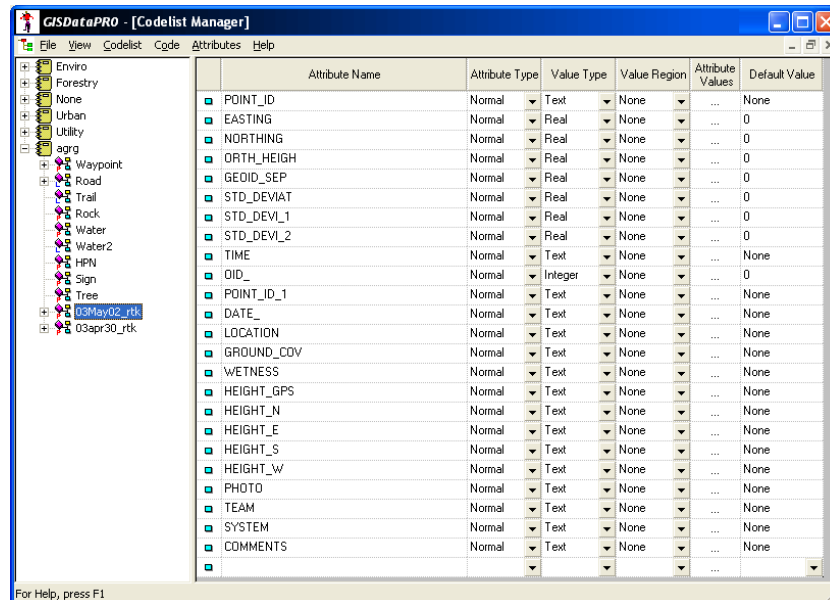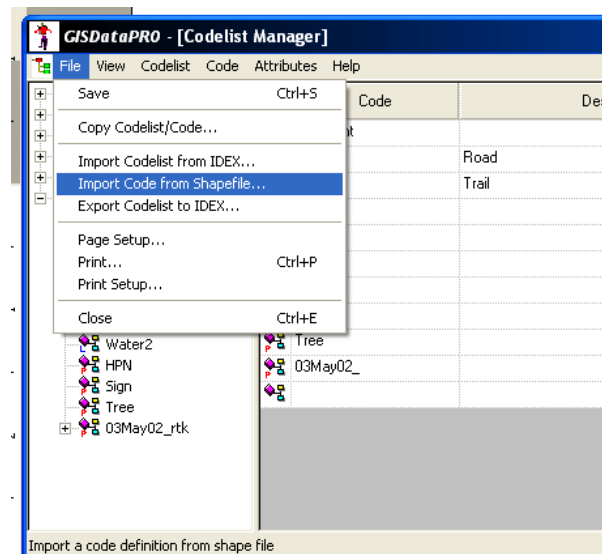Each new code will then appear in your list of codes of the Codelist Window after it is created.

7
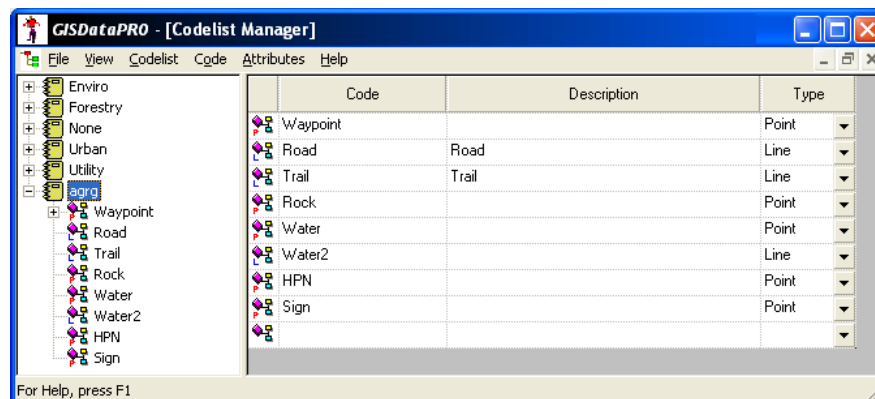
- To add **Attributes** to a Code, highlight the code in the left hand frame of the Codelist Window, then choose **New Attribute** from the Attribute Menu, (Or right click in the right hand side of the window and select **New**)

- Add an **Attribute Name**, then select properties such as Attribute Type, Value Type, and Value Region.

If you select **Choice List** as the option for Value Region then an "Attribute Values" tab will appear and you then enter in the values for your list.

- You can set the display properties that the GS20 uses to display your features.

- Highlight your code from the left hand frame, then choose Set Display Attributes from the Code pull down menu. A new window will pop up allowing you to change the symbol properties of the code.

- Continue adding attributes for all your codes that you have in your codelist.

- Continue adding all the attributes to your codes and then save your Codelist by selecting **Save** from the main menu under **File.**
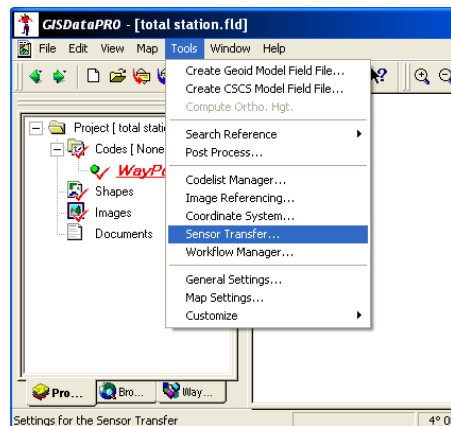
Select File, then Close to return to the main window.

Optional: You can also import **Codes** from an existing Shapefile.

8

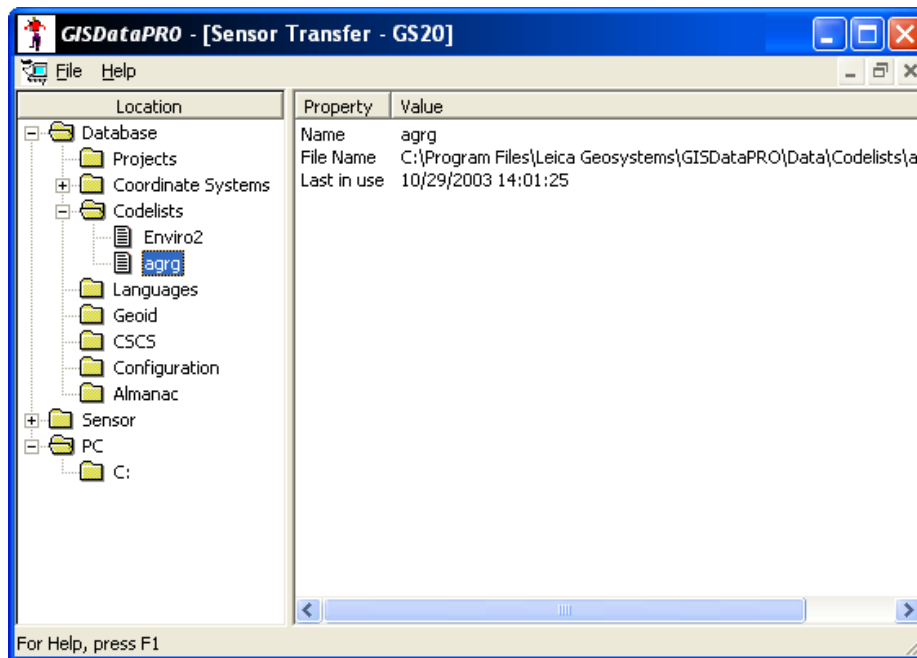**For more information on this and other related geomatics documents see tmackinnon.com**

Importing A Codelist to the GS20

- Open the GISDataPro Software package.

- Open the **Sensor Transfer** window from the **Tools Menu**.

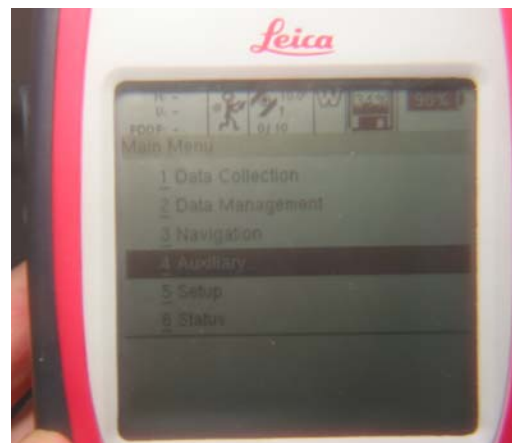Your window should switch from the Main window to the Sensor Transfer window.
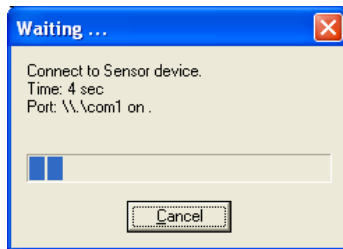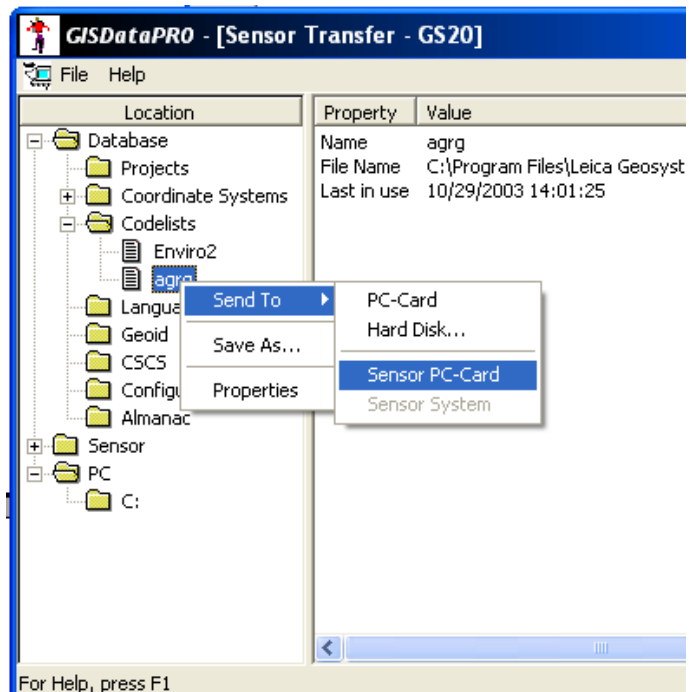
For more information on this and other related geomatics documents see tmackinnon.com

- Connect the Serial Cable to your PC and to the GS20.

- Turn the GS20 on.

- From the main menu, select **Auxiliary**, press the Enter Key, then in the Auxiliary menu select **Utilities**, press the Enter Key and then from the Utilities menu, select **Sensor Transfer,** and press the Enter Key.

- Select **1** from the **Port** options, Highlight the **Apply** box and then press the Enter Key.

For more information on this and other related geomatics documents see tmackinnon.com

- Click the Database folder; in the left hand frame of the Sensor Transfer Window, click the Codelists folder, and then Highlight the Codelist you want to transfer in the left hand frame

- Right Click on the Codelist you want to transfer and select **Send To** and **Sensor PC-Card**

To check that your Codelist was uploaded successfully, go to the Codelist Menu and your new codelist should be included in the list of available codelists.

For more information on this and other related geomatics documents see tmackinnon.com
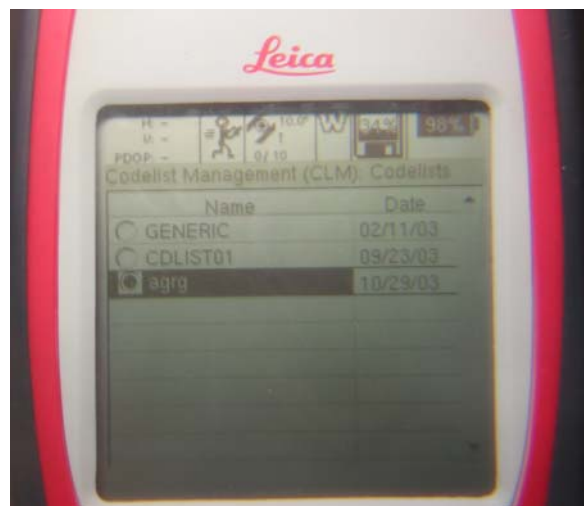
Importing Way Points to GS20

- Open the GISDataPro Software package.

- Select **Import File** from File in the main menu. Choose ShapeFile (*.shp) for the file type, find your shapefile and then select **Import**.
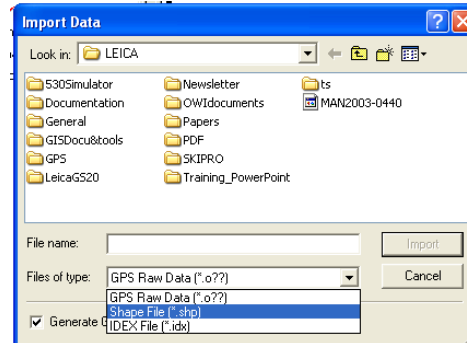
- Choose the Waypoint Tab near the bottom of the left hand side frame of the window.

- Select all the features of the map that you want transferred by clicking the left mouse button and dragging a box over all the selected items.
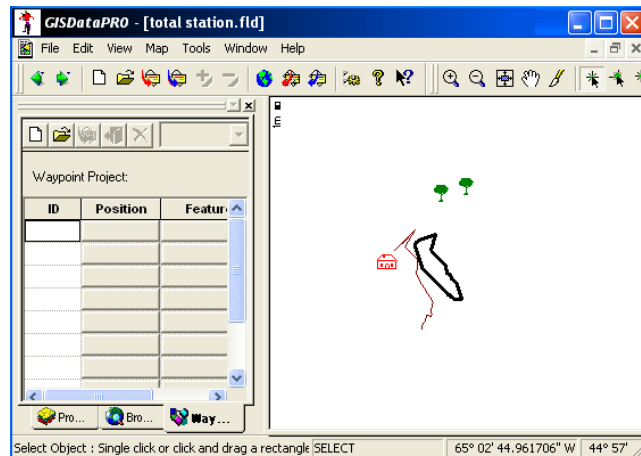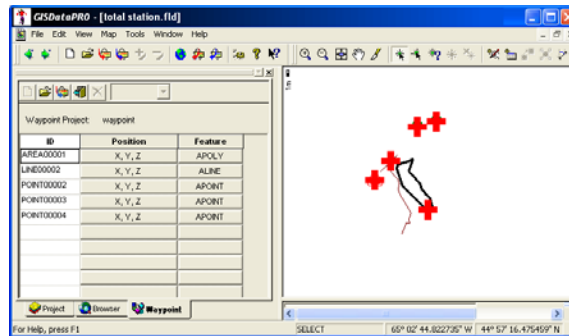
- Create a new Waypoint Project, by selecting the New Icon, and make sure that the Create Waypoints option is Only selected objects and the Create Background Map option is Include all features on the map. Then select OK.
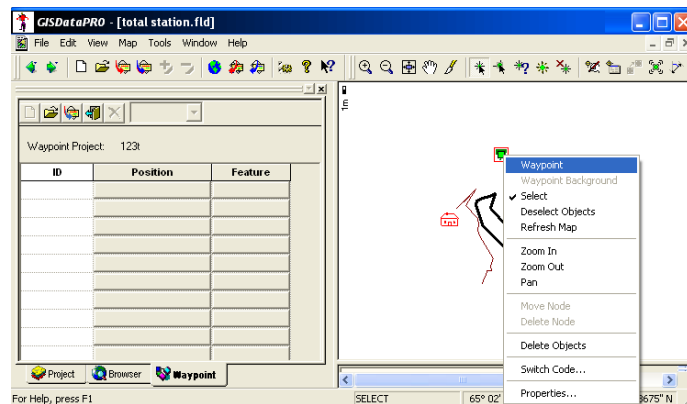
13
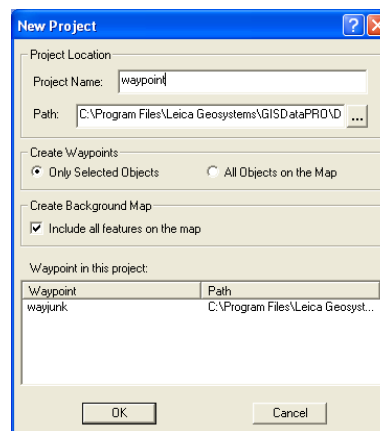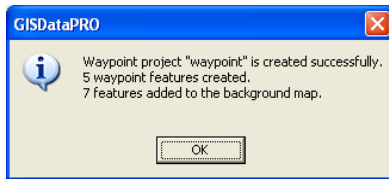
- You should see a list of waypoints in the left hand frame and new symbols (waypoints) added to your map window.

You can also just add a few select way points by right clicking on the point that you want as a waypoint and then selecting **Waypoint.** A new symbol should appear and then your waypoint feature will appear in the list to the left.

Now you can import the waypoint file into the GS20 with the Sensor Transfer option. From the **Tools Menu** select **Sensor Transfer**, **Database**, **Projects ,** select your waypoint project, right click and send it to the sensor PC card. (Similar to Importing Codelist, page 10)

Now the new way point project can be opened in the GS20, and used as a reference.

14

• Open the **Sensor Transfer** window from the **Tools Menu**.	

Your window should switch from the Main window to the Sensor Transfer window.

For more information on this and other related geomatics documents see tmackinnon.com

- Connect the Serial Cable to your PC and to the GS20.

- Turn the GS20 on.

- From the main menu, select **Auxiliary**, press the Enter Key, then in the Auxiliary menu select **Utilities**, press the Enter Key and then from the Utilities menu, select **Sensor Transfer,** and press the Enter Key.
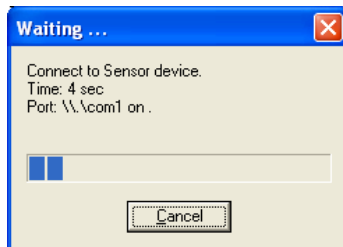
- Select **1** from the **Port** options, Highlight the **Apply** box and then press the Enter Key.

16

- Click the Database folder; in the left hand frame of the Sensor Transfer Window, click the Codelists folder, and then Highlight the Codelist you want to transfer in the left hand frame

- Right Click on the Codelist you want to transfer and select **Send To** and **Sensor PC-Card**

For more information on this and other related geomatics documents see <u>tmackinnon.com</u>

GS20 Operation

The Icon area at the top of the GS20 display provides constant access to important status data

- Autonomous Position ⊙
- Real-Time Position ◉
  - Quality and PDOP values
- Stop and Go Indicator
  - Identifies when a real-time auto stop position is complete
- Satellite Tracking Data
  - Mask Angle
  - Sats Visible / Sats Tracked
- Real-Time WAAS Correction Status
  - WAAS (Wide Area Augmentation) Signal
- Compact Flash Status
- Battery Status and Local Time
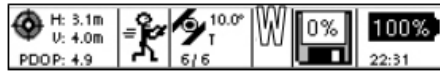
Power: Power on and off the unit, and starts the backlight

- Press once to start. An audible beep will be followed by the splash screen, then the main menu.
- Press and hold for 3 seconds to power down the unit. A message will display "Powering Down and Saving Data"

Alpha Numeric

- Press an alpha numeric multiple times, or hold to scroll through the characters available on that key.
  - To enter multiple characters from the same key, either right arrow, or wait for the time out. The time out can be specified in the Hardware settings.

Enter and Escape

- Enter accepts a choice, or advances an action
- Escape functions as a "Back" key or a back space in an edit field

Cursor Keys

- In a Map view, arrows control the cursor.
- In a Menu or Table, Left functions as home and Right functions End.
- In an edit field, up functions as home and down as end.
- Check Boxes and Radio Buttons: Left and right toggle makes a field selection.
- Choice lists and spin controls: Left and right scroll selections
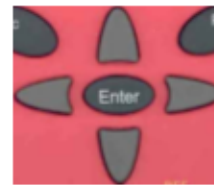
Menu Button

- Menu once opens the context menu for the application
- Menu twice saves the current application open in a paging queue, and returns to the main menu
  - By returning to the main menu, via the menu button, it is possible to open several applications at once.
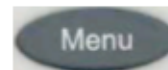
Page Button

- The page button Pages through open application
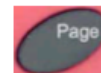
Special Functions

- 3 is Up:
  - Page Up in a table
  - Zoom Out out a Map
- 9 is Down
  - Page Down in a table
  - Zoom In on a Map
- Decimal key has special characters for edit fields
- Zero key also is the space button for edit fields

For more information on this and other related geomatics documents see tmackinnon.com

1) Turn on the unit by pressing and releasing the Power Key, a beep will follow, then the Leica GS20 start up screen should appear, and then disappear and then you will be in the Main Menu. The Main Menu provides access to all of the applications and utilities of the unit. Press the Menu button twice to return to this menu at any time.

2) In order to collect Data, you must be receiving GPS signal, so ensure that the GPS Position Icon found in the left corner of the top icon bar is displayed. The symbol will change from an Autonomous Position Icon to the Real-Time Position Icon as your GPS signal improved. If there is no position available, check the number of satellites and the mask angle found in the center of the top icon bar to make sure you are tracking satellites.

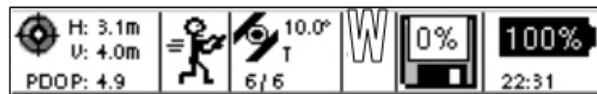(Make sure the unit is receiving **GPS positions** and **WAAS (Wide Area Augumentation Signal)** before you begin collecting data. The top icon bar will display this info for you. You should have at least 4 satellites showing under the **GPS Signal Icon**, have a good PDOP value displayed below the Real Time Icon**,** and the WAAS Real-Time Correction symbol **(W Icon)** should change from a hollow **W** (no signal received) to a solid **W** (no signal received) (arcs will appear below the W while it is changing).

For more information on this and other related geomatics documents see tmackinnon.com

3) Create a new job file or open an existing job file

Create a Job File

    A) Select Data Collection from the Main Menu and press the Enter Key
    B) Select NEW, which will open the Data Collection window.
    C) Enter the a JOB NAME, Creator, and Manager
    D) Press the Menu Key, and then the Enter Key to save and continue
    E) The screen will then prompt you to open or create a codelist.
    F) Scroll down, select an existing codelist and press the Enter Key

Open a Job File
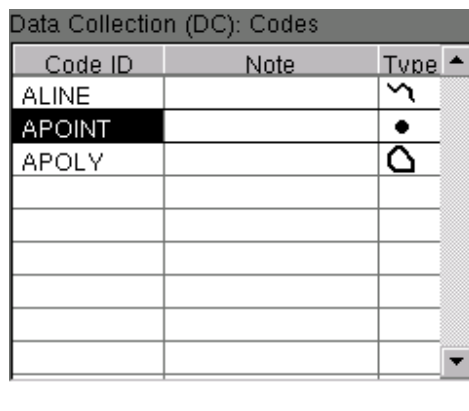
    A) Select Data Collection from the Main Menu and press the Enter Key
    B) Select OPEN, which will open the Data Collection window.
    C) Scroll down, select the existing job file and press the Enter Key

4) After the job is opened, you will be in the Data Collection Codes Screen , showing the Code ID, Note, and Type

5) Use the arrow key to scroll down and select the type of feature you want to record (line, point, polygon, or waypoint) and press the Enter Key. This will open the New Feature Attribution Screen.

Collect a Point

    A) While in the Data Collection Screen, scroll down and highlight **APOINT** and press Enter Key, this will open the New Feature Attribute Screen

    B) Edit the Attributes for your point, give the point a Feature Name (optional) or use the default Feature Name, then scroll up to the **Occupy Icon** and then press the Enter Key to begin recording GPS positions and a Quality

21

Window will open, with info on the quality of the point. Highlight the Stop Icon and press the Enter Key to save the feature when the quality is acceptable.

C) After the point is collected, a Map Display will appear, showing the feature you just collected and your GPS position.
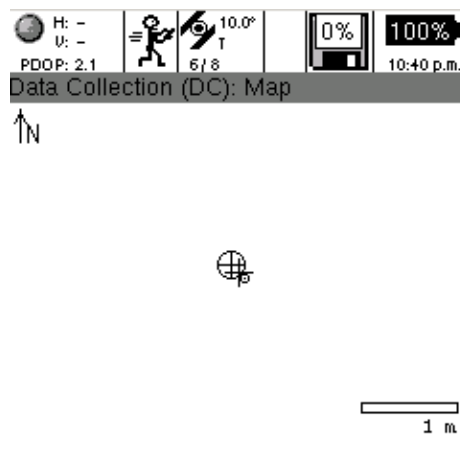
D) To collect another feature, simply press the Enter Key to open the Data Collection Screen and repeat the above steps, or chose one of the other methods.

Collect a Line

A) While in the Data Collection Screen, scroll down and highlight **ALINE** and press Enter Key, this will open the New Feature Attribute Screen

DC[2]: New Feature Attribution

| Stream mode | Occupy | Done |

Feature Code   ALINE
Feature Name   LINE00001

Attribute Name	Value
COMMENT	

Pos.: 0 () Nodes:0

B) There are two types of collecting lines, Stream or Node. The default type of line will be the last type used. If you need to change the type of line, press the **Menu button,** a menu, providing linear collection options. Select **Stream** or **Node.**

Save Feature
● 2 Node
○ 3 Stream
4 Offset ▶
5 Nest
6 Map
8 More ▶
Main Menu

Stream Mode: Automatically collects GPS positions by time or a specified distance.
Node Mode: Will collect vertices when you specify, similar to the method of collecting points.

Streamed

Noded
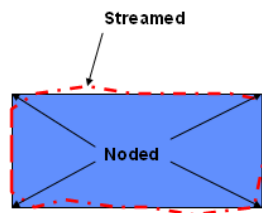
C) If you chose the Streaming method, a Stream Options window will open to allow you to select your options; Time (rate of positions) or Distance (distance between points), Node Beep**,** and an option to Ignore Quality.

After you have configured your settings scroll up to the Done Icon and press Enter Key or Esc Key.

DC[3]: Stream Options

```
┌─────────────────────────────────┐
│ DC[3]: Stream Options           │
│      ┌──────────────────┐       │
│      │     Done         │       │
│      └──────────────────┘       │
│  ┌───────────────────────────┐  │
│  │ ⦿ By Time                │  │
│  │ ○ By Distance            │  │
│  └───────────────────────────┘  │
│  Time, sec.      │1        │▲▼│ │
│  Distance        │1.000m        │
│  ☑ Node Beep                    │
│  ☐ Ignore Quality               │
│  Pos.: 0 () Nodes:0             │
└─────────────────────────────────┘
```
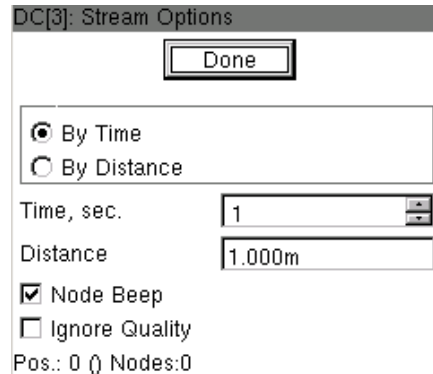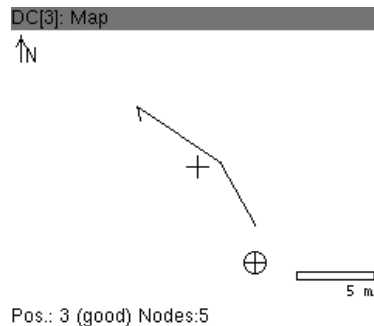
D) Edit the Attributes for your line, give the line a Feature Name (optional) or use the default Feature Name, then scroll up to the Occupy Icon and then press the Enter Key to begin recording GPS positions. The Occupy Icon will turn to a Stop Icon and the Quality Window will open, with info on the quality of the point. Start walking along your line feature, holding the unit in front of you, level and approximately at waist height. When you come to the end of your line feature, then scroll up and highlight the Done Icon and press the Enter Key, then press the Enter Key again to save the feature when the quality is acceptable. (If you want to collect points along your line, select the Stop Icon and press the Enter Key. Enter or select your attributes, highlight the Occupy Icon and then continue collecting your line.)

E) After the Line is collected, the Map Display will appear, showing the line feature you just collected, your GPS position, and possibly features that you may have already collected.

```
┌─────────────────────────────────┐
│ DC[3]: Map                      │
│ ↑N                              │
│                                 │
│         ↖                       │
│            \                    │
│          +  \                   │
│              \                  │
│               \                 │
│          ⊕      ───────         │
│                      5 m        │
│ Pos.: 3 (good) Nodes:5          │
└─────────────────────────────────┘
```

24

F) The Node Mode of line collection is similar to streaming except that you must specify where each node is located, and then a straight line will be interpolated between them. Select the Occupy Icon to start recording GPS positions, and then press the Save Node icon to record the first position of your line. Continue this until you complete your line, then scroll over to the Done Icon to save your line.

Collect a Polygon

A) Collecting a polygon is similar to collecting a line feature, but you must close your polygon close to the point where you started.
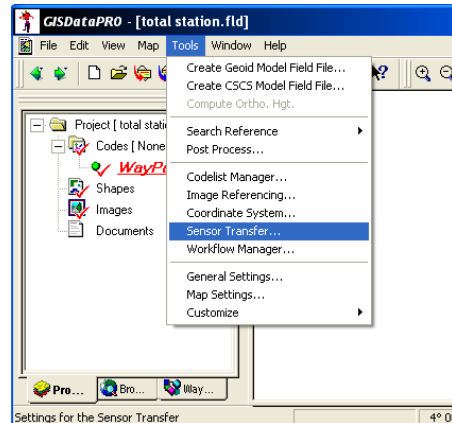
Collect a Waypoint

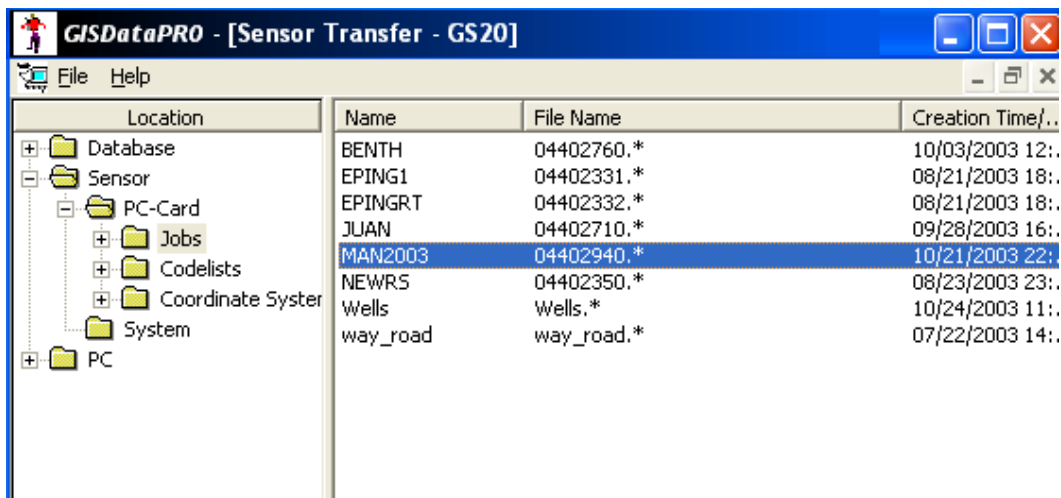A) Collecting a way point is similar to the method of collecting a point.

To shut down the unit, press the **Power Button** and hold for 3 seconds.

For more information on this and other related geomatics documents see tmackinnon.com

Importing Data from the GS20 to PC

- Open the GISDataPro Software package.

- Select Sensor Transfer from the Tools pull down Menu.

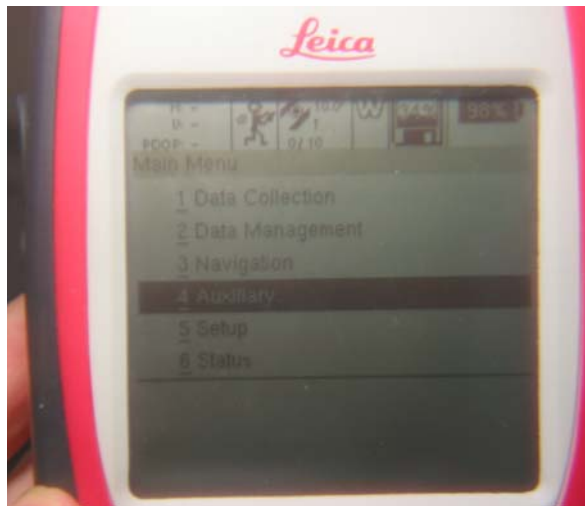Your window should switch from the Main Window to a Sensor Transfer GS20 Window.

For more information on this and other related geomatics documents see tmackinnon.com

- Connect the Serial Cable to your PC and to the GS20.

- Turn the GS20 on.

- From the main menu, select **Auxiliary**, press the Enter Key, then in the Auxiliary menu select **Utilities**, press the Enter Key and then from the Utilities menu, select Sensor Transfer, and press the Enter Key.
- Select 1 from the Port options, Highlight the Apply icon and then press the Enter Key.

**For more information on this and other related geomatics documents see <u>tmackinnon.com</u>**

- Right click on the Senor menu and choose Read the Contents

- Expand the Sensor folder by left clicking to expose sun folders

- Expand the PC-Card folder to expose sub folders

- A **Jobs** folder should appear in the left hand frame, when you click on the folder, all the job files will appear in the right hand frame
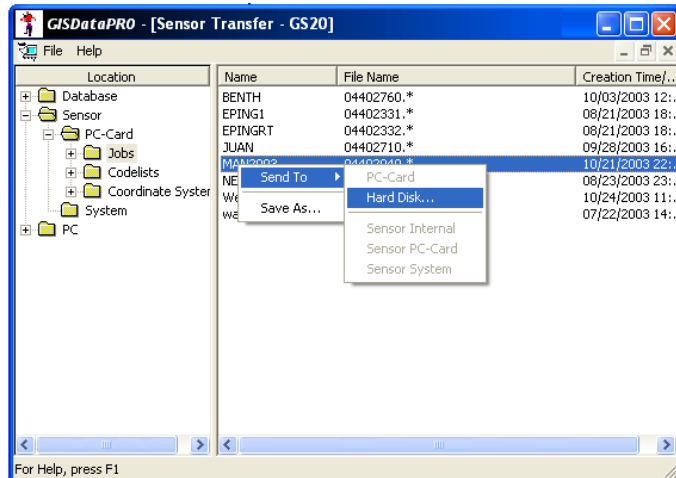
- Right Click on the **Job** you want to transfer to your PC and select **Send To** and **Hard Disk…** then select the location on your PC where you want to put your new files, and select **OK.**
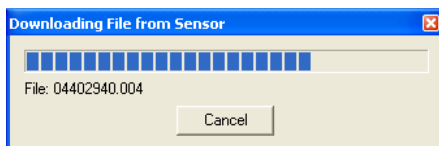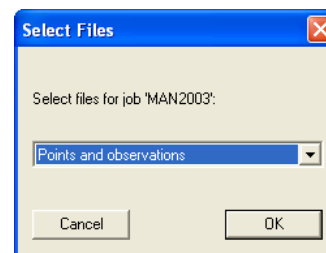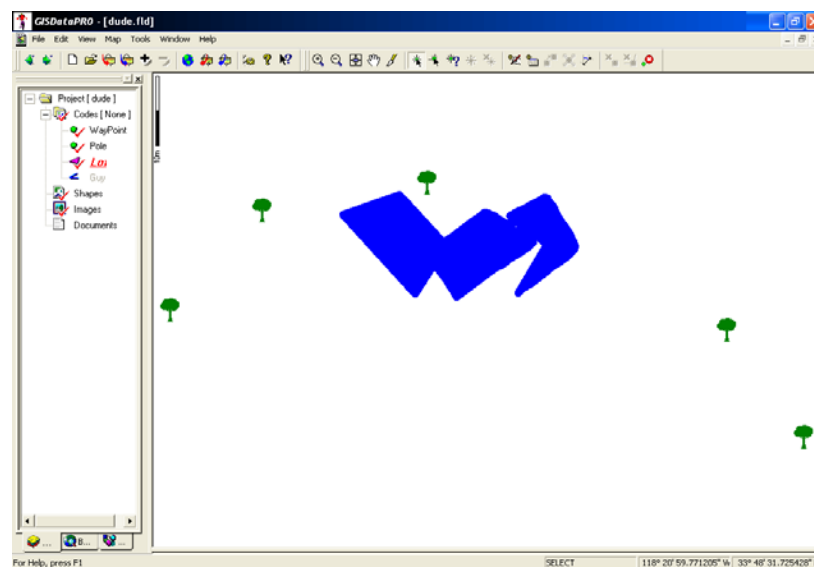

Select **Exit Sensor Transfer** from the **File** in Main Menu, and then your window should switch back to the main GISDataPro window where you can open your Job file. Select

For more information on this and other related geomatics documents see tmackinnon.com

Import, and then **File** from the main menu and find your GPS Raw Data file.
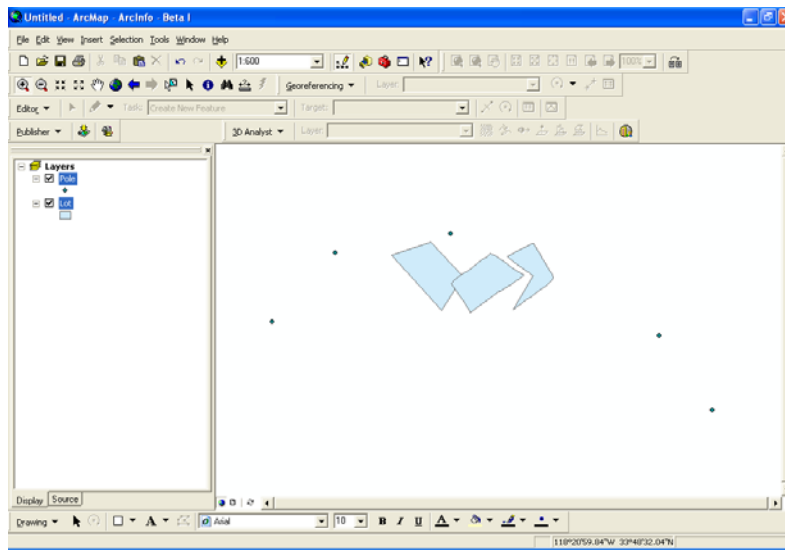
Note: Make sure that the "Generate GPS measurement database is selected in the Import Data window, this is necessary for post processing or computing orthometric heights.
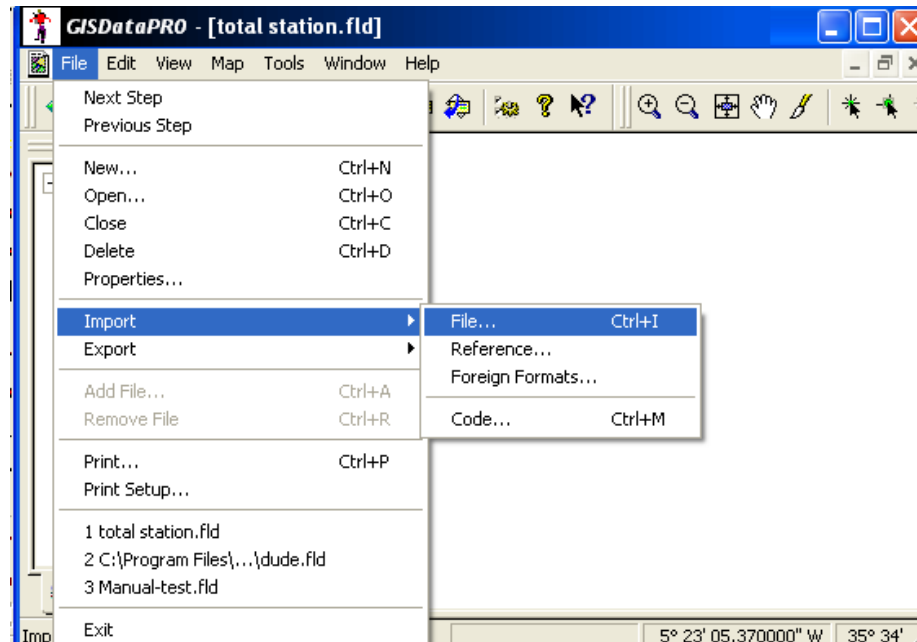
Your GPS Data will be displayed in the right hand frame of your window.

You can now use your shapefile with other GIS applications like ArcMap

For more information on this and other related geomatics documents see tmackinnon.com

For more information on this and other related geomatics documents see <u>tmackinnon.com</u>

References

Several images used were from Leica Geosystems website (Leica-geosystems.com) and basic system manuals included with the GPS unit.

For more information on this and other related geomatics documents see tmackinnon.com