SATLOC ®

Bantam 2 Air Trac
User Guide
PN 875-3011-000 Rev B

The Satloc® Bantam 2™ offers major improvements over the original Satloc Bantam.
- ➢ Upgraded GPS receiver for improved performance and accuracy
- ➢ Upgraded CPU
- ➢ WiFi connection capability
- ➢ Increased memory
- ➢ Works with Satloc Cloud
- ➢ Runs with Satloc L8 and H8 Lightbars

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Notice to Customers

Contact your local dealer for technical assistance. To find the authorized dealer near you:

Satloc
1206 Hatton Rd
Wichita Falls, TX 76302
Phone: 940-687-1100
Fax: 940-687-1941
www.Satloc.com

Technical Support

If you need to contact Satloc Technical Support:

1206 Hatton Rd
Wichita Falls, TX 76302
Call/Text 833-4-Satloc
support@satloc.com

Documentation Feedback

Satloc and Transland are committed to the quality and continuous improvement of our products and services. We encourage and appreciate any feedback regarding this guide and any of our products by writing to the following email address: Sales@Translandllc.com.

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Chapter 1: Introduction

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What's In This Guide?

This user guide provides the following information to get you up and running quickly with AirTrac.

- This introduction chapter briefly outlines the contents of this manual, lists AirTrac features, introduces related Satloc products, and describes both the advantages of differential GPS (DGPS) and how it is used by AirTrac.
- Chapter 2, "Getting Started" describes how to start and exit AirTrac, provides an overview of the AirTrac map (display) screen and an introduction to working with AirTrac.
- Chapter 3, "Setup" shows how to set the units of measure (UOM) used throughout AirTrac and how to set up your screen, lightbar, and flow control system (for use in AirTrac).
- Chapter 4, "Terminology and Basic Tasks" provides an overview of aerial guidance terms, describes how to quickly enter basic job details, and provides an overview of logging, especially its relationship to jobs.
- Chapter 5, "Pattern Guidance" walks you through flying a basic pattern and describes all pattern types.
- Chapter 6, "Routes, Waypoints, and Marks" shows you how to create routes and waypoints, receive guidance to waypoints and marks and work with various related files.
- Chapter 7, "Jobs and Polygons" describes how to work with jobs and polygons, with particular reference to auto-application of patterns to polygons.
- Chapter 8, "Flow Control" provides tables that summarise the screens and windows related to flow control (liquid, IntelliFlow and IntelliFlow2), menu maps for IntelliFlow2 and IntelliFlow and tables that detail the screens and window for the two flow controllers.
- Chapter 9, "Advanced Features" includes setting up zoom behavior, GPS options and 'return to mark' modes.
- Appendix A, "The Simulator Console" identifies the flight and location controls and data displays on the simulator console.
- Appendix B, "Index of Navigation Paths" provides a 'quick list' index of the navigation paths to the various features and setup fields and options in AirTrac.
- Appendix C, "Satloc Cloud Subscription" provides information on how to subscribe to Satloc Cloud and use it with Satloc Bantam 2.
- Appendix D, "KML Features" explains how to import KML files into the Satloc Bantam 2 system and convert them into JOB files. It outlines the steps for transferring KML files from a USB device and converting them for use in aerial application mapping.

Product Overview

The Bantam 2 comprise a 7" or 9" touchscreen display with AirTrac software, CPU with two USB ports, A21 antenna, and external lightbar.

AirTrac features a real-time map that provides visual guidance and shows key features such as swaths sprayed, field boundaries, skips and overlaps, mark points, waypoints, and polygons. In addition, with AirTrac you can:

- Fly various pattern types, such as back-to-back and racetrack
- Track acreage sprayed and monitor application rates
- View range and bearing to remote points or fields
- Store and transfer log and other data to a USB drive
- Perform advanced lightbar setup and dimming functions
- Maintain tracking via Satloc Cloud

Using Other Satloc Products with AirTrac

Satloc Cloud and MapStar® are Satloc software products that you can use in conjunction with AirTrac to perform more advanced tasks.

- Satloc Cloud is a web-based system that uses cutting-edge technology to manage aircraft tracking and wireless data transfer. The Satloc Falcon, Satloc Bantam 2 and Satloc G4 automatically receive files needed to rapidly move to the next job while still in the air, saving time and fuel. Application logs are automatically sent to the Satloc Cloud without pilot interaction, adding ease and efficiency. Direct data communication is available with 3rd party billing and management companies, harmonizing aircraft and billing operations. We offer videos and a quick reference guide to help users know how-to use the Cloud.

- MapStar is pre-application mapping and post-application analysis software that enables you to import/export common GIS file formats (such as CAD DXF, MapInfo MID/MIF, and Esri® shapefiles) as well as view, analyze, and export log data. MapStar also supports variable rate applications and prescription maps.

Differential GPS Receiver Advantage

AirTrac uses DGPS data to provide highly accurate guidance to help you efficiently complete your spray jobs. Once you establish a reference line, or starting location for your pattern, AirTrac can calculate exactly where your next swath should be based on your selected swath width and pattern using a GPS location it computes 5-20 times per second. The GPS location is made more accurate by applying DGPS corrections. The resulting lightbar guidance cues reflect your real-time GPS data. AirTrac also uses GPS data to guide you to specific waypoints—GPS coordinates of a specific location.

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Chapter 2: Getting Started

This chapter covers:

- Starting AirTrac
- Overview of the display
- Setting up AirTrac, including how to enter values and navigate AirTrac
- Exiting AirTrac (with the option to exit to the terminal's desktop)

Starting AirTrac

Refer to the Bantam Installation Guide for information on how to set up and power on your Bantam system. The Bantam Installation Guide is available from the Satloc website at www.satloc.com.

To start AirTrac:

1. Power on your Bantam system. After Bantam completes its bootup sequence the DISCLAIMER screen appears. Press **ACCEPT**. The "Select Additional Options or Start AirTrac" screen appears.

2. Either launch ('run') AirTrac (go to step 4) or press **Settings** (go to next step) to establish various settings for the coming AirTrac session.
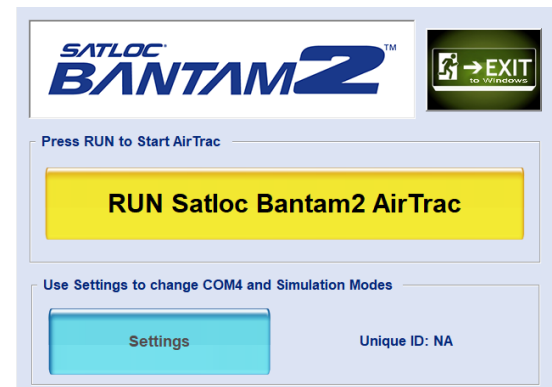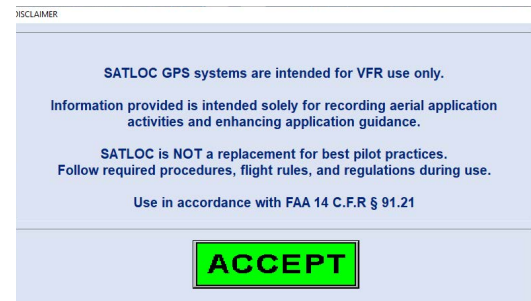
3. **Settings** (optional).

   Select and set as required:

   - **Select I/O Port Service** - for peripheral devices, such as AgLaser (see "Ag. Laser Offset" on page 26 and "Subscription Authorization" on page 147).

     Note: Connect any I/O port service device to the DB9 connector on the Bantam's GPIO cable.
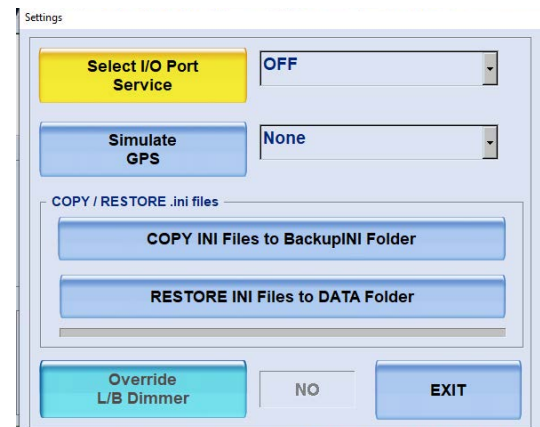
   - **Select Differential Source** - WAAS is the default differential source. For more information on WAAS see "GPS Options" on page 140.

- **Select User Input Device** - leave the value as Touch. The Keypad option refers to an external keypad that is not available for this version of AirTrac.
- **Simulate GPS** - select Internal Simulator to include the flight/spray simulator in this session of AirTrac (see Appendix A, "The Simulator Console" on page 149). Select External Simulator COM4 to connect to an external GPS simulator such as a GPS simulation program on a laptop.

Press **EXIT** to return to the Select Additional Options or Start AirTrac screen.
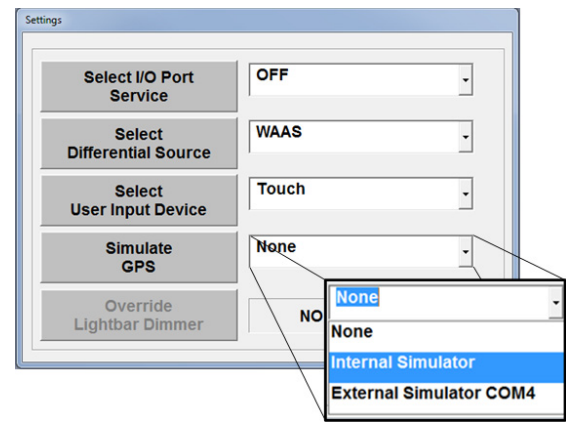
4. Press **RUN Satloc Bantam AirTrac** to start your AirTrac session. The Welcome to AirTrac splash screen appears. (*Note: The bottom right corner message "Just Loaded JOB file" relates to startup processing; you can ignore the statement.*)

5. After a few seconds the map screen (and associated panels — A), the simulator console (B - if selected at step 3) and the AirTrac Setup screen (C) appear (see "AirTrac Display Overview" on page 9).
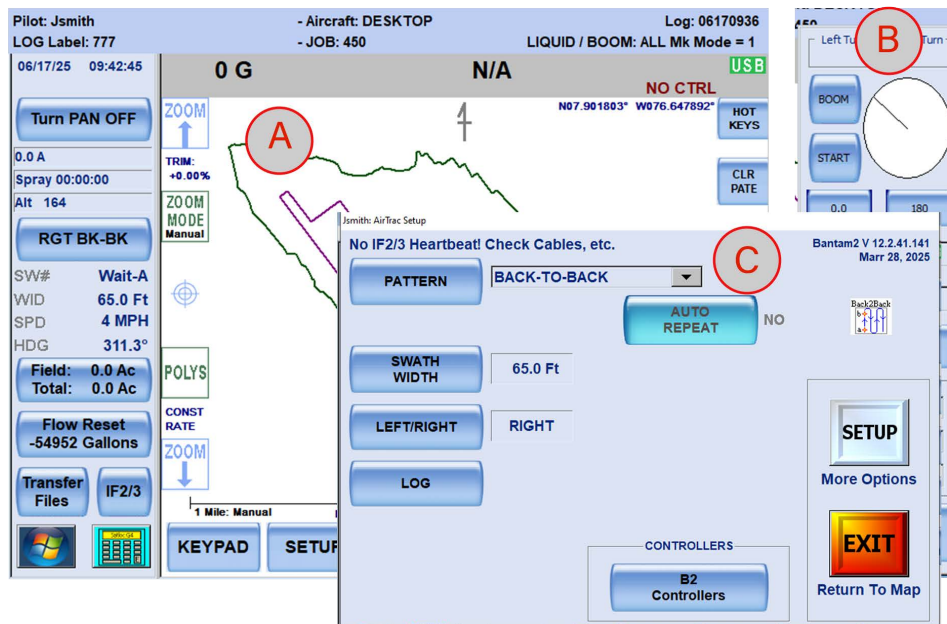
Figure 2-1: Map screen (A), simulator console (B) and first setup screen (C) (arrangement of the items will vary)

AirTrac Display Overview

The AirTrac display includes important status information and user-defined display options as well as Quick Keys that enable you to quickly perform tasks.

Understanding the Map Screen

The map screen (main display screen in AirTrac that fills the entire display) is divided into three areas: moving map, data panel, and header.
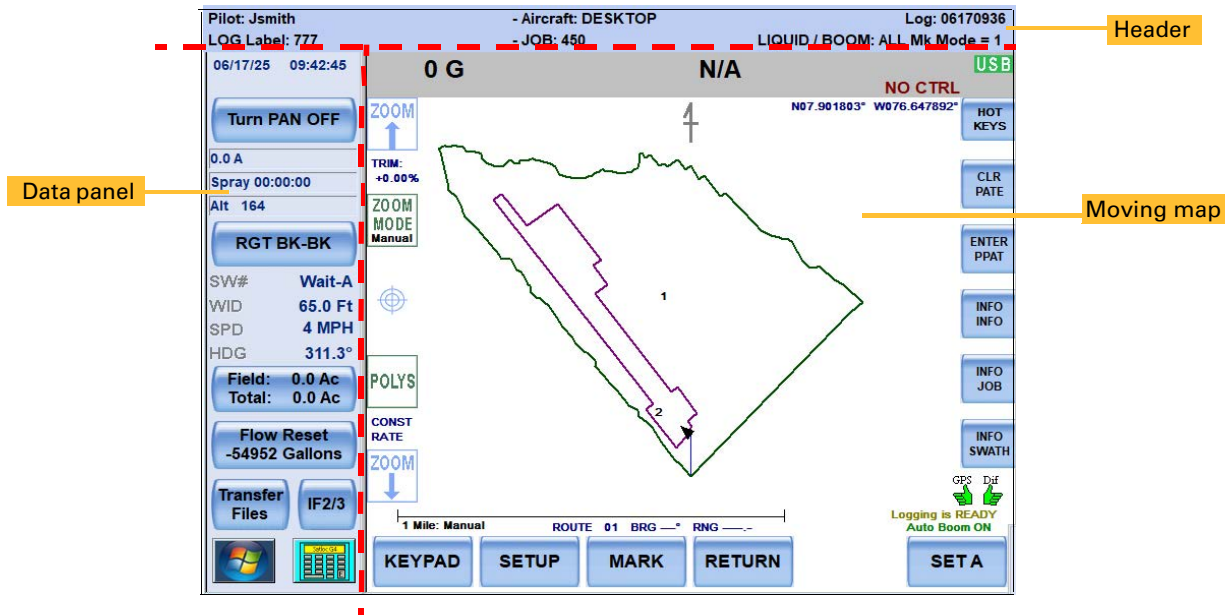
Figure 2-2: Map screen

Moving Map

The 'moving map' (just 'map' for brevity) (Figure 2-3) shows a GIS-generated map of the field when you fly patterns to spray fields. The map includes areas to spray or not to spray (polygons) and any markers you set in the field (such as a location of a cell tower or large tree). The map displays additional helpful information such as differential status (12), your current longitude and latitude (6), and if you are flying below the logging speed ("Logging is READY" - 13).
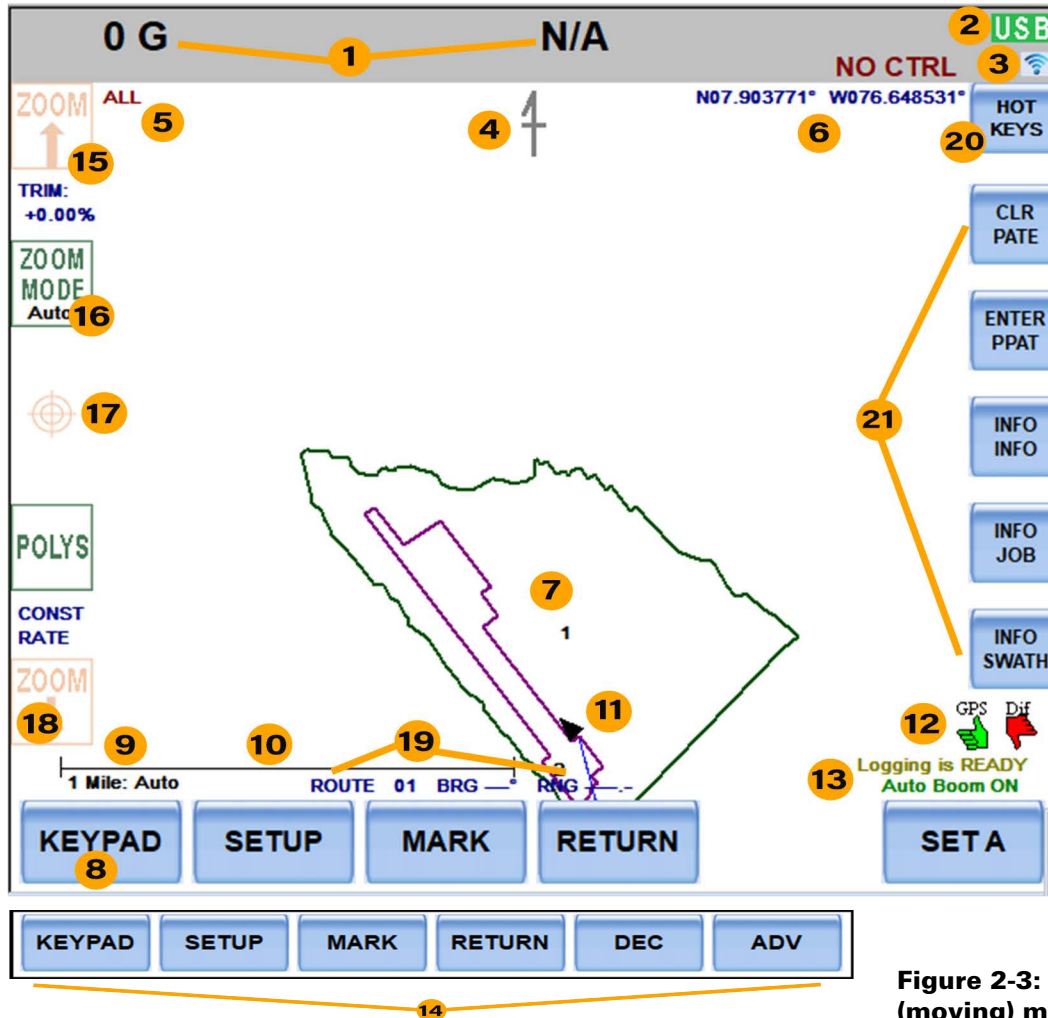
Figure 2-3: The (moving) map

Table 2-1: Map components

Item	Description
1	User-defined fields
	See "Screen Displays Screen" on page 30 and Table 3-3, "User-defined field options" on page 31
2	USB drive inserted in Bantam (green) or not inserted (red)
3	Wi-Fi
4	Points toward true north
5	Shows file name of each log or polygon, cycle through using POLYS button. (shows "ALL" for all logs or polygons)
6	Latitude/longitude of current position
7	Polygon with polygon name (if named. On creation, a polygon's name is its creation sequence number. If no name is added, its number remains its name.)
8	Show KEYPAD, starting point for most commands

Table 2-1: Map components *(continued)*

Item	Description
9	Current zoom level
10	Scale
11	Aircraft (airplane icon when zoomed in - ✈ , triangle when zoomed out - ▲)
12	GPS and differential status indicators
13	Logging status: **ON** or **READY** (on = logging is occurring; ready = logging is not [yet] occurring because you are flying below the currently set logging speed.)
14	Quick Keys: • KEYPAD (open keypad) • SETUP (Display Setup Window) • MARK (open Quick Marks screen) • RETURN (Return to Mark) • SET A (changes to SET B after setting point A. Changes to SET C after setting point B if setting a closed pattern.) After setting a pattern, DEC (decrement swath) appears to the right of MARK and ADV (advance swath) replaces SET.
15	Zoom in button
16	Cycle through zoom modes
17	Center aircraft in map
18	Zoom out
19	Waypoint name or route#/waypoint#, Bearing angle, Range distance
20	Hide/Display Hot Keys
21	Hot Keys

Data Panel

The data panel shows the current date and time, status information for special functions (such as waypoints and GPS status), and your current job information including pattern, direction, swath width and number, speed, heading, and sprayed area.

For a list of options for the data panel's three user-set display fields (#4 at right), see "Screen Displays Screen" on page 30 (which also covers the screen's left and right displays).

The system defaults are:

Left: Volume Sprayed
Right: Flow Rate
Field 1: Total Area
Field 2: Spray Time
Field 3: Log Time Remaining
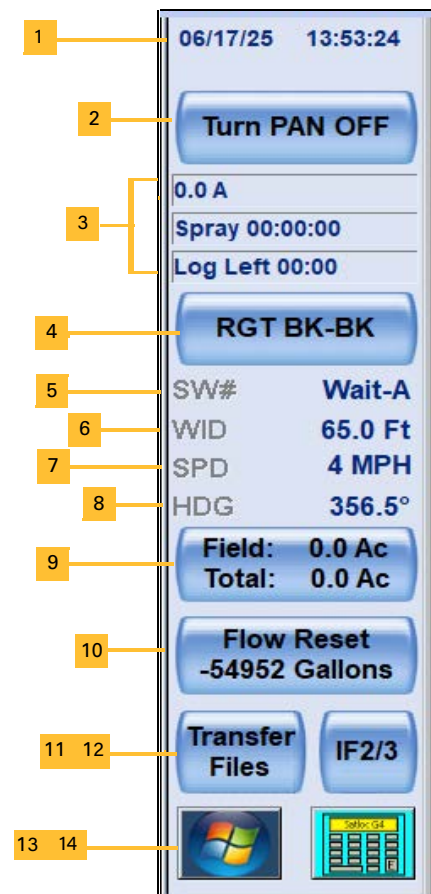
Table 2-2: Data panel components

Item	Description
1	Date and time
2	Toggle Pan Mode on/off
3	User-defined fields. See "Screen Displays Screen" on page 30 and Table 3-3, "User-defined field options" on page 31
4	Direction/pattern (press to change direction)
5	Swath #, GPS status
6	Swath width
7	Ground speed
8	Aircraft heading
9	Current field/total sprayed areas (press to reset)
10	Remaining Volume (press to reset)
11	Display File Transfer window
12	Display Flow Controller window
13	Switch to Windows desktop
14	Show Calculator

Header

| Pilot: Jsmith | - Aircraft: DESKTOP | Log: 06170758 |
| LOG Label: 777 | - JOB: 450 | LIQUID / BOOM: ALL Mk Mode = 1 |

The header, located along the top of the map screen, displays read-only data—you can change some of what is displayed here but not in the header itself, the data coming from various user setup fields. The following table (using the header screenshot above as an example) describes the data and provides links to more information in this manual.

Table 2-3: Header information

Information	Example	Description	For more information
Pilot name	JSMITH	Name of pilot	"Adding Job Information to the Log" on page 56
Aircraft name	DESKTOP	Name of aircraft	
Log label	777	Job number	
Log number	06170758	Current log; if no open log, <No Open Log> appears. Format is month, day, hour, minute: MMDDHHMM	"Jobs and Logs" on page 47
Job number	JOB:450	Current job number	"To delete all jobs, see "Deleting Files" on page 64, which includes information on deleting all files of a specific type (including jobs)." on page 104
Flow material	LIQUID	Liquid	See Chapter 8, "Flow Control."
Boom status	BOOM: ALL	Confirms that the left, center, and right booms are all (permanently) engaged. Boom section control is not available in Bantam/AirTrac.	See Chapter 8, "Flow Control."
Return/mark mode	Mk Mode=1	Determines what data, associated with a mark, is 'appended' (or loaded) onto the map when the mark is selected for return guidance.	See "Select Return/Mark MODE" on page 144

Pressing Buttons in AirTrac

In this manual—in sections describing AirTrac's feature—button images show the navigation path to the screen(s) in which you use those features. The navigation path—the button-press sequence—to the 'Screen Displays' screen for example is shown:

KEYPAD > SETUP > SETUP > SCREEN > Displays
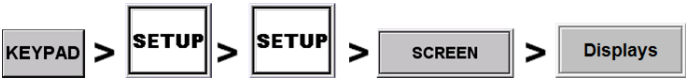
And the path, or button-press sequence, to clear a job from the map is shown:

KEYPAD > CLEAR > JOB 9 > ENTER

Button images are similarly used in tables that provide summary 'How to' information on the various features. For example, in Table 2-4, "Keypad buttons and functions" on page 14, you will see:

| SETUP | Display the AirTrac Setup screen (see Figure 2-5 on page 20). |

And:

Display the Quick Marks screen where you can quickly place a mark numbered from 1 to 9. Use other keys in conjunction with the MARK button to perform the following mark tasks (where 'n' is the mark numbered 1 to 99):

- Save a mark (SAVE > MARK\4 > n > ENTER)
  Example: To save a mark as mark 2, press:

  SAVE > MARK 4 > 2 > ENTER

In instructive text, however, usually in step-by-step format, when referring to buttons and button presses required to use AirTrac's features (once you have navigated to the appropriate screen), this manual uses the button's name (or 'label') in bold. Figure 2-4 is an example from the **Viewing Log Files** section (note that this kind of instructive text is supported by a screen image).

2. Select a log file in the upper list (press the file or press **UP** or **DOWN** to highlight the file) then press **SELECT**. The selected log file is added to the lower list. Repeat this step for each log file you want to view.

To remove a file from the lower list, select the file in the lower list then press **UNSELECT**.

Figure 2-4: Bolded button labels in body text

## Using the Keypad

The keypad (at right) is the starting point for most tasks in AirTrac. For example, pressing **SETUP** on the keypad displays the AirTrac Setup screen (from which you access most other screens). Use other keypad buttons to work with marks, logs, routes, waypoints, jobs, patterns, and polygons.

To display the keypad, press **KEYPAD** at the bottom of the map (see at right).
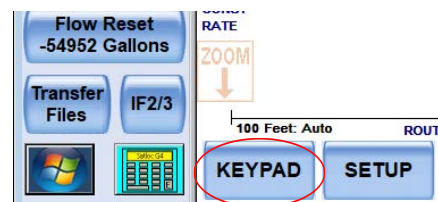
*Note: Pressing **KEYPAD** twice opens a basic calculator. Press **Quit** to exit the calculator.*
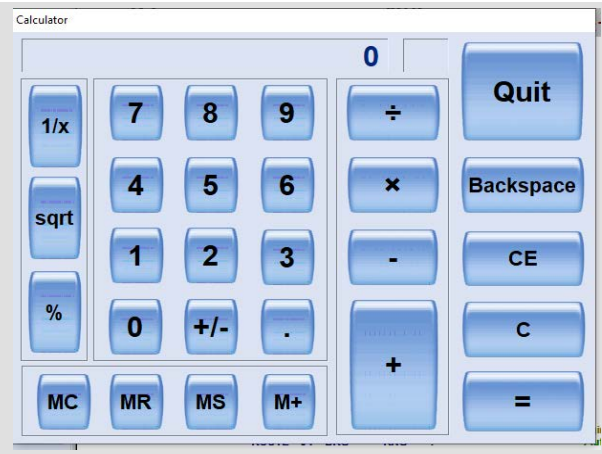
Ten of the keypad buttons double as number buttons 1 - 0. The system detects when a numeric value is required in button sequences and uses the number value of the key pressed. In this manual, when button press sequences (as text, not button images) are included in procedures, the buttons are referred to only by their function (e.g. SWATH, MARK, POLY), that is, their number value is not included. For example, you will see MARK (not MARK 4) or PATTERN (not PATTERN 1) for the mark and pattern functions. When a number value is required, the sequence will show 'n' or 'nn' to indicate that the key's number value will be taken for those key presses in the sequence. For example, to set (load) a specific job, press SET > JOB > 'n' (or 'nn') where **n** is the job number. Thus, to set Job **19**, press SET > JOB (also 9) > **1** (also PATTERN) > **9** (also JOB).

The most often used keys—SETUP, PATTERN, SWATH, and LEFT RIGHT—have a white background. Table 2-4 describes the function of each button on the keypad. See also Appendix B, "Index of Navigation Paths."

Table 2-4: Keypad buttons and functions

Button	Function
SETUP	Display the AirTrac Setup screen (see Figure 2-6 on page 19).
PATTERN 1	Scroll through available patterns (the pattern name changes in the data panel). This key also functions as numeric value 1.
SWATH 2	Display the Enter Swath Width screen, where you enter a swath width. The value you enter appears as the WID value in the data panel.
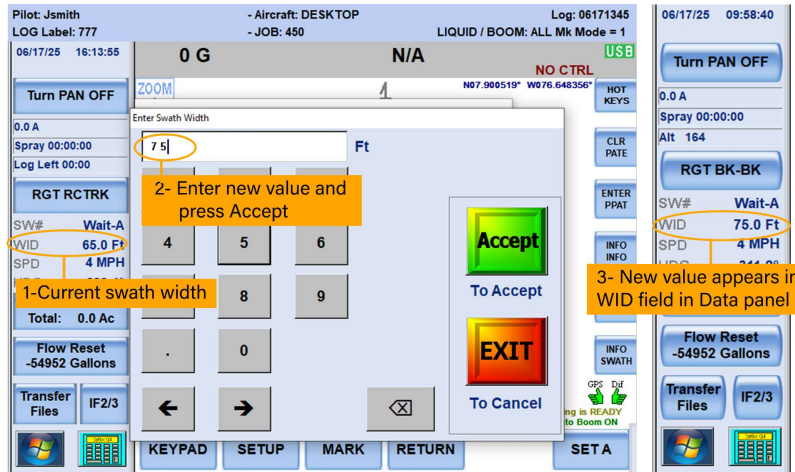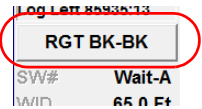
Alternatively, you can enter the swath width in the AirTrac Setup screen—see "Entering Basic Job Details (Quick Start)" on page 52.

This key also functions as numeric value 2.

Table 2-4: Keypad buttons and functions *(continued)*

Button	Function
LEFT RIGHT 3	Change direction (left to right or right to left) of the current pattern (if the pattern has the option to fly left or right). The pattern/direction button in the data panel shows the current direction and pattern—LFT or RGT indicate you are flying to the left or right, respectively, of the A|B line.

Left and right Back-to-Back patterns

Left and right Expand patterns

When you change the direction the new direction is shown on this button. For example, if you are flying an Expand pattern and the current direction is left, the direction/pattern button in the data panel shows LFT EXPND. Pressing the LEFT RIGHT button changes the direction to right and the direction/pattern button shows RGT EXPND.

Direction does not apply to all available pattern types. For example, you can change the direction of the Expand (EXPND) pattern but not the Squeeze (SQUEZ) pattern.

You can also press the pattern/direction button in the data panel to toggle between LFT and RGT for patterns that have the option to fly left or right.

This key also functions as numeric value 3.

Button	Function
ABC	Create A, B, and C points when creating a pattern. Once you set the pattern this button functions as a swath advance button (if not using the ADV Quick Key or the remote swath advance switch).
ZOOM PAN	Display the Zoom/Pan screen where you can zoom in and out, pan the display, and center your aircraft on the map. See "Zooming and Panning the Map" on page 22 for more information.
MARK 4	Display the Quick Marks screen where you can quickly place a mark numbered from 1 to 9. Use other keys in conjunction with the MARK button to perform the following mark tasks (where 'n' is the mark numbered 1 to 99):

- Save a mark (SAVE > MARK > n > ENTER)

  Example: To save a mark as mark 2, press **SAVE** > **MARK 4** > **2** > **ENTER**

- Receive guidance to a mark (SET > MARK > n > ENTER)
  Example: To recall mark 2, press:

  SET > **MARK 4** > **2** > **ENTER**

- Delete a mark (CLEAR > MARK > n > ENTER) *Example:*

  CLEAR > **MARK 4** > **2** > **ENTER**

See "Working with Marks" on page 97 for more information on marks, including working with marks numbered 10 and higher.

This key also functions as numeric value 4.

Button	Function
KML	Easily import and convert KML files into Satloc JOB files with the Bantam 2 for streamlined aerial application. Step-by-Step direction are located in Appendix D.

- Quick Transfer – Copy KML files directly from a USB to the Bantam 2.
- Effortless Conversion – Convert KML files to JOB files in just a few taps.
- No Extra Setup – Files are automatically saved and displayed on the map.
- Save Time in the Cockpit – Plan jobs in Google Earth and execute.

Table 2-4: Keypad buttons and functions *(continued)*

Button	Function
WPT **5**	Use in conjunction with other keys to (where 'n' is the waypoint number): • Save a waypoint (SAVE > WPT > n > ENTER) *Example:* To save a waypoint as waypoint 3, press: **SAVE** > **WPT 5** > **3** > **ENTER** • Receive guidance to a waypoint (SET > WPT > n > ENTER) *Example:* To recall waypoint 3, press: **SET** > **WPT 5** > **3** > **ENTER** • Delete a waypoint (CLEAR > WPT > n > ENTER) *Example:* To delete waypoint 3, press: **CLEAR** > **WPT 5** > **3** > **ENTER** The WPT key also cycles through the waypoints on the active route (RT / WPT n/**n** shows in the data panel) with guidance to the currently selected waypoint initiated. See also ROUTE on page 17. See also "Working with Routes and Waypoints" on page 90 for more information on waypoints. (* All waypoints are a component of a route - to load [set] a waypoint, you must first load [set] its route). This key also functions as numeric value 5.
POLY **6**	Use in conjunction with other keys to (where 'n' is the polygon number): • Receive guidance to a polygon (SET > POLY > n > ENTER) *Example:* To recall polygon 5, press: **SET** > **POLY 6** > **5** > **ENTER** • Delete a polygon (CLEAR > POLY > n > ENTER) *Example:* To delete polygon 5, press: **CLEAR** > **POLY 6** > **5** > **ENTER** See "Working with Polygons" on page 105 for more information on polygons. This key also functions as numeric value 6.
DEC	Swath decrement (if not using the DEC Quick Key on the map screen or the remote decrement switch).

Table 2-4: Keypad buttons and functions *(continued)*

Button	Function

CLEAR ←	Use in conjunction with other keys to either clear a data type from the screen or delete a data type. For example:
	
	• To clear job data (polygons and patterns) from the screen, press:
	
	   CLEAR ← **>** **JOB 9** **>** **ENTER**
	
	• To delete the job from memory (you have to confirm the deletion), press:
	
	   CLEAR ← **>** **JOB 9** **> n >** **ENTER** where n = the job number
	
	You also use this button to exit AirTrac:
	
	• To close AirTrac and return to screens, press:
	
	   CLEAR ← **>** **CLEAR** ← **>** **EXIT TO WINDOWS**
	
	• To close AirTrac and shut down screens, press:
	
	   CLEAR ← **>** **CLEAR** ← **>** **YES**
	
	For important information on exiting and powering off AirTrac see "Exiting AirTrac" on page 23.
	
	⚠**WARNING:** Make sure you understand the difference between clearing a data type from the screen and clearing (deleting) a data type from the database by entering its number. If you delete a job, you also delete the job's polygons and patterns.

RETURN 7	Press this key and then a number key (1 - 9) to return to a mark numbered 1 - 9. To return to a mark > 9 use SET (see SET later in this table). This key also functions as numeric value 7.

ROUTE 8	Use in conjunction with other keys to (where 'n' is the route number):
	
	• Recall a route (SET > ROUTE > n > ENTER)
	  Example: To recall route 6, press:
	
	   SET > ROUTE 8 > 6 > ENTER
	
	• Delete a route (CLEAR > ROUTE > n > ENTER)
	  Example: To delete route 6, press:
	
	   CLEAR ← **> ROUTE 8 > 6 > ENTER**
	
	The ROUTE key also cycles through your saved routes (with each route's waypoint 1 active— RT / WPT **n**/01 shows in the data panel), making each route active as selected and with guidance to its waypoint 1 initiated. See also WPT on page 16.
	
	This key also functions as numeric value 8.

Table 2-4: Keypad buttons and functions *(continued)*

Button	Function
JOB 9	Use in conjunction with other keys to (where 'n' is the job number): • Save a job (SAVE > JOB > n > ENTER) *Example:* To save a job as job 6, press: **SAVE** > **JOB 9** > **6** > **ENTER** • Recall a job (SET > JOB > n > ENTER) *Example:* To recall job 6, press: **SET** > **JOB 9** > **6** > **ENTER** • Delete a job (CLEAR > JOB > n > ENTER) *Example:* To delete job 6, press: **CLEAR** > **JOB 9** > **6** > **ENTER** This key also functions as numeric value 9.
SAVE	Use in conjunction with other keys to save a data type. *Example:* To save a polygon press: **SAVE** > **POLY 6** > **n** where 'n' is the polygon number
EXIT	Close the keypad and return to the map screen.
LOG CLOUD	Display the Logging screen where you can: • Start a new log • Transfer log files to a Satloc Cloud or USB drive
INFO 0	Use in conjunction with other keys to view data type information. *Example:* To display the Marks screen that shows the mark number, job number, and log name of all marks, press: **INFO 0** > **MARK 4** *Example:* To display the Flow Control Setup screen, press: **INFO 0** > **INFO 0** This key also functions as numeric value 0.
SET	Think of the SET button as the 'LOAD' button (if you 'SET' a job, the screen message tells you the job has 'loaded'). Use in conjunction with other keys to recall (load) a specific data type. For example: • To provide guidance to a mark, press: **SET** > **MARK 4** > **n** > **ENTER** where 'n' is the mark number Use the RETURN key to return to marks numbered 1-9 (see RETURN button page 17). • To switch the display between Normal (daytime) and Dark (nighttime) mode, press: **SET** > **SET**
ENTER	Complete a task after you press a combination of keypad buttons. *Example:* To create a mark numbered 10-99, press: **SAVE** > **MARK 4** > **nn** > **ENTER**

Working with AirTrac

After you have completed the startup sequence (see "Starting AirTrac" on page 6), AirTrac displays the map screen.
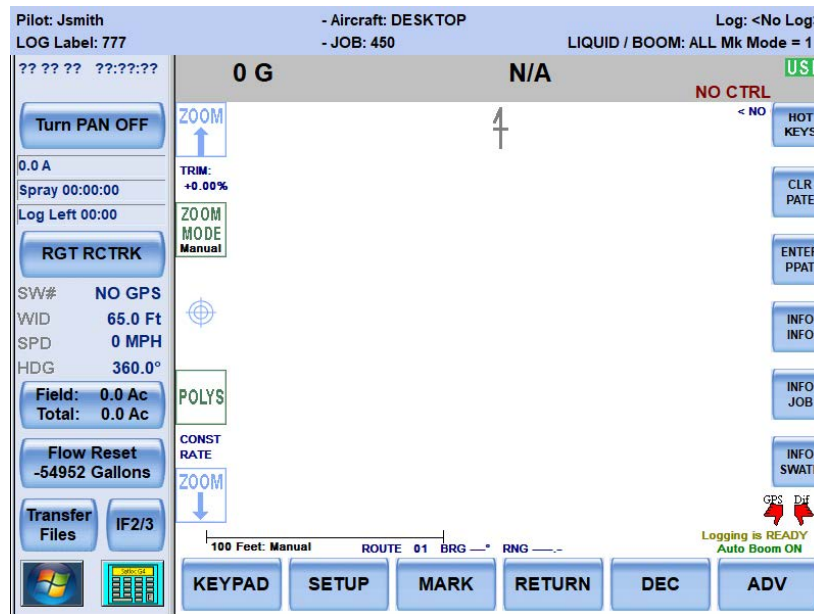
Figure 2-5: Map screen at startup

Pressing **KEYPAD** then **SETUP** displays the AirTrac Setup screen (below). From here you can drill down into additional setup screens that enable you to customize AirTrac.
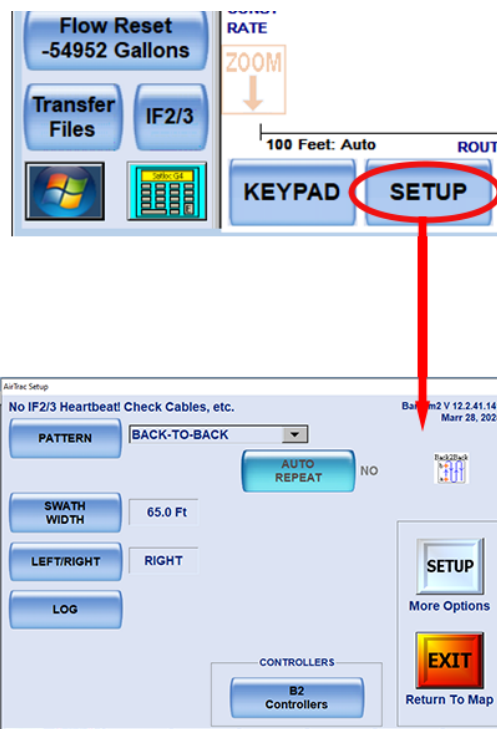
Figure 2-6: Displaying the AirTrac Setup screen

Use the setup screens (shown in Figure 2-7) to set values or make selections for all the different options within AirTrac. Navigate through, or out from successive setup screens using the following buttons:

- **SETUP** - display the next setup screen
- **CLEAR** - display the previous Setup screen
- **EXIT** - close the current setup screen and return to the map screen

There is no CLEAR button on the first setup screen (going back one screen takes you to the map screen) and there is no SETUP button on the last setup screen. Press EXIT to return directly to the map screen at any time—this applies to all screens with an EXIT button.

Additionally, when you press a field button (such as the UNITS button on the Setup 2 screen) the resulting screen may contain a SETUP button that provides additional setup options.
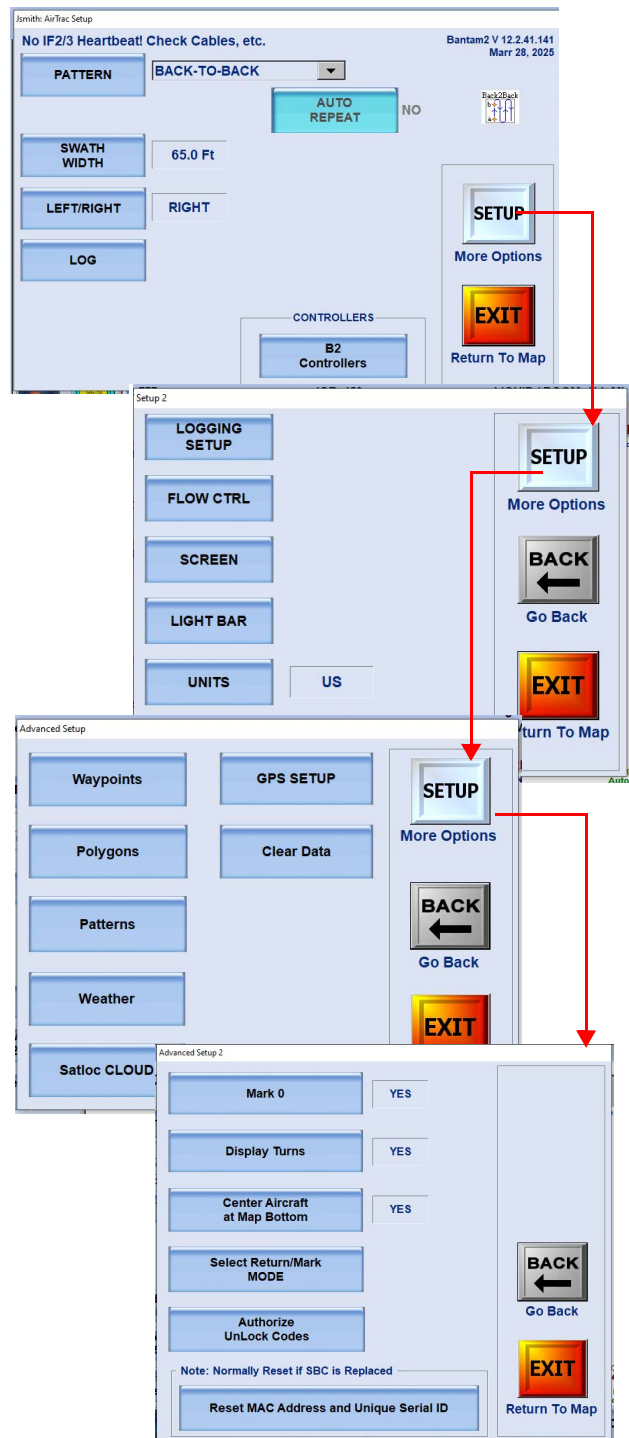
Figure 2-7: Setup screens

Entering Field Values

To enter field values in AirTrac, such as on the Logging Setup screen (at right), press the button for the field. For example, to enter the logging interval value, press the Logging Interval button (circled at right).

AirTrac then displays one of two types of data entry screens: numeric or alphanumeric. AirTrac determines if the value for the field can be numeric only or alphanumeric and displays the appropriate screen.

For example, on the Logging Setup screen the Logging Interval and the Logging Speed fields can be numeric values only. When you press the button for either field AirTrac displays a numeric data entry screen (left screen in Figure 2-8). LOG Label, Pilot, and Aircraft can be alphanumeric values, so when you press the button for any of these fields AirTrac displays an alphanumeric data entry screen (right screen in Figure 2-8).

Numeric data entry screen   Alphanumeric data entry screen

Figure 2-8: Data entry screens

To enter values in either data entry screen:

1. Press the button for the field value you want to enter/change.
2. Enter a value using the buttons in the data entry screen.
3. Press **ENTER** or **Accept**. The data entry screen closes and the value you entered populates the appropriate field on the previous screen.

    or

    Press **EXIT** to cancel the entry and return to the previous screen.

Zooming and Panning the Moving Map Area

Zooming refers to making a section of the screen larger so you can see more detail (zoom in) or making the screen smaller so you can see a larger area and less detail (zoom out).

You can zoom in and out using buttons in the Zoom/Pan window and in the Moving Map area (Figure 2-9). You can also 'pinch' to zoom in and out on the Moving Map area:

- To pinch to zoom in place your thumb and index finger far apart on the Moving Map area then drag (slide) your thumb and finger closer together
- To pinch to zoom out place your thumb and index finger close together on the Moving Map area then drag (slide) your thumb and finger farther apart

Panning refers to moving the screen in a specific direction (such as left or right) so you can see detail that may not be visible on the current screen.

Figure 2-9 illustrates the zooming and panning features of IntelliTrac.

Zoom/pan controls in Moving Map area

N/A

ZOOM ALL ——— Zoom in

ZOOM MODE Manual ——— Zoom Mode

POLYS ——— Zoom out

ZOOM

Zoom distance ——— 500 Feet

KEYPAD

Pan the screen by pressing anywhere in the Moving Map area and then dragging (Pan mode must be ON)
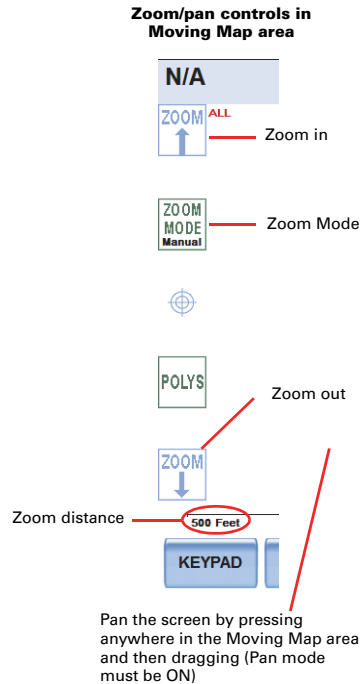
Figure 2-9: Zoom Out and Zoom In

The zoom indicator (lower left of map) shows your zoom level (a distance), the distance scale bar, and the zoom mode ('Manual' in Figure 2-9). For more information on zooming and its relationship to user scale and system scale (item 11, Table 2-2 on page 11) and scale ratio, see Zoom Level and Scale ratio in Table 9-1, "Screen Advanced Setup screen" on page 136.

To Pan, Manually Zoom, Set Auto Zoom

For the following zooming/panning operations first press Quick Key **ZOOM** to open the zoom/pan panel (press **EXIT** to close the panel).

Pan: To pan (move/shift) the map, press the arrows to pan the display in the opposite direction to the arrows. And, while the zoom/pan is panel open, you can pan by touch/sliding on the map—see 'On map' panning at right.

Manual Zoom: To manually zoom in/out on the map, press **ZOOM IN** or **ZOOM OUT** as many times as needed. With each press of either button the zoom indicator (showing 'Manual') distance decreases (ZOOM IN) or increases (ZOOM OUT).

Auto Zoom: To have AirTrac automatically zoom in/out to keep your pattern in view while spraying, press **AUTO ZOOM**. (Zoom indicator shows 'Auto'.)

Exiting AirTrac

When exiting AirTrac you can shut down AirTrac and go to the Windows desktop or shut your system down completely to power off your system.

⚠ WARNING: *To protect your data, exit AirTrac before powering off the Bantam; otherwise, you risk corrupting your data.*

To exit AirTrac:

1. Press **KEYPAD** > **CLEAR ←** > **CLEAR ←** to display the exit screen (at right).

2. Press:

   NO to cancel and return to AirTrac.

   EXIT TO WINDOWS to exit AirTrac and display the Window's desktop.

   YES to exit AirTrac (and power off Bantam).
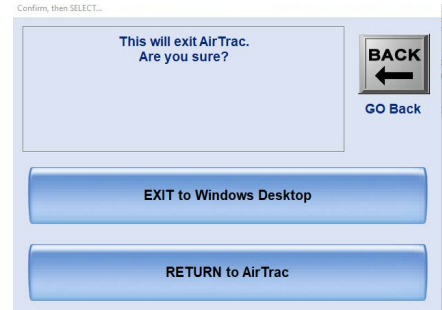
   Note: After the Bantam 2 software closes and the screen displays Windows, you may shut down the system.

Exiting AirTrac and Jobs

When you exit AirTrac:

- If you have cleared the last active job (KEYPAD > CLEAR > JOB > ENTER), <No Job> will show (i) in the header (always) and (ii) in any of the five user-set fields for which Job ID is the selected display option. On restart, 'Job 000' will show in the header, 'Job 0' will show in the user-set field.

- If you exit AirTrac with a job active, on restart that job will still be active. If the active job had a pattern loaded, and/or a log loaded at shutdown, neither the pattern nor the log will be reloaded on restart—only the job (and its polygon(s) will be (still) loaded.

At exit ← → On startup

Job 14 active   Job 14 active

No Job   Job 000 (Job 0)

SATLOC®
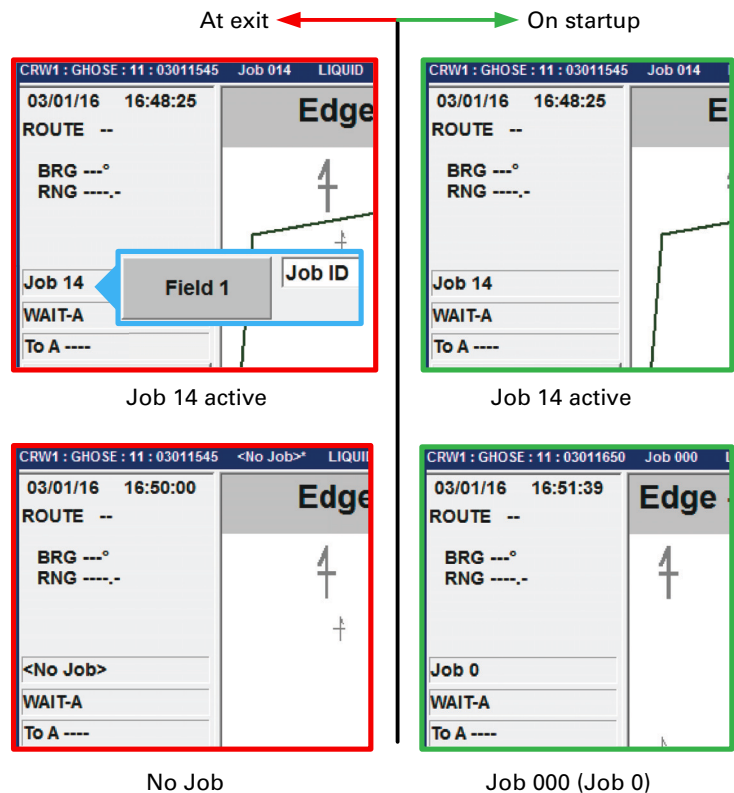
Chapter 3: Setup

Adjusting Systemwide Settings (Units)
Setting up the Screen
Setting up the Lightbar
Setting up Flow Control

This chapter describes how to adjust systemwide settings and set up your display, lightbar, and flow controller. The features are those accessed from the Setup 2 screen.

Path to the Setup 2 screen: [KEYPAD] **>** [SETUP] **>** [SETUP]

Adjusting Systemwide Settings (Units)

While AirTrac's default settings should meet most of your needs, you can set some systemwide ('global') values (see Table 3-1) and options to suit your local requirements.

Note: Customized settings are saved and can be transferred (in an .ini file) to Satloc Cloud or a USB drive and then to the hard drive of another Bantam. See "Customized Settings" on page 148, "Adding Job Information to the Log" on page 56, and "Transferring Files" on page 61.

Table 3-1: AirTrac systemwide settings

Field	Description
Local Time Offset	Also referred to as Coordinated Universal Time (UTC) offset
	UTC is similar to, but more precise than, Greenwich Mean Time (GMT). UTC is the time zone from which all other time zones are calculated and these time zones range from -12:00 (hours) to +14:00 (hours)—referred to as the UTC offset. Negative numbers increase as you move farther west from UTC; positive numbers increase as you move farther east from UTC. For example, the time zone for Dallas, Texas (USA) is -6:00.
	Set the UTC offset to display the correct time for your system. If you live in an area that observes daylight savings (DST), set the UTC offset in AirTrac twice a year.
Global Units	AirTrac uses U.S. standard units (such as feet and pounds) as the default. Use the Global Units field to change this setting to Metric or Nautical.
	You can assign units to individual data types (such as speed and area) in the Units Advanced Setup screen (see step 3 on page 27). For example, you can have speed and area as standard units and have all other measurements as metric units.
Coordinates	You can display GPS coordinates as one of the following:
	DDD.DDDDDDD-decimal degrees (default)
	DDDMM.MMMM-decimal minutes
	DDDMMSS.SSS-decimal seconds
Ag. Laser Offset	AgLaser is a laser altimeter used to provide AirTrac with a distance from the aircraft to the ground/crop canopy. The offset is a number that you can set to offset the difference between the actual mounting location of the AgLaser (usually in the wing) and the lowest point of the aircraft (the landing gear) to determine exactly how high the lowest part of the plane is off the ground/crop canopy.
	Note: The laser will bounce off the ground or the canopy of the crop the plane is flying over if the vegetation is thick and hides the ground.
	You need to subscribe to AgLaser to use the feature. See "Subscription Authorization" on page 147.
	You can set AgLaser's readings as a screen or lightbar field display - select **Laser Altimeter** as your display option. (See "Screen Displays Screen" on page 30 and "Lightbar Setup Screen" on page 37).
	When AgLaser is active and communicating, the ALT icon is displayed at bottom right of the map.

To select systemwide settings:

1. Press [KEYPAD] > [SETUP] > [SETUP] > [UNITS]

   The Units screen appears.

2. Using Table 3-1 on the previous page as a guide, set Local Time Offset, Global Units, and Coordinates by pressing the button or the field's drop-down list button (down arrow) and selecting an option.

3. To override the systemwide units for certain data, press **SETUP.** The Units Advanced Setup screen appears.

4. For each data value you want in a different unit, press the button or the field's drop-down list button (down arrow) and select an option. Press **EXIT** to return to the map.

Setting up the Screen

Screen setup relates to all areas of your main display, which comprises the header, the map and the data panel. Full screen setup is established through three screens:

1. Screen Setup (see "Screen Setup Screen" on page 29)
2. Screen Displays (see "Screen Displays Screen" on page 30)
3. Screen Advanced Setup (see "Advanced Screen Options" on page 136)
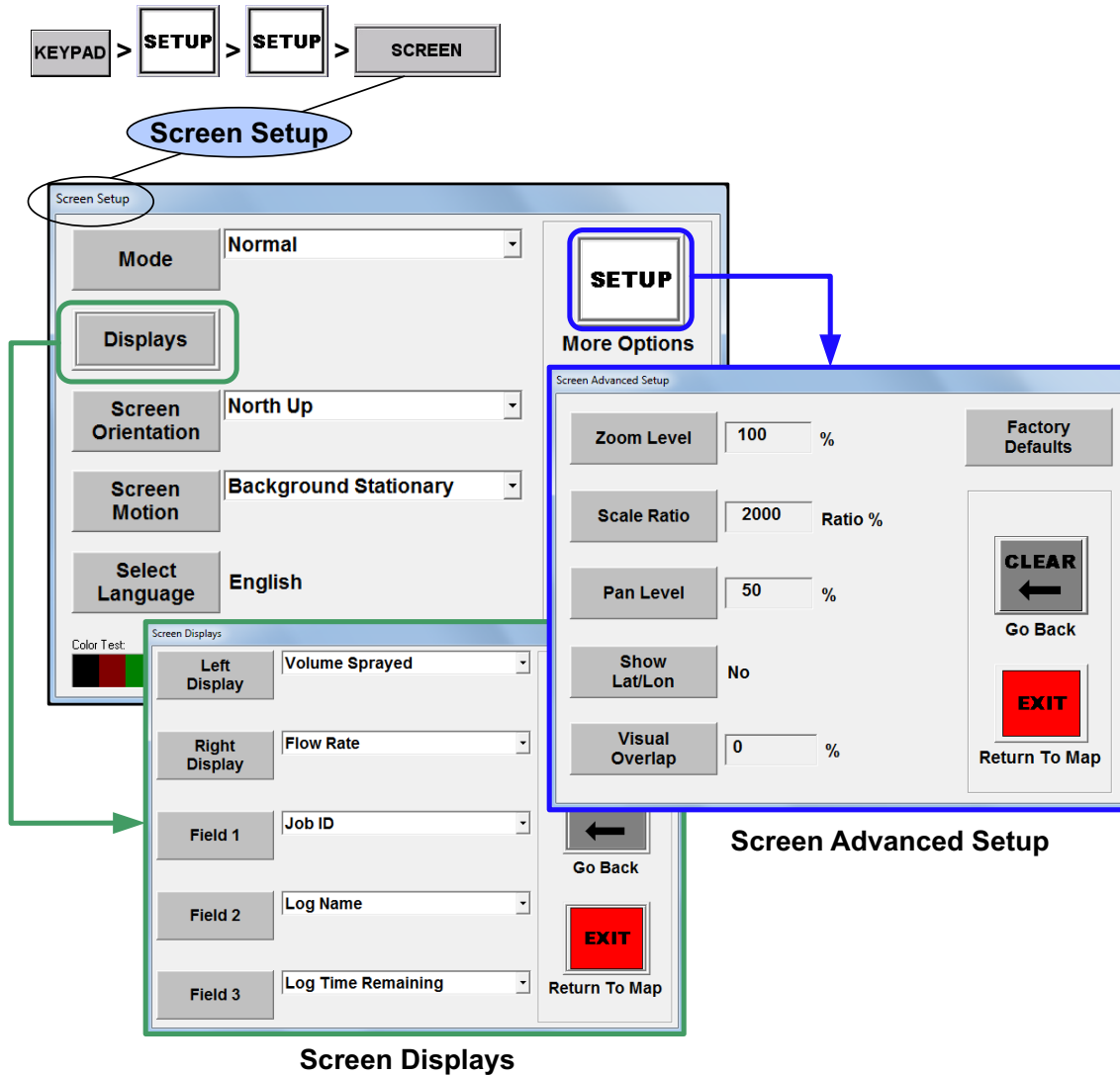
Figure 3-1: Screen setup screens

Screen Setup Screen

Path to the Screen Setup screen:

Figure 3-2: Screen Setup screen

Table 3-2 describes the fields of the Screen Setup screen. For mode, screen orientation and screen motion, you can press the button or the field's drop-down list button (down arrow) to see the options.

Table 3-2: Screen Setup screen

Item	Description
Mode	Normal (daytime) or Dark (nighttime)
	(KEYPAD > SET > SET also switches the screen modes).
Displays	Select what you want to appear in user-set fields (two just below the header and three on data panel)—see next section, "Screen Displays Screen".
Screen Orientation (vertical direction/ movement on screen)	• AB Line Up - A|B line is vertical onscreen (after you set pattern)
	• Course Up - aircraft is vertical and screen (background) changes direction
	• North Up - north is vertical and aircraft changes direction
Screen Motion	• Aircraft Stationary - aircraft remains in center of screen as you fly; the background moves under the aircraft.
	• Background Stationary - background remains stationary as you fly; aircraft moves over the background. If you fly off the screen you reappear at the center of the opposite side of the screen traveling in the same direction as when you flew off the screen.
Select Language	Select from English and other languages.
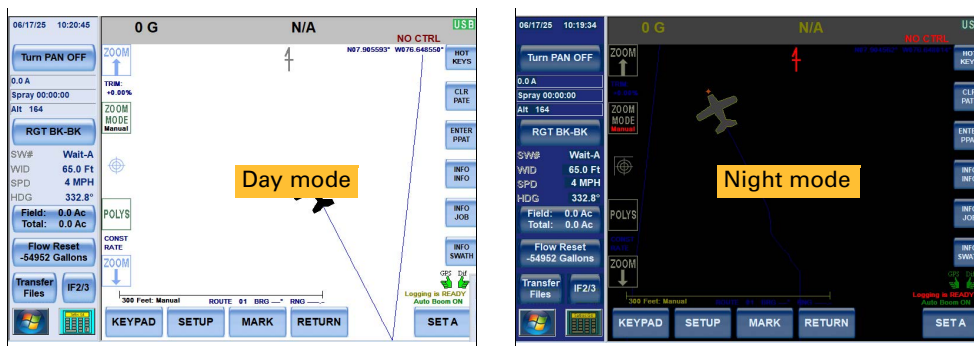
Screen Displays Screen

Use the Screen Displays screen to set five fields to display such data as flow rate or GPS altitude in the data panel and above the map (Figure 3-3).
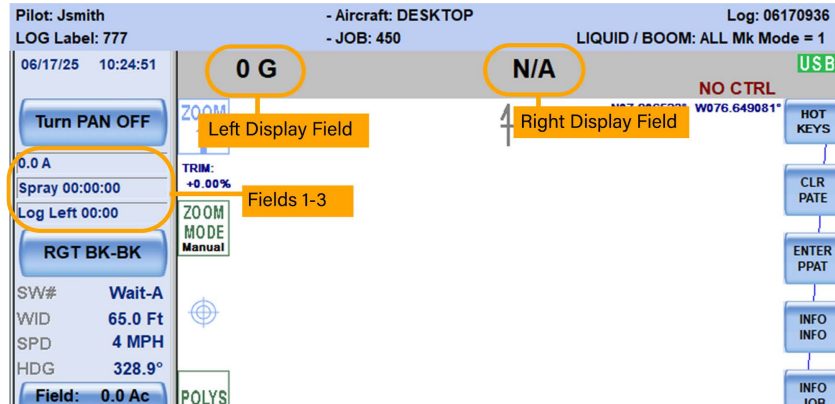
Figure 3-3: User-defined fields

The default field selections are:

- Left display - Volume Sprayed
- Right display - Flow Rate
- Field 1 - Total Area
- Field 2 - Spray Time
- Field 3 - Log Time Remaining

Path to the Screen Displays screen:
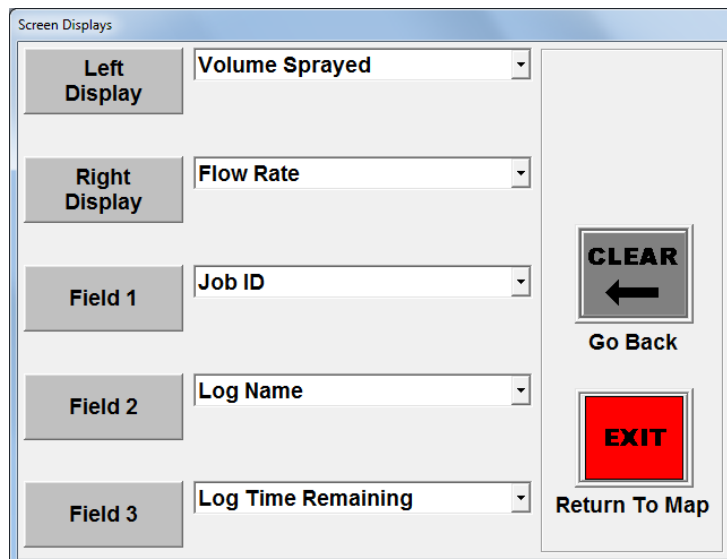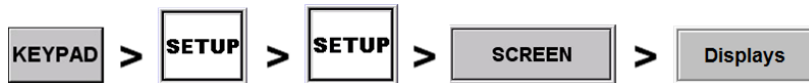
Figure 3-4: Screen Displays screen

Table 3-3 lists the field options in drop-down list order and alphabetical order.

Table 3-3: User-defined field options

Drop-down List Order		Alphabetical Order	
Cross Track Distance	Total Polygon Area	Altimeter	Log Name
Current Swath Number	Polygon In/Out	Altitude	Log Time Remaining
Swath Width	Polygon ID	Amount Per Minute	Pattern Type & Direction
Speed	Job ID	Amount Per Swath	Polygon Entry #
Pattern Type & Direction	Spray Time	Arrival Time	Polygon ID
Heading	Swath Heading	Barometric Pressure	Polygon In/Out
Field Area	Log Time Remaining	Bearing	Radius Circle Wpt
Total Area	Log Name	Blank	Route/Waypoint
Edge Distance	Wind Speed/Dir	Cross Track Distance	Speed
Time To Edge	Temperature	Current Modem Data Sent	Spray Time
Distance to AB	Barometric Pressure	Current Swath Number	SV/DF
Distance to A	Humidity	Desired Flow Rate	Swath #/DF
Distance to B	DOP/DF	Distance to A	Swath Heading
Distance to Spray-on	SV/DF	Distance to AB	Swath Width
Volume Sprayed	Swath #/DF	Distance to B	Temperature
Volume Remaining	Arrival Time	Distance to Mark/Wpt	Time
Amount Per Swath	Route/Waypoint	Distance to Spray-on	Time To Edge
Amount Per Minute	Radius Circle Wpt	DOP/DF	Total Area
Flow Rate	Distance to Mark/Wpt	Edge Distance	Total Modem Data Sent
Desired Flow Rate	Bearing	Field Area	Total Polygon Area
Valve/Encoder Position	Altitude	Flow Rate	Valve/Encoder Position
Time	Current Modem Data Sent	Heading	Volume Remaining
Altimeter	Total Modem Data Sent	Humidity	Volume Sprayed
Polygon Entry #	Blank	Job ID	Wind Speed/Dir(ection)
(continued next column)		(continued next column)	

Setting up the Lightbar

The lightbar displays guidance-related information based on your current activity and your display selections. The lightbar:

- Prompts you to set your A and B points (and C point if applicable) to establish your guidance array.
- Provides guidance to the swaths in pattern sequence once your guidance array is established.
- Provides timely warnings for double-spray, approaching a polygon edge, invalid GPS, and poor GDOP (geometric dilution of precision).
- Provides, as required, guidance to a mark or waypoint.

Lightbar Screens - Access and Features/Settings

AirTrac has three lightbar-related setup screens that enable you to select and configure your lightbar. Figure 3-5 shows the lightbar screens access and contents.
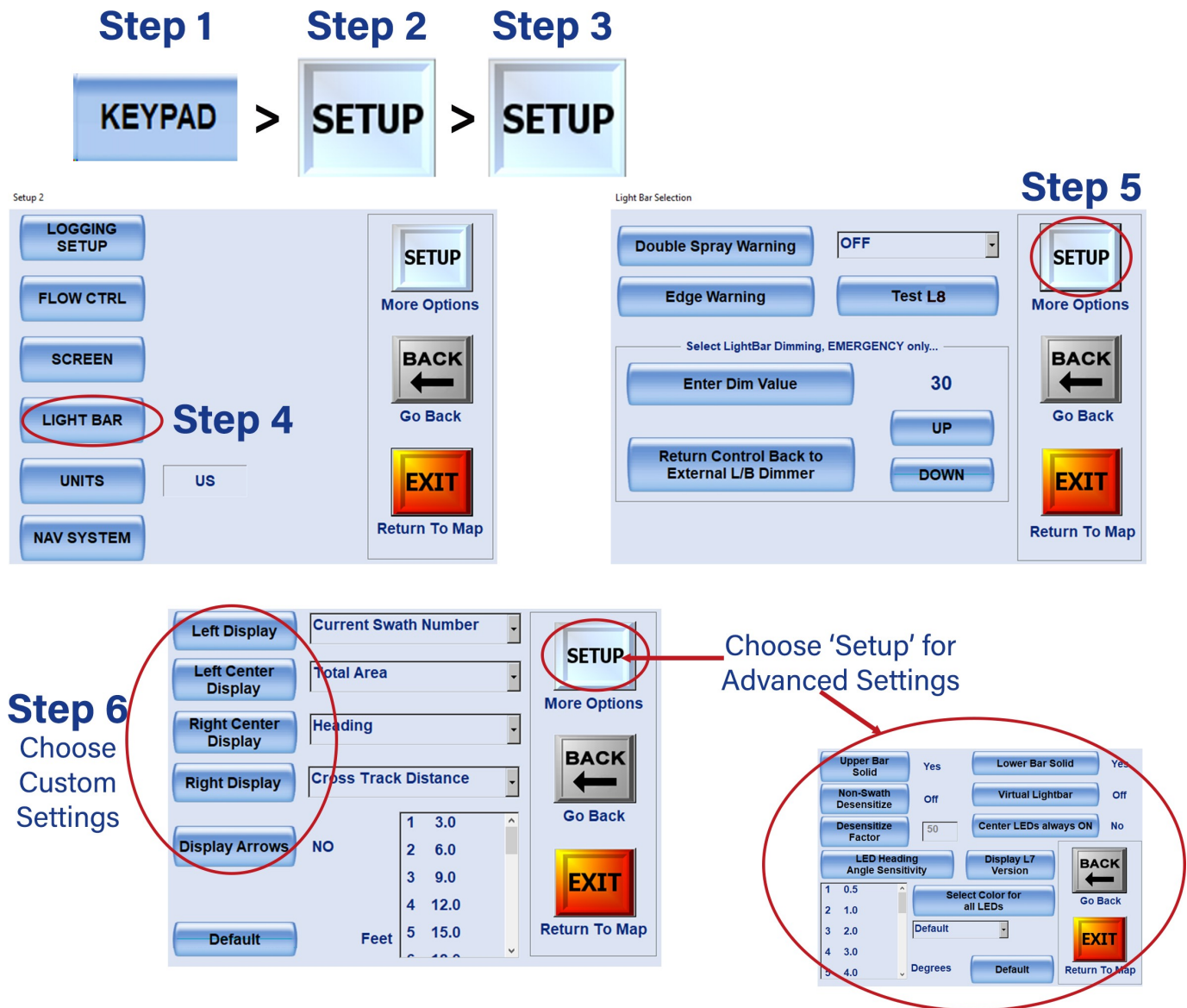
Figure 3-5: The lightbar screens

Lightbar Screen

Use the Lightbar Screen screen to:

- Set optional double-spray and edge warnings
- Test lightbar functionality
- Lightbar dimming

Path to the Lightbar screen:

Step 1 **Step 2** **Step 3** **Step 4**

KEYPAD > SETUP > SETUP > LIGHT BAR

Lightbar with DIM
(added touchscreen
dimming controls -
see "To set
touchscreen lightbar
dimming" on
page 36)
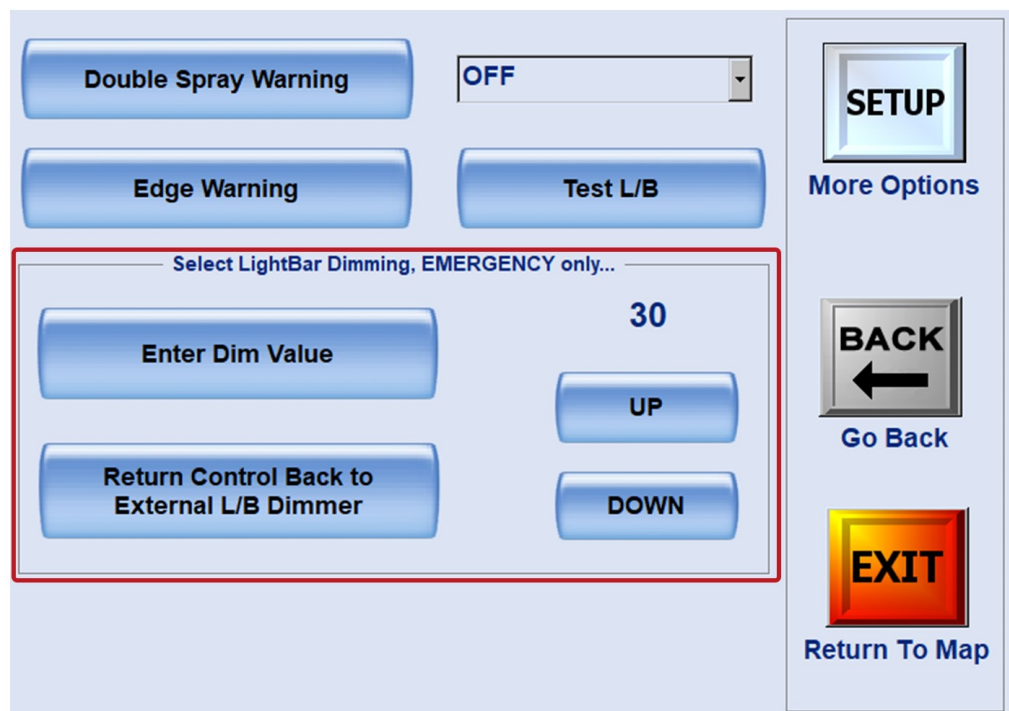
Figure 3-6: Lightbar screen

Table 3-4 starting on the next page describes the fields of the Light Bar Selection screen.

Table 3-4: Lightbar Selection screen

Item	Description
Double Spray Warning	When set to ON, a double-spray warning appears when you approach a previously sprayed area (such as coming into contact with your previous swath while spraying). Set the double-spray warning to one of the following: • OFF • "ON - Lightbar Warning" - warning appears on the lightbar only (top center LED flashes) • "ON - Screen Warning" - warning appears on the map only ("DOUBLE SPRAY") • "ON - Both" (default) - warning appears on the lightbar and the map.
Edge Warning	Setting an edge warning enables you to receive a visual warning (flashing 'U' in center of lightbar; flashing yellow center segment of virtual lightbar) when you get within a certain distance or time of a polygon. The start trigger determines when the lightbar starts flashing and the end trigger determines when the flashing stops. The start of the flashing lets you know you are getting close; the end of the flashing lets you know you are at the point where you need to take action to, for example, set an A|B line or turn on spray. Set the edge warning to one of the following: • OFF • Time - warning appears when you are within a certain time of a polygon (based on your current speed and your distance from the polygon). • Distance - warning appears when you are a certain distance from a polygon You can display the edge warning distance (Edge Distance) and edge warning time (Time To Edge) in the lightbar display fields—see "To set the lightbar edge warning" on page 36.
Test Lightbar	System check of lightbar's LEDs—see "To test the lightbar" on page 35.
Enter DIM Value	Enter a dimness/brightness value between 1 and 100. Use the 'Return' button to transfer dimming back to the lightbar's external dimming control—see "About touchscreen lightbar dimming" on page 35. (Works with next two items in this table.)
Return Control Back to External L/B Dimmer	Switches back to the external lightbar dimmer switch for control of the lightbar dimness/brightness if you have entered a DIM value or use the UP/DOWN buttons.
UP/DOWN	Increase/decrease the DIM value by five units per press. Use the 'Return' button to transfer dimming back to the lightbar's external dimming control. See "To set touchscreen lightbar dimming" on page 36.

To test the lightbar

Press **Test Lightbar** to have the system run through a short check of the lightbar's LEDs (it takes about 15 seconds). The test will include LEDs not used in Bantam's operational displays so you will see more lights during the test than during normal operations. If you press Test Lightbar before the test is complete (when the lightbar display returns to whatever was displayed before you ran the test), you will see a message advising that the test is still running.

About touchscreen lightbar dimming

See Figure 3-8, "Light Bar Setup screen" on page 40).

When available use this touchscreen brightness control feature if your external dimming switch ('DIMMER') malfunctions and prevents you from adjusting the lightbar brightness to suit ambient conditions (the 'EMERGENCY'). See "To set touchscreen lightbar dimming" on page 36.
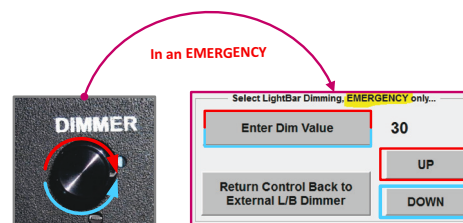
*Note: The first time (per AirTrac session) you use either method described on page 36, you will see a screen **CAUTION!!!** and note explaining that using either of these dimming adjustment methods disables the lightbar's external dimmer. Press ACCEPT (if the message was prompted by you pressing Enter Dim Value) or YES (if the message was prompted by you pressing the UP or DOWN button) to continue. The lightbar's external dimmer remains active after you accept the caution until you make a change by either method.*

To set touchscreen lightbar dimming

Either

Press **Enter Dim Value** then key in a new value between 1 and 100. You can ignore the leading zeros in the value field and just key in the new value—pressing 3 then 2 as shown in the example will change the 00030 to 32. Press **ENTER** to accept the new setting.

or

Press **UP** or **DOWN** to increase/decrease the current value (30 in the example) by five units per press. (Note: if you manually set the DIM value at other than a multiple of five, for example 32, the up/down function will still increase or decrease by five units—to 27 or 37 in our example.)
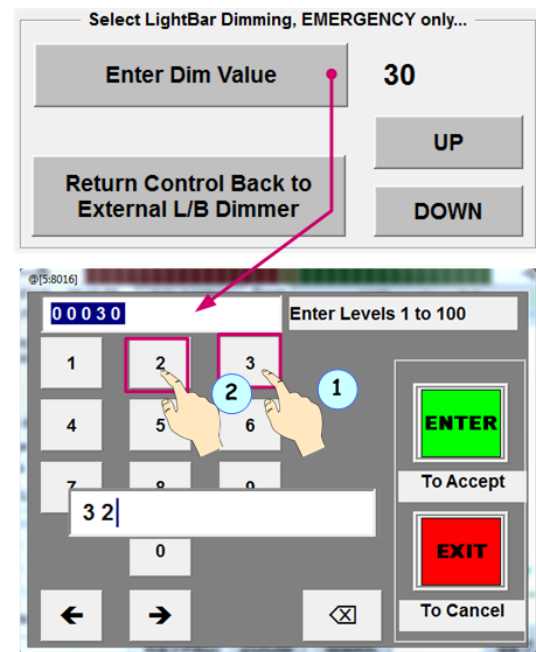
To revert to external lightbar DIMMER (switch) control, press **Return Control Back to External L/B Dimmer**.

To set the lightbar edge warning

1. Press **Edge Warning**. The Edge Warning Setup screen appears.
2. Press **Edge Warning Type** (or use the drop-down) then select:
   - OFF
   - Time
   - Distance

   For Time and Distance, the **Start Trigger** and **End Trigger** buttons are enabled.

For each trigger, press the appropriate button, enter a value in the data entry screen, then press **ENTER.**
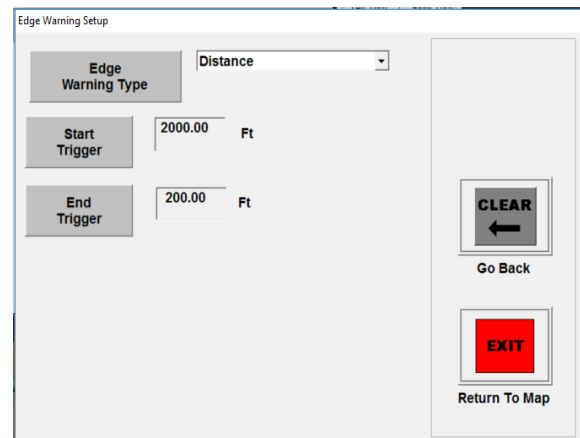
Note: The start trigger must be greater than the end trigger. The center 'U' of the lightbar and the yellow center segment of the virtual lightbar flash between the start and end time or distance - see "Edge Warning", Table 3-4 on page 34.

Lightbar Setup Screen

Use the Lightbar Setup screen to:

- Set the two lightbar display fields
- Adjust crosstrack sensitivity
- (Display Arrows is YES and cannot be changed)

Path to the Light Bar Setup screen:

Step 1   **Step 2**   **Step 3**   **Step 4**   **Step 5**

KEYPAD > SETUP > SETUP > LIGHT BAR > SETUP

Step 6
Choose
Custom
Settings
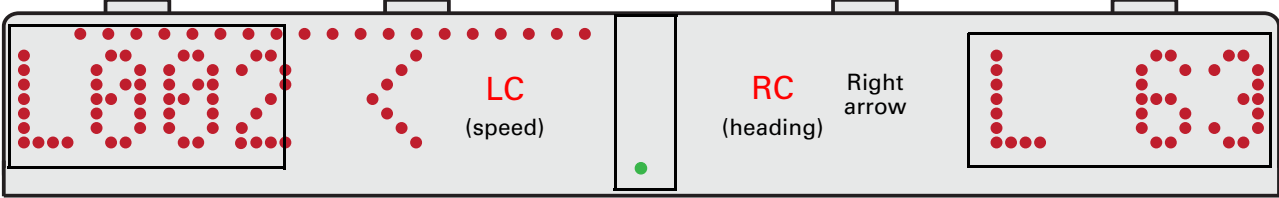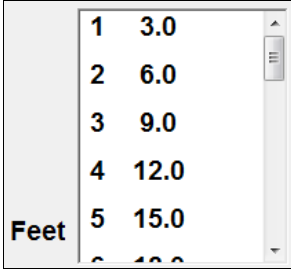
Lightbar (with or without DIM).

The box labeled 'Feet' is the LED Cross Track Distance Sensitivity settings box.

Figure 3-7: Light Bar Setup screen

Table 3-5 on the next page describes the fields of the Lightbar Setup screen.

Table 3-5: Lightbar Setup screen

Item	Description
Display fields (Left Display and Right Display)	User-set display fields. See Table 3-6 (next page) for the list of display options. Note: During pattern setup (A|B or A|B|C) the lightbar displays speed in the left center (LC) field and heading in the right center (RC) field. These 'center' fields are not available for user setup and are used only by the system and only during pattern setup.

Left Display - display option:
Current Swath Number

Center Display
(LEDs - on or flashing indicate various statuses - system set, cannot be changed)

Right Display - display option:
Crosstrack Distance shown

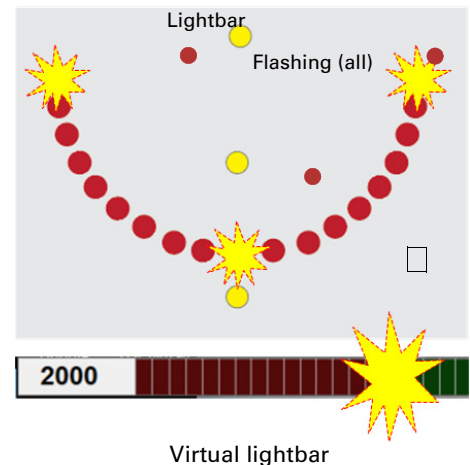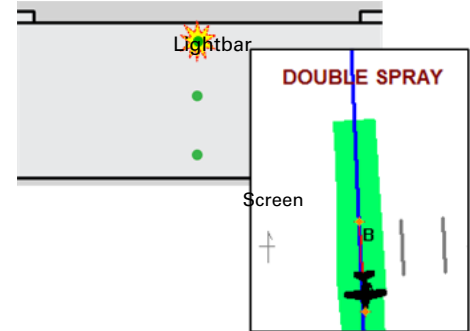*Note: Certain operations override the left and right display for their duration. For example, if you are under guidance to a waypoint on a route, the left and right fields display the heading and distance to the waypoint respectively. When you cancel waypoint guidance (or any other overriding operation), the fields revert to their user settings.*

Item	Description
Display Arrows	Left and left pointing (shown above, next to LC), right and right pointing. The arrows indicate direction of target swath, that is, the direction to steer to the target swath.
Crosstrack sensitivity	Crosstrack is the perpendicular distance you are from your target swath. Crosstrack sensitivity refers to the relationship between how far you are from your target swath and how this distance is represented by LEDs on the lightbar (or LED indicators on the virtual lightbar).

The left column in the list box represents each crosstrack LED and the right column represents the crosstrack distance from center of each LED. The default crosstrack sensitivity is 3 ft per LED. The first LED illuminates when the crosstrack distance reaches 3 ft, the second LED illuminates when the distance reaches 6 ft, and so forth. There are 15 settings; one for each LED. You can change any of the values. Press **Default** to reset the values in the list box.

To set the lightbar display fields, press the appropriate button then select from the adjacent drop-down.

To set crosstrack sensitivity:

1. Press the number in the list box that corresponds to the LED number you want to change. The Enter Crosstrack Distance screen appears.
2. Enter a new value then press **ENTER**. The new value appears next to the LED number.

To reset the crosstrack distance settings to the factory defaults, press **Default** (at bottom left of the setup screen - see Figure 3-7 on page 37).

Table 3-6 lists the field options in drop-down list order and alphabetical order.

Table 3-6: User-defined field options

Drop-down List Order		Alphabetical Order	
Cross Track Distance	Total Polygon Area	Altimeter	Log Name
Current Swath Number	Polygon In/Out	Altitude	Log Time Remaining
Swath Width	Polygon ID	Amount Per Minute	Pattern Type & Direction
Speed	Job ID	Amount Per Swath	Polygon Entry #
Pattern Type & Direction	Spray Time	Arrival Time	Polygon ID
Heading	Swath Heading	Barometric Pressure	Polygon In/Out
Field Area	Log Time Remaining	Bearing	Radius Circle Wpt
Total Area	Log Name	Blank	Route/Waypoint
Edge Distance	Wind Speed/Dir	Cross Track Distance	Speed
Time To Edge	Temperature	Current Modem Data Sent	Spray Time
Distance to AB	Barometric Pressure	Current Swath Number	SV/DF
Distance to A	Humidity	Desired Flow Rate	Swath #/DF
Distance to B	DOP/DF	Distance to A	Swath Heading
Distance to Spray-on	SV/DF	Distance to AB	Swath Width
Volume Sprayed	Swath #/DF	Distance to B	Temperature
Volume Remaining	Arrival Time	Distance to Mark/Wpt	Time
Amount Per Swath	Route/Waypoint	Distance to Spray-on	Time To Edge
Amount Per Minute	Radius Circle Wpt	DOP/DF	Total Area
Flow Rate	Distance to Mark/Wpt	Edge Distance	Total Modem Data Sent
Desired Flow Rate	Bearing	Field Area	Total Polygon Area
Valve/Encoder Position	Altitude	Flow Rate	Valve/Encoder Position
Time	Current Modem Data Sent	Heading	Volume Remaining
Altimeter	Total Modem Data Sent	Humidity	Volume Sprayed
Polygon Entry #	Blank	Job ID	Wind Speed/Dir(ection)
(continued next column)		(continued next column)	

Light Bar Advanced Setup Screen

Use the Lightbar Advanced Setup screen to:

- Set the upper (crosstrack) and lower (heading) LED bars to 'solid' (Solid - Yes) or to a single moving LED (Solid - No)
- Set the desensitize factor (increase or decrease LED sensitivity)—for non-swathing tasks only, such as flying to a mark or waypoint
- Set the LED heading angle sensitivity
- Turn the virtual (onscreen) lightbar on/off
- Turn Center LEDs on/off
- Get version number

Path to the Light Bar Advanced Setup screen:
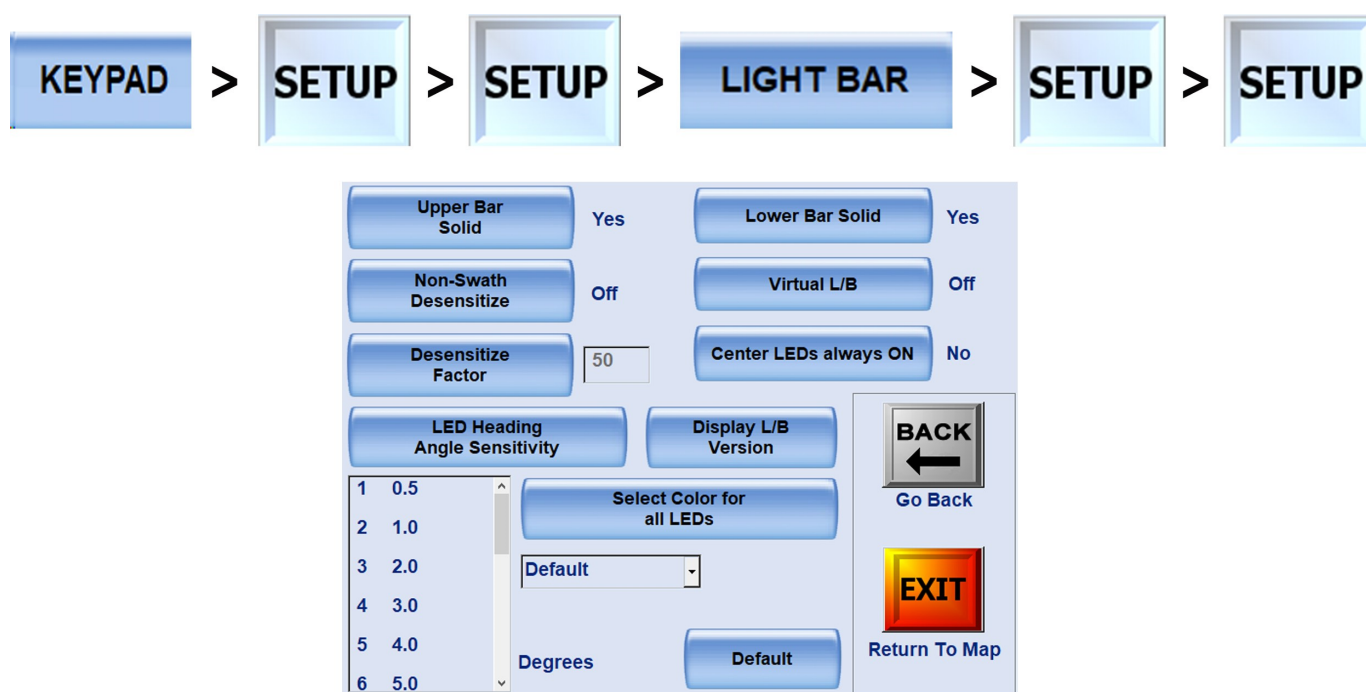
Figure 3-8: Light Bar Setup screen

Table 3-7: Light Bar Advanced Setup screen buttons/fields

Item	Description
Upper Bar Solid Lower Bar Solid	You can set the upper and lower rows of LEDs on the lightbar to display as a progressively longer or shorter row of LEDs (indicating increases or decreases in value of what they represent - see A below, this is 'solid') or as a single moving LED (indicating the value of what it represents by its position - see B below).

Note: the LEDs in the lightbar representation below (indicating 'set B/150 mph) during pattern setup) are for illustration purposes only—there are no operational situations where all the top and all the bottom LEDs are lit.

Upper LED bar

Lower LED bar
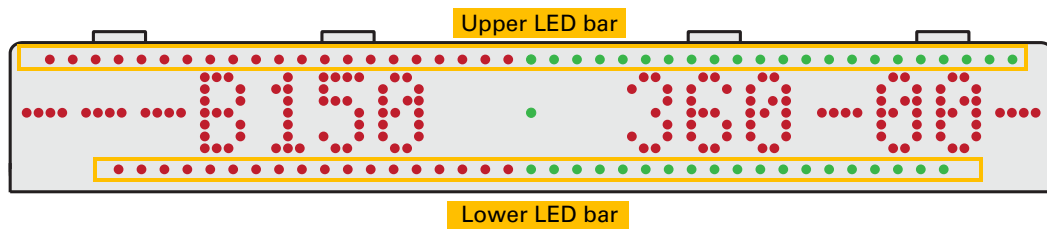
For each field:
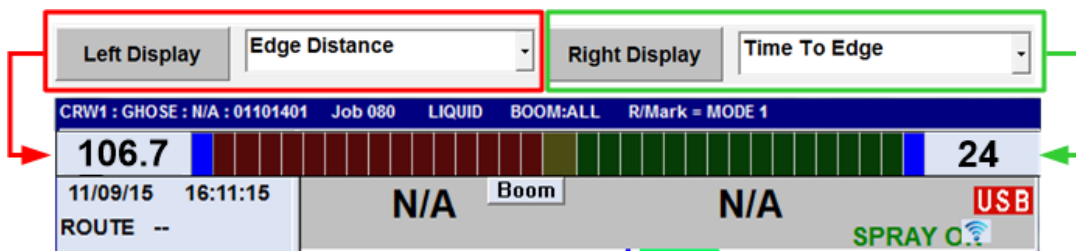
- **A:** Set (solid) to YES to show as a progressive row of LEDs. As the crosstrack distance or heading angle increases, more LEDs are lit (from center outward); as the distance or angle decreases, fewer LEDs are lit.
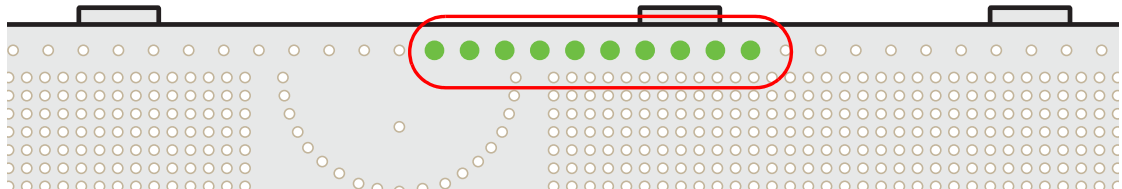
- **B:** Set (solid) to NO to display a single LED. As the crosstrack distance or heading angle increases, the single lit LED is farther from the center; as the distance or angle decreases, the LED is closer to the center.
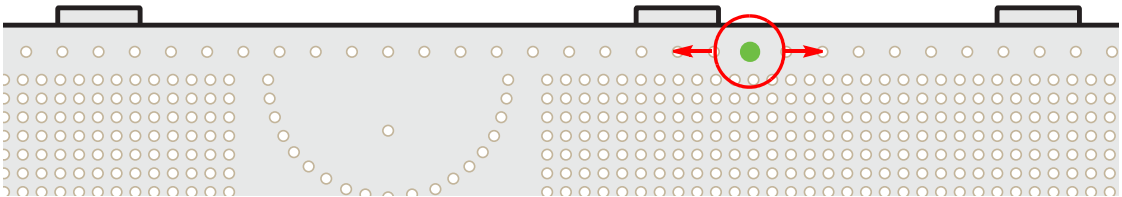
Table 3-7: Light Bar Advanced Setup screen buttons/fields *(continued)*

Item	Description
Non-Swath Desensitize	Desensitizing the LEDs enables you to navigate to/from a mark or waypoint with less sensitive LED distance warnings. When set to On, set a desensitize factor where the distance each lightbar LED represents is multiplied by this factor. For example, if the first LED is set to 3 ft and you set the factor to 20, the first LED will not illuminate until you are within 60 ft (3 x 20) of a swath. To set the non-swath desensitize factor: 1. Press **Non-Swath Desensitize** to set to **On** (if necessary); the Desensitize Factor button is enabled. 2. Press **Desensitize Factor**. The Enter Desense Factor screen (number pad) appears. Enter a value then press **Enter**. *Note: Pressing ABC ADV (or the remote Swath Advance button) to set the "A" point of a pattern disables desensitize functionality.*
Virtual Lightbar	Toggle On/Off—when On, the virtual lightbar sits beneath the header Note: The virtual lightbar replicates only the top row crosstrack/direction LEDs and the blue 'spray on' LEDs. There is no replication of the lightbar's bottom row heading ('heading error') LEDs. Display options set in KEYPAD > SETUP > SETUP > LIGHTBAR > SETUP
Center LEDs always ON	Yes/No: Instead of having the center LEDs come on to indicate zero crosstrack and zero heading error (No), you can have them on all the time to use as a center reference (Yes). When the top and bottom LEDs have all gone out, and the center LEDs are the only ones on (other than field display LEDs), your crosstrack and heading error are zero.
LED Heading Angle Sensitivity	Angle of intercept in degrees (bottom LED row)—each LED represents a degree value (which you can change) so, in total, the lit LEDs indicate the angle at which you are approaching your target swath. To change the LED heading angle sensitivity: 1. Press each number/value (in degrees) row - the **Enter Angle** data entry screen opens. 2. Change the value, then press **ENTER.** *Note: You can reset changed values to the factory defaults by pressing **Default**.*

Setting up Flow Control

AirTrac currently supports:

- Flow control for liquid applications—'Legacy' IntelliFlow and IntelliFlow 2/3 and third-party products such as AerialACE and AutoCal.

AirTrac automatically detects if a flow control system is connected and what type it is. Various screens indicate what AirTrac has detected (as connected) or if no controller is detected.

Legacy IntelliFlow   IntelliFlow 2/3

AirTrac Setup
Single IntelliFlow Detected

IF2 Initial Setup
Single IntelliFlow Detected

Flow Control Setup
Single IntelliFlow Detected

AirTrac Setup
Single IF2 Ctrl Detected

IF2 Initial Setup
Single IF2 Ctrl Detected 5_LIQ_PRIMARY

Flow Control Setup
Single IF2 Ctrl Detected

No controller detected

IF2 Initial Setup
No Ctrl! Check Cables, etc.

Figure 3-9: Flow control system detection - AirTrac and Flow Control Setup screens

There is summary and detailed information on flow control related screens and windows, and menu maps in Chapter 8, "Flow Control" on page 119.

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Chapter 4: Terminology and Basic Tasks

Aerial Guidance Terms and AirTrac
Automatic Guidance
Entering Basic Job Details (Quick Start)
Managing Data and Log Files

Before using AirTrac, make sure you have a clear understanding of the aerial guidance terms used within AirTrac and this user guide, and the automatic guidance features AirTrac provides. These are covered in the first two sections of this chapter. The rest of the chapter provides basic information on how to start using AirTrac to perform common tasks: setting up a job, logging data, and setting up your flow control system.

Note: The schematics and examples provided for some features are illustrative only; as such, while often not authentic examples of actual operations, they do indicate the key points of the feature.

Aerial Guidance Terms and AirTrac

AirTrac uses common aerial guidance terms on the map screen and in the various screens you can display. This section provides a brief summary of these common terms and how they are used in AirTrac. The remaining sections of this chapter and the chapters that follow provide detailed information on how these terms apply to using AirTrac and all its advanced features.

Routes and Waypoints

Route: A group of waypoints to which AirTrac can provide sequential guidance during the flying of the route. (You *can* have a route with only one waypoint but in practice a route with only one waypoint may as well be a 'mark' - see "Working with Marks" on page 97.) All waypoints are associated with (are part of) a route. When a route is active, AirTrac displays the route-waypoint ID for each waypoint in the route in the format R#-W# (Route #1 with its three waypoints is shown at right). You can add names to waypoints and they will also display when their route is active (not shown at right). See Chapter 6, "Routes, Waypoints, and Marks."

Waypoint: A point on a route that represents the GPS coordinates of a significant location you want to record (that is, save). You can create/save waypoints while flying or in a dedicated routes/waypoints screen. However created/saved, a waypoint will be a point on a route. When you set a waypoint while flying, a message briefly appears on the screen indicating the waypoint number being saved ("**Waypoint 3 saved**." above). A saved waypoint becomes part of the currently active route (if a route is active), or Route 1 if no route is currently active. See Chapter 6, "Routes, Waypoints, and Marks."
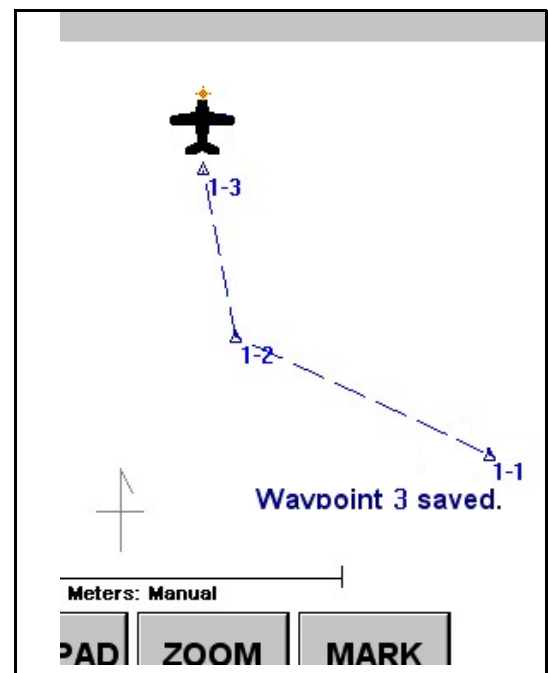
Polygons and Patterns

Polygon: Saved with 'boundary-defined' jobs, polygons are the shapes of a field (or other area, such as a forest plot) that you define. You can create two types of polygons in AirTrac—an inclusion polygon (enclosed area you spray, shown at right) and an exclusion polygon (enclosed area you do not spray). Inclusion and exclusion polygons visually show you the borders of your spray/no-spray areas in the map. Just as a route is made up of one or more waypoints, a polygon is made of multiple poly points that you set. See Chapter 7, "Jobs and Polygons."

Pattern: The order (the sequence) in which, on demand, AirTrac guides you to the swaths that make up the area to be sprayed. Guidance comprises heading and crosstrack as well as a visual display of your aircraft (in its current position) and your target (start of swath). The swath array to which AirTrac applies the pattern's sequence is generated by either the auto-application of an array to a polygon (see 'Enter Poly Pat' following) or the creation of an A|B line (and addition of a C point where applicable - see 'closed patterns' following).
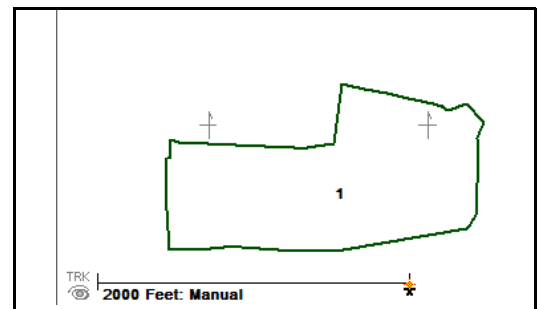
AirTrac includes several built-in patterns. For example, a back-to-back pattern (shown at right) where you fly consecutive swaths parallel to the A|B line. There are two types of patterns in AirTrac—an open pattern (requires only A and B points), where you can fly an unlimited ('open') number of swaths because the pattern is not dependent on the size of the field, and a closed pattern (requires A, B and C points), where the number of swaths you can fly is limited ('closed') because you define the width of the field. See Chapter 5, "Pattern Guidance."

Using a special feature (generally referred to as "Enter Poly Pat") you can have AirTrac optimally auto-apply the pattern of your choice to a polygon. And, within the feature, you can adjust the auto-application to suit prevailing conditions. See "Applying a Swath Array (Pattern) to a Polygon" on page 115.

5 swaths; A|B line is swath 1

Jobs and Logs

Job: An entity within AirTrac comprising spray and non-spray areas and spray patterns (in this sense an AirTrac job can be regarded as a template for a spraying operation). You can define spray/non-spray areas in various ways, and you can specify the spraying operation's pattern—the sequence in which guidance to swaths is provided (and flown/sprayed if followed).

While you can predefine spray and non-spray areas with polygons, and specify the spray pattern, you can instead, while flying, specify a pattern, set your pattern limits (with an A|B line—sometimes a C point also), fly/spray 'the 'job' and save the job. The predefined, 'polygon jobs' may be referred to as 'boundary-defined' jobs, the others as 'pattern-defined' jobs. You can save, delete, and add or subtract (areas and patterns) to or from a job. See Chapter 7, "Jobs and Polygons."

Log: A set of position-specific data that always includes exact positioning and rate of spray application, precise time and date record, flight speed, GPS altitude, patterns flown, and GPS position quality. AirTrac logs this data while you are at or above a preset GPS airspeed. You can have job-related information included with the standard logged information (see "Adding Job Information to the Log" on page 56).

Note: Although logging (such as speed and spray rate) occurs during a spray operation associated with, or saved as a job (spray area and pattern being job data), logged data, being position-specific data, is not stored as part of the job. But you can bring jobs and logs together. See following section.
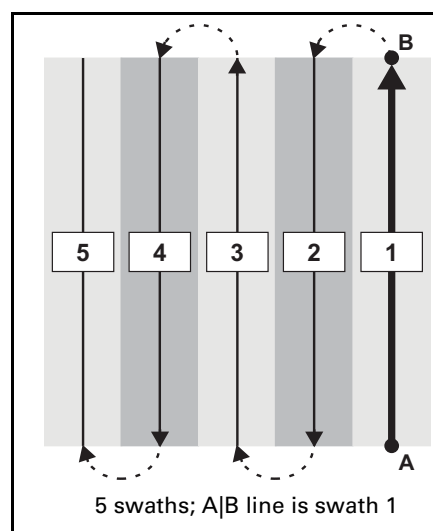
Bringing Jobs and Logs Together

If you want to display a job, its pattern and the spray as applied, you need to know the log number for the flying/spraying operation and load it (view it) with the job (which loads with its polygon) and the job's pattern.

Job in AirTrac

KEYPAD
SET
JOB
1 - 4

In the schematic at right (with AirTrac menu navigation shown): (**1**) is Job 14 with its polygon loaded in AirTrac; (**2**) is Job 14 with its pattern (#1) also loaded in AirTrac (left image) and MapStar (right image); (**3**) is Job 14, pattern #1 and log 02281753 loaded ("Select Log Files To View", etc.) in AirTrac (left) and MapStar (right).

When you bring jobs and logs together in this way, it is with a new log active. Any further logging, and only further logging, will be part of the currently active log. The 'viewed' log data (**3** is an example) remains the content of the viewed log—see schematic lower right.

Thus, you cannot directly continue (add to) a log through menu options such as "KEYPAD > (RE)SET > LOG > n". But you can reload a log to active status using the return to mark feature with mode 4 active. See "Original or Current Log Modes (4-6)" on page 146.

KEYPAD
SET
PATTERN
1
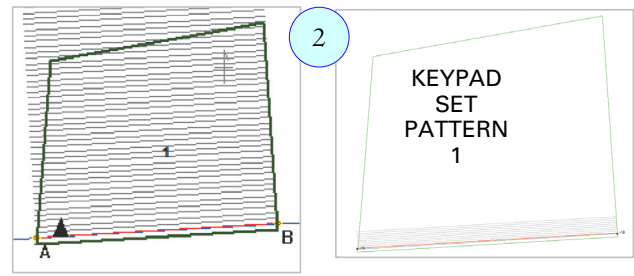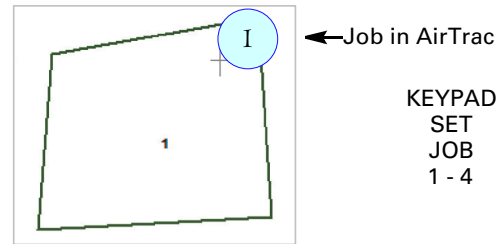
Job and Pattern in AirTrac and MapStar

KEYPAD
INFO
LOG
SELECT
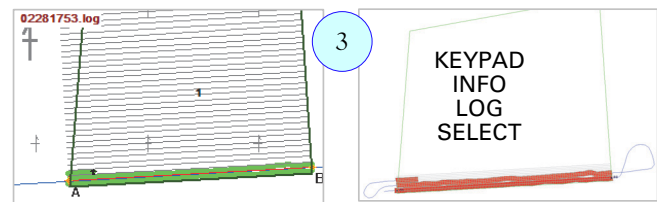
Log 02281753 added in AirTrac & MapStar
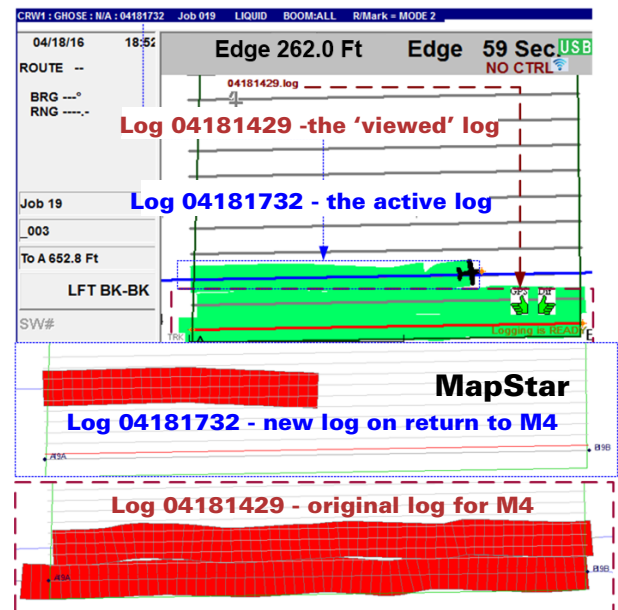
Other Guidance Terms

Swath: A strip or row of a field that you fly. For example, in the pattern on page 46 there are five swaths.

A|B line: The initial guideline of a pattern. Each subsequent swath of the pattern is based on this initial guideline. You set points A and B and a line (A|B line) extends through both points. For example, in the pattern on page 46, the A|B line is swath 1.

Crosstrack: The perpendicular distance between you and your target swath.

Heading angle: The 'heading error'; the angular difference between your current heading and the heading of the target swath line in the direction of travel (see schematic bottom of page 72). When the heading angle is zero, you are on or parallel to the target swath (the crosstrack will also be zero if you are *on* the target swath).

Mark: A point to which you want to return, such as a last sprayed point, like M2 at right. When you create a mark, AirTrac saves (as exists): the swath number, pattern, A|B line, direction, job ID, acreage, swath width, and spray information. See also, Chapter 6, "Routes, Waypoints, and Marks."
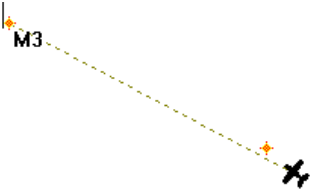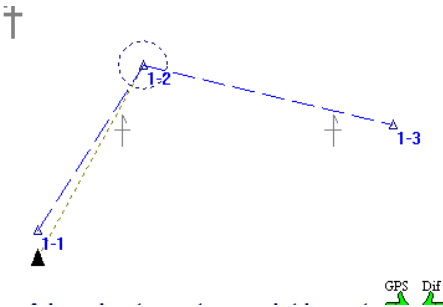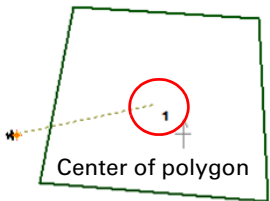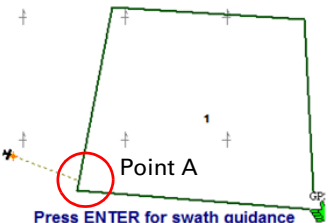
Automatic Guidance

Guidance in AirTrac refers to navigational cues that help you fly to a specific set of coordinates. These cues include bearing and range and a visual indicator—a direct line from you to the coordinates.

AirTrac can provide guidance to the following points:

- Mark
- Waypoint
- Polygon (to the center of)
- Pattern (to the point where you start/resume flying your pattern)

Table 4-1: Automatic guidance cues

Item	Cues	More Information
Mark	Dotted line guides you to mark.	"Returning to a Mark" on page 98.
Waypoint	Dotted line guides you to the waypoint (as opposed to the dashed lines that connect waypoints). A dotted (radius) circle appears around the waypoint. If there are multiple waypoints in a route, when you reach the dotted circle of the first waypoint, a dotted line guides you to the next waypoint and a dotted (radius) circle appears around that waypoint.	Next page at "Waypoint radius example" and "Recalling a Route and Associated Waypoints" on page 94.
Polygon/ Pattern	Dotted line guides you to the center of the polygon or the A point of an A|B line. Center of polygon — KEYPAD > SET > POLY > 1 (Job # loaded) Point A — Press ENTER for swath guidance — KEYPAD > SET > PATTERN > 1 (Job # loaded)	"Press ENTER for swath guidance" on page 52, "Receiving Guidance to a Polygon" on page 113 and "Recalling a Pattern" on page 78.

Waypoint radius example: In the figure below, the circle around waypoint 2 (in route 1, thus labeled 1-2) represents the radius value that you set in the Waypoints screen.
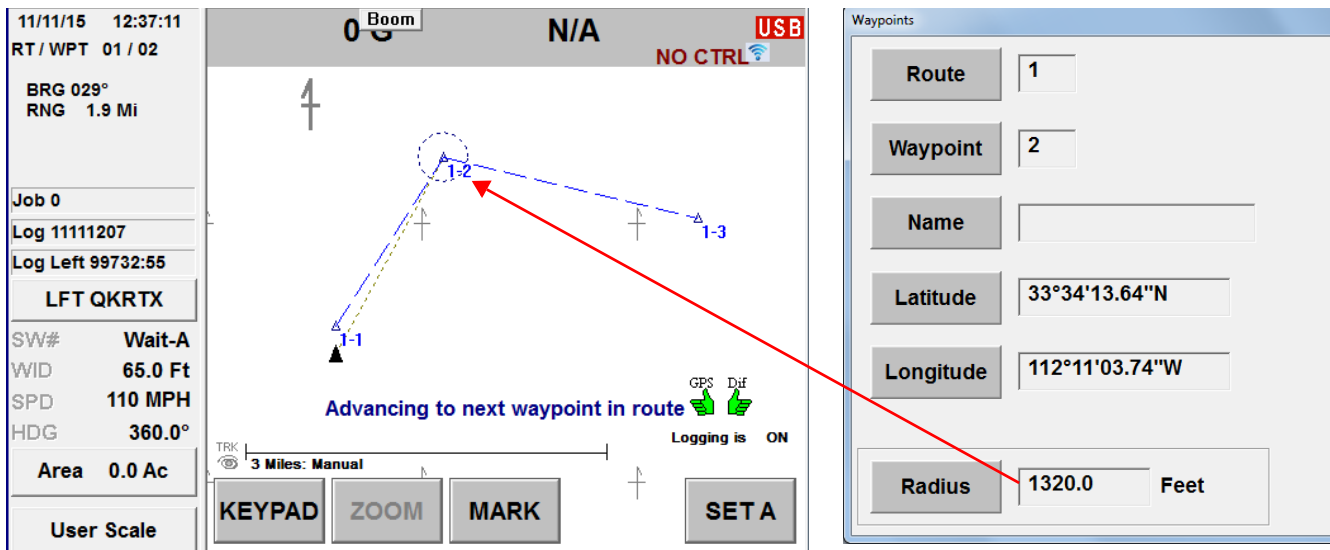
- If you recall a waypoint and you are outside the radius circle of that point, a dotted line appears around the point.
- When you reach the radius circle of that point:
    - "Advancing to next waypoint in route" appears for several seconds.
    - The dotted radius circle appears around the next waypoint (1-2 above).
    - You receive guidance (dotted line) to that waypoint.
    - RT / WPT in the data panel indicates guidance to that waypoint.
- When you approach the last waypoint in a route and reach the radius circle around that point:
    - The radius circle disappears.
    - "Arrived at end of route" appears for several seconds then disappears.
    - In the data panel, only the route number is displayed (no waypoint) and BRG (bearing) and RNG (range) have no values because there are no more waypoints to which to receive guidance.
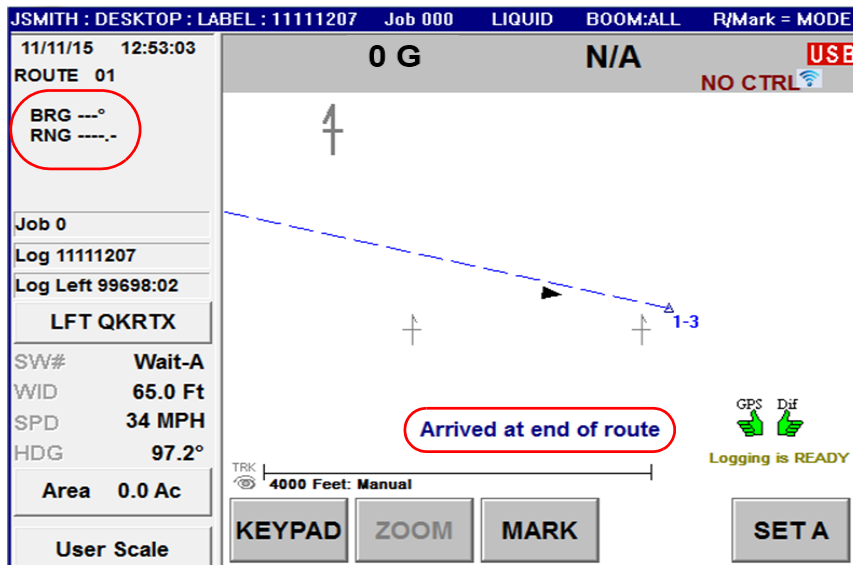
Press ENTER for swath guidance: When you first set guidance to a pattern (KEYPAD > SET > PATTERN > 'n'), the guidance line is to the A point of the pattern's A|B line, irrespective of any previous spraying operations on this pattern. If you press **ENTER**, the guidance line disappears and the pattern (swath array) appears with (i) the A|B line in red (between the A and B points) and (ii) the last swath in blue (extending beyond the swath array - top image at right). If the pattern has never been sprayed, the A|B line will be blue and red (red within the pattern - bottom image at right).
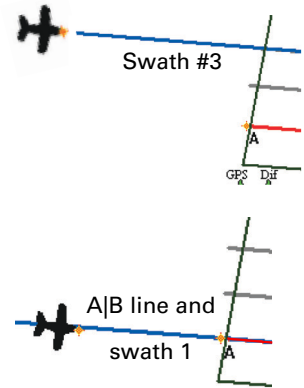
Entering Basic Job Details (Quick Start)

Note: If you exit AirTrac with a saved job active, that job is active when you restart AirTrac. If you exit with no job active (<No JOB Name> is displayed in the header), Job 000 is displayed in the header when your restart AirTrac. See "Exiting AirTrac and Jobs" on page 23.*

After you complete basic setup in AirTrac ("Starting AirTrac" on page 6) and each time you start AirTrac thereafter, the AirTrac Setup screen appears (in front of the map screen).

In addition to being the starting point to all other setup screens, the AirTrac Setup screen enables you to enter the following basic job information (for more information on jobs, see "Jobs - Polygons and Patterns" on page 103):

- Pattern, with or without auto-repeat (additional Pattern Setup button available for QUICKTRACK X pattern only—not shown at right)
- Swath width
- Direction (left/right) of subsequent swaths
- Access the Logging screen (press LOG)
- Rotation and total (number of) fields (Multi Back-To-Back pattern only)
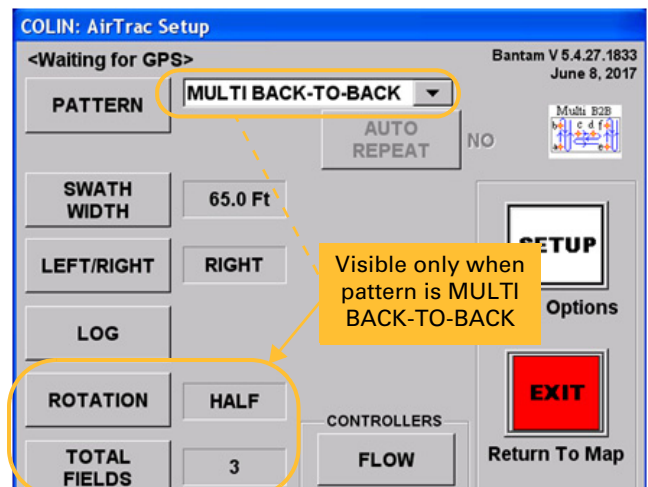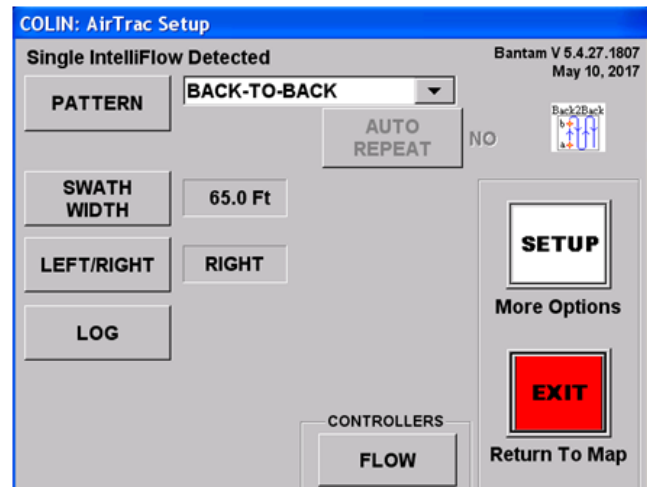
To enter basic job information in the Setup screen:

1. Press **>**

    The AirTrac Setup screen appears (see previous page).

2. Press **PATTERN** then select a pattern type from the drop-down.

    Additional buttons/fields appear when you select QUICKTRACK_X or MULTI BACK-TO-BACK (see bullets below).
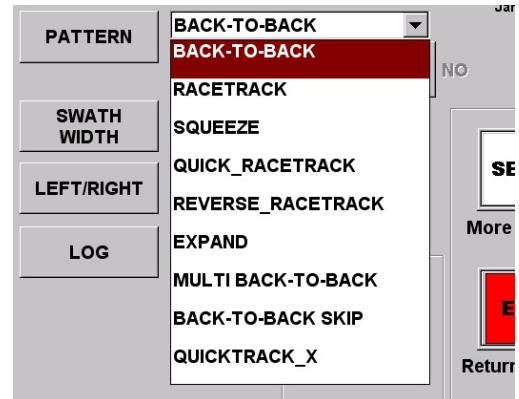
    - If you select QUICKTRACK_X, the PATTERN SETUP button appears below the drop-down.
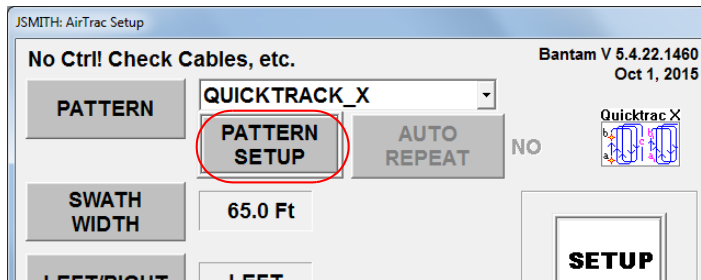
        Press **PATTERN SETUP**. The Quicktrack X Settings screen appears.
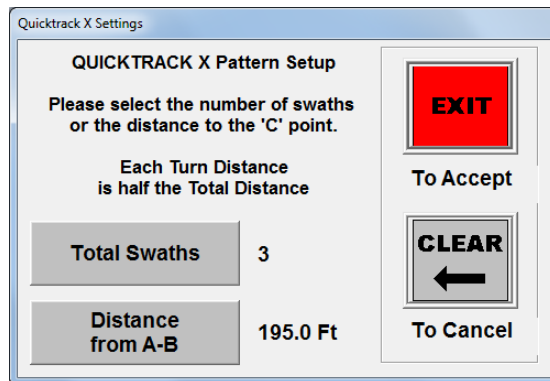
        Press **Total Swaths** or **Distance from A-B** enter a value in the data entry screen that appears, then press **ENTER**.

        For the value you set, AirTrac recalculates the other value. For example, if Total Swaths is 10 and you set it to 6, AirTrac reduces the 'Distance from A-B' value accordingly.

    - If you select MULTI BACK-TO-BACK, the ROTATION and TOTAL FIELDS buttons appear in the bottom left of the screen. See "Multi Back-to-Back Pattern (MB2BK)" on page 81 for information on rotation and total fields.

        Press **ROTATION** to toggle between HALF and FULL.

        Press **TOTAL FIELDS** to enter a value, then press **ENTER.**
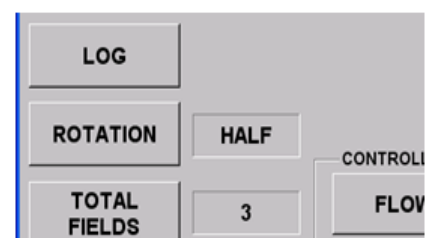
3. Press **AUTO REPEAT** (closed patterns only - see note below) to switch between YES and NO. When YES, AirTrac re-presents the current pattern's swath array (that is, presents a new closed set) when you select ADV after working the last swath of the current closed pattern. When NO, AirTrac reverts to a back-to-back pattern on completion of the current pattern. With auto-repeating patterns:

   • When you advance to the last swath in the closed array, if you have 'Current Swath Number' as one of your lightbar displays, you will see LAST displayed alternately (switching) with the last swath's number (L# or R#). 'LAST' is not displayed in any of the five screen display fields if they are set to display 'Current Swath Number': it's a lightbar only feature.

   • When you have worked the last swath in your closed array, the pattern's closed array is re-presented to the left or right of the finished array depending on the direction set for your pattern.

   > Note: You can auto-repeat (AUTO REPEAT enabled) only:
   >
   > RACETRACK; SQUEEZE; QUICK_RACETRACK and REVERSE_RACETRACK (that is all 'C' patterns except QUICKTRACK_X)
   >
   > You cannot auto-repeat (AUTO REPEAT disabled):
   >
   > BACK-TO-BACK; EXPAND; MULTI BACK-TO-BACK; BACK-TO-BACK SKIP and QUICKTRACK_X (the only 'C' pattern you cannot auto-repeat)

4. Press **SWATH WIDTH**, enter a swath width, then press **ENTER**.

5. Press **LEFT/RIGHT** to toggle the direction. The key points about the direction are:

   • For open patterns (A|B only), the direction dictates which side of the A|B line the swath array is presented once you've entered your B point. You can switch sides at any time.

   • For closed patterns (A, B and C), except reverse racetrack (see next point), the direction is the side of the A|B line you *intend* to set your C point and the side the swath array is presented if you do set C that side (if you set your C point to the other side, the left/right direction simply switches).

   • For the reverse racetrack closed pattern, in which the swath array is presented on both sides of the A|B line, the direction also dictates whether the A|B line is L001 or R001.

   • With patterns set to auto-repeat, the direction also dictates to which side of the A|B line (and the previous swath array) repeating (finite) swath arrays are presented.

Logging Data

With your airspeed above a preset level, AirTrac automatically creates or continues a log file for each job flown, assigning the time/date stamp of each new log as the log file name. You can enter additional (optional) details to your job, such as a name/number, pilot name, and aircraft name/number and this information is stored in the log file (and is included in multiple reports - particularly MapStar reports).

You can also start a new log (or transfer logs) at any time by accessing the Logging screen - see page 63. To access the Logging screen, press:

KEYPAD > SETUP > LOG

If New Log Per Job is set to Yes (Logging Setup screen - see page 57) and you set (load/reload) an existing job, these two messages are briefly displayed in sequence.

Current LOG CLOSED   Opened NEW LOG

What Data is Logged?

Log data is position-based and includes:

- Exact position
- Rate of spray application
- Precise time and date record
- Flight speed, GPS altitude, patterns flown
- GPS position quality

AirTrac logs this data when you are at or above a preset (or default 45 mph) logging speed. See "Adding Job Information to the Log" on the next page).

Note: AirTrac does not record any data while you are below the logging speed.

Adding Job Information to the Log

In addition to the default information that AirTrac logs (see "What Data is Logged?" on the previous page) you add specific job information to a log via the Logging Setup screen. The LOG Label, Pilot, and Aircraft values appear in the header—see "Header" on page 12 for more information.

Path to the Logging Setup screen: **KEYPAD** > **SETUP** > **SETUP** > **LOGGING SETUP**

Figure 4-1: Logging Setup screen

Table 4-2: Logging Setup screen

Item	Description
Log Label	Name associated with the log number (log label appears in header).
Pilot	Pilot name (appears in header).
Aircraft	Aircraft name (appears in header).
Logging Interval	How often you want AirTrac to log data.
Logging Speed	Minimum speed you must be traveling before AirTrac logs data (default is 45 mph).
New Log Per Job	Set to Yes to start a new log each time you load—'set'—an existing job. (In this sense, 'new' means 'newly loaded into the map'). Set to No to continue the current log even when an existing job is loaded. See also "New Log Per Job - Yes" on page 57 and "New Log Per Job - No" on page 58.
View Logs	View log files (see "Viewing Log Files" on page 60).
Clear Logs	Clear (delete) log files (see "Deleting Log Files - Quick Method" on page 65).

To add the job information (Log Label, Pilot, Aircraft, Logging Interval, Logging Speed) to a log, press the button, enter a value in the data entry screen that appears, then press **Accept** or **ENTER** as applicable.

For entering these values AirTrac displays either an alphanumeric or a numeric data entry screen. See "Entering Field Values" on page 21 for more information on data entry screens. Values in these fields also appear on various MapStar reports.

New Log Per Job - Yes

Note: Irrespective of the New Log Per Job setting (Yes or No), you can start a new log at any time with KEYPAD > LOG > Start New Log.

Set to Yes, AirTrac closes the current log and starts a new one each time you:

- Set an existing job active (load an existing job).
- Restart AirTrac. On restart, if a saved job was active at shutdown, that job is reloaded; if <No Job> was active at shutdown, (unsaved) Job 0 is loaded on restart. In either case, AirTrac treats this as a 'new' job and starts ('opens') a new log.

Figure 4-2 shows Job 75 (**1**) with log 1511 (**2** - MapStar image). After clearing Job 75 from the screen (KEYPAD > CLEAR > JOB > ENTER), the map status is <No Job> (**3**). With a map status of <No Job>, a new A|B line has been set, swaths have been sprayed and the work saved as Job (and Pattern) 76 (**4**). All logged data for Jobs 75 and 76 is in log 1511 (**5**) —because no (existing) job was set (loaded) between Job 75 and 76. The purple box (**6** - KEYPAD > INFO > JOB) shows Job 75 has a pattern and a polygon, Job 76 has only a pattern.
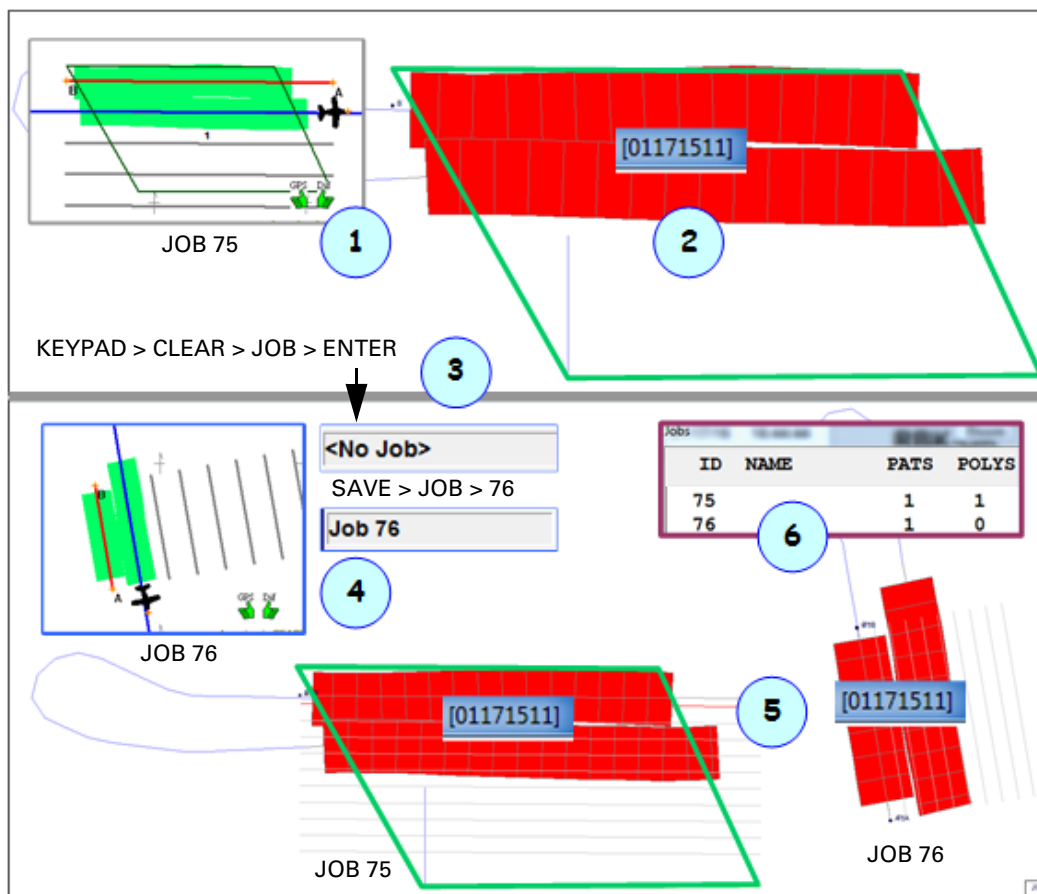
Figure 4-2: One Log, two Jobs: New Log Per Job - Yes

In the schematic at right (for Jobs 77 and 78, above and below the red line respectively):

(**1**) Setting (loading/reloading) a new job (Job 77 and 78).

(**2**) Setting a new job automatically closes the active job and its log.

(**3**) New log opens for the newly loaded job.

(**4**) Log shows in KEYPAD > INFO > LOG.

(**5**) Partial spray job.

(**6**) Job and log in MapStar.

(**7**) Two jobs, two logs (77/1850 and 78/1942) in MapStar.

JOB 77

JOB 78
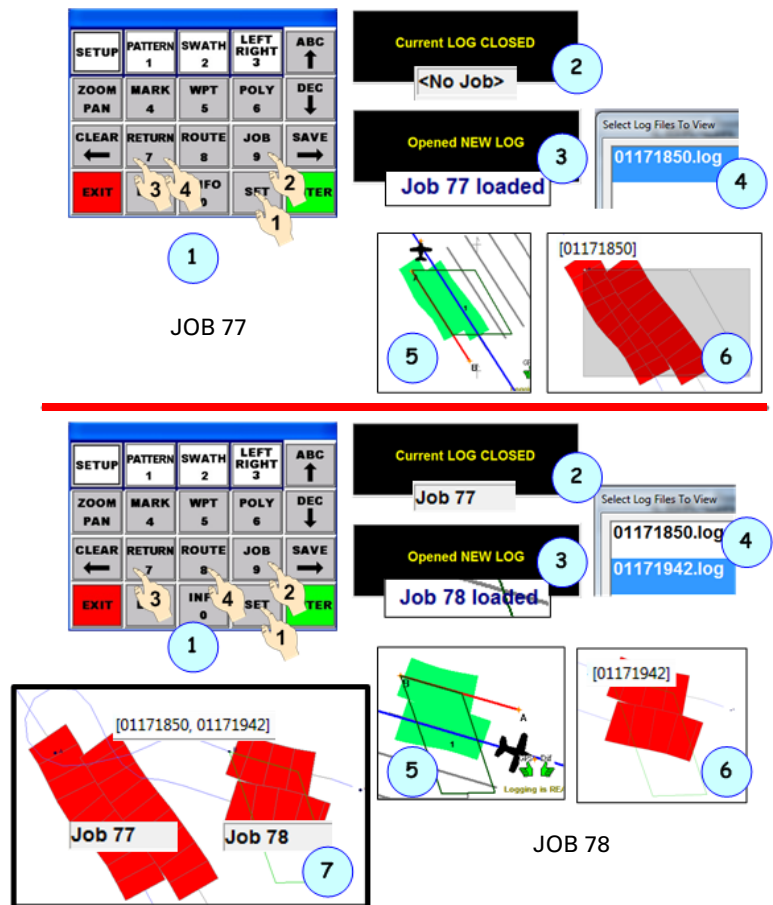
New Log Per Job - No

Set to No, AirTrac will keep a log open and add to it (at or above logging speed) when you:

- • Set an existing job active (a boundary or a pattern-defined job).
- • Create a new job (freeform).

Figure 4-3 shows how one log (1408) has remained open and been added to over three (partial) spray operations in three boundary-defined jobs.
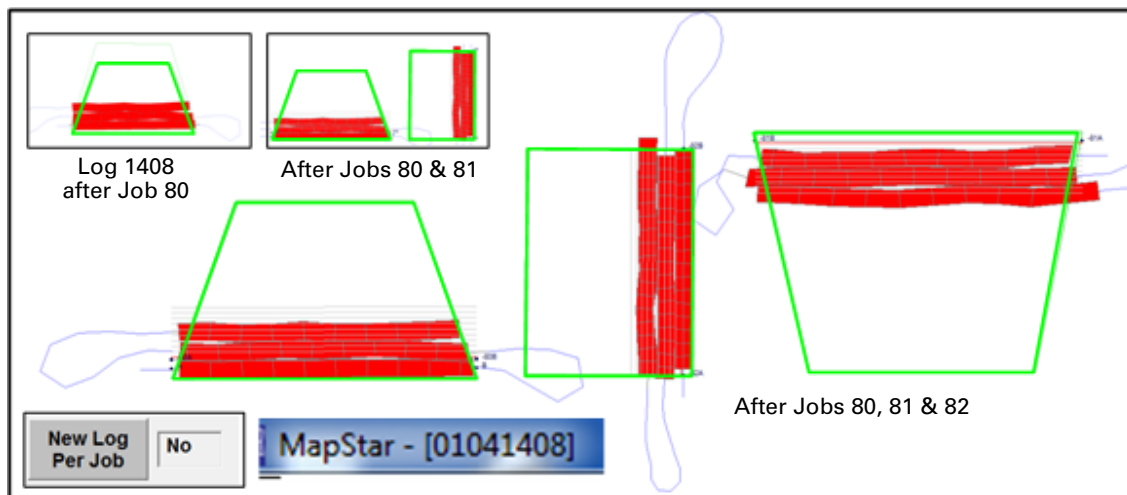
Figure 4-3: One log, three jobs: New Log Per Job - No

Managing Data and Log Files

AirTrac enables you to transfer the following data types between Satloc Cloud and the Bantam hard drive:

> Logs (automatically uploaded to Satloc Cloud as a standard feature)
> Jobs

AirTrac enables you to transfer the following data types between an external storage device (USB drive) and the Bantam hard drive:

> Logs
> Jobs
> Marks (MARKS.DAT file)
> Waypoints (WAYPTS.DAT file)
> Pilot settings (ABTrac.ini file)

Note: All mark and waypoint data is saved into MARKS.DAT and WAYPTS.DAT respectively. They are the only two files that can export or import (transfer) mark or waypoint data.

You can then transfer data to a PC and view it in MapStar and transfer MapStar data back to AirTrac using Satloc Cloud or a USB drive—but see note preceding.

## About Log Data Files and Job Data Files

Logs are automatically uploaded to the Satloc Cloud as a standard feature. Log files and job files are independent of each other. A job file contains polygons and patterns. A log file contains the spray information that comes from spraying a pattern and any additional optional information you entered, such as the pilot's name or aircraft ID. Although the job file is used as a boundary to spray in, the log file that is created from spraying is not linked to that file—this means opening one does not open the other. You can, however, bring a job and logging associated with it together. You load the job (opens with any polygons within it), open the associated pattern (optional) and load (view) the logs you know were active when the flying operation for that job was completed.

Satloc Cloud Path from Keypad

Contact your local dealer to set up a Satloc Cloud subscription. See Appendix C for more information.

Viewing Log Files

Viewing log data enables you to see a physical representation of where you sprayed, how much you sprayed, and if you missed any areas. You can open and view one log, multiple logs, or all logs.

To view log files:

1. Press **KEYPAD** > **SETUP** > **SETUP** > **LOGGING SETUP** > **View Logs** .

   or **KEYPAD** > **INFO 0** > **LOG** . The Select Log Files To View screen appears.
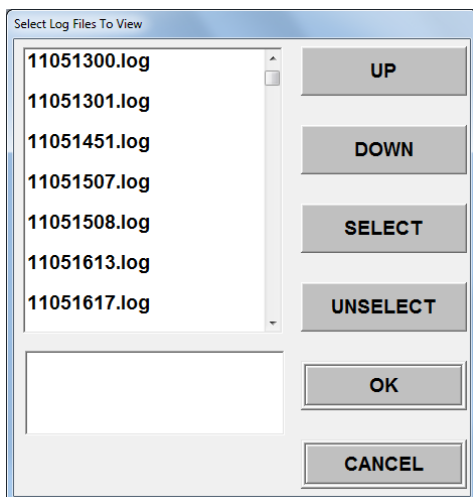
2. Select a log file in the upper list (press the file or press **UP** or **DOWN** to highlight the file) then press **SELECT**. The selected log file is added to the lower list. Repeat this step for each log file you want to view.

   To remove a file from the lower list, select the file in the lower list then press **UNSELECT**.

3. When finished selecting files, press **OK**.
   - If you selected only one log file in step 2 that log is displayed in the map.
   - If you selected multiple log files in step 2 the log with the lowest number is displayed in the map—proceed to step 4 for how to cycle through multiple log files in the map.
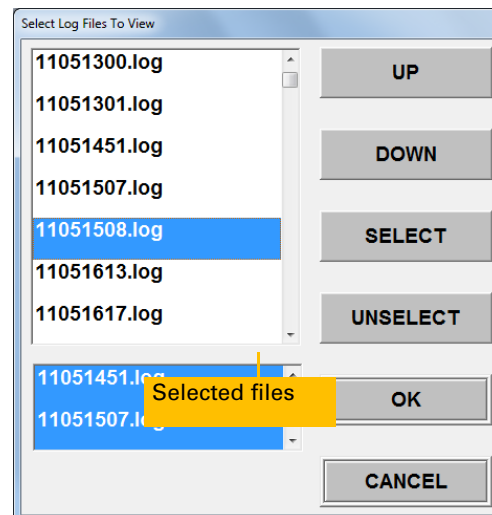
   In either scenario the filename of the active log appears in the upper left of the map.

4. Press the **POLYS** button repeatedly to cycle through multiple log files on the map.
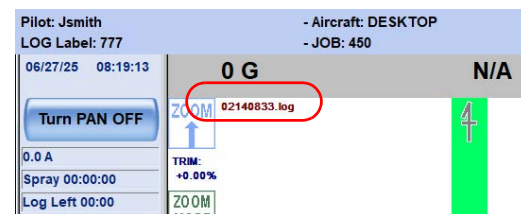
When you reach the last log file (in order of alphabetical filename) ALL appears in place of the filename—this means all logs are visible on the map. For example, if you have three log files in different geographical areas and you sprayed in each area, you can zoom out to see all three sprayed areas when ALL appears.

To get back to the first log press **POLYS** when ALL is displayed.
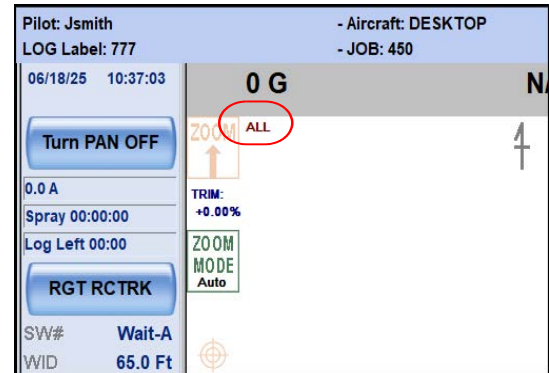
Transferring Files

Use the Transfer Logs/Files Setup screen (below) to transfer files between the Bantam hard drive Satloc Cloud or a USB drive.

Figure 4-4: Transfer Logs/Files Setup screen

To transfer files:

1. Press KEYPAD > SETUP > SETUP > Transfer Logs/Files . The Transfer Logs/Files Setup screen appears (Figure 4-4 on page 61).

2. Press the button for the files you want to transfer—for example, to transfer all log files press **Logs**.

A message appears with three options: 1) Copy from hard drive to a USB, 2) Copy from a USB drive to hard drive, and 3) Transfer Cloud File.

Select Transfer Drive

Copy from Hard Drive to USB

Copy from USB to Hard Drive

Transfer CLOUD File to C:\...\Data folder...
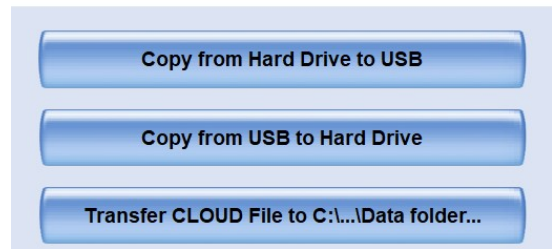
Note: You can also transfer log files from the Bantam hard drive to Satloc Cloud or a USB drive from the Logging screen—see "Transferring Log Files to a USB Drive - Quick Method" on page 63.

3.   Press a copy (transfer) button. AirTrac checks for duplicate files on the destination drive, and if found, the Duplicate File Found screen appears asking if you want to overwrite the duplicate file.

If the Duplicate File Found screen appears, press:

YES to overwrite the file

YES TO ALL to overwrite all duplicate files

NO to not overwrite (transfer) the file

When using the YES and NO options, the Duplicate File Found screen appears each time a duplicate is found.

When copying multiple files you may see the "Copying to" message at the bottom left of the Transfer Logs/Files Setup screen (the transfer process for a small number of files may occur too quickly for you to notice this message).

When the file transfer is complete, the "Finished Copying Files" message appears at the bottom left of the screen.

Duplicate File Found

YES

YES TO ALL

NO

File D:\1001010200SatlocG4_038d.log already exists.

Do you want to OVERWRITE?

Marks

Copying to: C:\Satloc\Data\03091320.log

Go Ba

Marks

Finished Copying Files

EXI

Return T
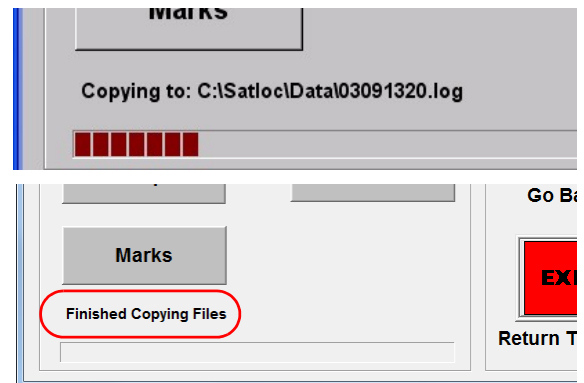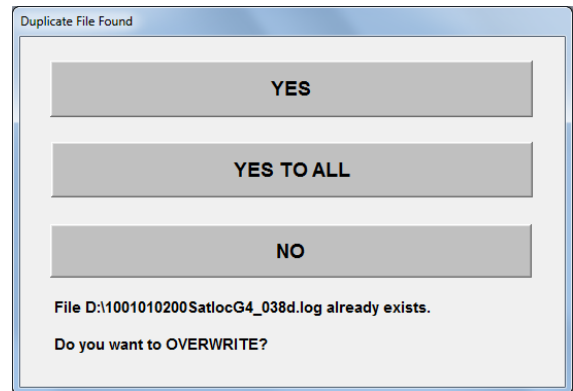
Transferring Log Files to a USB Drive - Quick Method

AirTrac enables you to quickly transfer just log files directly from the Bantam 2 hard drive to a USB drive without first navigating to the Transfer Logs/Files Setup screen (see "Transferring Files" on page 61).

To transfer log files from the Bantam 2 hard drive to a USB drive:

1. Press [KEYPAD] > [LOG CLOUD] , the Logging screen appears.
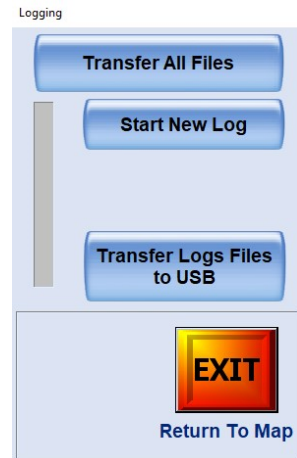
2. Press **Transfer Logs**. AirTrac copies the files from the Bantam 2 hard drive to the USB drive.

   When copying multiple files the status bar displays the transfer status (more bars = more files copied).
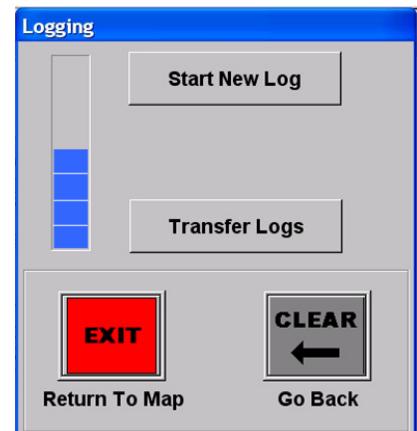
3. When copying is complete, AirTrac asks if you want to delete the transferred log files from the hard drive.

   Press **YES** or **NO** to delete/not delete (keep) all (now copied) log files on the hard drive.
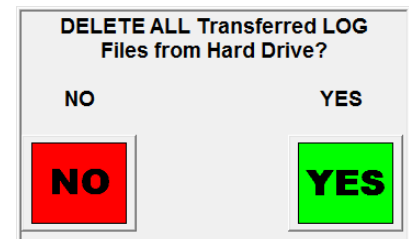
Deleting Files

⚠ WARNING: *Once you delete data files they are permanently removed from memory; you cannot retrieve deleted data files.*

Use the Clear Data screen to delete all data files or all files of a specific type from the hard drive. You can quickly delete just log files in fewer steps—see "Deleting Log Files - Quick Method" on page 65.
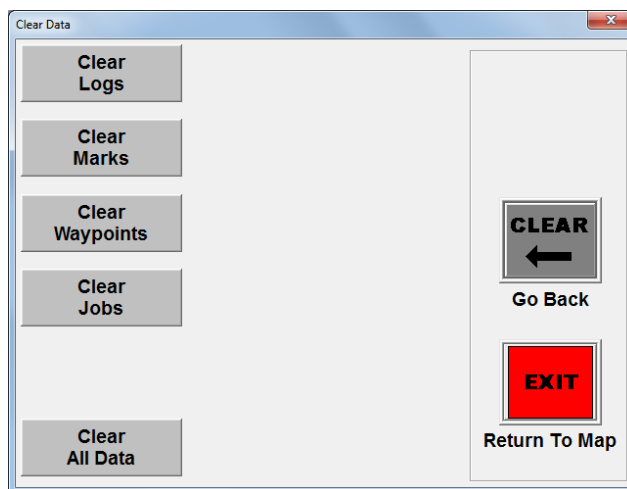
Figure 4-5: Clear Data Screen

To delete all files or all files of a specific file type:

Press **KEYPAD** > **SETUP** > **SETUP** > **SETUP** > **Clear Data** , the Clear Data screen appears (see Figure 4-5 above).

For the type of files you want to delete press the appropriate button, for example, to delete all logs, press **Clear Logs**.

When the confirmation screen appears, press **YES** or **NO** to delete/not delete (keep) all files (of the type noted on the message—logs in the example) on the hard drive.
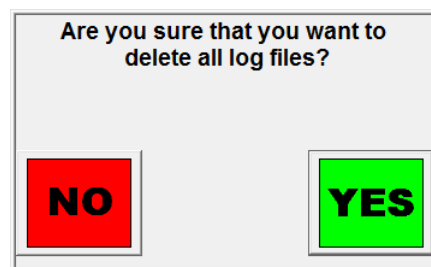
Deleting Log Files - Quick Method

⚠ WARNING: *Once you delete a log file it is permanently removed from memory; you cannot retrieve a deleted log file.*

AirTrac can store up to 1,000 hours of log time. Satloc recommends deleting unneeded files on a regular basis to ensure you have sufficient space for logging data. You can delete specific log files or all log files.

Paths to the Log Clear screen:

KEYPAD > **CLEAR ←** > **LOG**   or

KEYPAD > **SETUP** > **SETUP** > **LOGGING SETUP** > **Clear Logs**
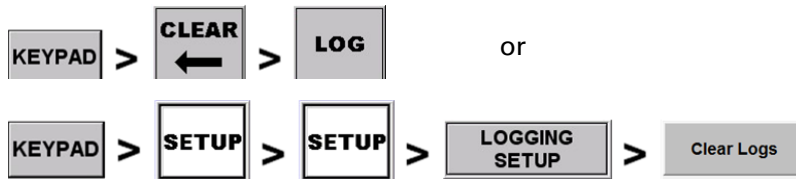
To delete specific logs:

Press **ABC** (up arrow - **1**). The Select Logs to Delete screen appears (**2a**).

Select a log file in the upper list (**2b**) by pressing it or pressing **UP** or **DOWN**. Press **SELECT**. The selected log file is added to the lower list (**2c**). Select each log file you want to delete.

(To return a selected file to the upper list, reselect it and press **UNSELECT.**)

Press **OK** to delete the selected logs and return to the map.

To delete all logs:

Press **DEC** (down arrow - **3**). The 'Are you sure ...' message appears (**4**). Press **YES** to delete all logs then, back in the Log Clear screen, **EXIT** to return to the map.
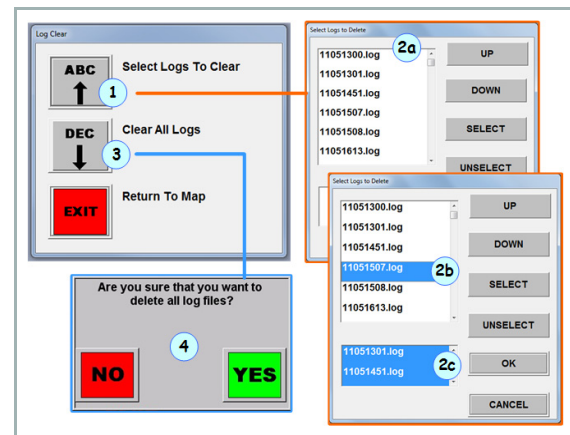
Chapter 5: Pattern Guidance

This chapter describes patterns—the pattern types and how you set them and fly them, as well as marks (return points).

Patterns Overview

There are two types of patterns in AirTrac:

- Open pattern—where you can fly an unlimited (open) number of swaths because the pattern is independent of the size of the field
- Closed pattern—where the number of swaths you can fly is limited (closed) because you define the width of the field

Both open and closed patterns require an initial guideline on which to base the pattern's GPS coordinates. In AirTrac, this initial guideline is called the A|B line (a straight line defined by two points A and B). Closed patterns need an additional defined point—point C.

After entering the number of points required for a pattern—two or three—AirTrac places, or 'presents', an array of swath guidelines on the screen with the A|B line in red (examples shown below - Figure 5-1). See Table 5-1 for more detail on A|B lines in patterns.
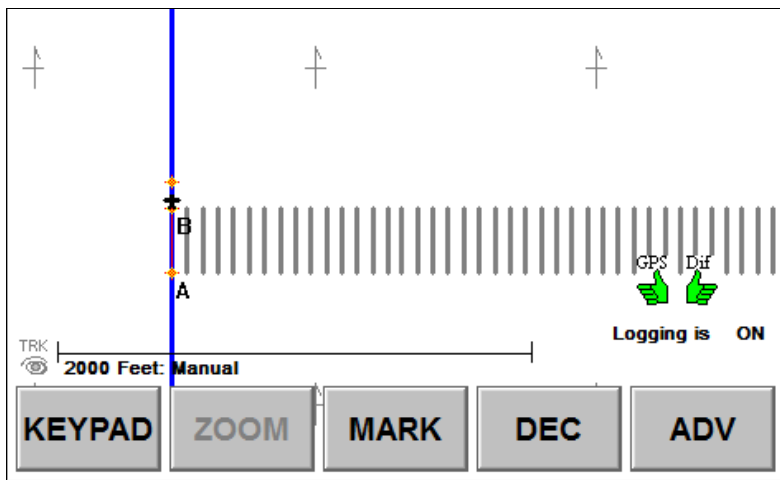
Open pattern (back-to-back example)

Two points in pattern (A, B)

A|B line is red (over blue)

Current swath is blue

Additional swath lines are gray and are unlimited in number

Closed pattern (racetrack example)

Three points in pattern
(A, B, C)

A|B line is red

Current swath is blue

Additional swath lines are green with the number of swath lines determined by the width of the pattern and the swath width

Figure 5-1: Pattern examples—open back-to-back (top) and closed racetrack (bottom)

Table 5-1: A|B lines in open and closed patterns

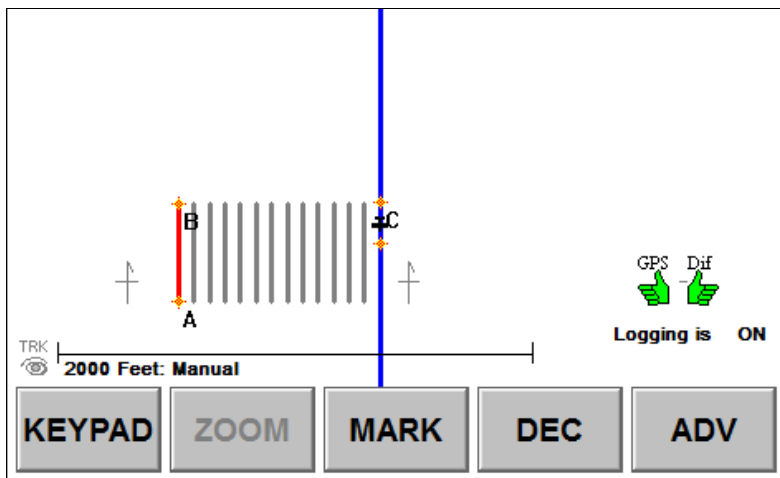| Pattern	A|B Line Use
Open	Point A is the beginning of the line. Point B is the end of the line. All swaths you fly will be parallel to this initial A|B line.
	AirTrac automatically prompts you to set your A and B points according to the pattern you select.
	The A|B line may be inside or outside the field. Points A and B should be as far apart as possible to ensure the accuracy of the line. Establishing A and B points too close together may result in a small error that creates a larger divergence the longer the distance.
	You can have AirTrac auto-apply A|B lines/patterns to polygons - see "Auto-applying a Swath Array to a Polygon" on page 115.
Closed	Point A is the beginning of the line. Point B is the end of the line. You define the width of your field by setting a third point—C.
	AirTrac automatically prompts you to set your A, B, and when applicable, C points according to the pattern you select.
	You can have AirTrac auto-apply A|B lines/patterns to polygons - see "Auto-applying a Swath Array to a Polygon" on page 115.

After you have completed AirTrac setup (Chapter 3, "Setup" on page 25) and set your job options (Chapter 4, "Entering Basic Job Details (Quick Start)" on page 52) you are ready to begin flying with AirTrac.

Note: There are several tasks you can perform in more than one way. For example, to set point A (first point) in an A|B line, you can use any of the following methods:

- *Remote switch provided in your Bantam kit*
- *Set A button (Quick Key) in the map*
- *Flight control stick (swath advance wire set connected directly to the stick)*

For the instructions in this manual where multiple methods are available the most common and practical method is described. For example, the section "Flying a Pattern" on page 73 describes using the physical remote swath advance button (instead of the Set A button) when setting an A|B line—this is very similar to using the same functionality integrated into a flight control stick.

Available Pattern Types

AirTrac supports nine pattern types (both open and closed), providing the flexibility to fly any field shape. This section describes the ten patterns and how you fly them. Although AirTrac provides ten pattern types, you can save as many as 99 flown patterns, of any type mix, in a job.
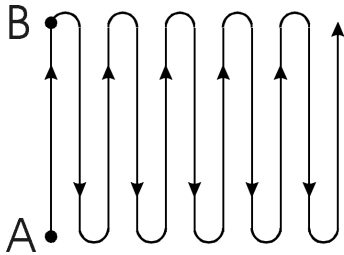
Back-to-Back (BK-BK)

Fly consecutive swaths parallel to the A|B line.

Multi Back-to-Back (MB2BK)

Fly multiple back-to-back patterns. Input the number of fields you want to fly (up to 9) and whether you want to full rotate (123, 123) or half rotate (123, 321). AirTrac automatically rotates your A|B line for each field and provides guidance accordingly.
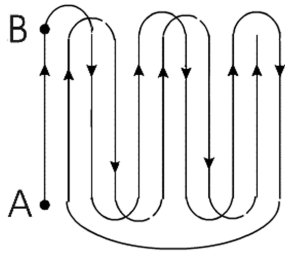
Back-to-Back Skip (BKBKS)

Fly the odd-numbered swaths first, then the even numbered swaths.
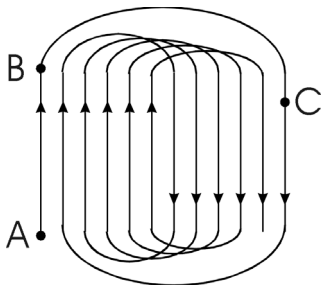
Racetrack (RCTRK)

Fly each side of a field, then alternately work from swath #2 to the middle, and from the middle toward the other end of the field. This pattern is useful for flying wide, smooth turns.
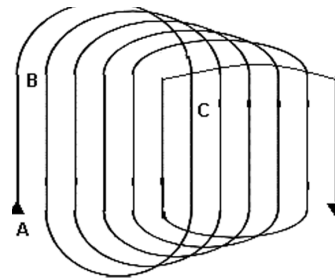
Quick Racetrack (QKRTK)

Fly a pattern similar to the racetrack, but set your C point in the middle of the field.
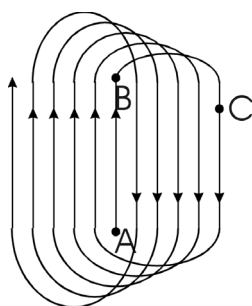
Reverse Racetrack (RVTRK)

Fly a pattern similar to the racetrack. This is called the "reverse" racetrack because you are flying in one direction, but swaths are incrementing in the opposite direction. In this pattern, you set your A|B line in the center of the field. This pattern is useful for flying circular fields or other fields where the center line is clearly visible.

QuickTrack X

Fly a pattern similar to the quick racetrack. You specify the 'C' point for QuickTrack X patterns by the number of swaths or the distance from A|B to the furthermost swath in the pattern. After you have set the A and B points, fly the pattern like a quick racetrack: the second swath is in the middle of the field, the third is swath #2, and so forth.

Squeeze (SQUEZ)

Fly loops of decreasing size, from the outside of the field to the middle of the field. This pattern allows you to make wide turns at the beginning of a job when carrying a heavy load, and narrower turns as your load becomes lighter.
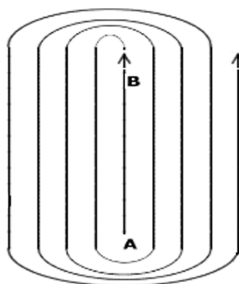
Expand (EXPND)

Fly successive swaths outward from the center of the field. This pattern is useful for fields with a visible center line or a long, irregular shape.

Lightbar Basics

The top and bottom rows of LEDs represent linear or angular distance (by number or position*) and direction (by color where red is left, green is right).

Top row LEDs: crosstrack distance (green = right), direction (> and R - Right) and distance (33 ft)

Swath (2nd left from A|B line)

Direction of travel (DOT)

Bottom row LEDs: Heading (heading error - to the right [green] of target swath)

* The option to have distance represented by a number of LEDs (an expanding or contracting 'bar') or the relative position of a single LED is selected in the **Lightbar Advanced Setup** screen. See Table 3-7, "Light Bar Advanced Setup screen buttons/fields" on page 41

Target swath guidance line

Each LED represents a certain linear or angular distance.

- Crosstrack distance (top LED row)—the greater your perpendicular distance from the target swath, the more LEDs are lit; fewer LEDs are lit as you get closer. When you are at the target swath, no top LEDs are lit. The color of the LEDs indicates the direction of the target swath—the direction to steer to it.
- Heading angle (bottom LED row)—the greater the heading error (90° is maximum), the more LEDs are lit. When you are on or parallel to the target swath, no bottom LEDs are lit. The color of the bottom row LEDs indicates the direction of the heading error relative to the target swath in the direction of travel (DOT)—as shown below (read all LED displays horizontally—as on the lightbar).
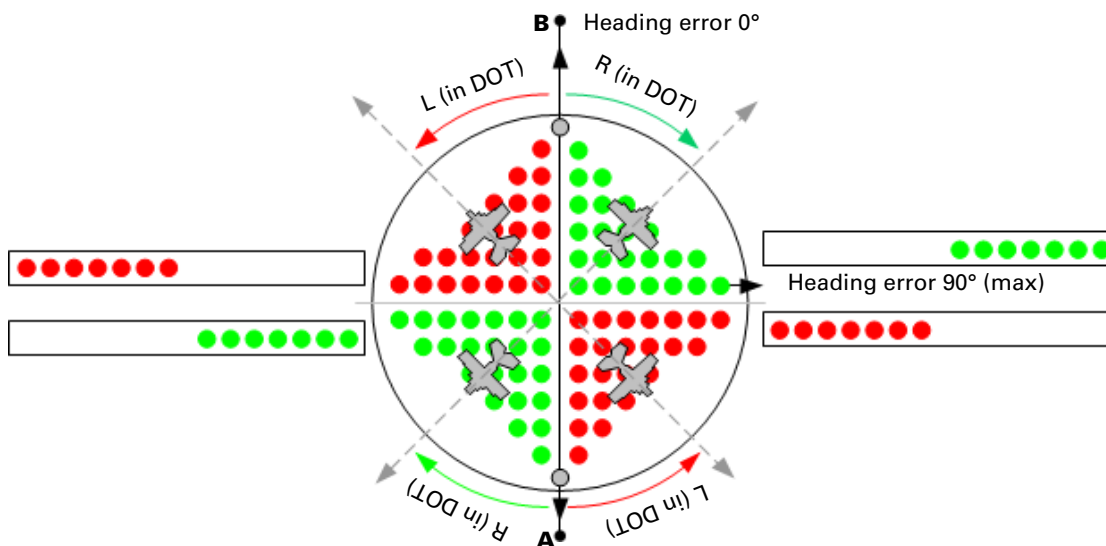
When the center vertical row of lightbar LEDs is illuminated, you are on the target swath (zero crosstrack, zero heading error).

Continue to fly the rest of your swaths using lightbar guidance.

Target swath line
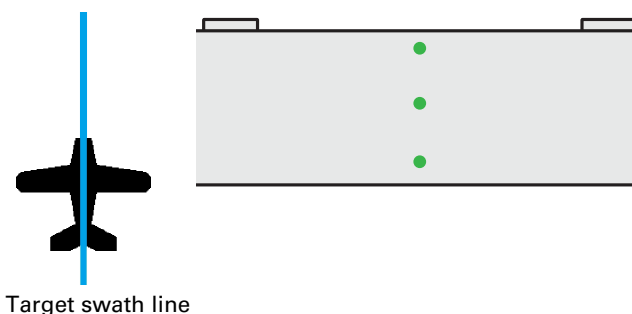
The following section, "Flying a Pattern", uses a back-to-back pattern (BACK-TO-BACK in the AirTrac Setup screen, BK_BK in the data panel) and factory default settings. If you change the default setup you may see different data on your lightbar.

Flying a Pattern

This section steps you through setting up and continuing to fly a pattern. In the example:

- The pattern is open pattern Left Back-to-Back ((BACK-TO-BACK in the AirTrac Setup screen, BK_BK in the data panel) although setting a C point for a closed pattern is mentioned.
- Where there are two ways to execute a particular command (for example 'Set A' or 'Advance one swath', that is, by using either the screen button or the remote swath advance button) the notes only mention the command—it's your choice how you execute the command.
- There are no instructions to turn spray on or off. Follow your own procedures on spraying/not spraying during setup and between swaths. Use swath advance accordingly.
- During pattern setup the left and right *center* displays show speed and heading respectively (speed is 150 mph in the example). These two fields are not available during normal operations and their setup fields (in the lightbar setup screens) are either missing or disabled/grayed out.

Left Display current swath number	Left Center Display speed	Right Center Display heading	Right Display crosstrack
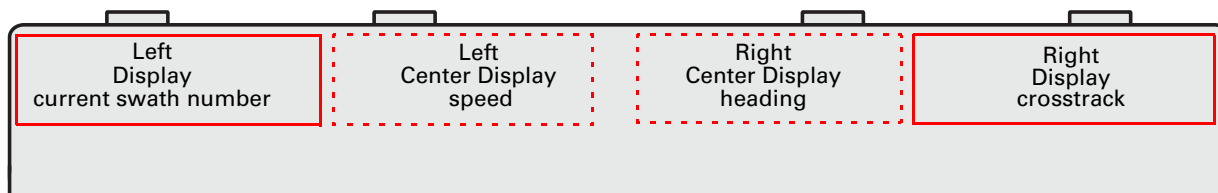
- At step 4, the lightbar's left and right displays, after the setting of point B (or C), are **Current Swath Number** (L002 - 4a) and **Cross Track Distance** (L63 - 4c and 4e) respectively. That information displays in the example setup because they are the user-set options for those display fields. Once the pattern is set (B or C point entered), these two fields display whatever they have been user set to display—see "Lightbar Setup Screen" on page 37.

To fly a basic pattern:

1. Begin flying. "A" appears in the lightbar's left display (**1a**) prompting you to set point A. The top and middle center LEDs show yellow (**1b**).

2. Fly to the beginning of your A|B line; set your A point. "B" (prompt) appears in the lightbar's left display field (**2a**) and the whole upper row of LEDs flash (**2b**). The middle center LED remains steady yellow (**2c**).

   If you turn spray on, the far left and far right LEDs on the bottom row illuminate steady blue (**2d**).
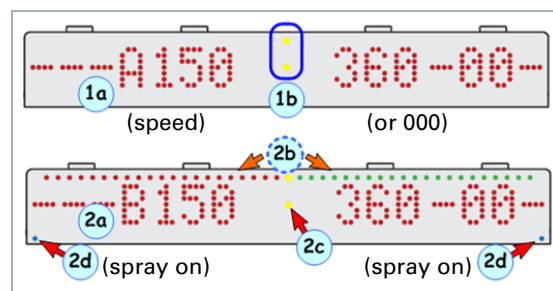
3. Fly to and set your B point. The swath number (L001 in this example) appears in the left display field (**3a** - your A|B line is always swath #001 and the direction set for the pattern—left in this example—determines if A|B is swath L001 or R001). The three center vertical LEDs show yellow (**3b**) and speed and heading are no longer displayed (**3c**).
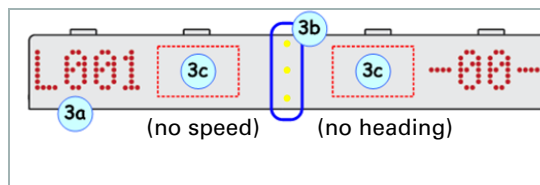
   If you are flying a closed pattern, after you set point B, "C" (prompt) appears in the lightbar's left display field (**3d**), with your current swath number, (**3e**)—see note below). The whole bottom row of LEDs flash (**3f**). Speed and heading continue to be displayed (**3g**).
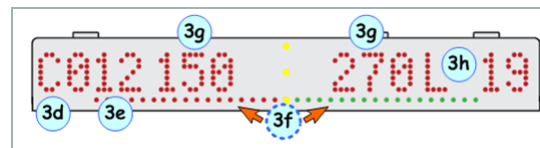
   Fly to and set your C point.

   *Note: As you fly toward your C point, the swath number increases indicating with each increase that the point you have reached is a multiple of your swath width. For example, when your left field first displays C012, you have flown eleven swath widths from your A|B line. Also, as you fly toward your C point, because you already have an A|B line, the crosstrack (right field - **3h**) switches been L and R with a varying crosstrack value as you fly toward, over and beyond successive (but as yet unpresented) swath lines.*

4. With your swath array presented (after A and B or A, B and C entered), when you are ready, advance to the next swath. In this example L002 appears in the left display field (**4a**). The top LEDs, the arrows (**<** or **>**) and the crosstrack field (right side—letter and number, L63 in this example) will indicate where and how far away your target swath is. In this example, the red LEDs (top left, (**4b**) and L (**4c**), crosstrack letter) indicate your target swath is to your left (based on your current direction of travel - DOT) and
   < (**4d**) is pointing in the direction you have to steer. The crosstrack number (**4e**) is the perpendicular distance to your target swath in your chosen units (for example, feet/decimal miles).
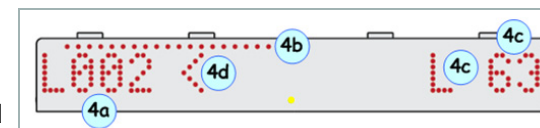
5. Make the turn onto your next swath using the lightbar for guidance.

c. After turning left to
fly toward swath #2

d. Lined up on
swath #2

b. Turning right at
start of turn

a. Press Swath Advance

e. Turn on
spray as
you enter
field then
fly swath #2
(see step 6)

2   **1**

f. Turn off spray as you exit field
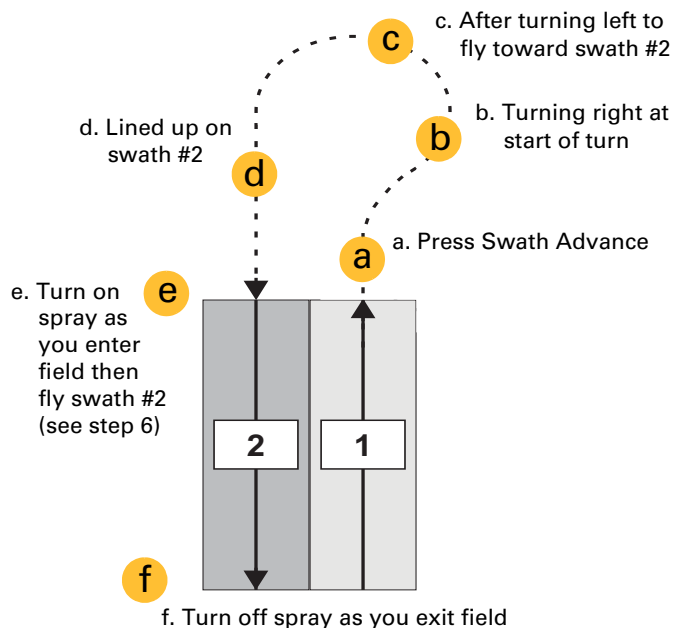
Lightbar guidance:

- Top row of LEDs represents crosstrack distance and direction to the target swath. (b and c)
- The **<** arrow indicates the direction of the target swath (b and c)
- Bottom row of LEDs shows the heading (angle of intercept) to the target swath (c).
- Center LEDs illuminated indicate you are lined up on the swath (d).
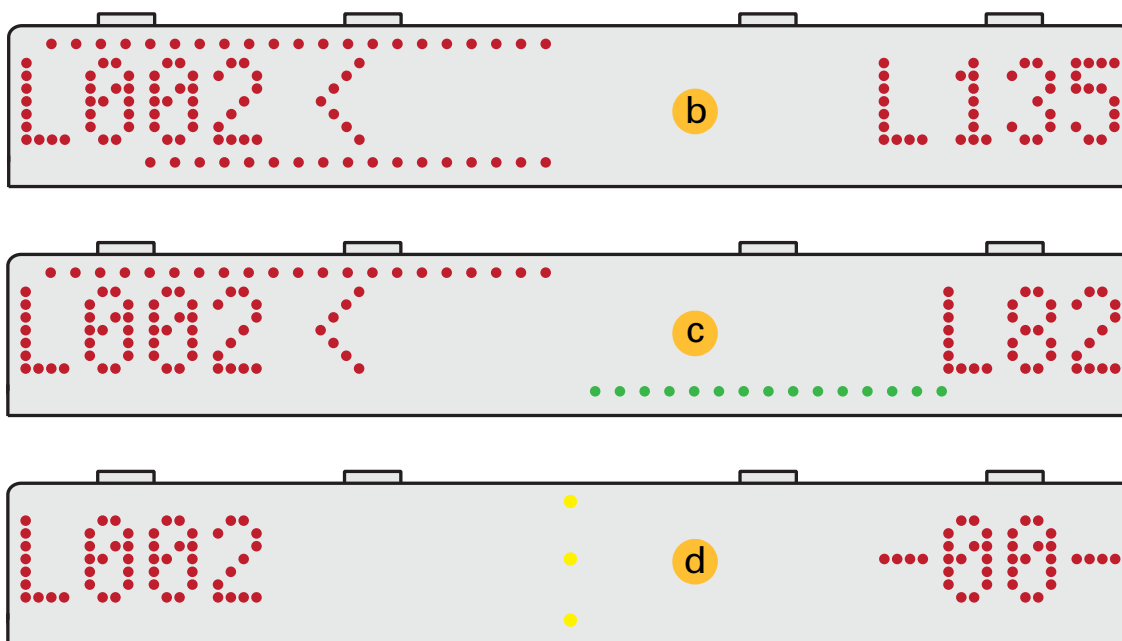
6. Turn the spray on as you enter the field. Complete swath #2 and all remaining swaths in your field using lightbar guidance.

Common Pattern Flying Tasks

Table 5-2 lists the steps for common pattern flying tasks.
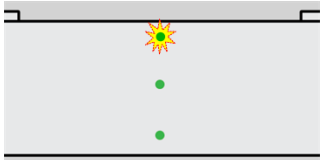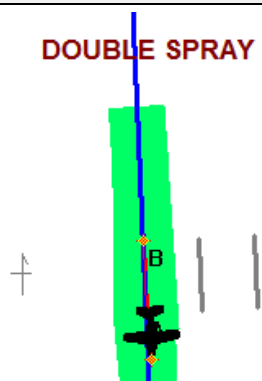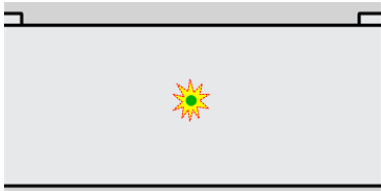
Table 5-2: Common pattern flying tasks

Task	How To (Presses)
To change direction at any time while flying a pattern (from flying to the right of the A|B line to flying to the left of it, or vice versa)	`LFT BK-BK` on the data panel. or `KEYPAD` > `LEFT RIGHT 3`
To change your remote swath advance button from swath advance to swath decrement	`KEYPAD` > `SET` > `DEC ↓`
To change your remote swath advance button from swath decrement to swath advance	`KEYPAD` > `SET` > `ABC ↑`
Clear the current pattern (remove it from the screen)	`KEYPAD` > `CLEAR ←` > `PATTERN 1` > `ENTER` Current spray data remains visible on the map.
Recall a saved pattern	`KEYPAD` > `SET` > `PATTERN 1` > **n** > `ENTER`
Clear aircraft swath marks from the screen	`KEYPAD` > `CLEAR ←` > `SWATH 2` > `ENTER`

Lightbar and Screen Warning Messages

When flying a pattern, the lightbar or screen may display a warning, such as for spraying a previously sprayed swath (double-spray warning). When AirTrac generates a warning your active guidance display disappears from the lightbar. In its place you see flashing LEDs and/or additional error information in the left and right display screen.

Table 5-3: Warnings

Warning	Lightbar	Screen
Double spray	If set on for the lightbar (see "Setting the Double Spray Warning" below), the top center LED and the crosstrack LEDs flash when spray on is detected on a previously sprayed swath. It flashes until you turn spray off or you change the swath number.	

Setting the Double Spray Warning: Set this feature to on for both lightbar and screen (default), lightbar only, screen only, or off for both.

Press **KEYPAD** > **SETUP** > **SETUP** > **LIGHT BAR** > **Double Spray Warning** then select from the drop-down.

Warning	Lightbar	Screen
DGPS signal lost	Middle center LED flashes; system will use extrapolated GPS signal from last signal. Reboot system.	Bottom right of map

Saving a Pattern

A pattern in AirTrac is the sequence of swaths you intend to fly—and to receive guidance to—when spraying your field. You can save a pattern to the current job, where the pattern is either associated with (or 'applied to') a specific polygon within the job or just associated with the job itself (not to a specific polygon within the job but a pattern generated from the A and B [and C if applicable] points you set). The pattern is then available each time you load the job. You can to store up to 99 patterns per job.

To save a pattern to the current job, press **KEYPAD** > **SAVE** > **PATTERN 1** > **n** > **ENTER** where 'n' is the pattern number.

Example: To save a pattern #2, press (the **SWATH** key press is for the 'n' value 2 - pattern #2)
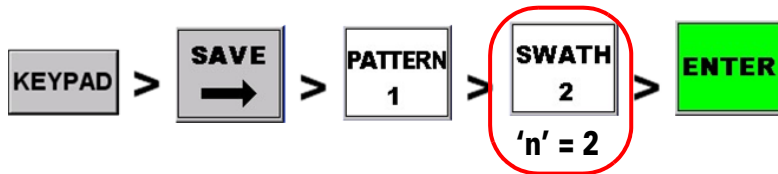
If you save and close a partially flown pattern, AirTrac remembers the last active swath. This is significant when recalling a pattern—see next section.

Recalling a Pattern

If you save a pattern or patterns to a job, the next time you load (set) that job, you can recall (set) any of the job's saved patterns (you can recall only patterns saved to the active job).

Because you can save multiple patterns to a job, you must recall the specific pattern you want to fly. You give a pattern its number when saving it, and the same pattern numbers can be used for multiple jobs: For example, both Job #1 and Job #2 could have patterns 1, 2, and 3. Because you can recall a pattern for the active job, you cannot accidentally recall the incorrect pattern #2.
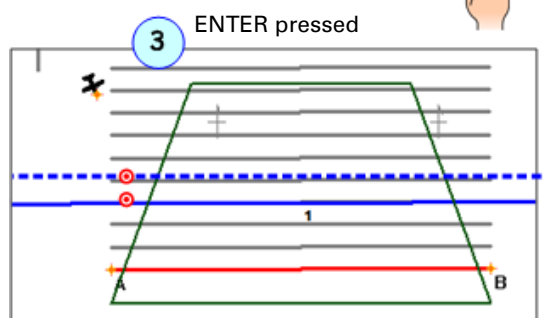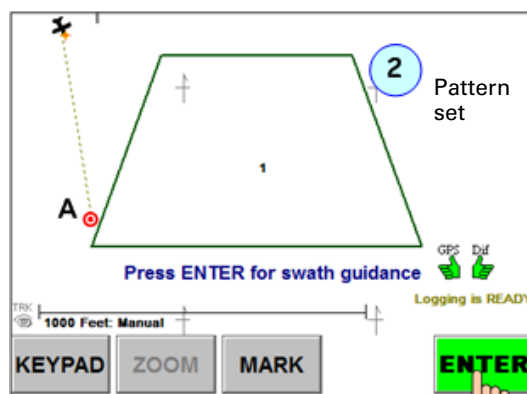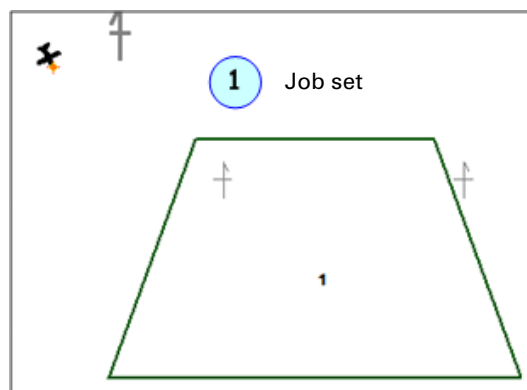
For example, you have a job with following polygons and patterns: Polygon #1 that you fly using two patterns (Pattern #1, Pattern #2) and Polygon #2 that you fly using one pattern (Pattern #3). To recall the second pattern for the first polygon, you recall Pattern #2.

Receiving Guidance to a Pattern

When you recall a pattern (after setting a job - (**1**), AirTrac initially provides vector guidance from your current position and the A point of your pattern's A|B line, enabling you to fly directly back to the start of the pattern (**2**).

AirTrac also provides the option to display the actual swath array of the pattern you saved by pressing the ENTER button that appears on screen (the on-screen instruction is "**Press ENTER for swath guidance**" - (**2**). If you exercise this option, the guidance line between you and the A point disappears and, in the resulting swath array (**3**), the last selected swath is the selected swath in the recalled pattern.

The dotted blue swath line in (**3** - added in this document) indicates the next swath that would be selected (using ADV with this pattern) if the blue solid-line swath had already been sprayed. (If you view the log—KEYPAD > INFO > LOG > SELECT > OK—you can see what has been sprayed.)

(1) Job set

(2) Pattern set

Press ENTER for swath guidance

Logging is READY

1000 Feet: Manual

KEYPAD   ZOOM   MARK   ENTER

ENTER pressed

(3)

To recall a saved pattern, press KEYPAD > SET > PATTERN 1 > n > ENTER where 'n' is the pattern number.

Example: To recall a pattern #2, press (the **SWATH** key press is for the 'n' value 2 - pattern #2).

KEYPAD > SET > PATTERN 1 > SWATH 2 ('n' = 2) > ENTER
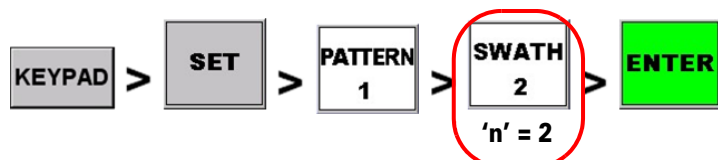
Flying the Available Pattern Types

This section reinforces the main points about each pattern and describes how to fly the patterns.

Back-to-Back Pattern (BK-BK)

In a back-to-back pattern you fly consecutive swaths parallel to the A|B line. You can fly this pattern either right-to-left (LFT BK-BK) or left-to-right (RGT BK-BK).
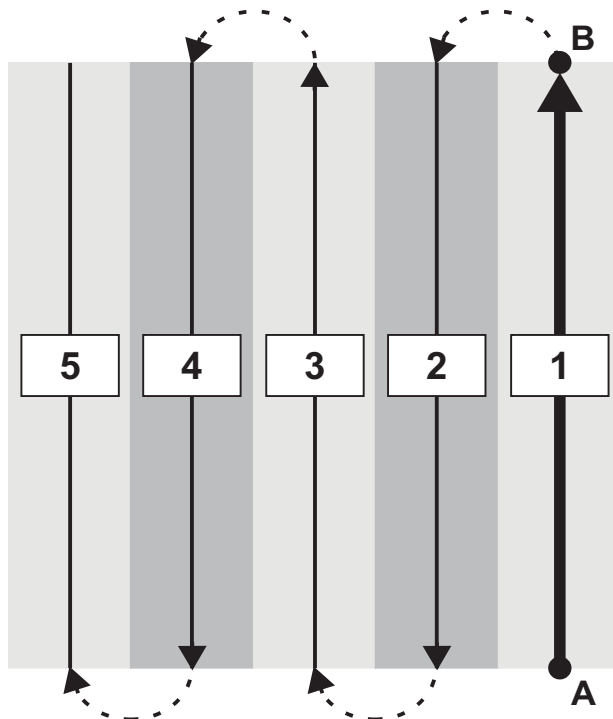
1. Set the pattern type as BACK-TO-BACK and set other basic job details (see "Entering Basic Job Details (Quick Start)" on page 52).
2. Set your A|B line (see "Flying a Pattern" on page 73).
3. Fly swaths consecutively: 1, 2, 3, and so on.

Multi Back-to-Back Pattern (MB2BK)

In this pattern you fly back-to-back patterns over a maximum of nine fields. Multi back-to-back patterns can be full rotate or half rotate patterns.

Note: In the two pattern examples below, the **bold** *and the* ***bold/italic*** *(colored) texts show the field/ swath combinations that change their place in the sequence between full rotate and half rotate patterns.*

Back-to-Back full rotate pattern: Field 1-Swath 1, Field 2-Swath 1, Field 3-Swath 1; **Field 1-Swath 2**, Field 2-Swath 2, ***Field 3-Swath 2***.
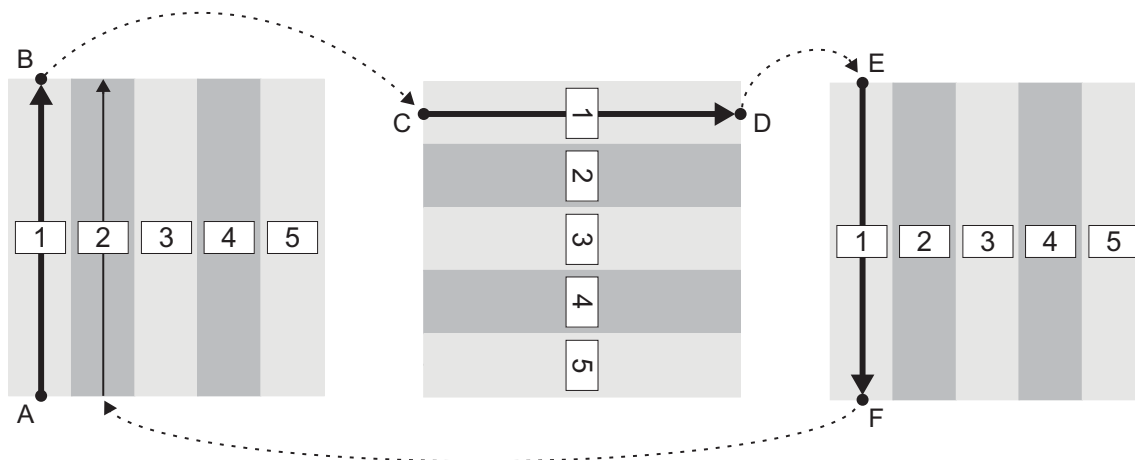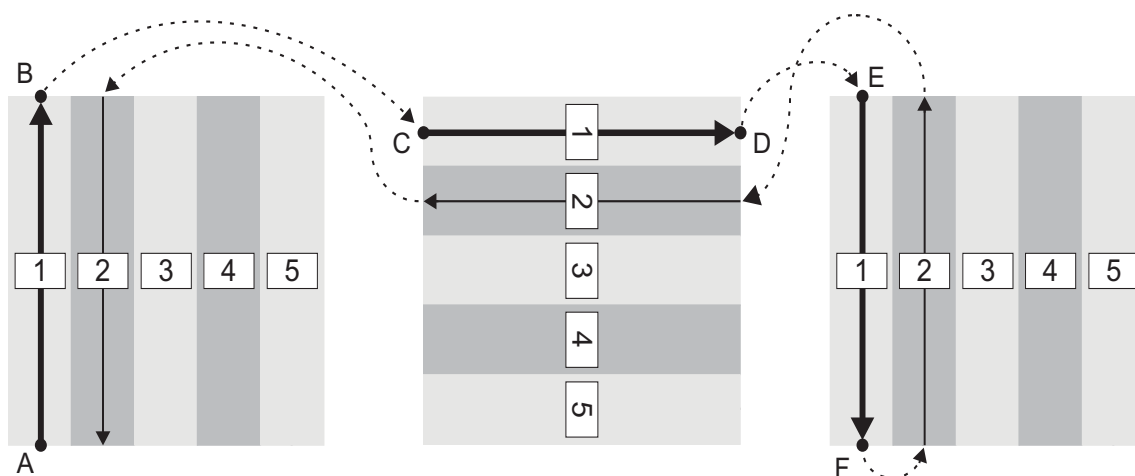

Back-to-Back half rotate pattern: Field 1-Swath 1, Field 2-Swath 1, Field 3-Swath 1; ***Field 3-Swath 2***, Field 2-Swath 2, **Field 1-Swath 2**.

AirTrac automatically rotates your A|B line for each field and provides guidance accordingly.

1. Set the pattern type as MULTI BACK-TO-BACK and set other basic job details (see "Entering Basic Job Details (Quick Start)" on page 52). Make sure you set the rotation (full or half) and the number of fields you want to fly (total fields).
   - Full rotate means you fly the first swath of each field and then fly the second swath of each field starting again at field 1 (such as 123, 123).
   - Half rotate means you fly the first swath of each field, then fly the second swath of each field in the opposite direction beginning with the last field—field 3 in the example (so 123; 321).
2. Set your A|B line for each consecutive field (see "Flying a Pattern" on page 73).
3. Follow the guidance prompts to complete flying your pattern.

Back-to-Back Skip Pattern (BKBKS)

In this pattern you fly the odd-numbered swaths first, then the even numbered swaths in a back-to-back pattern. You can fly this pattern either right-to-left (LFT BKBKS) or left-to-right (RGT BKBKS).
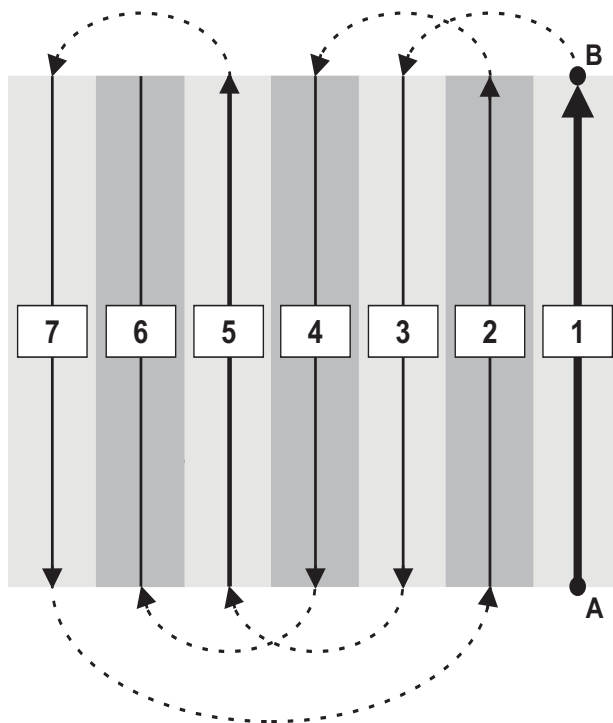
1. Set the pattern type as BACK-TO-BACK SKIP and set other basic job details (see "Entering Basic Job Details (Quick Start)" on page 52).
2. Set your A|B line (see "Flying a Pattern" on page 73).
3. Fly your odd numbered swaths first.
4. To switch from odd to even numbered swaths, press KEYPAD > ENTER.
5. Fly your even numbered swaths.

Racetrack Pattern (RCTRK)

This pattern consists of a series of loops (or racetracks) resulting in wider, smoother turns. In a racetrack pattern, you first fly each side of a field, then alternately work from swath #2 to the middle, and from the middle toward the other end of the field.
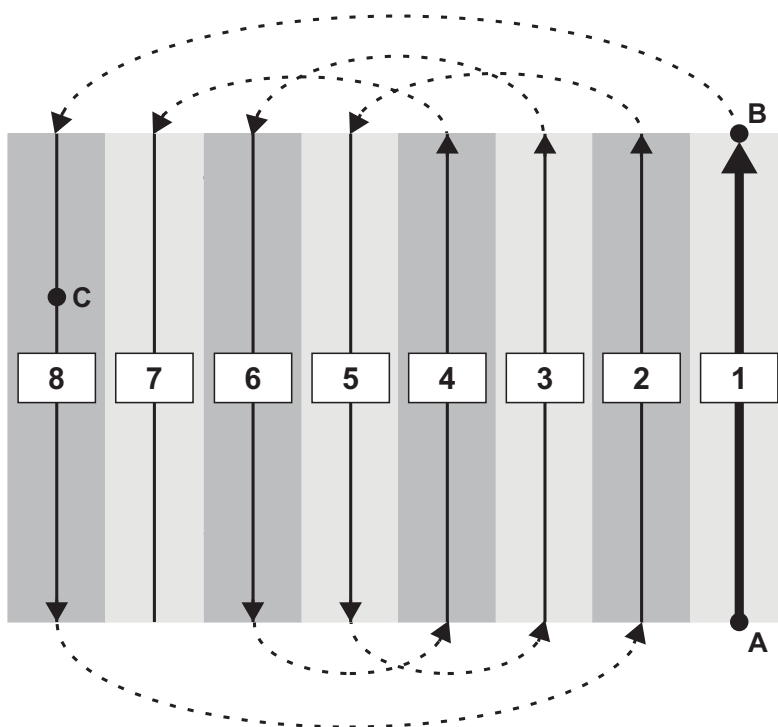
1. Set the pattern type as RACETRACK and set other basic job details (see "Entering Basic Job Details (Quick Start)" on page 52).
2. Set your A, B, and C points (see "Flying a Pattern" on page 73)
3. For an 8-swath field for example (as shown above), fly swaths in the following order: 1, 8, 2, 5, 3, 6, 4, 7.

Quick Racetrack Pattern (QKRTK)

This pattern is similar to the racetrack pattern; however, in a quick racetrack pattern you set your C point in the center of the field, not at the end. This is called a "quick" racetrack because you do not have to fly to the end of the field to press the C point.

In the quick racetrack pattern you fly a constant size loop after setting the A, B, and C points. Point C is the swath on or after the field center line.
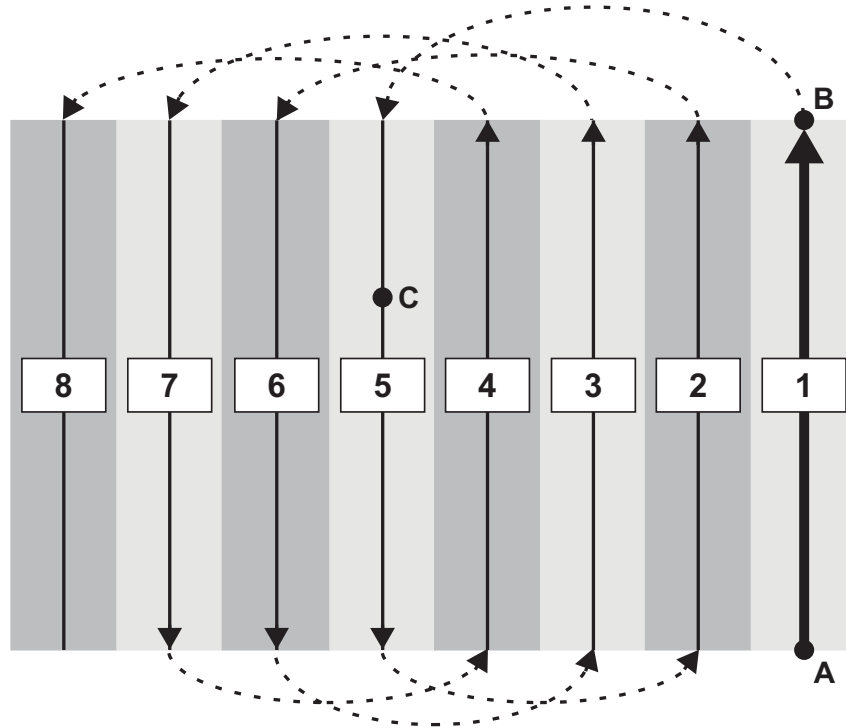

1. Set the pattern type as QUICK_RACETRACK and set other basic job details (see "Entering Basic Job Details (Quick Start)" on page 52).
2. Set your A, B, and C points (see "Flying a Pattern" on page 73).
3. Fly swaths in the following sequence: 1, 5, 2, 6, 3, 7, 4, 8.

Reverse Racetrack Pattern (RVTRK)

This pattern is similar to the racetrack pattern. It is called a "reverse" racetrack because you are flying one direction, but swaths are incrementing in the opposite direction. In the example below you are flying to the left, but the swaths are incrementing to the right.

Unlike the racetrack pattern, in reverse racetrack, you set your A|B line in the middle of the field. Point C is still on the edge of the field. This pattern is recommended for circular fields or other fields where the center line is clearly visible.
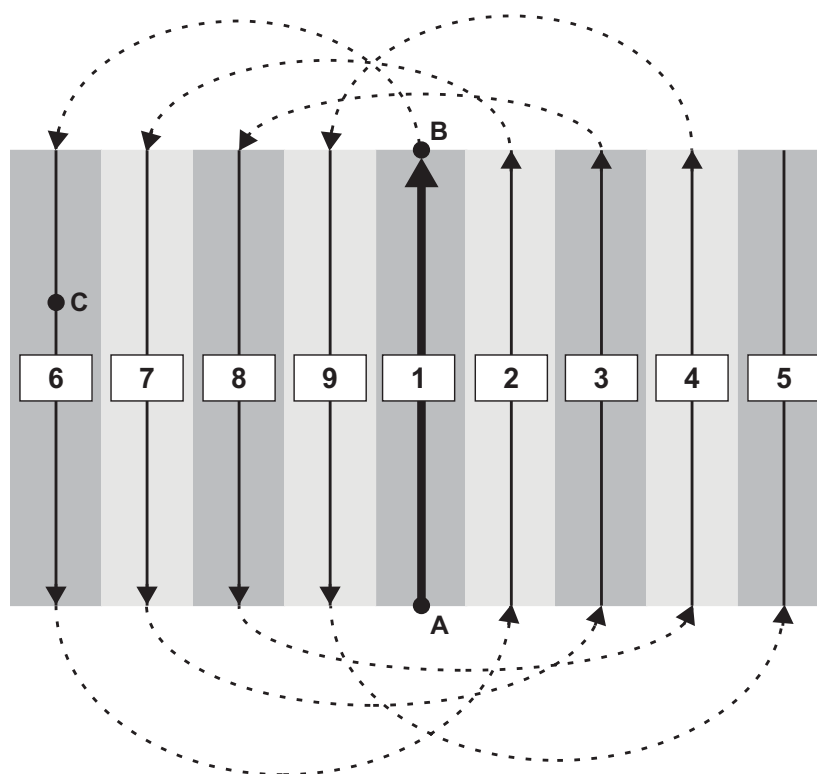

1. Set the pattern type as REVERSE_RACETRACK and set other basic job details (see "Entering Basic Job Details (Quick Start)" on page 52).
2. Set your A, B, and C points (see "Flying a Pattern" on page 73).
3. For a 9-swath field, *right reverse racetrack* pattern, spray the swaths in the following sequence: 1, 6, 2, 7, 3, 8, 4, 9, 5.

QuickTrack X Pattern (QKRTX)

This pattern is similar to the quick racetrack pattern. You specify point C for the quicktrack X pattern by either the number of swaths or by the distance from the A|B line to the furthermost swath in the pattern. After you set the A|B points, you fly the pattern like a quick racetrack. You can fly this pattern either right-to-left (LFT QKRTX) or left-to-right (RGT QKRTX).

By number of swaths
(x = 5 swaths)
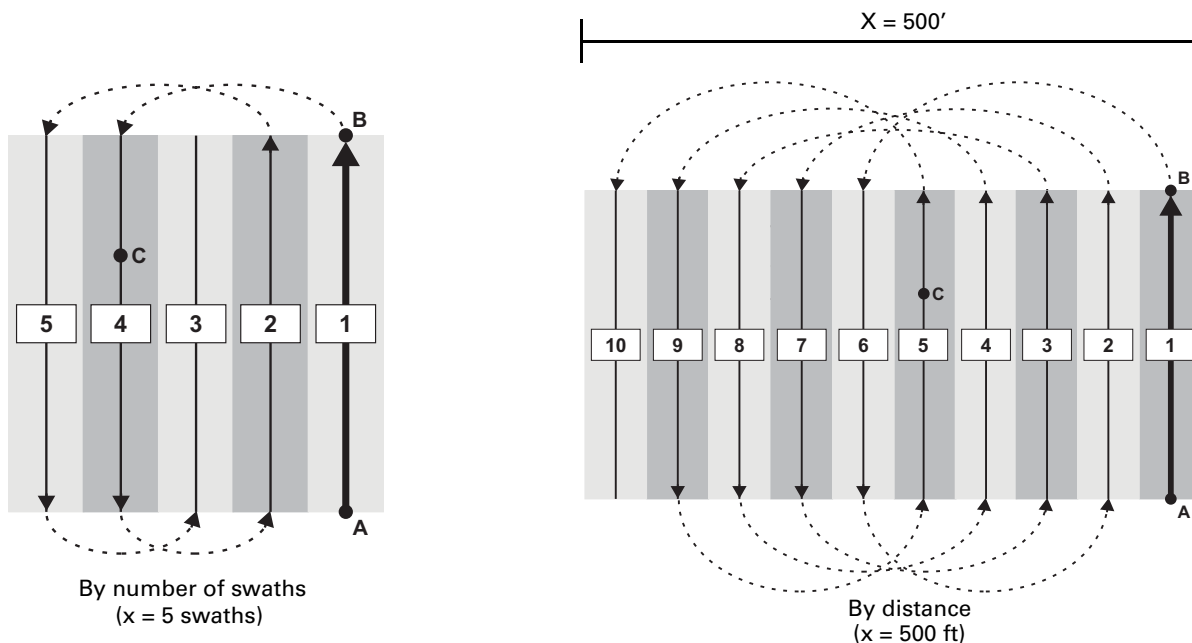
By distance
(x = 500 ft)

1. Set the pattern type as QUICKTRACK_X and set other basic job details (see "Entering Basic Job Details (Quick Start)" on page 52).

    Make sure you enter a value for Total Swaths or Distance from A-B.

2. Set your A, B, and C points (see "Flying a Pattern" on page 73).

3. Fly the pattern according to guidance cues:

    •   If x = total swaths: For example, if x = 5 (total swaths), fly the swaths in the following order: 1, 4, 2, 5, 3.

    > Note: The quicktrack X pattern is predefined as auto-repeating (you cannot set AUTO REPEAT - YES in the AirTrac [first] Setup screen—there is no need to). In the example, after flying the initial defined number of swaths, the pattern repeats on swaths 6-10 (so 6, 9, 7, 10, 8), then 11-15 and so on. The first swath in each set (1, 6 and 11 in the example) is shown in red.

    •   If x = distance: For example, if x = 500' (Swath Width set at 50'), fly the swaths in the following order: 1, 6, 2, 7, 3, 8, 4, 9, 5, 10.

LFT QKRTX
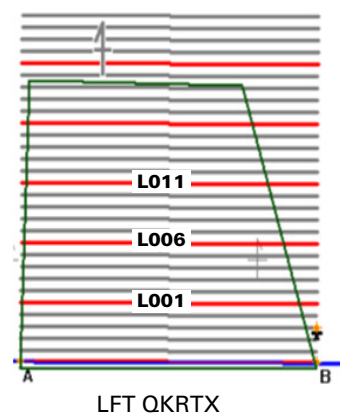
Squeeze Pattern (SQUEZ)

This pattern consists of loops of decreasing size, from the outside of the field to the middle of the field. You define the outside edges of your field (the largest loop) by your A|B|C points. You make wide turns at the beginning of your spray job when your load is heavy then make narrower turns as your load becomes lighter.
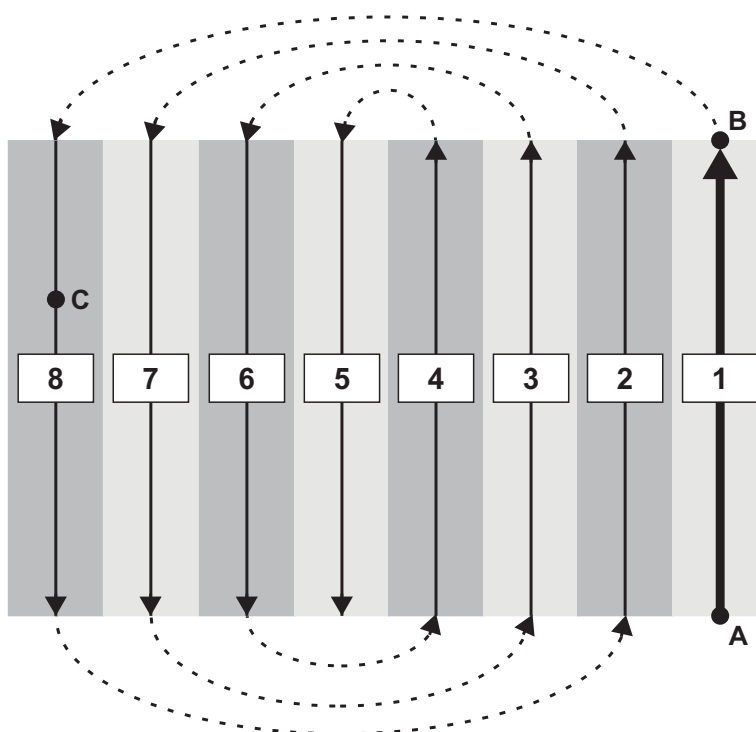
1. Set the pattern type as SQUEEZE and set other basic job details (see "Entering Basic Job Details (Quick Start)" on page 52).
2. Set your A, B, and C points (see "Flying a Pattern" on page 73).
3. For an 8-swath field, spray the swaths in the following sequence:

    1, 8, 2, 7, 3, 6, 4, 5

Expand Pattern (EXPND)

This pattern begins with the A|B line in the center of the field and successive swaths increase outward. Expand patterns are useful for fields with a visible center line or with a long, irregular shape. You can fly this pattern either right-to-left (LFT EXPND) or left-to-right (RGT EXPND).
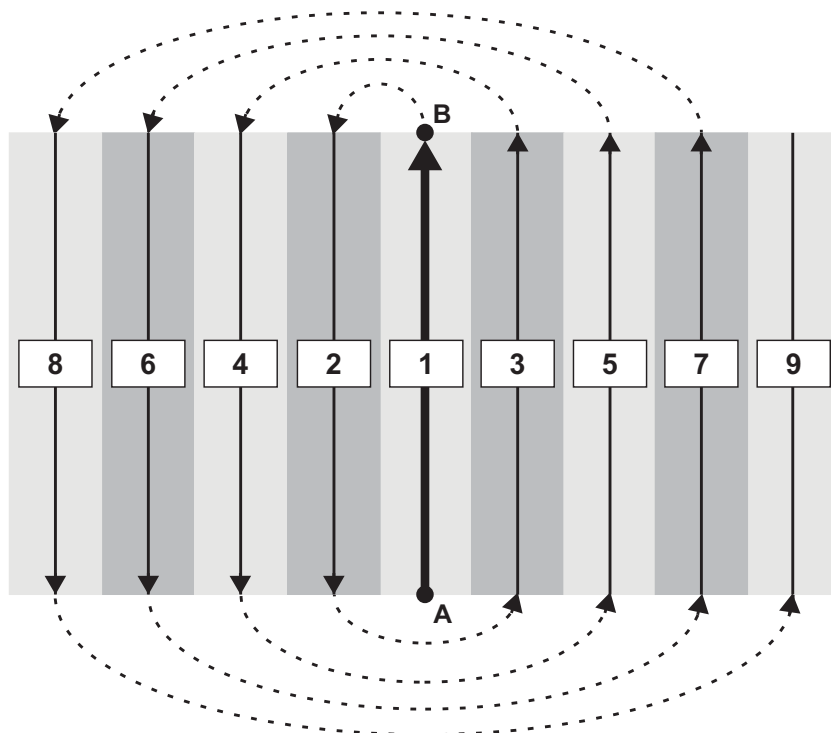
1. Set the pattern type as EXPAND and set other basic job details (see "Entering Basic Job Details (Quick Start)" on page 52).
2. Set your A|B line (see "Flying a Pattern" on page 73).
3. For a 9-swath *Expand Left* pattern, spray the swaths in the following sequence:

   1, 2, 3, 4, 5, 6, 7, 8, 9

Chapter 6: Routes, Waypoints, and Marks

Working with Routes and Waypoints

Working with Marks

This chapter explains the fundamentals of waypoints and their inseparable relationship to routes, and all aspects of management of both routes and their waypoints. It also explains marks and the data that marks store and all aspects of their management.

Working with Routes and Waypoints

A waypoint represents the GPS coordinates (lat/lon) of a significant location, such as a point along a route at which you will change course. A route comprises one or more waypoints although waypoints can be 'freestanding' that is, not associated with a route. See "Aerial Guidance Terms and AirTrac" on page 46 for an overview of waypoints, routes, and other aerial terms.

You can create waypoints that are associated with (are part of) a route—'route-based' or 'by-route' waypoints, or waypoints that are freestanding—non-route-based or 'by-name' waypoints. You can create only route-based waypoints while flying; you create freestanding, 'by-name', waypoints through the menus. Route-based waypoints appear onscreen with their route-waypoint ID, for example, 1-2 identifying route 1/waypoint 2.

You can set up routes/waypoints wholly within AirTrac (there are three methods - see following) or within an external program like MapStar and import them into AirTrac.

⚠ WARNING: *If you import the waypoints data file (WAYPTS.DAT) created in MapStar, it will overwrite any route/waypoint data you created wholly within AirTrac and your route/waypoint data will be only that which you have imported.*

Key Points about Routes and Waypoints

(These key points are reiterated in various, appropriate sections following.)

- You *create* a waypoint by 'saving' it; you *recall* a waypoint (within its route) by 'setting' it (you also 'set' a saved route to recall it—make it active).
- You can create waypoints in AirTrac (i) while flying, (ii) using the simulator or (iii) by direct entry in a dedicated routes/waypoints screen (called 'Waypoints').
- You can create routes and waypoints in MapStar and import them into AirTrac (but see warning above).

- A route comprises one or more waypoints, being the 'parent' entity for waypoints. Routes have no independent function, they just keep a set of waypoints together.
- You cannot load a route's waypoints without first loading the waypoint's route.
- If it does not already exist, Route 1 will 'self-create', that is, if, while flying, you use the keypad to create a waypoint with no route active, Route 1 is created and the waypoint is the first waypoint associated with it (usually waypoint #1, but it can be any number). That also means that if you create a waypoint while flying with no route active, the waypoint becomes a Route 1 waypoint even if Route 1 does already exist.

- If you have an active route, you do not have to clear that route to make a different route active. If you set another route it replaces the current route to become the new active one. The figure at right shows the key presses to make a route active (to 'set' a route) and how the route number shows at the bottom of the map (ROUTE 01, ROUTE 02 in the examples) or is blank (top left image). (Bearing and range relate to waypoints so are blank in the images.)

- If you save a waypoint with a number already used in the active route (or Route 1 if no route is active) the original way-point data will be overwritten. For example, if you have Route 2 active and save a waypoint as waypoint 3, when Route 2 already has a waypoint 3, the original waypoint 3 data will be overwritten. Waypoints with the same number in non-active routes (except Route 1) are not affected.
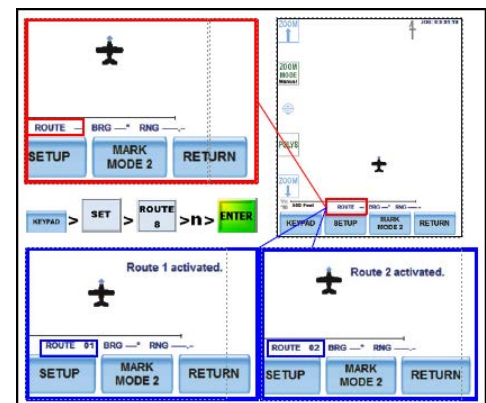
⚠ WARNING: *AirTrac does not warn you if you are about to overwrite a waypoint (by saving a new waypoint with an existing waypoint's number).*

- If you shut down AirTrac with a route active, that route will still be active when you restart AirTrac.

- If you add an optional name to the waypoint (only in the 'Waypoints' screen - 20 character limit), this name appears alongside the route/waypoint ID on the screen (see **1** at right - 'NE WTR TWR').

- When you recall/set a waypoint (route active), AirTrac provides a guidance line between the waypoint and your current position (see **2** at right). Fly on the guidance line toward the waypoint.

- When flying the waypoints of a route sequentially, you can set the distance (the 'radius') from the waypoint you are approaching at which guidance switches ('advances') to the next waypoint (see **3** at right).

Besides importing or creating waypoints, you can recall (receive guidance to) a waypoint, edit a waypoint (change the coordinates of or rename the waypoint), and delete waypoints.
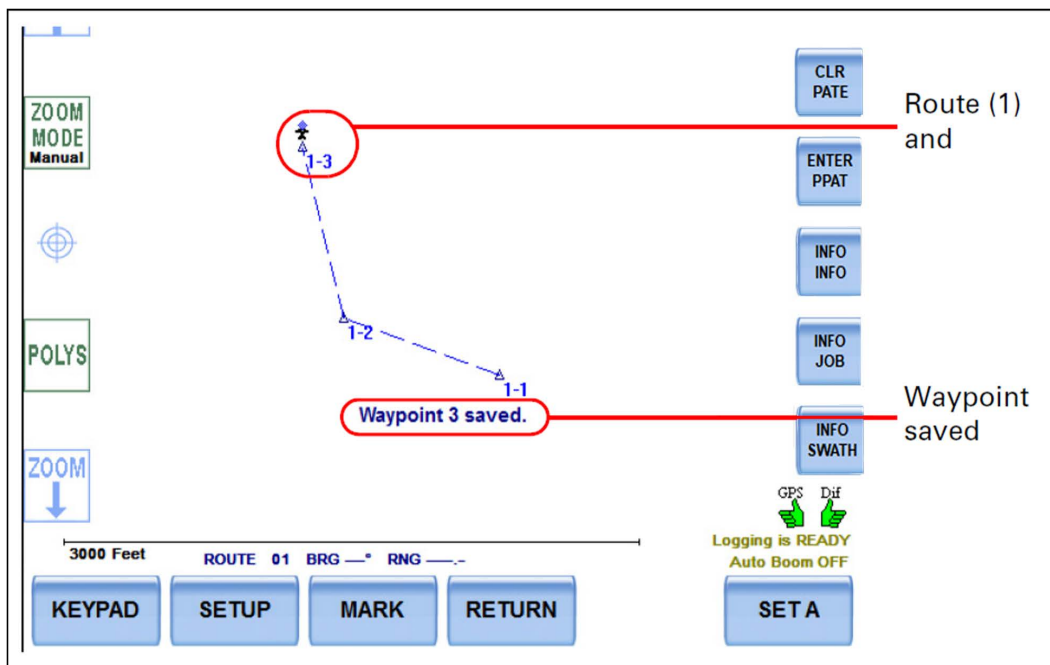
Importing Waypoints

See "Transferring Files" on page 61.
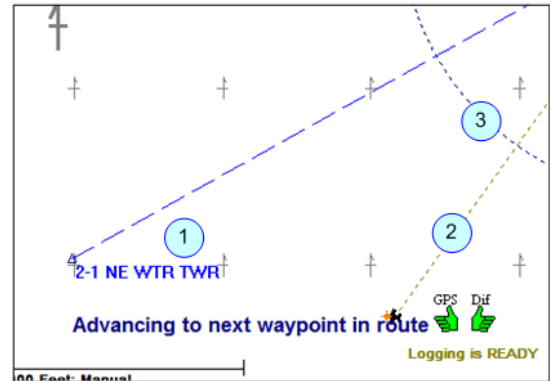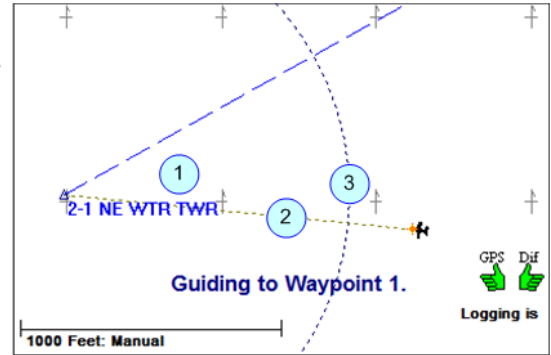
Saving a Waypoint While Flying

When you save a waypoint while flying the map displays a waypoint saved notification ("Waypoint n saved.") and a route-waypoint ID (in the format "Route # - Waypoint #"). For example, Figure 6-1 shows the map after setting waypoint 3 in route 1.

**Figure 6-1: Saved waypoint and route-waypoint indicator**

To save a waypoint while flying, press **KEYPAD** > **SAVE →** > **WPT 5** > n > **ENTER** where 'n' is the waypoint number. The waypoint's coordinates are your position when you press ENTER.

Besides the waypoint saved notification and route-waypoint ID, AirTrac displays:

- A triangle at the waypoint
- A dashed line between the new waypoint and the previous waypoint

If no route is active, waypoints are saved to route 1—you cannot save the waypoint to any other route using this 'save' (flying) method. To save waypoints to other routes, either make those routes active and fly/save waypoints or add the waypoints through the Waypoints screen.

See at right: when a route is first activated, only its route ID shows in the data panel—'ROUTE 01' in Figure 6-1. You see a route-waypoint ID (in the format RT / WPT) only while you are under guidance to a waypoint (that is, when you have 'set' a waypoint with a route active).
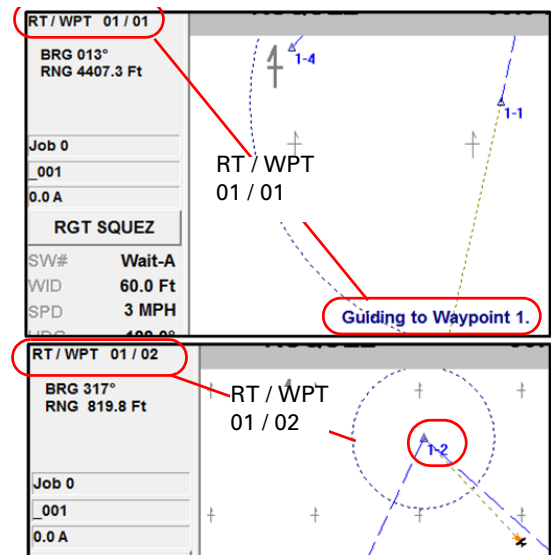
## Saving a Waypoint by Entering Coordinates

Path to the Waypoints screen:

KEYPAD **>** SETUP **>** SETUP **>** SETUP **>** Waypoints

Press each field's button and enter the required value. See additional name and radius information below.

Figure 6-2: Waypoints screen

Name: You can enter an optional waypoint name that appears alongside the route/waypoint designation on the screen. For example, if you save waypoint #2 in route #1 and enter "JF2" as the waypoint name, AirTrac displays the waypoint as 1-2 JF2.

Waypoint without name

Waypoint with name
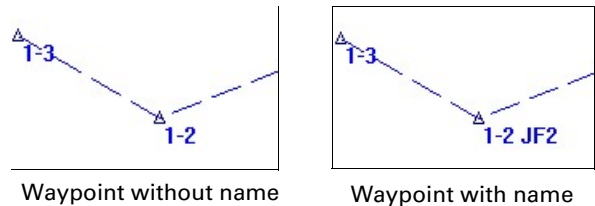
Radius: By setting a radius value, a dotted circle appears around the waypoint to which you are currently receiving guidance (see Route 1/Waypoint 2, shown as 1-2, at right). When you are within this radius, AirTrac displays guidance to the next waypoint in your route (if one exists).

Advancing to next waypoint in route
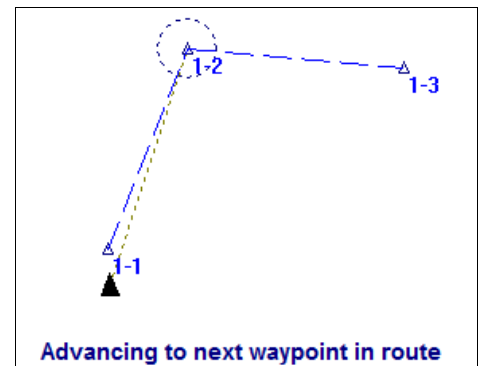
When entering the latitude and longitude you also enter the direction (N or S for latitude, E or W for longitude) as shown below.

1) Press → or press the numbers to enter values to move the cursor to just before the direction indicator ('N' in this example)

2) Press ↓ to switch between N/S (or E/W)

Recalling a Route and Associated Waypoints

Note: The procedures in this section describe menu-driven route and waypoint guidance management. AirTrac does, however, provide a 'quick' keypad-driven alternative. The keypad's ROUTE *key cycles through your saved routes (with each route's waypoint 1 active—RT / WPT **n**/01 shows in the data panel), making each route active as selected and with guidance to its waypoint 1 initiated. The keypad's* WPT *key subsequently cycles through the waypoints on the active route (RT / WPT n/**n** shows in the data panel) with guidance to the currently selected waypoint initiated.*

To work with waypoints in a route, you must first recall the route. Figure 6-3 illustrates what appears on the map when you set a route (KEYPAD > SET > ROUTE > n) then (Figure 6-4) set a waypoint (KEYPAD > SET > WPT > n). When you recall a route, the data panel shows route number only, "Route n activated." appears at the lower center of the map, and dotted lines connect waypoints in the route. You may need to zoom out to view all the waypoints in the route.

With the route activated, you can initiate guidance to the waypoints in the route. When you set a waypoint in the route, "Guiding to Waypoint n" appears on the map, a dotted line connects the aircraft position to the waypoint and a dotted radius circle appears around the waypoint. The data panel shows the route/waypoint designation and bearing/range values.
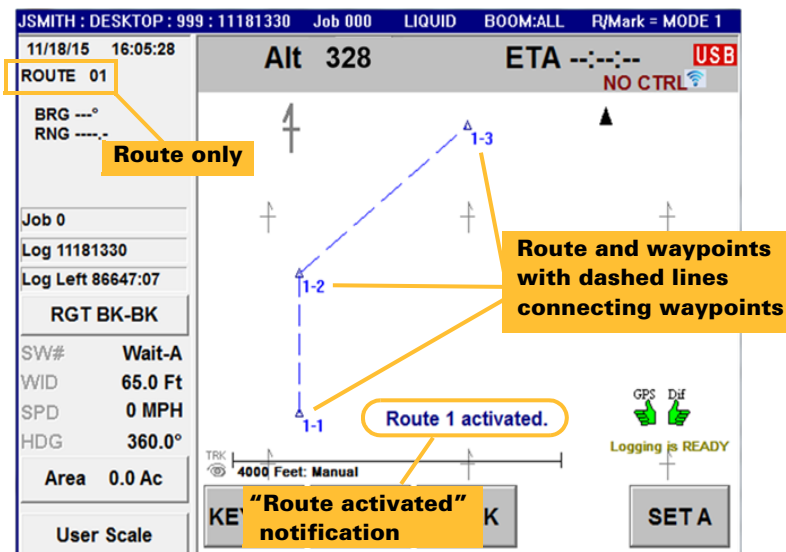
After setting
Route #1

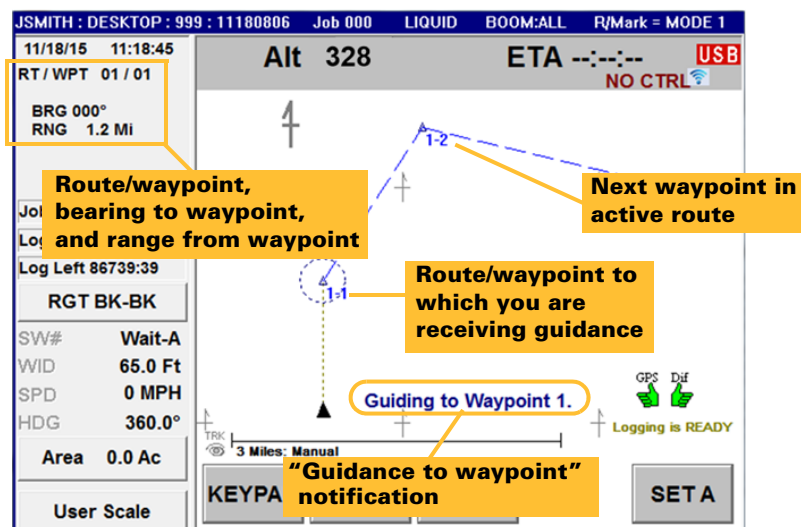**Figure 6-3: Recalled route with waypoints**

After setting
Waypoint #1

Figure 6-4: Guidance to waypoint initiated

To recall a route, press **KEYPAD** > **SET** > **ROUTE 8** > **n** > **ENTER** where 'n' is the route number.

If you have multiple routes, you can cycle through all active routes by pressing KEYPAD then pressing Route repeatedly. Each press cycles through the routes you have defined—the route number and waypoint number or just the route name is displayed near the top of the data panel.

Example: *You have two routes: Route 01 (with Waypoints 01, 02, 03) and Route 02 (with Waypoints 01, 02). Route 01 is active. If you recall Route 02 (KEYPAD > SET > ROUTE > 2 > ENTER), "RT / WPT 02 / 01" appears in the data panel (if you are outside the waypoint radius area for waypoint 01 in this route). With the Keypad still visible, if you then press ROUTE again "RT / WPT 01 /01" appears above in the data panel and AirTrac provides guidance to Waypoint 1 in Route 1 (if you are outside the radius area for waypoint 01 in this route).*

Editing a Waypoint

You can edit the name, latitude, longitude, and radius of a waypoint.

To edit a waypoint:

1. Press **KEYPAD** > **SETUP** > **SETUP** > **SETUP** > **Waypoints** .

   The Waypoints screen appears (see Figure 6-2 on page 93).

2. Select the waypoint to edit by entering the route and waypoint.

3. For name, latitude, longitude, and radius, press the appropriate button, enter a value, then press **ENTER** or **Accept.**

Deleting a Waypoint

⚠ WARNING: *Deleting a waypoint removes the waypoint from AirTrac's memory. You cannot undo this action.*

You can delete an individual waypoint or delete all waypoints at once. When deleting an individual waypoint, the route to which the waypoint is assigned must be active.

To delete an individual waypoint:

1. Press [KEYPAD] > [SET] > [ROUTE 8] > n > [ENTER] to recall the route (n) to which the waypoint is assigned.

2. Press [KEYPAD] > [CLEAR ←] > [WPT 5] > n > [ENTER] where 'n' is the waypoint number you want to delete.

To delete all waypoints, see "Deleting Files" on page 64.

Working with Marks

Marks are points to which you want to return, such as a refueling station or a large object in a field. When you create a mark, AirTrac saves the following swathing data (when such data exists):

Swath number
Pattern
A|B line
Direction
Job ID
Acreage
Swath width
Spray information

Aircraft at M1 in Job 13

M1 data in text file →

Saving a Mark

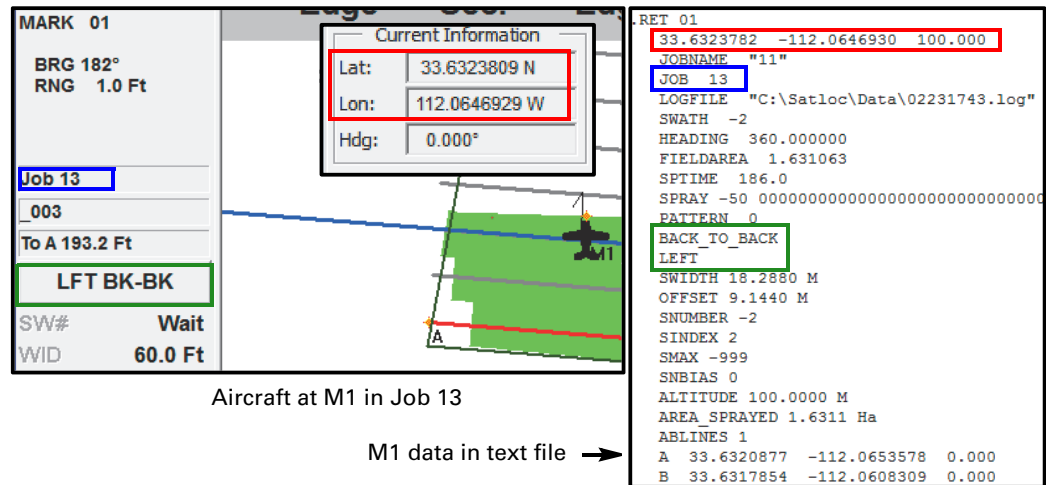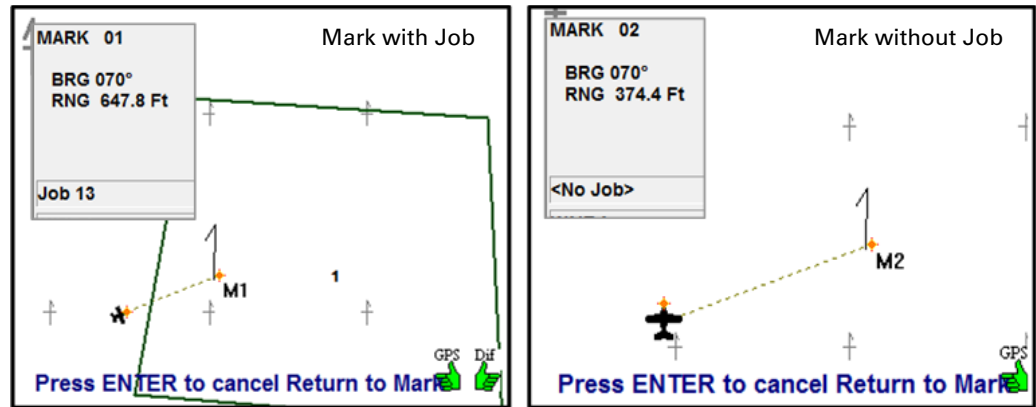You can save a mark anywhere on the map. If a job is active when you save a mark, AirTrac saves the job number (and other data) with the mark (the mark stores the job; the job doesn't store the mark). When you later use AirTrac to provide guidance to that mark, AirTrac

loads the mark, its job, and any polygons saved with the job (left image above - 'Mark with Job'). If you save a mark with no job active (map status <No Job>), AirTrac simply provides guidance to the mark, the map status remaining as <No Job> (right image above - 'Mark without Job'). In other words, marks can be, but do not have to be associated with a job.

You can save up to 99 marks—that is the total across all jobs, not per job. If you want four marks (M) across two jobs (J) they must be numbered differently— for example you cannot have J**1**M**1**, J**1**M**2**; J**2**M**1**, J**2**M**2**; you would have to have (continuing this example) J**1**M**1**, J**1**M**2**; J**2**M**3**, J**2**M**4**.

When you save a mark, the mark number appears on the map in the format of Mnn (for example, mark #12 appears as **M12**).

Note: AirTrac automatically saves your last sprayed point (where you most recently turned spray off) as mark zero (M0) and overwrites this mark as M0 each subsequent time you turn spray off. If you want to keep a mark for a previous spray-off point, create a mark for that point immediately after turning spray off. You will have two marks for this point: M0 (spray-off point) and Mn (the mark you create). These points will be very near each other. After you turn spray off again, the previous spray-off point will have just one mark—the one you created (M0 has moved).

To receive guidance to the last sprayed mark, press **KEYPAD** > **RETURN 7** > **INFO 0** *.*

Saving a Mark - Quick Method

You can quickly save a mark numbered 1 through 9 using the MARK Quick Key

1. Press **MARK** to display the Quick Marks screen (Mark numbers already in use are shown as depressed numbers—see 1, 2, 3, 4 at right—but you can reuse them to reposition a mark, that is to overwrite its position to the new position).

2. Press the button you want this new mark numbered as. The Quick Marks screen closes and the new mark (M2 - circled at right) appears on the map.
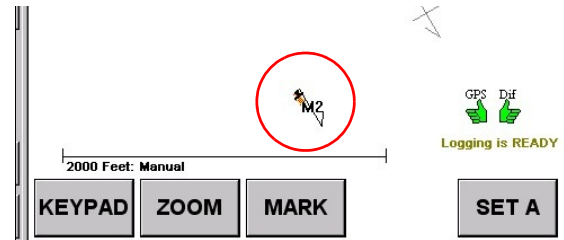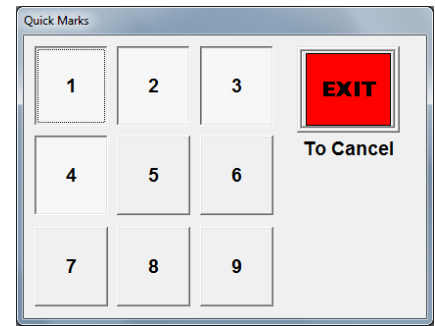
Saving a Mark - Keypad Method

Use the keypad to save a mark numbered 1 through 99. Although you can save a mark numbered 1 through 9 using the MARKS Quick Key (previous section), the following procedure is the only way to save a two-digit (10-99) mark.

To save a mark using the keypad, press KEYPAD > SAVE > MARK 4 > nn > ENTER where 'nn' is the mark number. The mark appears on the map in the format of Mnn (for example, mark #12 appears as **M12**).

Returning to a Mark

Note: There are six 'modes' under which you can return to a mark. The mode relates to what is 'loaded' onto the map with the mark. The currently active mode shows in the header as R/Mark = MODE # *. See "Select Return/Mark MODE" on page 144.*

You can return to any saved mark under map and lightbar guidance. AirTrac provides different features depending on where or how the mark was saved, for example (i) with or without an active job, (ii) with an active job that has a pattern within which some spraying has occurred. See "Returning to a Job Mark - without Patterns" on page 99 and "Returning to a Job Mark - with Patterns" on page 100.

To return to a mark numbered 1-9, press KEYPAD > RETURN 7 > n where 'n' is the mark number.

To return to a mark numbered 1-99, press

KEYPAD > SET > MARK 4 > nn > ENTER where 'nn' is the mark.

When returning to a mark:

- AirTrac provides guidance to the mark: the mark indicator appears and a dotted line connects your current location to the mark.
- A green ENTER button appears at the far right in the Quick Keys area.
- "Press ENTER to cancel Return to Mark" appears below the mark.
- The data panel shows the current bearing (BRG) and range (RNG) to the mark.

To cancel guidance to a mark, press the green **ENTER** button—"Return to Mark canceled." appears briefly.

Note: The message "Return to Mark canceled" appears under different circumstances, for example when you are using the 'Enter Poly Pat' feature (see "Auto-applying a Swath Array to a Polygon" on page 115). When you have set up the swath array for the appropriate polygon and have pressed EXIT to remove the Poly Pat panel (1) AirTrac treats A|B's A point as a mark and provides guidance to it (2). If you press ENTER (cancel guidance to a mark as described above - 3), you get the "Return to Mark canceled" message (4).
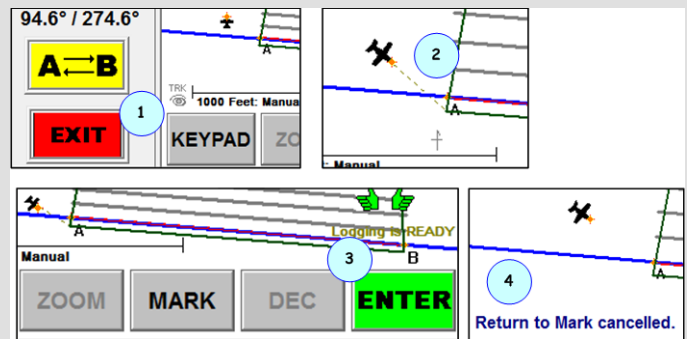

If you select the wrong mark to return to, you do not have to cancel guidance to that mark—just use either return method (depending on the mark number) for guidance to a different mark.

Returning to a Job Mark - without Patterns

Press **KEYPAD** > **RETURN 7** > **n** where n is the mark number and the mark was saved with a job active. AirTrac (i) loads the job with its polygons (it has no patterns); (ii) provides a guidance line to the mark; (iii) advises that pressing **ENTER** cancels the return to mark (cancels the guidance). The lightbar displays the bearing and distance to the mark, temporarily overriding the user-set displays.

If you press ENTER, a message confirms that guidance to the mark is canceled.
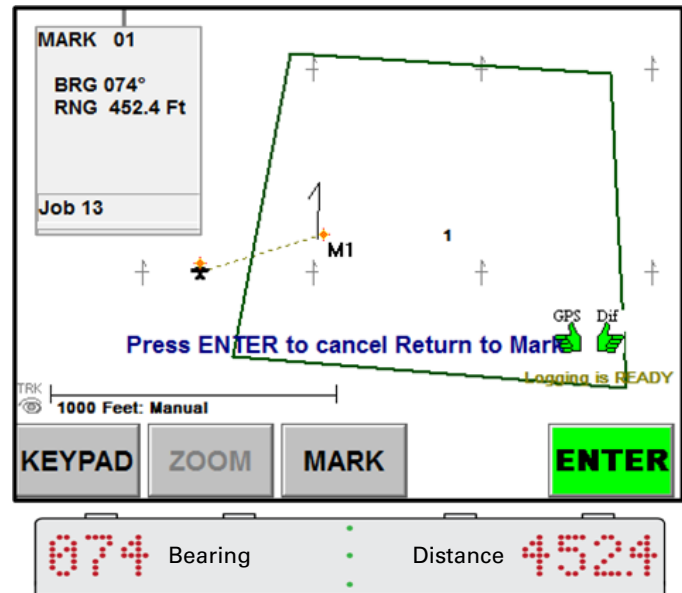

System override display

Returning to a Job Mark - with Patterns

Press [KEYPAD] > [RETURN 7] > n where n is the mark number and the mark was saved with a job active. AirTrac:

    i.   Loads the jobs, polygons and patterns

    ii. Provides a guidance line to the mark

    iii. Advises that pressing **ENTER** results in swath guidance.

The lightbar displays the heading and distance to the mark.

If you press **ENTER**, the guidance line to the mark disappears, a screen message advises that the pattern has activated, and the lightbar begins standard swath guidance (crosstrack, heading error and user-set field displays).

User-set display
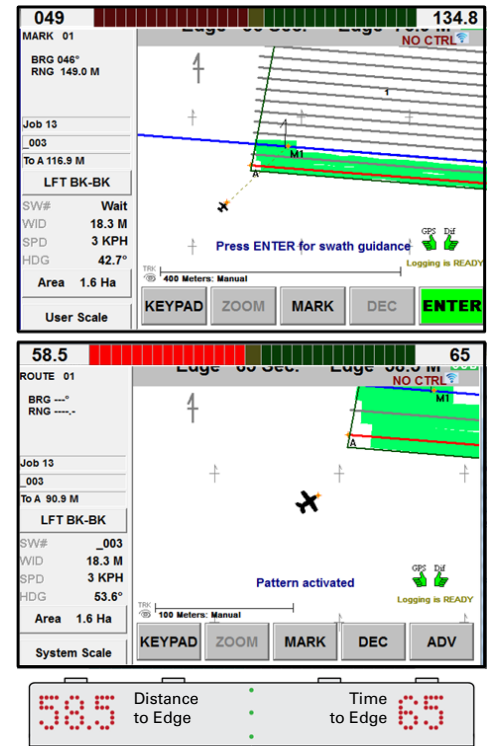
Deleting a Mark

⚠ WARNING: *Once you delete a mark it is permanently removed; you cannot retrieve a deleted mark.*

You can delete a single mark or delete all marks at once.

Note: You can delete a single mark only if that mark is active—that is selected for return guidance (KEYPAD > RETURN > n). With the mark active, use the button sequence below to delete the mark; screen messages advise that the return to mark in canceled and that the mark is cleared (deleted).

To delete a single mark, press

[KEYPAD] > [CLEAR ←] > [MARK 4] > n > [ENTER]   where 'n' is the mark number.

To delete all marks, press

[KEYPAD] > [SETUP] > [SETUP] > [SETUP] > [Clear Data] > [Clear Marks]

When the confirmation message appears, press **YES** .

Are you sure that you want to delete all marks?

[NO]   [YES]

SATLOC®

Chapter 7: Jobs and Polygons

Overview
Jobs - Polygons and Patterns
Working with Polygons

Overview

A job is an AirTrac entity which stores areas for spraying (or not spraying) and patterns for the actual spraying. In this sense you can think of jobs as *templates* for spraying operations. (For a brief introduction to jobs and their particular relationship to logs, see "Jobs and Logs" on page 47.)

The fundamentals of a job, simply put, are:

- Defined areas: where to spray (or not to spray)
- Patterns: the sequence in which swaths in the defined area are sprayed

A text version of a job's data is shown at right. Job 83 comprises one four-point inclusion polygon and one pattern. Both are shown in the bottom image.

You can define the area to be sprayed several ways, the most common being a polygon representing the boundaries of the area. You can also define a spray area by flying a polygon, creating its points as you fly them. Jobs with an area defined this way may be referred to as "boundary-defined" jobs.

You can have AirTrac auto-apply the pattern of your choice to a polygon/boundary (see "Auto-applying a Swath Array to a Polygon" on page 115) or apply the pattern yourself by flying an A|B line on one side of the polygon/boundary. Either method generates an array of swaths parallel to the boundary line used to generate the array. AirTrac will then, on demand, provide guidance to and along the swaths in the order—the sequence—dictated by the applied pattern. See "Polygons and Patterns" on page 46.

You can also generate a swath array (with associated pattern) without a pre-defined boundary by creating an A|B line (through the setting of an A and B point and, for 'closed' patterns, a C point). A job with an area defined this way may be referred to as a pattern-defined job.

You can create boundary-defined and pattern-defined jobs within AirTrac and outside of AirTrac (for subsequent import) in, for example, MapStar.


```
.JOB 83
.VERSION 2

.POL 1 1
    INC
    33.673573 -112.060576
    33.673573 -112.057383
    33.672354 -112.056777
    33.672354 -112.060302

.PAT 83 83
    BACK_TO_BACK
    LEFT
    SWIDTH 18.2880 M
    OFFSET 9.1440 M
    SNUMBER -1
    SINDEX 1
    SMAX -999
    SNBIAS 0
    ALTITUDE 0.0000 M
    AREA_SPRAYED 0.0000 Ha
    ABLINES 1
    A   33.6724360   -112.0605764   0.000
    B   33.6724360   -112.0567773   0.000
```
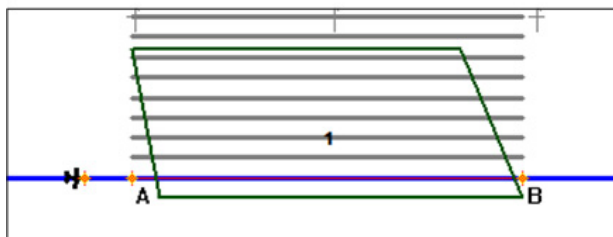

Job 83's polygon (INC = Inclusion) and pattern data: text file and in AirTrac

Jobs - Polygons and Patterns

Note: A job is active when you have loaded it using the SET command. The 'active' job has been 'loaded' (or 'set'); a 'loaded' job is the 'active' job and those terms—set, loaded, and active—are used synonymously.

A job can include up to 99 polygons and 99 patterns. But a job can include nothing. Wherever you are, you can save a job with KEYPAD > SAVE > JOB > n > ENTER. But your location would not be saved with the job—there would be no defining point like a polygon vertex or the coordinates of a pattern's A or B point. As such the job would be a placeholder or more accurately, since there's no 'place' involved, a 'name holder' (see Job 90 at right, top image, it has nothing to define where it is). In practice you will have a boundary (however created) and you will save it as part of the job, giving it content—and a place (see Job 86 at right, top image). Any polygon/boundary created while a job is active will be added to—become part of—that job.

Similarly, you could create a pattern anywhere by creating an A|B line and saving it, but if there was no active job at the time (map status <No Job>), the pattern would not 'belong to' any job and could not be recalled. To make the pattern a recallable (reloadable) item, after saving it and while it is still in the map, create a new job (see Job 84 above, top image). To save a pattern, then, you must either have a job active or, with the newly saved pattern still in the map, create a job (thus making it active) for the pattern to 'belong to'.

Jobs with/without patterns and polygons

Jobs 83 loaded (polygon loads with job)

Job 83's pattern loaded - as applied to polygon

While a job is active, only polygons and patterns saved with that job can be loaded (set) onto the map.

Other job tasks include clearing a job from the screen (not deleting it) and deleting a job.

Transferring Jobs to the Bantam Hard Drive

If you created the job outside of AirTrac and you want the job to always be available on your hard drive, transfer the job from Satloc Cloud or a USB drive to the hard drive. See "Transferring Files" on page 61.

Saving, Resaving, Creating a Job

You save a job by pressing:

[SAVE] > [JOB 9] > n > [ENTER]   where n (or nn) is the job number.
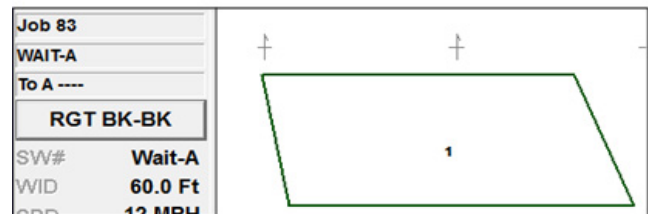
If you have an existing job active (see "Loading (Setting) a Job" on page 104), you need (re)save it only if you have changed or added a polygon (patterns already saved, loaded or not, will remain saved. See "Saving a Pattern" on page 77).

If you have created either boundaries or patterns with a map status of <No Job> or with Job 0 as the active job, you can save (in this case *create*) the job with SAVE > JOB > nn > ENTER taking care to use a new 'n' (there are no 'overwrite' warnings in AirTrac).
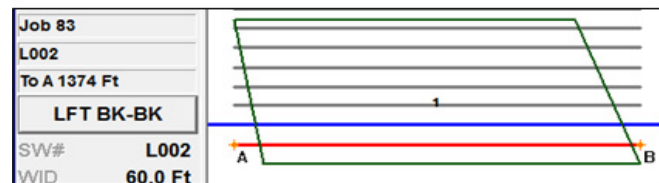
Note: <No Job> is the map status after clearing a job; Job 0 is default on startup if AirTrac is closed with map status <No Job>.

Loading (Setting) a Job

Loading a job automatically clears (closes) the current job (if one is active). When you load a job, any polygons saved with that job are also loaded.

Path to loading (setting) a job by number:

KEYPAD > **SET** > **JOB 9** > **n** > **ENTER**

where 'n' is the job number.

Path to loading (setting) a job from job list:

KEYPAD > **INFO 0** > **JOB 9** select the job you want

to set (Job 15 in the example below) then press **ENTER.**

In both procedures above, the following occur:

- If New Log Per Job is set to YES, the two messages at right briefly appear one after the other. See "New Log Per Job - Yes" on page 57.
- "Job n loaded" appears briefly in the map and the header displays the new log number (see bullet above) and the job number.

ID	NAME	PATS	POLYS
15		1	1
23		1	2
33		0	0
35		1	0
50		3	3
51		0	1

ENTER
To Accept

EXIT
To Cancel

Current LOG CLOSED   Opened NEW LOG

(If New Log Per Job = YES)

JSMITH : DESKTOP : 50 : 11191337   Job 050   LIQUID   BOOM:ALL   R/Mark = MODE 1
11/19/15   13:37:37   500 G   N/A   USB
ROUTE --   NO CTRL

WIU   65.0 Ft
SPD   0 MPH
HDG   360.0°   Job 50 loaded   GPS Dif
Area   0.0 Ac   Logging is READY
TRK   500 Feet: Manual
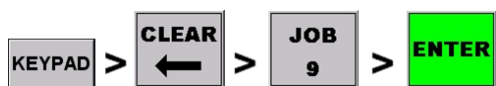System Scale   KEYPAD   ZOOM   MARK   SET A

Clearing a Job from the Screen (temporary removal)

Clearing a job removes it from the screen—it does not delete the job.

Path to clearing a job (from the screen):

KEYPAD > **CLEAR ←** > **JOB 9** > **ENTER** . "**Current JOB and/or Pattern are cleared.**" appears briefly in the map and <No Job>* appears in the header.

Clearing a Job from AirTrac (deleting - permanent removal)

⚠ **WARNING:** *Deleting a job permanently removes it—you cannot retrieve a deleted job. When you delete a job all its polygons and all its patterns are deleted with it.*

You can delete a single job or delete all jobs.

Path to deleting a job or jobs (permanently):

KEYPAD > **CLEAR ←** > **JOB 9** > **n** > **ENTER** where 'n' is the job number. A

confirmation message similar to that at right appears. Press **YES**.

To delete all jobs, see "Deleting Files" on page 64, which includes information on deleting all files of a specific type (including jobs).

Are you sure that you want to delete Job Number 51?

NO   **YES**

Working with Polygons

A polygon represents the boundary of an area you want to spray, a field for example, or not spray—a 'no-spray zone'. In AirTrac, you can create 'inclusion' and 'exclusion' polygons. You can also import both types plus a third type—an 'open' polygon:

- Inclusion polygon (enclosed area you spray)—dark green border.
- Exclusion polygon (enclosed area you do not spray)—purple border.
- Open polygon (not actually a polygon because it's not a closed shape: it's a multi-point line created in MapStar and imported into AirTrac).

Inclusion and exclusion polygons, which you can create in different ways, or import (from MapStar for example), show you the boundaries of your spray/no-spray areas in the map (Figure 7-1) Note the polygon type is identified by its color.
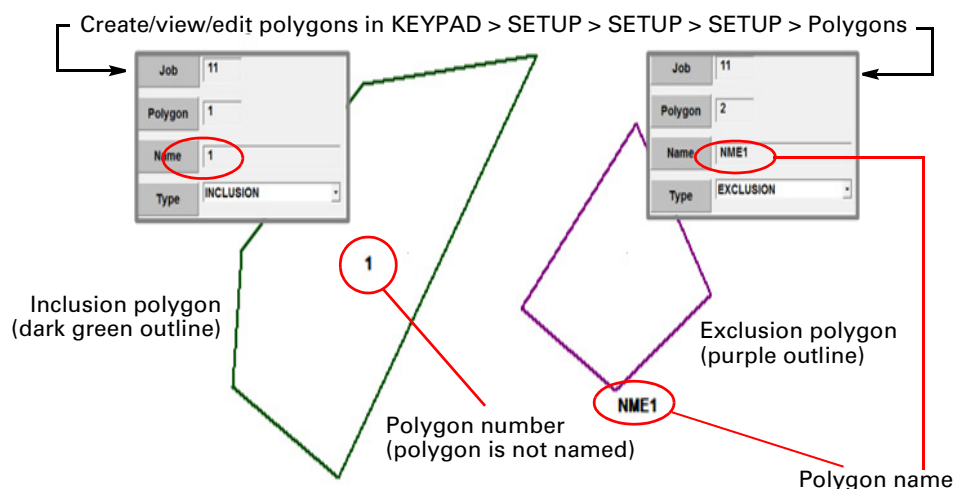
Figure 7-1: Inclusion and exclusion polygons

Table 7-1: Polygon types - details

Type	Description
Inclusion	Inclusion polygons define spray areas. When creating polygons by coordinates in AirTrac (KEYPAD > SETUP > SETUP > SETUP > Polygons), the default type is inclusion (see polygon 1's **Type** in Figure 7-1): you can change this to exclusion. AirTrac sums the areas of multiple inclusion polygons in a job. You can select Total Polygon Area as an onscreen or lightbar display option (see "Screen Displays Screen" on page 30 and "Lightbar Setup Screen" on page 37). Inclusion polygons have dark green sides.
Exclusion	Exclusion polygons define no-spray areas (see Inclusion above for changing the default type). Exclusion polygons have purple lines. Exclusion polygon areas wholly or partially within an inclusion polygon subtract from the total polygon area.
Open	Open 'polygons' are polylines (an unclosed shape). Multi-point open polylines created in MapStar become open polygons in AirTrac.

*Note: Accessing the polygons screen (*SETUP > SETUP > SETUP > Polygons*) closes the current log and starts a new log.*

Numbering and Naming Polygons

When you create polygons in MapStar (and save with a job), they are automatically sequentially numbered (and counted as there is a limit of 99 per job). You can give your polygons names but if you don't name them, their 'name' is the same as their number.

When you create polygons in AirTrac (normally within a job), you have to number them manually. To avoid overwriting an existing polygon for the active job, you need to know what polygon numbers have been used. See Note before step 1 on page 107.

Note: The polygon examples provided in this section are illustrative only; as such, although they are not authentic examples of boundary polygons, they do demonstrate the key points of the feature or functionality.

This schematic shows: (**1**) four polygons, created left to right in MapStar and saved as Job 10. The first and third (green) are inclusion polygons, the second and fourth (purple) are exclusion polygons. (**2**) shows the four polygons in AirTrac (Job 10 active). Note that the polygons retain their border color. (**3**) is the text file of Job 10. Note that polygons have two numbers (1 1, 2 2 etc.) They are the polygon's sequence number and 'name' respectively and, in (**3**) the name and number are the same because names were not allocated in MapStar. (**4a**) to (**4c**) show each polygon's detail via KEYPAD > SETUP > SETUP > SETUP > Polygons. Note that (i) the name for each is its number (field Polygon) and (ii) - in (**8**), polygon 1 now has a name. The coordinates are for each polygon's first vertex. (**5a**) to (**5c**) show each polygon being selected (for viewing/editing). (**6**) is a composite of a new text file (**3**) showing each polygon's (new) name. (**7**) is (**2**) but with the polygons now named. (**8**) is (**4a**) with polygon 1 now named (NI1).
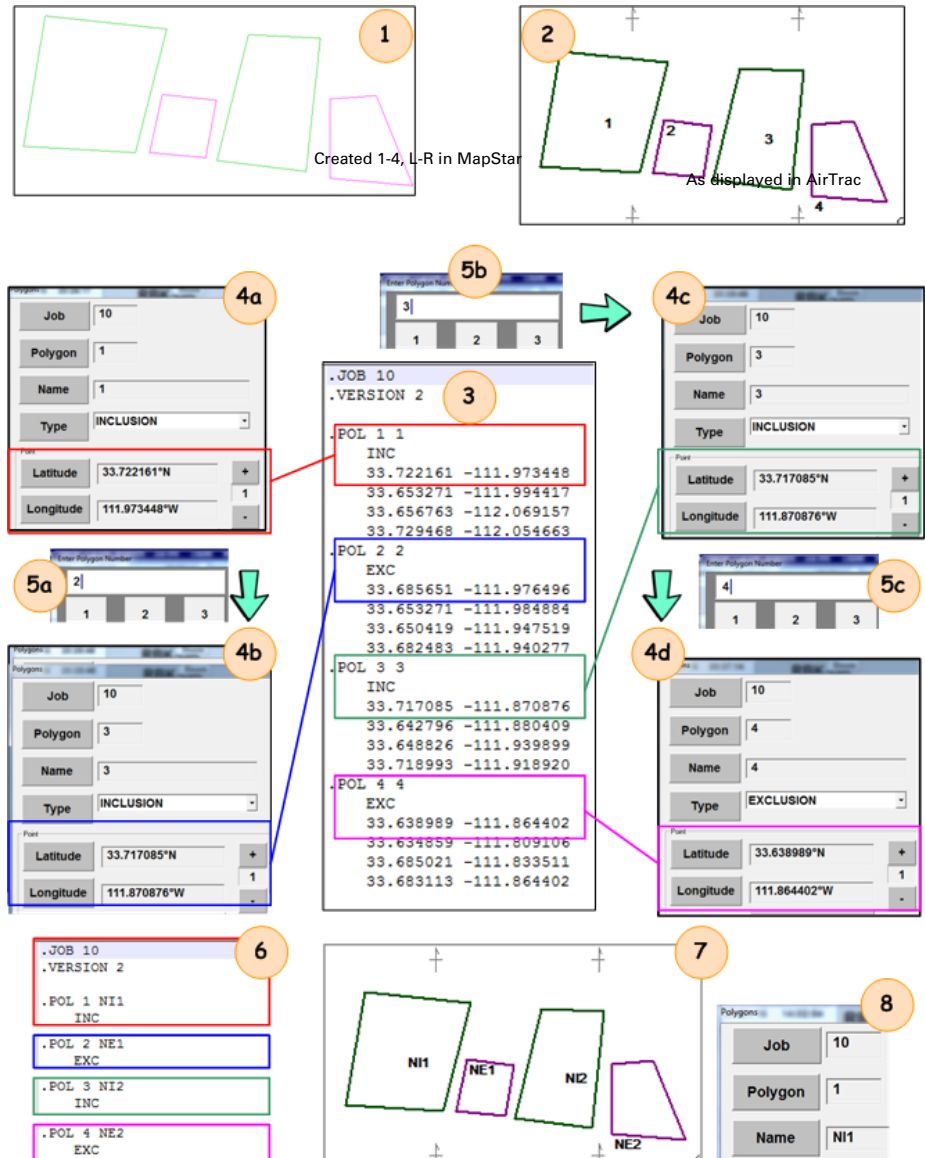
Using Polygons

Inclusion polygons, however created, are the basis of your flying pattern (swath sequence). You can have AirTrac apply your chosen pattern automatically (see "Auto-applying a Swath Array to a Polygon" on page 115) or you can establish a pattern by flying/setting an A|B line on one side of your polygon.

While flying toward a polygon edge you can use the Edge Distance and Time to Edge lightbar display options to monitor your approach. Distance and time—which are based on you current heading—are momentarily zero as you cross the polygon edge and then immediately start registering the distance and time to the next edge on your current heading (if applicable, that is if you are inside the polygon). You can

also set the lightbar to provide a flashing time-based or distance-based warning on your approach to a polygon - see "Edge Warning" in Table 3-4 on page 34 and "To set the lightbar edge warning" on page 36.

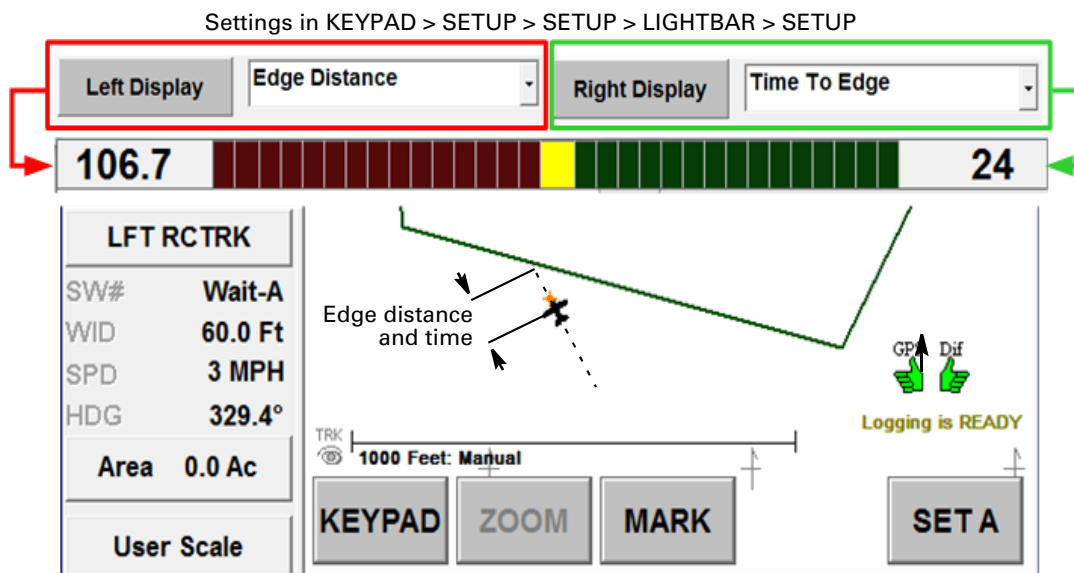Settings in KEYPAD > SETUP > SETUP > LIGHTBAR > SETUP

Figure 7-2: Edge Distance and Time to Edge lightbar settings

Creating Polygons

You can create polygons:

- In MapStar (saving them as/with a Job):
    - By 'drawing' (clicking vertices)
    - By entering the polygons' vertices coordinates 'manually'
- In AirTrac (saving them as/with a job):
    - By flying their shape and marking their vertices (saving their coordinates)
    - By entering the polygons' vertices coordinates 'manually'

Setting Polygon Points as You Fly

When setting polygon points while flying, on entry of the third point AirTrac creates a triangle onscreen by joining the third and first points and displays the enclosed area. (The polygon area is displayed as 0.00 until then - see steps following). As you add points AirTrac joins the (new) last point to the first point creating, progressively, a quadrilateral, a pentagon, a hexagon, and so on. The enclosed area is updated with each added point.

*Note: AirTrac does not provide 'overwrite protection' with polygons. If you have a job active, and that job has polygons, if you create a new polygon and on **SAVE** use an existing polygon's number, your new polygon will overwrite (delete/replace) the existing polygon. Check in KEYPAD > SETUP > SETUP > SETUP > Polygons where, for the active job, you can check which polygons (numbered in the **Polygon** field) have coordinates. When you see <NEW> in the Latitude and Longitude fields, that polygon does not yet exist and you can use its number for a new polygon. See also step 6 on page 108.*

To set polygon points as you fly:

1. Press [KEYPAD] > [POLY 6] > [POLY 6]:
    - The map displays the message **'Swath Advance button will work as POLY button until EXIT is pressed'**
    - Buttons labeled **–** (minus) and **+** (plus) appear at the top of the map

• **SAVE** and **EXIT** Quick Keys appear at the lower right

Buttons for adding a polygon point (+) and canceling a polygon point (-).

Press **+** to add a polygon point
Press **-** to cancel (undo) a polygon point (the last added)

Means remote swath advance button will work as **+** button until EXIT is pressed

Press **SAVE** to save a polygon, **EXIT** to cancel
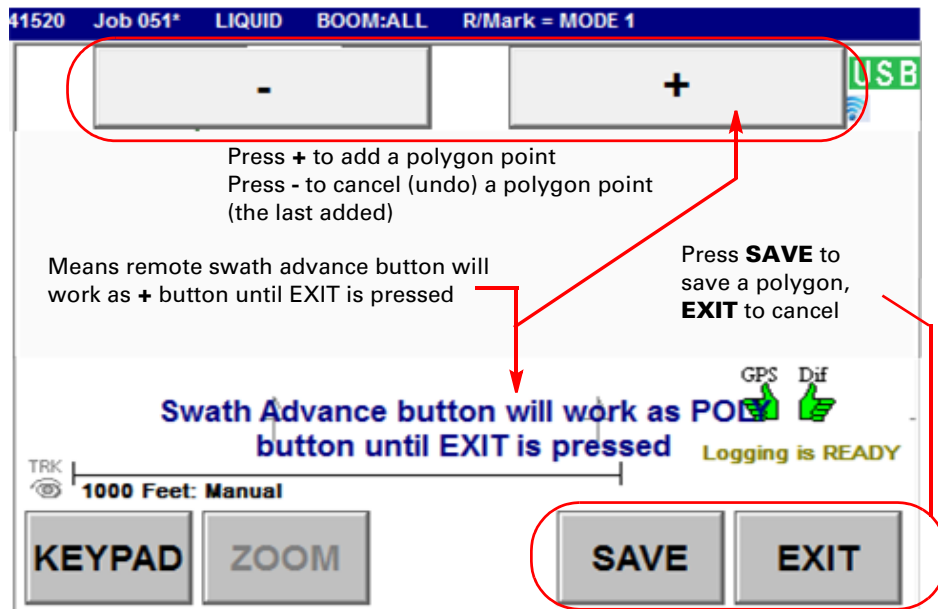
Figure 7-3: Create, save or exit a polygon

2. At the start point of your polygon, enter the first polygon point by:
   • Pressing the + button, or
   • Using the remote swath advance switch, or
   • Pressing KEYPAD > ADV

   '**1 points in polygon   0.00 Ac**' appears near the bottom of the map.

3. Fly to your second polygon point and, by your preferred method, enter the second point. See at right, the screen message updates to: '**2 points in polygon 0.00 Ac**'.

   > Note: KEYPAD > DEC and ADV work as the – and + buttons on the screen, where the – button removes the last vertex entered. ADV works as the remote swath advance button also.

4. Fly to your third point and add the third point. AirTrac creates a triangle from the three points. See at right, the screen message updates to:
   '3 points in polygon n.nn Ac' where n.nn is the area of the triangle/polygon.

5. Continue adding points. With each point entered, AirTrac adjusts the shape (joining the last point to the first) and updates the onscreen 'points' message and the area of the polygon.

6. When you have entered your last point, press Quick Key **SAVE**—the Enter Polygon Number window appears. Enter a number for the polygon, but note the following (and see also "Saving/Using a Polygon without a Job - Single Session" on page 112):

   • If a job was active while you created the polygon, and that job already has polygons, make sure you save your new polygon with an new/unused polygon number - see Note before step 1 on page 107. The new polygon is automatically saved to the active job and you do not need to save the job itself (if you check KEYPAD > INFO > JOB you will see the job's polygon count has increased).
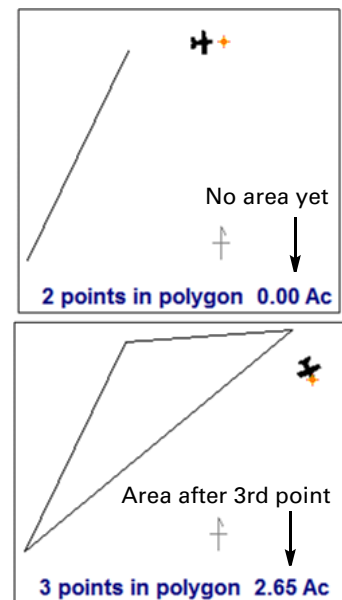
- If the map status was <No job>, when you created, saved (and numbered) your new polygon, you can still 'manually' save the polygon to a *new* job with KEYPAD > SAVE > JOB > n > ENTER, but note the following:
  - 'n' must be a new job number - if 'n' is already a job, that job will be overwritten and the new job 'n' will contain only your new polygon.
  - Polygon numbers appear only after the polygon is 'manually' saved to a job (if auto-saved to the active job, the new polygon number appears immediately).

Note: If an exclusion polygon is wholly or partially inside an inclusion polygon, the area of the exclusion polygon inside the inclusion polygon is subtracted from the total polygon area. See "Calculating Total Polygon Area" on page 112.

Repeat the procedure as required, flying additional polygons and saving them to the current job with a new polygon number each time. At right: top image, before saving; bottom image, after 'Quick' saving (number only) and subsequent naming (in KEYPAD > SETUP > SETUP > SETUP > Polygons.)
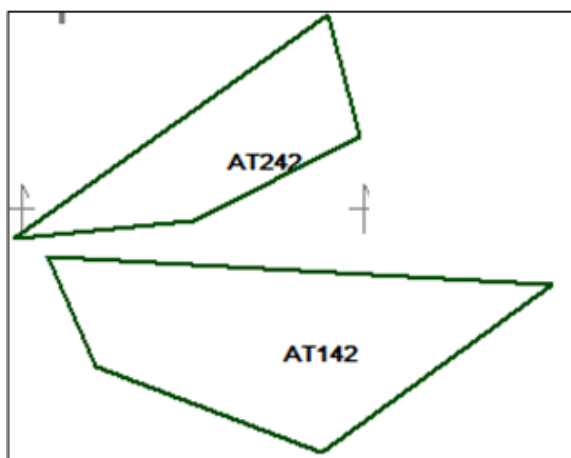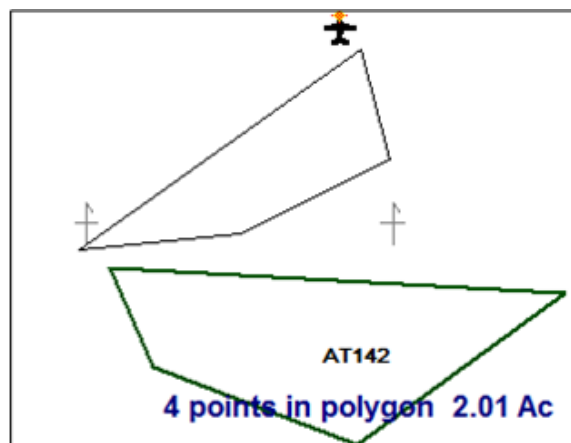
Manually Entering GPS Coordinates of a Polygon

To manually enter the GPS coordinates of a polygon:

Press [KEYPAD] **>** [SETUP] **>** [SETUP] **>** [SETUP] **>** [Polygons] —the Polygons window appears. The default job number is the active job number, the default polygon number is 1. You can change both.
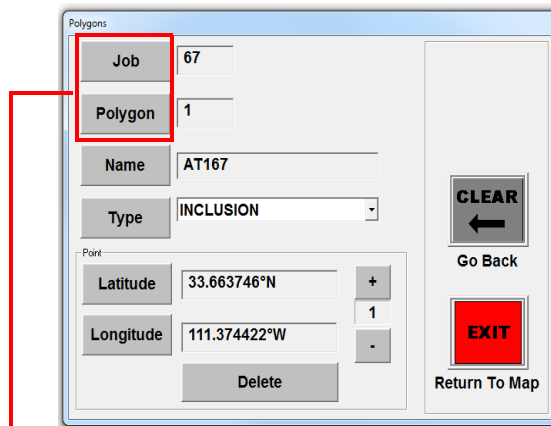
Figure 7-4: Polygons window

If necessary, press the **Job** and **Polygon** buttons (Figure 7-4 and **1a**) and enter the job and polygon number (**1b** - the 'Enter Job Number' window is shown at 1b—the polygon's window is the same.)

Press **Name**, enter a value in the data entry window that appears. Press **Accept** (**2**).

Accept the default or press **Type** and select INCLUSION, EXCLUSION, or OPEN from the drop-down list (**3**). See "Working with Polygons" on page 105 for information on polygon types.

Press **Latitude** and **Longitude** and enter the coordinates* for each polygon point (**4a** - 'Enter Latitude' window shown, the default point is 1). Press **Accept**.

* (**4b**) To change N/S or E/W, use the left/ right arrows to place the cursor to the left of the N (S, E or W), then press the down arrow, which toggles the direction pairs N/S, E/W.

For each additional point in the polygon, press the plus (**+**) button to move to the next sequential polygon point, (re)set the type (if necessary) and enter the new point's coordinates. When finished entering all the polygon information, press **EXIT** to close the Polygons window and return to the map. Press CENTER in the ZOOM panel to shift the map to the new polygon's position if necessary.
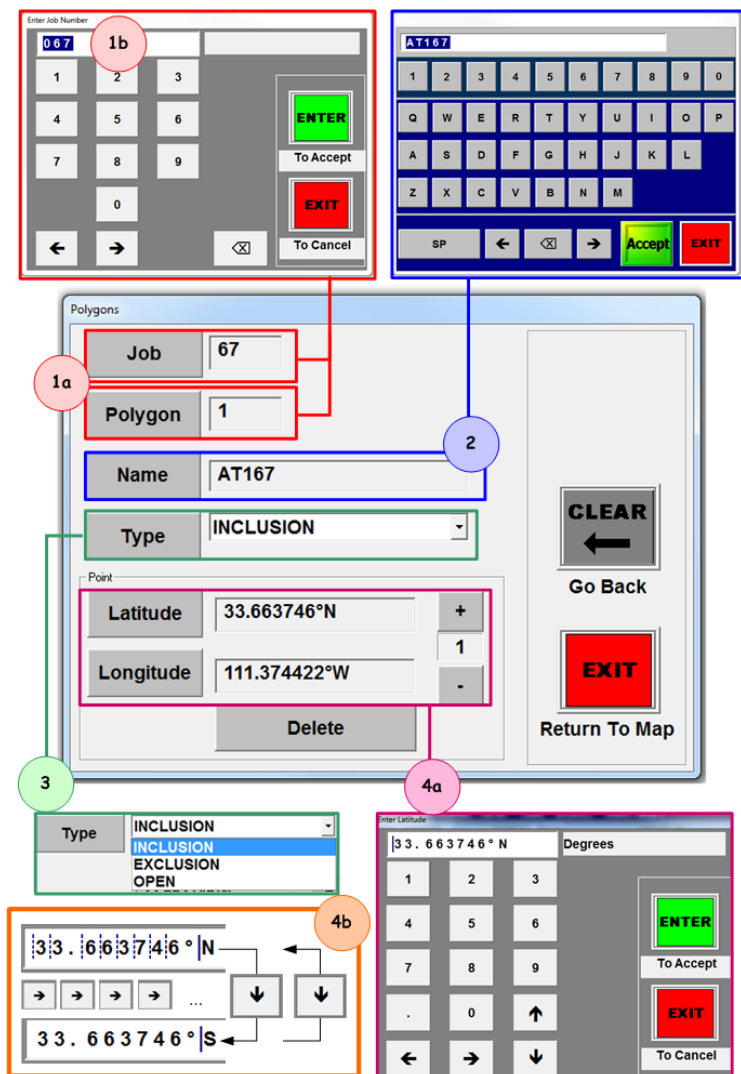
The example below shows polygon AT167 created with the above procedure entering these polygon points (in decimal degrees):

1: 33.663746°N, 111.374422° W
2: 33.660937°N, 111.298444° W
3: 33.613269°N, 111.289794° W
4: 33.611047°N, 111.376713° W
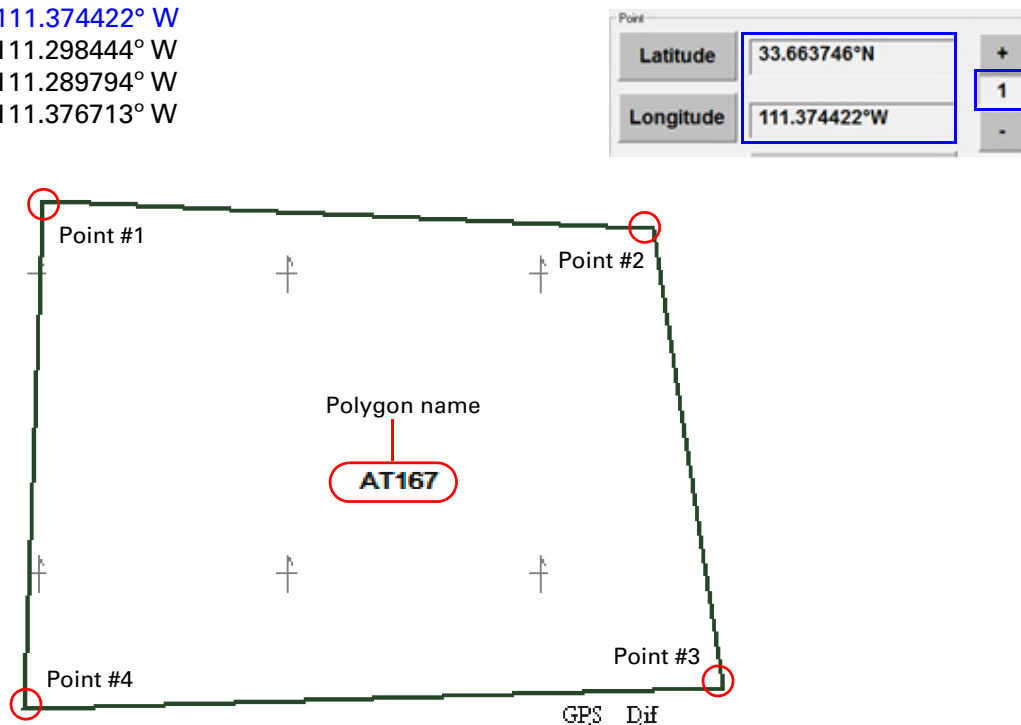
Figure 7-5: A 'coordinate-entered' polygon (Job 67)

Repeat the process for other polygons to be associated with the same job, AT267 for example (in Figure 7-6):

1: 33.660087°N, 111.292861° W
2: 33.613261°N, 111.287079° W
3: 33.613394°N, 111.260150° W
4: 33.659553°N, 111.264110° W
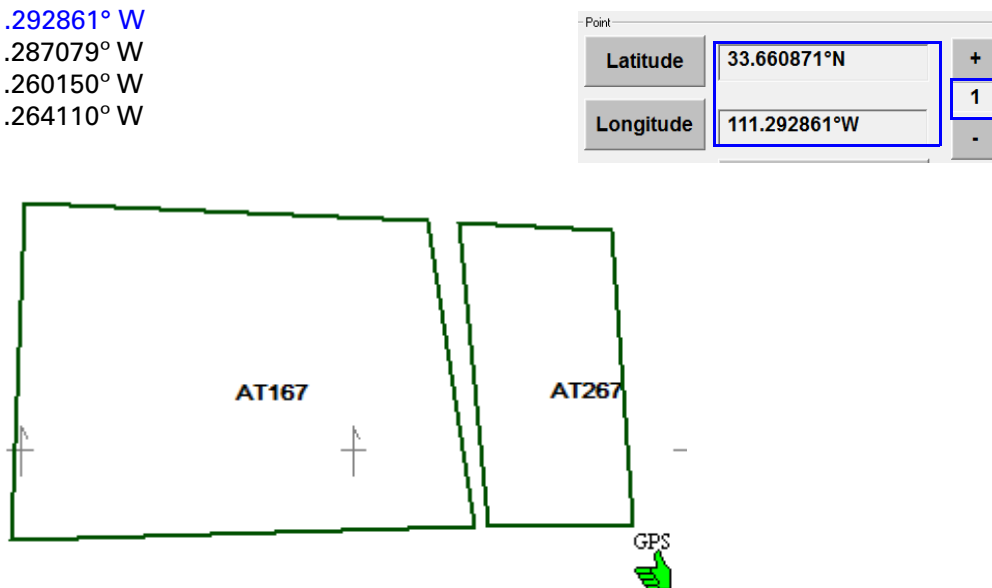
Figure 7-6: A second 'coordinate-entered' polygon (Job 67)

*Note: To see the total cumulative area of your inclusion polygons set one of your field (fields 1-3) displays to **Total Polygon Area** through SETUP > SETUP > SCREEN > DISPLAYS. The total polygon area is the sum of the inclusion polygon areas less the area of any exclusion polygons wholly or partially inside an inclusion polygon (see "Calculating Total Polygon Area" on page 112).*

Calculating Total Polygon Area

The total polygon area is the sum of the areas of all the inclusion polygons in a job less the area of any part of exclusion polygons within the inclusion polygons.

Tip! *Total Polygon Area is a lightbar display option. See "Screen Displays Screen" on page 30.*

From the total area of the inclusion polygons, AirTrac subtracts the:

- Area of any exclusion polygons wholly within inclusion polygons
- Area of any parts of exclusion polygons within inclusion polygons

Figure 7-7 shows how AirTrac calculates the total polygon area. Polygons 1, 3, and 4 are inclusion polygons; polygon 2 is an exclusion polygon.

In A, the total polygon area is Polygon 1 area minus Polygon 2 area.	In B, the total polygon area is Polygon 1 area minus the shaded area of Polygon 2.	In C, the total polygon area is the sum of Polygons 1, 3 and 4 area minus the three shaded areas of Polygon 2
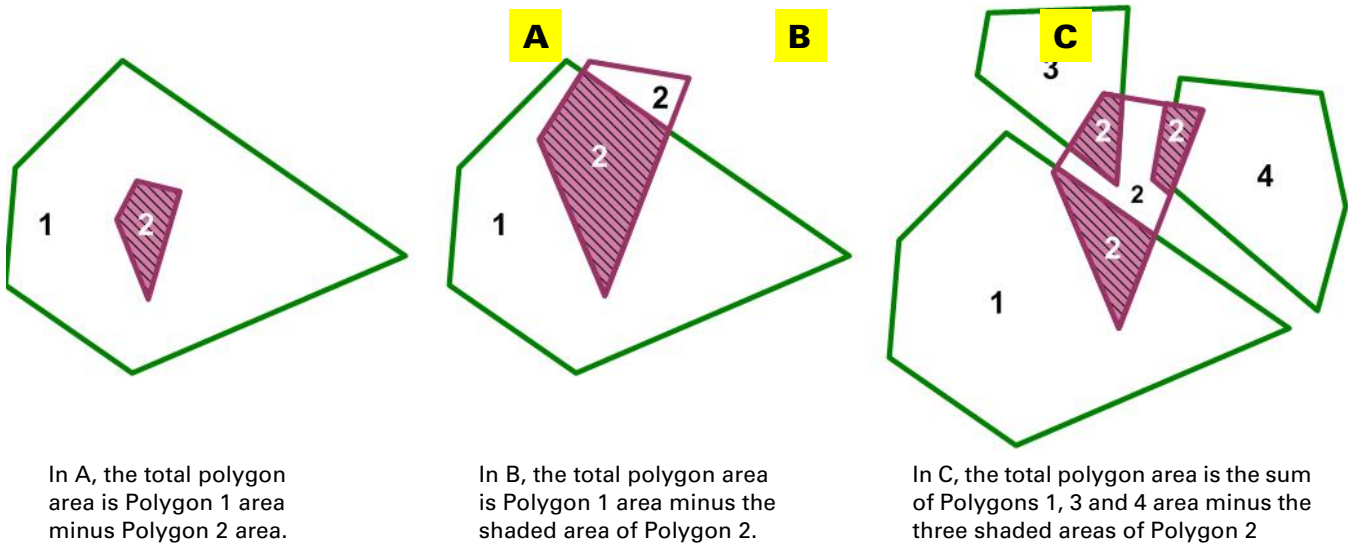
Figure 7-7: Total polygon area calculations in AirTrac

Saving/Using a Polygon without a Job - Single Session

If you want to create and use a polygon without saving it (as part of a job):

1. Press KEYPAD > CLEAR > JOB > ENTER to clear all jobs (map status <No Job>).
2. Press KEYPAD > POLY > POLY then define your polygon points (steps 1 to 5 of "Setting Polygon Points as You Fly" on page 107).
3. When you have finished defining your polygon, *do not use the SAVE Quick Key*. Instead, press KEYPAD > SAVE > POLY > EXIT (so do not enter a polygon number). AirTrac returns you to the map with the (unnumbered) polygon still displayed and the SET A button available. The map status is still <No Job>.
4. Set your pattern points (A, B, and C if necessary—see Note (ii) below) and fly/spray your swaths in pattern order.

   Notes: (i) You cannot use the Enter Poly Pat feature with these temporary polygons; (ii) you can save your pattern—with no job specified, the pattern is auto-saved to Job 0; (iii) logging occurs normally.

   When you exit AirTrac the polygon is deleted from the system and any pattern associated with it is also deleted unless you saved the pattern (KEYPAD > SAVE > PATTERN > n—auto-saves to Job 0 so can be recalled/loaded [SET] only with Job 0 active). If you overwrite Job 0, you lose the pattern. Any data logged during the flying operation is saved normally.

Saving/Using a Polygon without a Job - Multiple Sessions

In the same way as you can save (auto-save) the pattern to Job 0 in the preceding procedure (without saving the polygon), you can also save the polygon to Job 0.

Briefly:

1. Clear an active job if necessary (so map status <No Job>).
2. Fly a polygon.
3. On completion, save the polygon (KEYPAD > SAVE > POLY > n > ENTER); the polygon auto-saves to Job 0.
4. Set and fly/spray your pattern (auto-save the pattern to Job 0 if required).

> *Notes: (i) You **can** use the Enter Poly Pat feature with these numbered, Job 0 polygons; (ii) logging occurs normally.*

When you exit AirTrac your polygon is auto-saved to JOB 0 and when you restart AirTrac, with JOB 0 being the default startup job, your polygon is also loaded just as any polygon is loaded with its job (ZOOM > CENTER if necessary). The polygon, like any saved pattern, remains a component of Job 0 until you save Job 0 with new components.

Editing a Polygon

You can edit all aspects of a polygon.

1. Press KEYPAD > SETUP > SETUP > SETUP > Polygons.
2. In the Polygons window (the active job and polygon 1 are the defaults—change as required), make the data changes required. See "Manually Entering GPS Coordinates of a Polygon" on page 110.

Deleting a Polygon

⚠WARNING: *You can use the same polygon numbers in multiple jobs; therefore, make sure that when deleting a polygon you delete it from the correct job. The number you enter is the number of the polygon in the current job.*

To delete a polygon:

1. Press KEYPAD > CLEAR > POLY > n > ENTER (where 'n' is the number of the polygon you want to delete). A message similar to the one at right appears.
2. Press **YES** to confirm the deletion.

Receiving Guidance to a Polygon

To receive guidance to a polygon, with the job containing the polygon loaded, press

 where 'n' is the polygon to which you want to receive guidance.

To cancel guidance to a polygon, press **KEYPAD** **>** **ENTER** . The message "Return to Mark canceled."

displays briefly.

While receiving guidance to a polygon:

- The map provides a dotted guidance line between you and the center of the polygon (fly along the line) and the lightbars (real and virtual) provide bearing and distance data. The bearing and distance data is displayed in the left and right lightbar fields irrespective of your user setting for those fields—AirTrac overrides user settings during guidance.

User settings

Receiving guidance to specified polygon

- The data panel displays "POLYGON", the polygon number and name (01 and NI1 in Figure 7-8) and bearing and range values to the polygon.

- If your left and right screen display options are Time to Edge and Edge Distance (see "Screen Displays Screen" on page 30) these values appear when *any* polygon side is in your flight path (it may not be the one you are under guidance to). If you cross a polygon's edge and are inside the polygon, the display changes to the time and distance to the next side in your flight path.
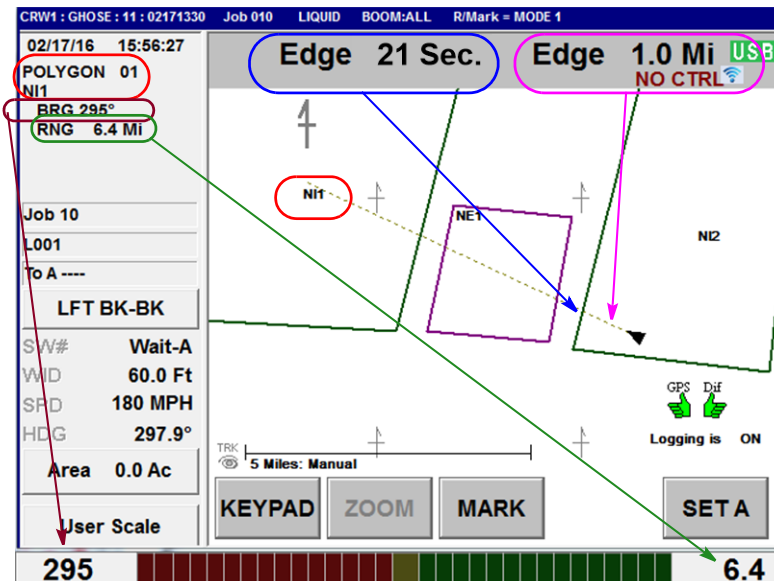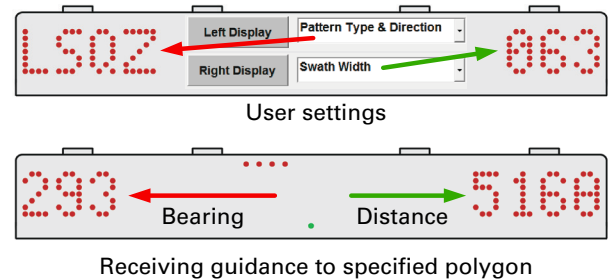
Figure 7-8: Under guidance to polygon 01/NI1, bearing 295°, at range 6.4 mi

Notes: When receiving guidance to a polygon:

(i) The lightbar displays distance to the center of the specified polygon

(ii) The fields (if user set) display distance to the nearest edge of any polygon in your path. Distances are in miles/kilometers until under 1 mile/kilometer when they switch to feet (decimal feet below 1000 ft) and meters respectively.

Applying a Swath Array (Pattern) to a Polygon

You can apply (recall) a swath array to a polygon 'manually' if the polygon has patterns saved with it (see "Applying a Saved Pattern to a Polygon" following) or by using AirTrac's automatic swath array/pattern application feature (see "Auto-applying a Swath Array to a Polygon").

Applying a Saved Pattern to a Polygon

Some polygons may have associated patterns. For example, you may have two patterns (such as back-to-back and racetrack) saved to a specific polygon because those are the two patterns you fly most frequently for that polygon. Use SET > PATTERN 'n' > ENTER to apply a saved pattern to a polygon.

Auto-applying a Swath Array to a Polygon

This feature is known as "Enter Poly Pat". When you use this feature, AirTrac automatically 'patterns' a polygon by applying an A|B line to it and generating a swath array. By default, AirTrac applies the A|B line to the job's lowest numbered polygon (if the job has multiple polygons). And it applies the A|B line to the side of that polygon that results in the fewest number of swaths required to cover the polygon area. When you have multiple polygons, you can change the polygon to be patterned and the side of the selected polygon that the swath array is based upon (see "Rotating the A|B Line Around a Polygon" on page 117).

To auto-apply a pattern to a polygon:

1. Set the job containing the polygon (KEYPAD > SET > JOB > 'n' > ENTER).
2. Select the pattern you want to fly—see "Entering Basic Job Details (Quick Start)" on page 52 for more information.
3. Press KEYPAD > ENTER > POLY 6 > PATTERN 1.

   AirTrac applies an A|B line to the side of the lowest numbered polygon that results in the fewest (minimum) number of swaths, generates a swath array from the A|B line, and displays the poly pattern panel in front of the data panel. In Figure 7-9, AirTrac has applied A|B to the first polygon (LI1) and generated an array to the left of A|B (the right of B|A —as viewed).
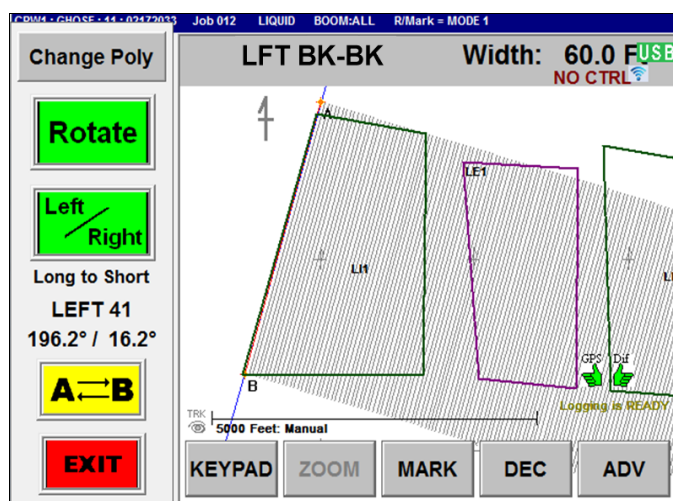
Figure 7-9: A|B line and swath array auto-applied to the first polygon

*Note: On pressing **EXIT**, AirTrac provides guidance to A|B's point A. See "Guidance to A|B line's A Point - As a 'Mark'" on page 117.*

Using the 'Poly Pat' Panel Features:

Change Poly: Cycles through the polygons. AirTrac initially applies A|B (and array) to the 'minimum swaths' side.
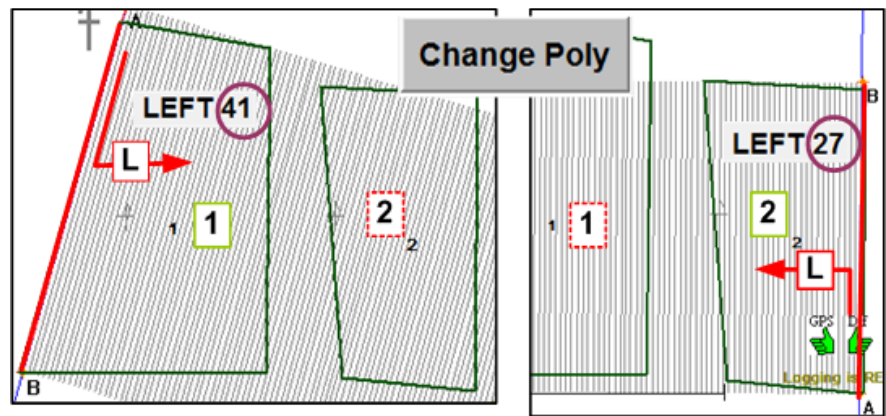
Rotate: Cycles A|B through the polygon sides. The sequence is dictated by the Left/Right selection, which toggles between long(est) to short(est) and short(est) to long)est). See also "Rotating the A|B Line Around a Polygon" on page 117.

Left/Right (i): Because the swath array must occupy the selected polygon (and beyond), the left/right direction relates to where the swath array is relative to A|B. So when you press the Left/Right button, the A|B line switches end-to-end. This changes the left/right direction of the (unmoved) swath array relative to A|B.

Left/Right (ii): In addition to switching A|B end-to-end, pressing this button also changes the sequence of the 'rotation' of A|B around the polygon: from '**Long**(est) **to Short**(est)' (the default) to '**Short**(est) **to Long**(est)'. If you switch, the new sequence becomes effective at the next press of **Rotate**.

'**LEFT 41**' (example)**:** Indicates that 41 swaths to the left of A|B will cover the area (of polygon 1).

'n'° / 'n'°: The first figure is the true north bearing of the vector A|B; the second the true north bearing of the vector B/A. Thus the values are always +/- 180° of each other. The values switch position if you switch A|B end-to-end: A|B is always first.

A -> <- B: Switches A|B end-to-end (so L/R stays the same) *and* switches A|B to the last swath of the polygon's array. The new start of the array is what was the last swath for the polygon.
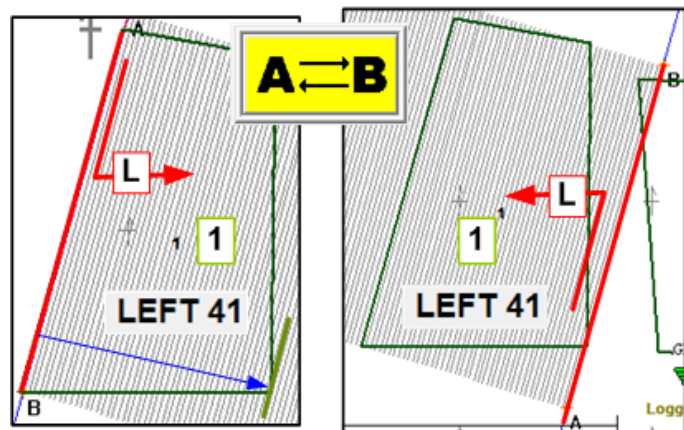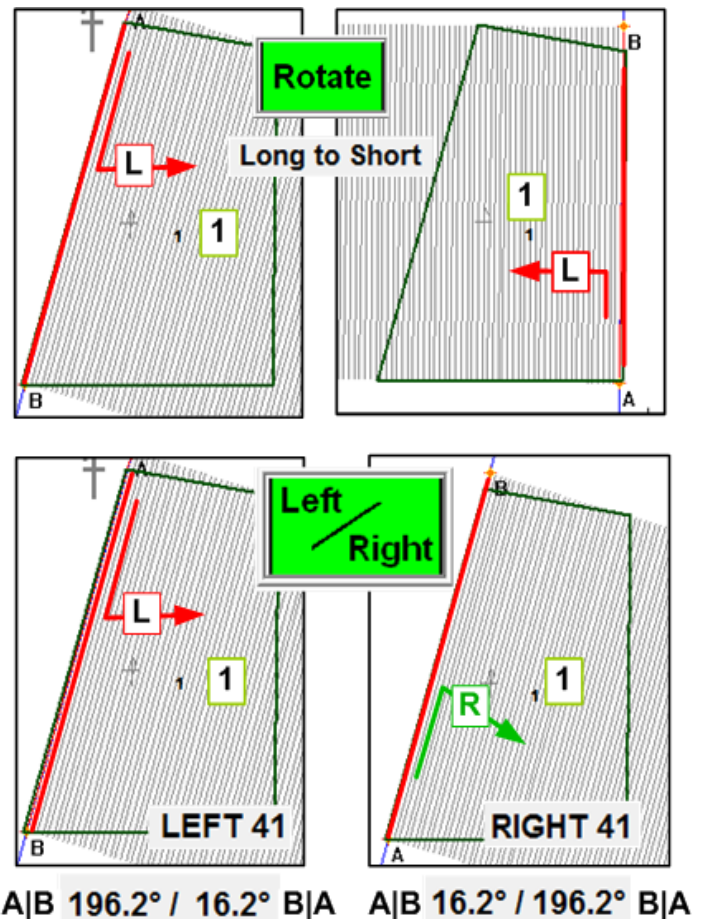
Rotating the A|B Line Around a Polygon

After AirTrac has initially applied the A|B line you can 'rotate' it around the polygon to suit the prevailing conditions.

Note: The 'Rotate' button does not actually rotate the A|B line around the polygon sides in the sense of in a clockwise or counter-clockwise direction. It moves the A|B line in the sequence long(est) to short(est) or short(est) to long(est). Pressing the Left/Right button switches the sequence (as well as the swath array direction from A|B).
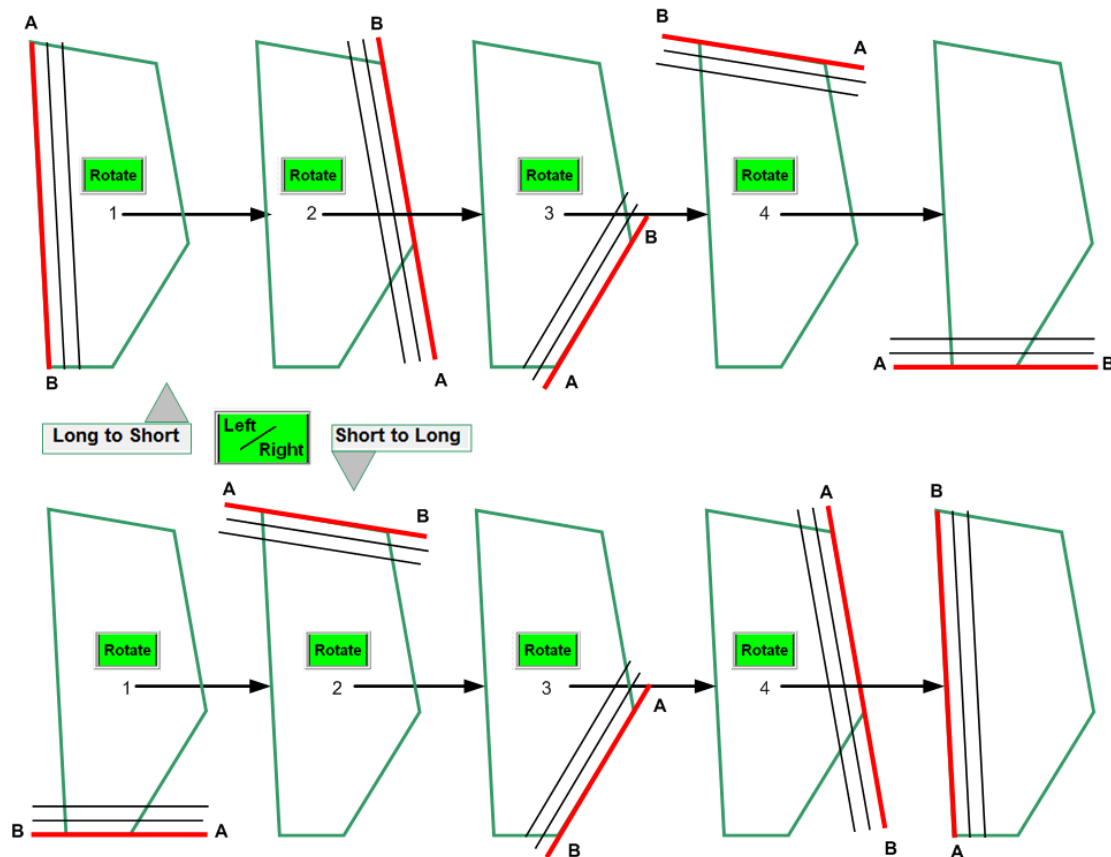
Figure 7-10: 'Rotating' the A|B Line around a polygon

Note: In the Long to Short sequence (top row) the swath arrays are all left of A|B. In the Short to Long sequence, the swath arrays are all right of A|B. The Left/Right button doubles as a swath direction button and a rotation sequence button.

Guidance to A|B line's A Point - As a 'Mark'

If, after setting up your swath array for the appropriate polygon, you press **EXIT** to remove the Poly Pat panel (**1**), AirTrac treats A|B's A point as a mark and provides guidance to it (**2**). If you press **ENTER** (cancels guidance to 'mark' - **3**), you get the "Return to Mark canceled" message (**4**).
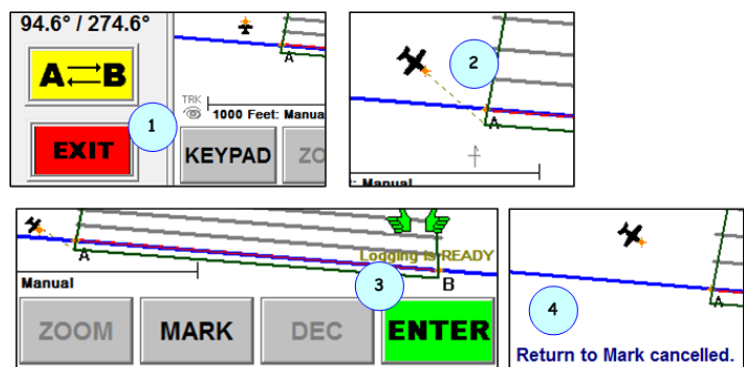
Chapter 8: Flow Control

IntelliFlow2/3 ('IF2/3') - Screens and Windows Summary

Liquid Menu Map - IntelliFlow2/3 ('IF2/3')

Legacy IntelliFlow ('IF') - Screens and Windows Summary

IntelliFlow (Legacy) - Liquid Menu Map

IntelliFlow and IntelliFlow2/3 (Liquid) Screen Details

This chapter provides information on two controller modes:

- IntelliFlow2/3 (IF2/3) liquid
- IntelliFlow (IF - 'legacy')

The chapter structure is:

a. A table of screens with brief, summary descriptions of screen features for IntelliFlow2/3 liquid and legacy (IntelliFlow).
b. The menu map for each mode (each mode's menu map follows its screen summary section - a).
c. A table for each screen (across all modes) with details of each field or option on the screen.

The summaries and menu maps (b and c) are in the order:

IntelliFlow2/3 ('IF2/3') - Screens and Windows Summary

See menu map next page. Use the screens/windows as follows (details are provided after the menu map):

Table 8-1: IntelliFlow2/3 ('IF2/3')

	Screen/Window (link to page)	Activities and Options
1	AirTrac Setup (page 124)	Go to 'Controllers' (in 2) and the system setup screen (3)
2	Flow Controllers (page 124)	Identify the aircraft's flow controller and, for IF2/3, access sub-screens (info, warnings) or reset the controller.
3	Setup 2 (page 125)	Access the flow control setup screen (4)
4	Flow Control Setup (page 126)	Set flow control rate type, flow mode, target rate (same as set in 6), tank volume (content, not capacity [size], same as set in 7). Reset product used volume and sprayed area.
5	Flow Control Advanced Setup (page 127)	Set valve adjustment during turns on/off, set trim percentage of rate, access the control parameters screen, access the valve test screen (10) - same as from 8
6	Flow Setup Parameters (page 128)	Set (primary) meter's Z factor (same as in 9), target rate (same as set in 4), and tank volume (content, not capacity [size], same as set in 4). Reset volume 1 (primary flow).
7	IF2/3 Liquid PGT Setup (page 129)	Select preset PGT response times for valve flow and position, or separate values for P and G gain and tolerance for flow and position.
8	IF2/3 TAD / Test Valve(s)(page 130)	Set the turn around delay, reset defaults, and access the valve test screen (10 - same as from 5).
9	Turbine Meter Calibration Setup (page 131)	Set meter's Z factor (same as in 6) and calibrate the turbine meter using a known amount or by rate and volume.
10	IF2/3 Valve Open/Close Test (page 132)	Test valve opening and closing times functionality.
11	IF2/3 Warnings (page 133)	View ID, Type, and details of warnings generated by the system
12	IF2/3 Info List (page 134)	View information-only details of 'IF2/3 Hardware/ Firmware/Software'

Liquid Menu Map - IntelliFlow 2/3 ('IF2/3')
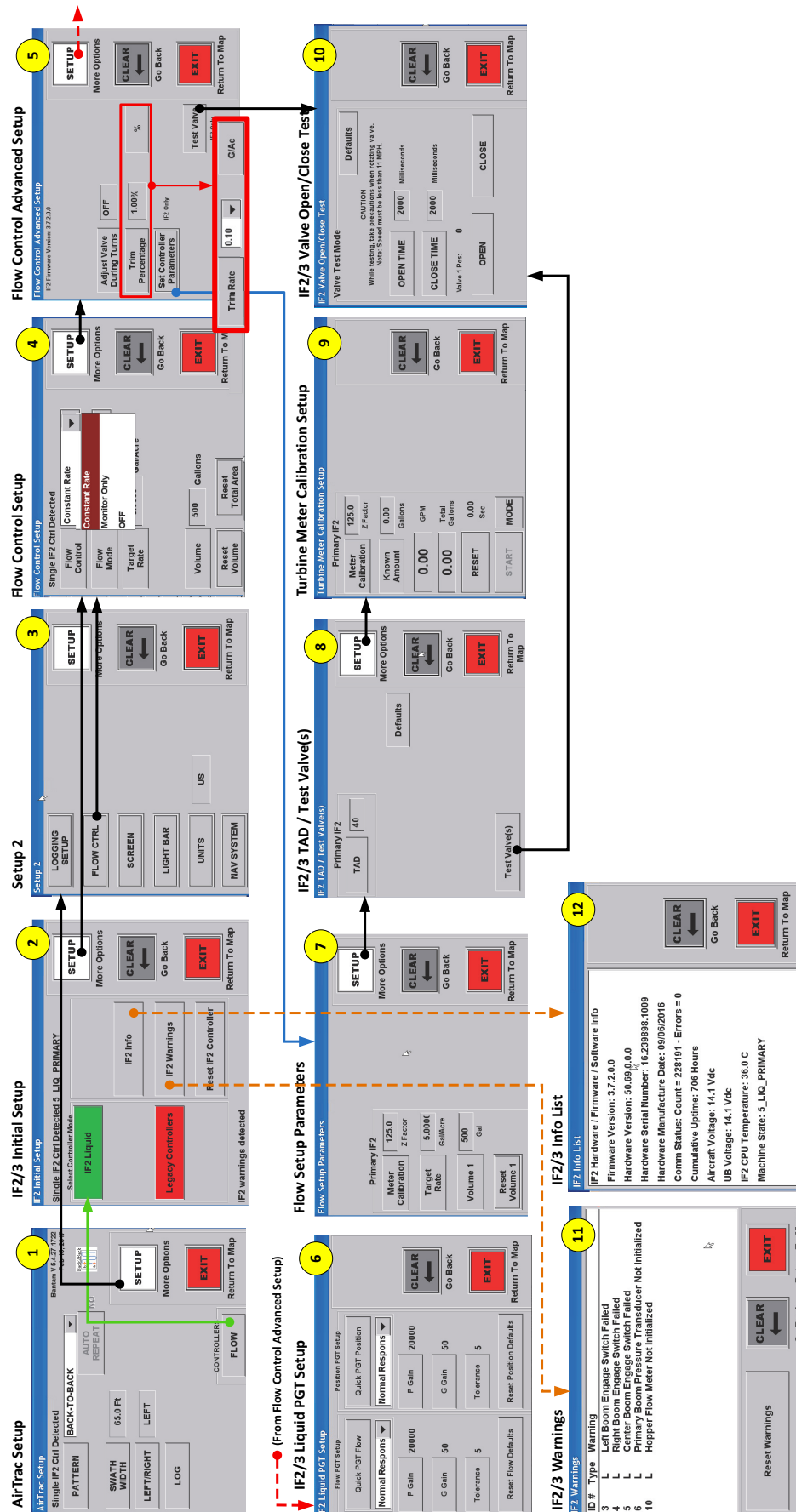
Legacy IntelliFlow ('IF') - Screens and Windows Summary

See menu map next page. Use the screens and windows as follows (details are provided after the menu map):

Table 8-2: IntelliFlow (IF)

	Screen/Window (link to page)	Activities and Options
1	AirTrac Setup (page 124)	Go to 'Controllers' (in 2) and the system setup screen (3)
2	IF2/3 Initial Setup (page 124)	Despite its name, this screen is for IntelliFlow (IF) and IntelliFlow2/3 (IF2/3) controllers. Select from IF2/3 Liquid and Legacy Controllers (IntelliFlow).
3	Setup 2 (page 125)	Access the flow control setup screen (6)
4	Flow Control Setup (page 126)	Set flow control rate type, flow mode, target rate (same as set in 6), tank volume (content, not capacity [size], same as set in 6). Reset product used volume and sprayed area.
5	Flow Control Advanced Setup (page 127)	Access the control parameters screen (6) and the valve test screen (9 - same as from 7)
6	Flow Setup Parameters (page 128)	Set (primary) meter's Z factor (same as in 8), target rate (same as set in 4), and tank volume (content, not capacity [size], same as set in 4). Reset volume 1 (primary flow).
7	TAD / Diagnostics & Troubleshooting (page 130)	Set the turn around delay, reset defaults, and access the valve test screen (9 - same as from 5).
8	Turbine Meter Calibration Setup (page 131)	Set meter's Z factor (same as in 6) and calibrate the turbine meter using a known amount or by rate and volume.
9	IntelliFlow Valve Open/Close Test (page 132)	Test valve opening and closing times.

IntelliFlow (Legacy) - Liquid Menu Map

AirTrac Setup

1

AirTrac Setup

Single IF2 Ctrl Detected

Bantam V 5.4.27 4720
Feb 15, 2017

PATTERN | BACK-TO-BACK

AUTO REPEAT | NO

SWATH WIDTH | 65.0 Ft

LEFT/RIGHT | LEFT

LOG

CONTROLLERS | FLOW

SETUP
More Options

EXIT
Return To Map

IF2/3 Initial Setup

2

IF2 Initial Setup

Single IntelliFlow Detected

Select Controller Mode

IF2 Liquid

Legacy Controllers

Controllers
Reset
Controller Found

Running Legacy Controllers

SETUP
More Options

CLEAR
Go Back

EXIT
Return To Map

Setup 2

3

Setup 2

LOGGING SETUP

FLOW CTRL

SCREEN

LIGHT BAR

UNITS

NAV SYSTEM

US

SETUP
More Options

CLEAR
Go Back

EXIT
Return To Map

Flow Control Setup

4

Flow Control Setup

Single IF2 Ctrl Detected

Flow Control | Constant Rate

Flow Mode | Constant Rate
Monitor Only
OFF

Target Rate

Volume | 500 | Gallons

Reset Volume | Reset Total Area

SETUP
More Options

CLEAR
Go Back

EXIT
Return To Map

Flow Control Advanced Setup

5

Flow Control Advanced Setup

INTELLIFLOW - Firmware Version: 174.3261-hF
Compile Date/Time: Oct 2 19:50:34 2011

Set Controller Parameters

CLEAR
Go Back

EXIT
Return To Map

Flow Setup Parameters

6

Flow Setup Parameters

Primary IF

Meter Calibration | 125.0 | Z Factor

Target Rate | 5.0000 | Gal/Acre

Volume 1 | -33264 | Gal

Reset Volume 1

SETUP
More Options

CLEAR
Go Back

EXIT
Return To Map

TAD / Diagnostics & Troubleshooting

7

TAD / Diagnostics & Troubleshooting

Primary IF

TAD | 40

VERSION | Controller Version #: 174-3261-hF
Compile Date: Oct 2 18:50:34 2011

Defaults

IntelliFlow Controller Diagnostic Tests

Input Record from IntelliFlow

SFC.8.86.46.77.44.1660.0P29

SO BIN:

Test Valve(s)

Load New Program

SETUP
More Options

CLEAR
Go Back

EXIT
Return To Map

Turbine Meter Calibration Setup

8

Turbine Meter Calibration Setup

Primary IF2

Meter Calibration | 125.0 | Z Factor

Known Amount | 0.00 | Gallons

0.00 | GPM

0.00 | Total Gallons

RESET | 0.00 | Sec

START | MODE

CLEAR
Go Back

EXIT
Return To Map

IntelliFlow Valve Open/Close Test

9

IntelliFlow Valve Open/Close Test

Valve Test Mode

Defaults

CAUTION
While testing, take precautions when rotating valve.
Note: Speed must be less than 11 MPH.

OPEN TIME | 2000 | Milliseconds

CLOSE TIME | 2000 | Milliseconds

Valve 1 Pos: | 1560

OPEN | CLOSE

CLEAR
Go Back

EXIT
Return To Map

Test Valve

IntelliFlow and IntelliFlow2/3 (Liquid) Screen Details

Each of the screens\windows listed and mapped in the previous pages are repeated here followed by a table with details about the fields and options on each screen ('Screen Item' - column 1).

AirTrac Setup
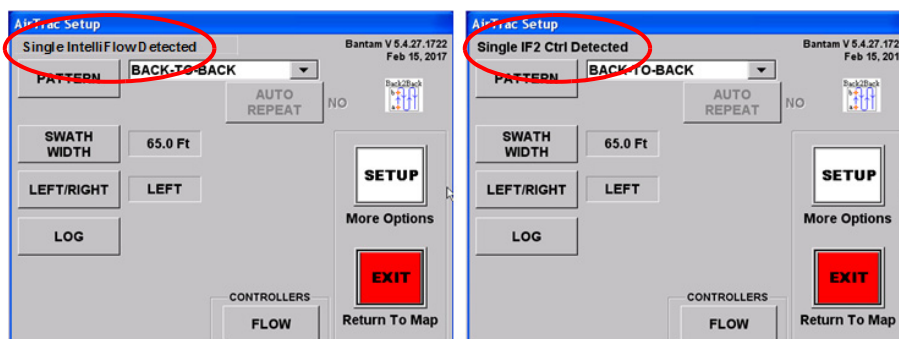
IntelliFlow   IntelliFlow 2/3

AirTrac Setup (SETUP quick key below map)	
Screen Item	**Description/Comment**
Controllers	Goes to "IF2/3 Initial Setup" (next screen)

Flow Controllers
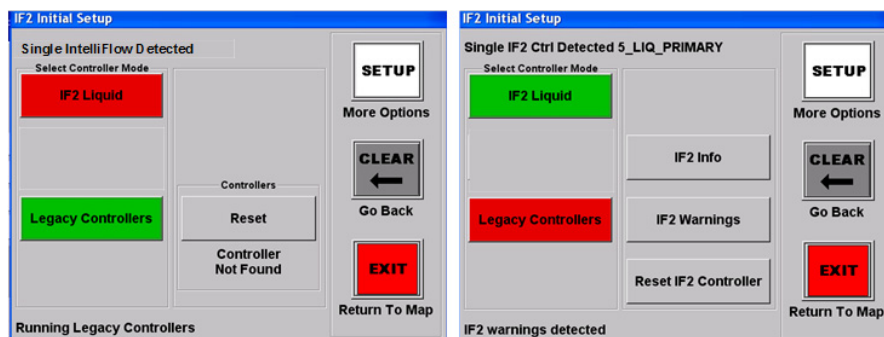
IntelliFlow   IntelliFlow2/3

IF2/3 Initial Setup (SETUP > B2 Controllers	
Screen Item	**Description/Comment**
Legacy Controllers (controller mode)	Note: Any change to **Controller Mode** closes current log, opens a new log
Reset (controller IF only)	May say "Controller Not Found"
Running Legacy Controllers	Status, information only
Single Flow IF2/3 (controller mode)	
IF2/3 Info	Goes to "IF2/3 Info List" (page 134)
IF2/3 Warnings	Goes to "IF2/3 Warnings" (page 133)
Reset IF2/3 Controller	
IF2/3 warnings detected	See IF2/3 Warnings above.

Setup 2

Setup 2 (SETUP > SETUP)	
Screen Item	**Description/Comment**
'FLOW CTRL' (and other non-IF2/3 related settings, e.g. LOGGING SETUP)	From **Flow Mode** (in **Flow Control Setup** (next screen) where flow mode 'Liquid' shows FLOW CTRL.

Flow Control Setup

IntelliFlow

IntelliFlow2
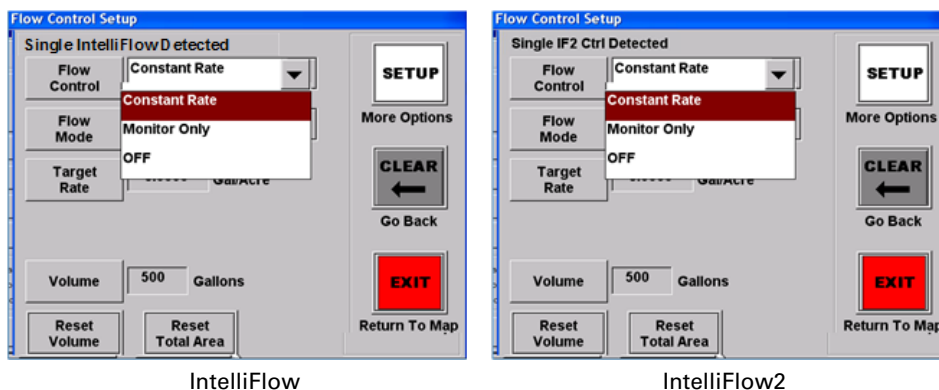
Flow Control Setup (SETUP > SETUP > FLOW CTRL)	
Screen Item	**Description/Comment**
Flow Control	Constant Rate - Constant rate flow control
	Monitor Only - You monitor the flow system, controlling the flow manually. For example, use this mode to calibrate your flow meter or for logging rates if using AutoCal.
	OFF
Target Rate	Press (for number pad) and enter target rate. Units change according to **Flow Mode** e.g. Gal/Acre for Liquid (for 'Global Units' = US from UNITS from System Setup - there are metric equivalents)
Volume	Set the beginning hopper volume.
	This value counts down as material is sprayed.
Reset Volume	Resets the volume to the last amount entered by the user. The volume resets to the default 500 gallons if no previous amount was entered (that is, the default was accepted)
Reset Total Area	Reset the total sprayed area (as shown in the data panel) back to 0. The Total Area counter resets to 0.

Flow Control Advanced Setup - IF and IF2/3
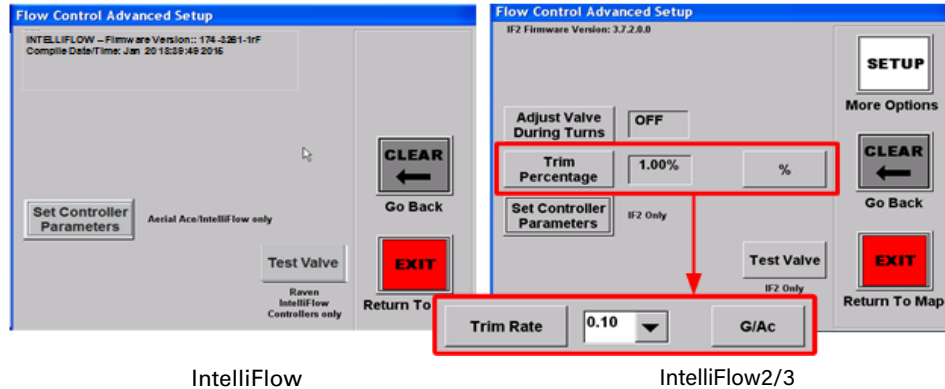
IntelliFlow   IntelliFlow2/3

Flow Control Advanced Setup (Liquid - IF and IF2/3), (SETUP > SETUP > FLOW CTRL> SETUP	
Screen Item	**Description/Comment**
Adjust Valve During Turns	These settings determine how the valve will behave during the speed variations of the aircraft's turns. They work to ensure the valve is (re)set at the current target rate after responding to turn speed variations.
Trim Percentage (e.g. 1.00) % or Trim Rate	Percentage of target rate to increase/decrease per trim (sometimes referred to as 'bump'). E.g. Target = 30 gals/acre; Trim% = 5; one trim 'nudge' = 1.5 gals/acre increase (so 31.5 gals per acre). Percentage is not cumulative; it is always of the target rate, not the 'trimmed' rate.
	If set as a trim rate, each trim will increase/decrease the rate by the set amount.
Set Controller Parameters	Goes to "Flow Setup Parameters", page 128.
Test Valve ('IF2/3 only' below button)	Goes to "IntelliFlow/IF2/3 Valve Open/Close Test", page 132.

Flow Setup Parameters - IF and IF2/3

IntelliFlow   IntelliFlow2/3
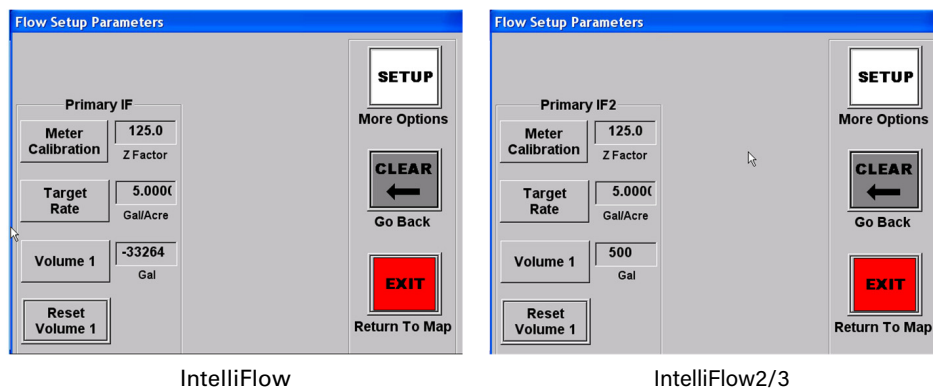
Flow Setup Parameters (Liquid - IF and IF2/3),
(SETUP > SETUP > FLOW CTRL> SETUP > Set Controller Parameters)

Screen Item	Description/Comment
Meter Calibration	Set the Z Factor value – start with the Z factor shown on the flow meter. This is the same as setting the meter calibration the "Turbine Meter Calibration Setup - IF and IF2/3" on page 131
Target Rate	User set 'coverage'
Volume 1	User set – volume in hopper
Reset Volume 1	Resets volume to last value in the Volume field

Single Liquid P and G Gain with Tolerance Setup - IF2/3 Only

IntelliFlow2/3 only

IF2/3 Liquid PGT Setup (SETUP > SETUP > FLOW CTRL> SETUP > SETUP)	
Screen Item	**Description/Comment**
Quick PGT Flow	This button opens the drop-own list below it. The preset options are Slow, Normal and Fast; they reflect the 'aggressiveness' with which the system attempts to attain the PGT target flow rate settings.
Quick PGT Position	This button opens the drop-own list below it. The preset options are Slow, Normal and Fast; they reflect the 'aggressiveness' with which the system attempts to attain the PGT position settings.
P Gain (e.g. 5000 and 10000 are the flow and positions default values respectively)	This is the major movement of the valve—how quickly and slowly the valve is initially controlled.
G Gain (e.g. 100 the default value - flow and position)	This is the fine tune adjustment of the valve, effecting overshoot and the speed of fine tune corrections to the valve.
Tolerance (e.g. 50 - the default value flow and position)	This is the 'plus or minus' value for the encoder's position. For example, if the encoder position is 3000 and the tolerence is set to 5, the motor will stop moving the valve within the encoder range of 2995-3005.
Reset Flow Defaults	Resets PGT flow values to defaults (5000, 100, 50)
Reset Position Defaults	Resets PGT position values to defaults (10000, 100, 50)

TAD / Diagnostics & Troubleshooting, Version Data - Liquid - IF and IF2/3

IntelliFlow	IntelliFlow2/3
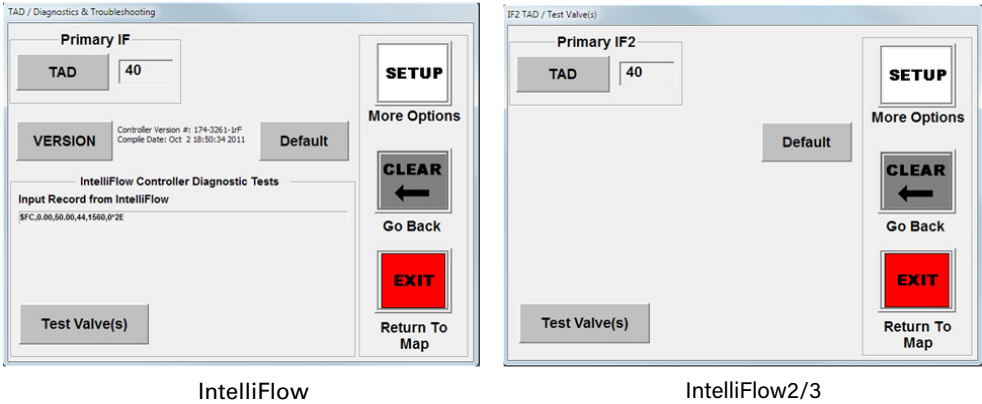
TAD / Diagnostic & Trouble Shooting (IF1); IF/3 TAD / Test Valves (IF2/3)
(SETUP > SETUP > FLOW CTRL> SETUP > Set Controller Parameters > SETUP)

Screen Item	Description/Comment
TAD (IF & IF2/3)	'Turn Around Delay'. Change the input/output of the flow controller within a range of 20 (minimum) and 80 (maximum): 40 is the default. Typically, you do not need to change this value.
Version (IF only - see **IF2/3 Info** from **IF2/3 Initial Setup**)	Information only – controller version
Default	Reset the TAD to default value 40
IntelliFlow Controller Diagnostic Tests (IF only)	Fields display information depending on the task you are performing, such as diagnostic information when troubleshooting or status information when updating IntelliFlow software.
• Test Valve(s) (IF1 & IF2/3)	Goes to IntelliFlow Valve Open/Close Tests (IF1) /IF2 /IF3 Open/ Close Test (IF2/3), page 132 (the button, as 'Test Valve', is also on "Flow Control Advanced Setup - IF and IF2/3" on page 127.

Turbine Meter Calibration Setup - IF and IF2/3

Turbine Meter Calibration Setup (SETUP > SETUP > FLOW CTRL> SETUP > Set Controller Parameters > SETUP > SETUP)	
Screen Item	**Description/Comment**
Meter Calibration	Adjust the 'Z Factor' value, as required, so that the reported GPM/LPM matches the actual values used for your stop/start flow rate measurement/calibration procedure (your 'stop/start test parameters'). Start with the Z factor value shown on the meter. This is the same as setting the meter calibration in the "Flow Setup Parameters - IF and IF2/3" on page 128.
Known Amount	Enter the amount of liquid you will use in a visual, fixed-volume rate measurement/calibration procedure.
GPM (or LPM)	The system's calculation of the flow rate based on your stop/start flow rate measurement/calibration procedure using the current meter calibration (Z factor). Adjust the Z factor until this matches your stop/start test parameters.
Total Gallons (or Liters)	The system's calculation of the volume moved during your stop/start test.
Sec	Timer - runs between start and stop of your flow rate measurement/calibration procedure.
RESET	Reset the calibration time to zero.
START/STOP	Start and stop your rate measurement/calibration procedure.
MODE	Disable/enable Known Amount field to suit your flow rate measurement method.

IntelliFlow/IF2/3 Valve Open/Close Test
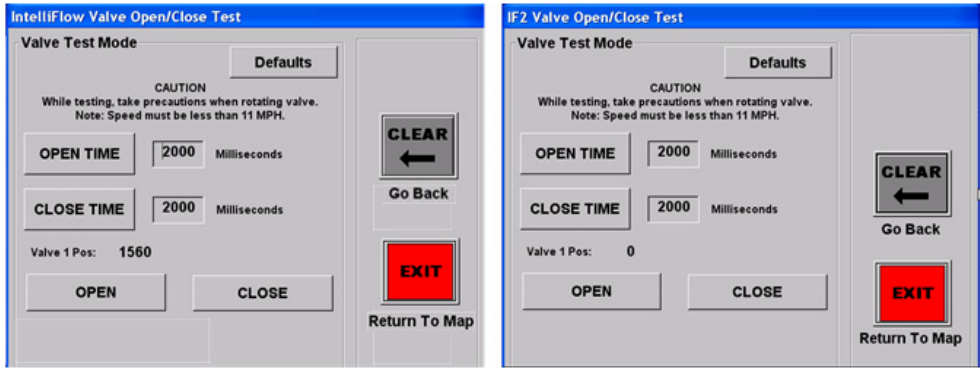
IntelliFlow   IntelliFlow2

IntelliFlow/IF2/3 Valve Open/Close Test (SETUP > SETUP > FLOW CTRL> SETUP > Set Controller Parameters > SETUP > Test Valve(s))	
Screen Item	**Description/Comment**
Defaults	Resets open and close times to defaults (100 ms)
OPEN TIME (e.g. 200) Milliseconds	Use times for a simple 'audio check' of relative motor runtimes for valve opening – e.g. 200 milliseconds for a 0.2 second runtime, 2000 milliseconds for a 2 second runtime. Use the OPEN button for the check.
CLOSE TIME (e.g. 200) Milliseconds	Use times for a simple 'audio check' of relative motor runtimes for valve closing – e.g. 200 milliseconds for a 0.2 second runtime, 2000 milliseconds for a 2 second runtime. Use the CLOSE button for the check.
Valve Pos: 1 0	Encoder position for valve at open or closed position.
OPEN	Open the valve (see OPEN TIME above)
CLOSE	Close the valve (see CLOSE TIME above)

IF2/3 Operational Warnings List - IF2/3 Only
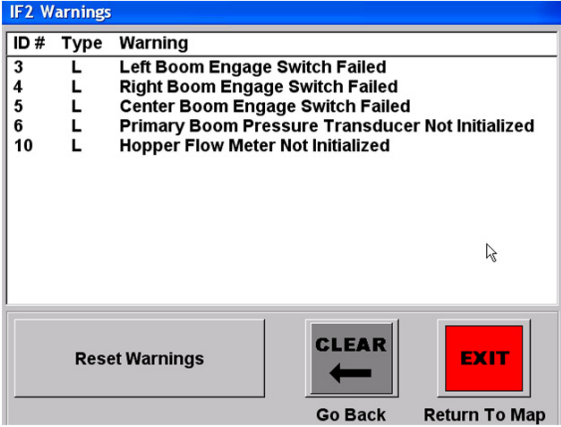
IF2/3 Warnings (SETUP > FLOW > IF2/3 Warnings)	
Screen Item	**Description/Comment**
ID# - Type - Warning	See Appendix C for a list of warnings.
RESET Warnings	Effectively refreshes the display. At the next system check, all warnings relating to current statuses are redisplayed.

IF2/3 Info List - IF2/3 Only
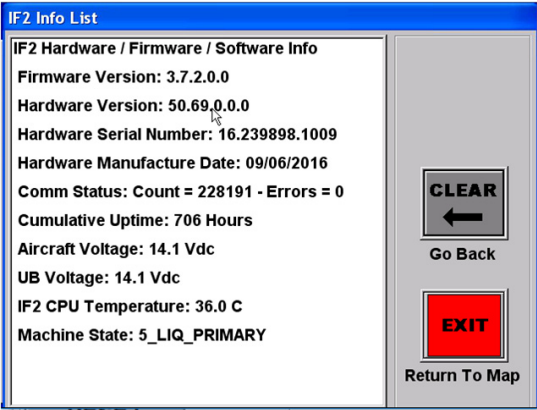
IF2/3 Info List (SETUP > FLOW > IF2/3 Info)	
Screen Item	**Description/Comment**
IF2/3 Hardware / Firmware / Software info	
Firmware Version: (e.g. 3.6.2.0.0)	
Hardware Version (e.g. 50.69.0.0.0)	
Hardware Serial Number: (e.g. 16.232165.1003)	
Hard Date-Of-Manufacture: (MM/DD/YYYY)	
CAN Status: Count = n – Errors = n	As displayed above
Cumulative Up-Time: (e.g. 7 Hours)	
Aircraft Voltage: (e.g. 25.4 Vdc)	
UB Voltage: (e.g. 25.4 Vdc)	
IF2/3 CPU Temperature: (e.g. 32.0 C)	
IF2/3 Machine State: (e.g. 14)	

Chapter 9: Advanced Features

Advanced Screen Options

Guidance Delay

GPS Options

Advanced Mark, Display and Subscription

Customized Settings

Advanced setup features include screen control behavior (for example zoom and pan), refined lightbar settings, return to mark options, GPS options and what is included in the .ini file (for possible transfer to and use in another system).

Advanced Screen Options

Use the Screen Advanced Setup screen (Figure 9-1) to set advanced screen options. Table 9-1 provides descriptions of the screen's features.

Path to the Screen Advanced Setup screen: **KEYPAD** > **SETUP** > **SETUP** > **SCREEN** > **SETUP**
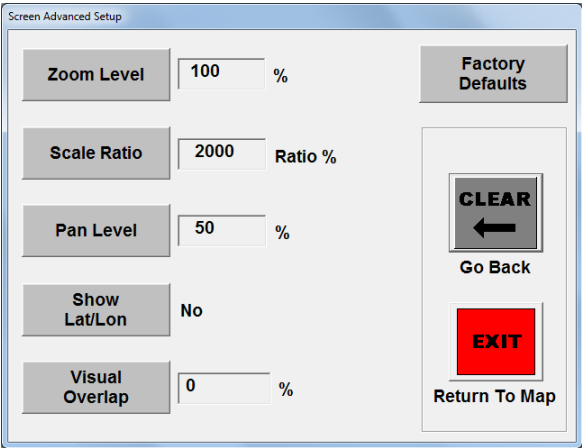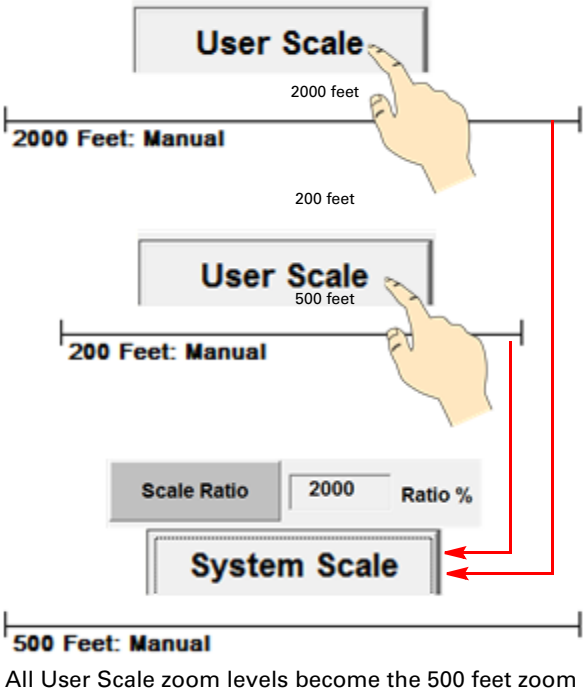
Figure 9-1: Screen Advanced Setup screen
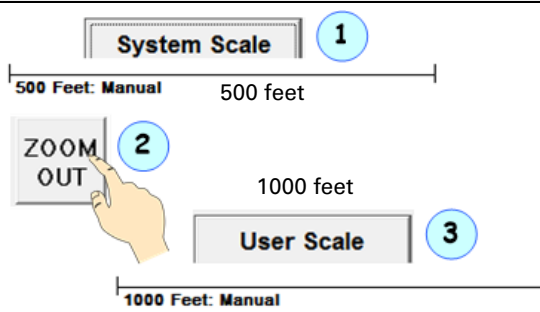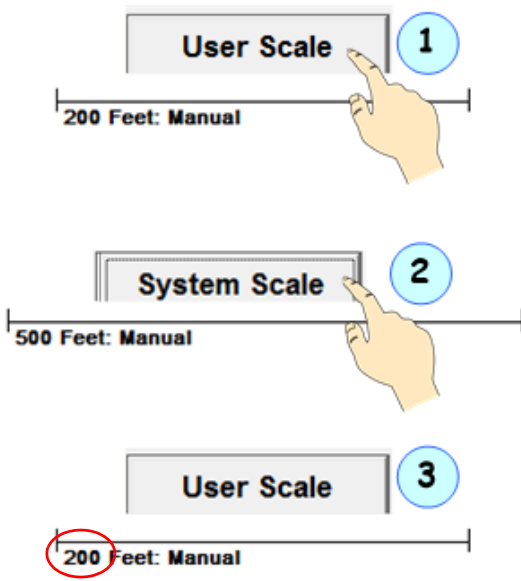
Table 9-1: Screen Advanced Setup screen

Item	Description
Zoom Level	Percentage that each zoom in/out moves the display. The range is 10-500, the default is 100. The higher the number the fewer the zoom levels (so bigger 'jumps') between the zoom limits of 100 ft/40 m (zoom in) and 100 miles/200 km (zoom out).

Table 9-1: Screen Advanced Setup screen *(continued)*

Item	Description
Scale Ratio	Sets the single level to which the map will always zoom if the User Scale button (in the data panel) is switched from User Scale to System Scale. The range is 1000 to 3000000 (no change between 2 and 3 million), the default is 2000. For a given ratio then, all user scale zoom levels switch to the one zoom level. For example, at the default scale ratio of **2000**, pressing User Scale at any zoom level will (i) switch the button label to System Scale and (ii) zoom the map to **500 Feet** (see schematic at right).

All User Scale zoom levels become the 500 feet zoom

Table 9-1: Screen Advanced Setup screen *(continued)*

Item	Description	
Scale Ratio *(cont)*	After manually switching to system scale, manual zooms (in or out) resume from the system scale setting (and button becomes User Scale - see schematic at right). If *you* switch from system scale back to user scale, manual zooms resume from the current user zoom (see schematic below right).	Zoom levels in this range are 200, 500, 1000
	As you zoom in or zoom out in user scale 'mode', when the zoom reaches the currently set system scale (from the Scale Ratio), the button switches to System Scale (then back to User Scale if you continue zooming). For example, the sequence of user scale zooms is (in feet): 100, 200, **500**, 1000, 2000. When you zoom in or out to 500, the button label becomes System Scale.	
	See schematic *top right*: When AirTrac auto-switches to system scale (**1**) because you have zoomed to its current setting, you need to zoom in or out manually (**2**) to resume in user scale mode (**3**).	
	See schematic *at right*: If you manually switch to system scale from any user scale zoom (**1**), you can switch back to user scale (**3**) just by pressing the button again (**2**), that is, you don't have to use a zoom control.	
Pan Level	The percentage the screen moves in the direction of the arrow you press.	
Show Lat/Lon	Toggle between Yes (show lat/lon) and No (do not show lat/lon).	
Visual Overlap	Set the spray overlap percentage you want to view on the map.	
	Visual overlap (or spray overlap) visually represents the distance beyond the spray boom that spray is applied. If you enter this percentage as "0," the map shows spray applied only as the length of the boom. If, for example, you enter a value of 10, a 65 ft spray width with a spray overlap of 10% will display a 6.5 foot total spray overlap (3.25 feet on each side of the spray boom). Visual overlap applies to the display in the map only. It does not apply to guidance or logged data.	
Factory Defaults	Restores the advanced setup settings to the factory defaults.	

Guidance Delay

Guidance delay or 'forward prediction' in AirTrac is the delay (in msec) between when the lightbar displays a guidance prompt and when you need to react. For example, if you set this value to 600 the lightbar prompts you 600 msec before you need to react. The default value of 500 msec is based on the average airspeed.

Path to the Nav System Setup screen:

KEYPAD > **SETUP** > **SETUP** > **NAV SYSTEM**

Press **Forward Prediction** and in the data entry screen that appears enter the guidance delay value then press **ENTER**.
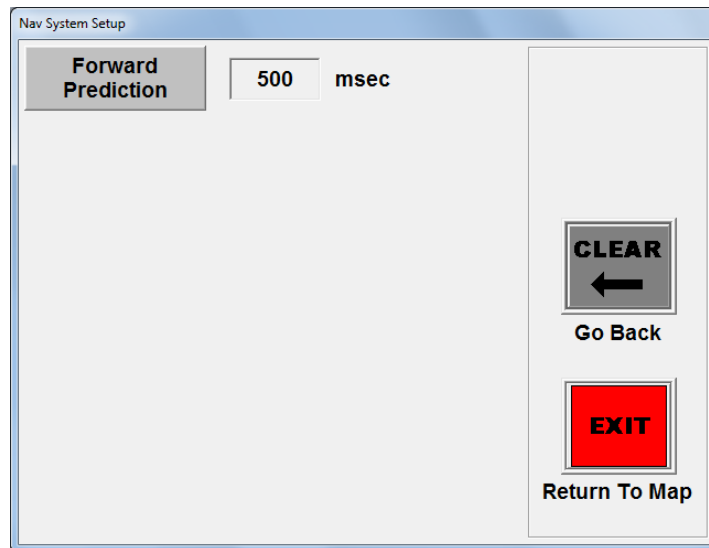
GPS Options

You can set such GPS options as elevation mask angle, GPS message rate, and e-Dif parameters, differential corrections source and refresh rate. AirTrac has two GPS-related screens.

GPS / e-Dif Message Commands Screen

The GPS / e-Dif Message Commands screen (Figure 9-2) enables you to work with e-Dif, set an elevation mask, and send GPS commands to the Bantam receiver. Table 9-2 provides details of the screen's features.

Satloc's extended differential (e-Dif) software enables AirTrac to perform with differential-like accuracy for extended periods of time without the use of a differential service. e-Dif models the effects of ionosphere, troposphere, and timing errors for extended periods by computing its own set of pseudo-corrections. e-Dif may be used anywhere geographically and is especially useful where WAAS (SBAS) networks have not yet been installed, such as South America, Africa, Australia, and Asia.

Path to the GPS / e-Diff Message Commands screen: KEYPAD > SETUP > SETUP > SETUP > GPS SETUP
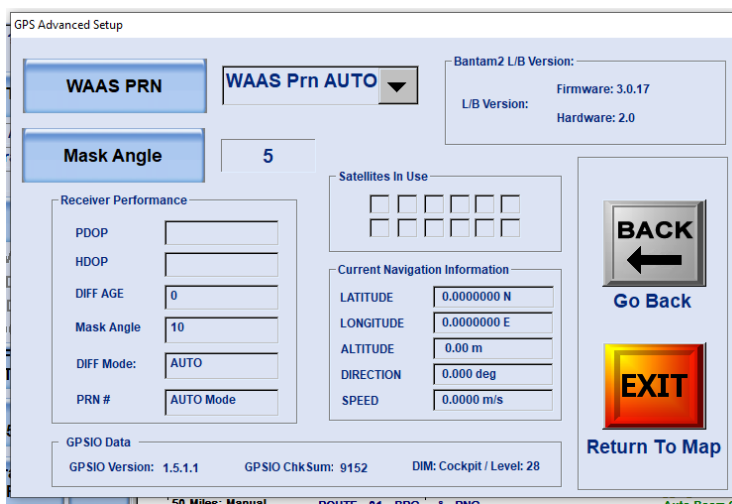
Figure 9-2: GPS / e-Dif Message Commands screen

Table 9-2: GPS / e-Dif Message Commands screen

Item	Description
Set Relative Position	Recalibrate e-Dif to on/near your position at initial e-Dif acquisition.
Reset e-Dif	Recalibrate e-Dif based on your current position.
Latitude	Set the latitude of the absolute reference point.
Longitude	Set the longitude of the absolute reference point.
Elevation	Set the elevation of the absolute reference point.
Reset Absolute e-Dif Position	Set an absolute e-Dif position (such as for your home base) or reset an absolute e-Dif position (such as for working from a different base location). If your base is the same each day, set your absolute e-Dif position once. You reset your e-Dif position if you use a different home base (including if you then return to your original home base). The position you set/reset is based on the Latitude, Longitude, and Elevation values on this screen.
Mask Angle	Set the mask angle (default is 5°). Any satellites below this angle are ignored (not used in computing GPS positions) even if available. Because satellites higher above the horizon have less noise (signal degradation) than satellites closer to the horizon, setting a mask angle eliminates (masks) those satellites closer to the horizon (that reduce accuracy).

Table 9-2: GPS / e-Dif Message Commands screen *(continued)*

Item	Description
Command	Enter GPS commands to send to the Bantam's GPS receiver.
	You can send GPS commands to the receiver to request such information as receiver engine and firmware version, differential application being used, and SBAS (WAAS) frequency.

GPS Advanced Setup Screen

Use the GPS Advanced Setup screen (Figure 9-3) to set your differential corrections source WAAS/SBAS to auto or a specific satellite (PRN) and set the update/refresh rate of the corrections. Table 9-3 provides information on the screen's features.

Path to the GPS Advanced Setup screen: **KEYPAD** > **SETUP** > **SETUP** > **SETUP** > **GPS SETUP**
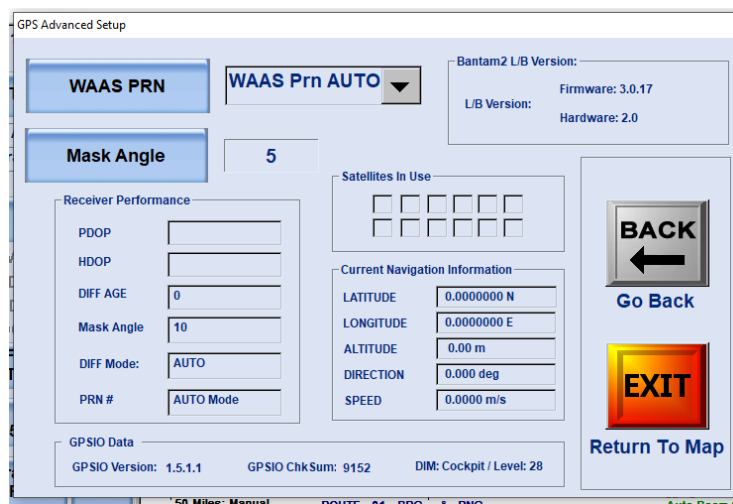
Figure 9-3: GPS Advanced Setup screen

Table 9-3: GPS Advanced Setup screen

Item	Description	
WAAS PRN	Select the WAAS (SBAS) satellite (or satellite PRN) used in AirTrac's position calculation. The default value is AUTO (AirTrac automatically selects from the available satellites). Any time you change this setting, AirTrac displays the message at right.	
GPS Rx Rate	Select the GPS receiver update (refresh) rate—how often the receiver calculates its position. A higher update rate improves accuracy and reduces screen display lag time, but it also requires more processing power. Contact your local dealer or Satloc Technical Support for information on changing this setting.	
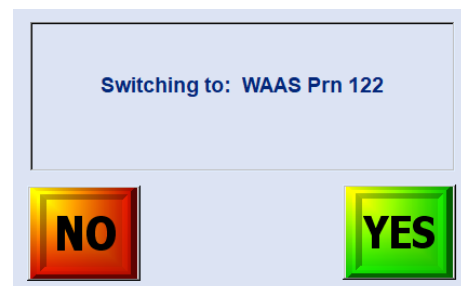
Advanced Mark, Display and Subscription

Set these advanced options as required. Optional subscription unlocks can be entered on this screen.

Path to the Advanced Setup 2 screen:
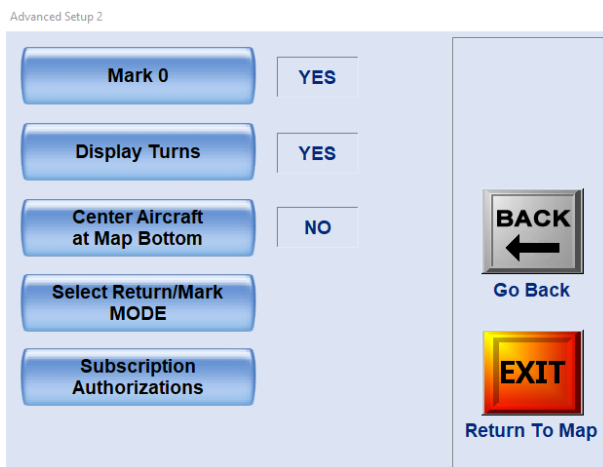
Figure 9-4: Advanced Setup 2 screen

Mark 0

When set to **YES**, your spray-off point becomes Mark 0 (**M0**). Each subsequent spray-off point becomes the new Mark 0, replacing the previous M0.
Mark 0 is not added/updated when this option is set to **NO**. See at right.
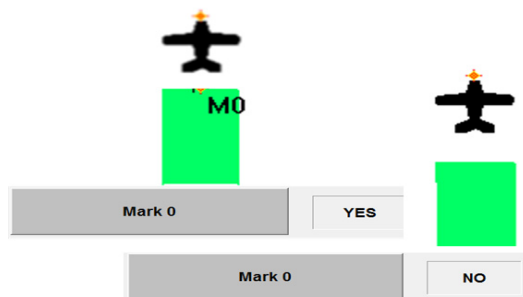
Display Turns

When set to **YES**, AirTrac displays a thin blue trace of the aircraft's path. You can *hide* the trace by setting the option to **NO** or, *clear* the trace (with option still set to **YES**) by pressing KEYPAD > CLEAR > SWATH (after which the trace will restart). If you *re*set the option to YES, the trace's start point will be the restart point after the last KEYPAD > CLEAR > SWATH clearance.

In the schematic at right (at different zoom levels) at point (**1**), (i) the option is (already) set to YES; (ii) the trace up to that point has been cleared (KEYPAD > CLEAR > SWATH) and (iii) the trace has automatically restarted from that point.

At point (**2**), option is set to NO. The trace no longer shows but is still there and still being recorded. At (**3**), option is reset to YES and the trace, from the last 'CLEAR > SWATH restart' (**1**), is redisplayed.
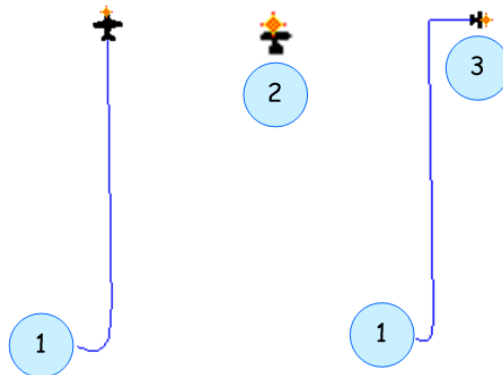
Center Aircraft at Map Bottom

With this option set to **YES**, the aircraft is horizontally centered after it first exits the map at the bottom. It reappears just above the bottom of the map then repeats this short loop. That is, it does not return at the top of the map as it does when this option is set to **NO**.

In the schematic at right, top images, the option is **NO**: In (**1a**), the aircraft is exiting the bottom of the map off center. In (**1b**) the aircraft reappears, centered at the top of the map. The aircraft repeats this centered 'long' loop.

In the schematic at right, bottom images, the option is **YES**: In 2a), the aircraft is exiting the bottom of the map off center. In (**2b**) the aircraft, now centered, is exiting the bottom of the map. In (**2c**), the aircraft reappears a short distance above the bottom of the map and repeats this short loop 2b > 2c > 2b > 2c.

> *Notes:*
>
> 1. *In all cases, the aircraft maintains its heading during these loops.*
> 2. *This 'long' or 'short' looping applies only when the aircraft is exiting the bottom of the map (as the option implies). The aircraft completes centered, long loops only when exiting the top of the map.*
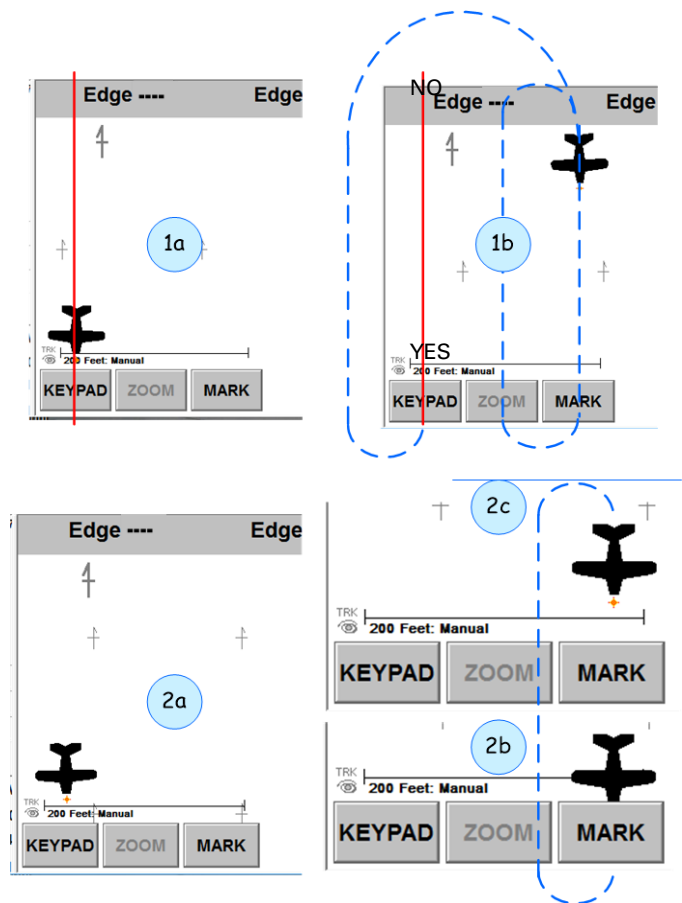
Select Return/Mark MODE

The return mark modes provide options about what associated data to load ('append') onto the map when you return to a specific mark. Data is saved with marks when they are set and you can specify what of that data is loaded with that mark when you return to it. Options include such associated data as job and pattern, logs, or just guidance.

MODE	RETURN / MARK Mode	
Mode1	Open NEW LOG: Append all MARK data.	
Mode2	Open NEW LOG: Append only JOB/Area/pattern data.	
Mode3	Open NEW LOG: Provide only guidance to last MARK Pt.	
Mode4	Use MARK LOG if found, else current LOG: Append all MARK data.	
Mode5	Continue with Current LOG: Append only JOB/Area/Pattern data.	
Mode6	Continue with Current LOG: Provide only guidance to last MARK Pt.	

Accept — Accept MARK Mode

CLEAR — Go Back

Select RETURN / MARK Mode and press ACCEPT

Notes:

1. *Remember that mark numbers cannot be duplicated (in different jobs or patterns for example). If you give a mark the number of a mark that already exists (anywhere), that existing mark is overwritten by the new one.*

2. *When you reset an existing mark, the current/active log becomes the log associated with that mark in the updated MARKS.DAT file.*

3. *While there are six modes, they are really two sets of the same three load options. You can apply any one of the three options to new logs (modes 1-3) or to a saved log or the current log (modes 4-6).*

4. *Patterns do not have to be saved patterns to be 'appended' (with a job) by the return to mark mode selected. If the job had a pattern applied either by ENTER > POLY > PAT or by manual setting of an A|B line, that pattern will be appended on return to the mark even if it is not saved with the Job (it's saved with the mark).*

5. *To return to a mark, press KEYPAD > ENTER > n where n is the mark number.*

New Log Modes (1-3)

The schematic at right illustrates the first three modes:

Mode 1: "Open NEW LOG: Append all MARK data". AirTrac will open a new log, provide guidance to the specified mark and load the job, pattern, and log data (sprayed swaths and measured area) if such data exists for the mark.

In (**1**), new log 04131836 has been opened, Job 15 and its polygon and pattern have been loaded, and the sprayed area from the original log has been loaded. Guidance to the mark and the option to switch to swath guidance are provided.

Mode 2: "Open NEW LOG: Append only JOB/Area and pattern data".

In (**2**) AirTrac has loaded the same data as for mode 1 (new log 04131842) *except* for the spray data from the original log—so no green spray area. What has been loaded is, as the mode description says, the Job, the measured sprayed area (the value displays on the Area button in the data panel and in any display field set to Field Area), and the pattern. Guidance to the mark is provided with the option to switch to swath guidance.

Mode 3: "Provide only guidance to the last MARK Pt": 'The 'last' mark means the selected mark ('n' in Note 5 above). In (**3** - new log 04131816), AirTrac has provided only guidance to the mark—there is no option to switch to swath guidance because there is no pattern (swath array) loaded.
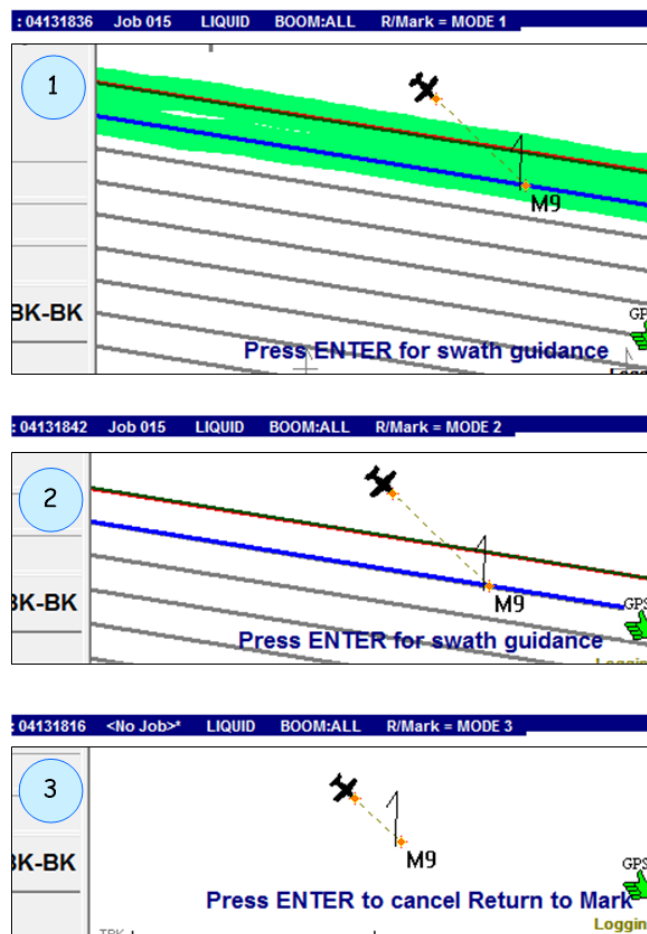
Original or Current Log Modes (4-6)

Mode 4: "Use MARK LOG if found, else current LOG. Append all MARK data". AirTrac checks to see if the log that was active when the mark was first set (the log in the MARKS.DAT file for the mark concerned) is still in the system. If it is (and it will be unless it's been user deleted), AirTrac reopens (reloads) the log and all its data. AirTrac also loads the job, area and pattern and provides guidance to the specified mark. In the example in the schematic, the original log was found. If it hadn't been, mode 4 would act as mode 1 but without opening a new log—it would append 'all MARK data' to the currently active log.

The schematic at right provides detail on the key points of mode 4:

At (**1**), two swaths have been completed for Job 18. Log 0417**1439** is active and M8 is set.

(**2** - MapStar) shows the log data (so far). At (**3**), (MARKS.DAT extract) shows M8's coordinates, the active log when M8 was set (**1439**), and the field area (sprayed area) 1.22 Ha.

(**4a** - MapStar) shows the system data value and the user's area measurement value for the sprayed area and (**4b**) is an enlarged view of that data.

At (**5a**), after a system restart, there is a new log (0417**1552**). The default job (either 0 or 18) has been cleared (KEYPAD > CLEAR > JOB) setting the map status to <No Job>. At (**5b**), RETURN > 8, with mode 4 active has closed log **1552** and reopened log **1439**.

(**6**) shows return guidance to M8; (7) shows swaths 3 and 4 completed. (**8a**) and (**8b**) (both MapStar) show the new (added to/increased) 1439 log data.

Modes 5 and 6: "Continue with Current LOG: Append only JOB/Area and Pattern data" and "Continue with Current LOG: Provide only guidance to the last MARK Pt":

These modes are the same as modes 2 and 3 except a new log is not opened. Work continues with the currently active log.
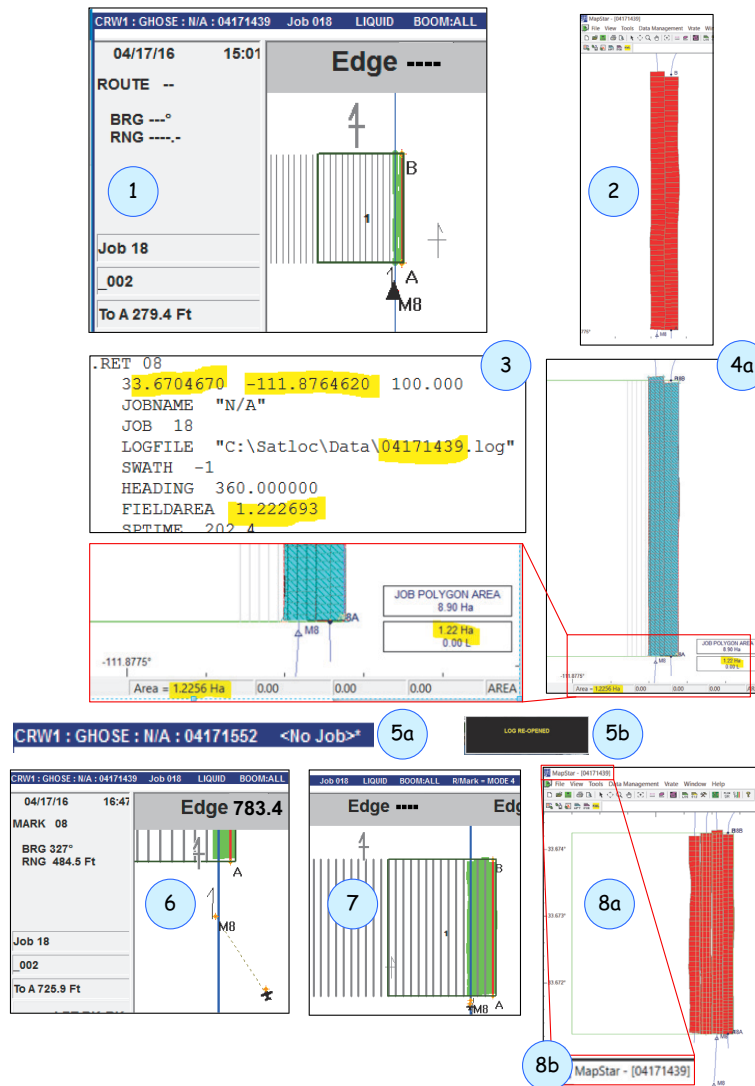
Comparing Modes and Appended Data

In Figure 9-5 the top left and right images show what is 'loaded' onto the map for a guided return to mark #4 (M4) with mode 1 and mode 2 active respectively. The difference is the sprayed area from the original data logged when the mark was set. The bottom two images show the top images after **ENTER** has been pressed to switch from guidance to the mark to swath activation (**ADV** [not shown] has been pressed, swath #3 is next).

Mode 1, M4: New log (1640); guidance to mark; pattern; spray (log data)

Mode 2, M4: New log (1732); guidance to mark; pattern; no spray (no log)

Switched to swath guidance (activated pattern). Next swath (3) selected.

Switched to swath guidance (activated pattern). Next swath (3) selected.
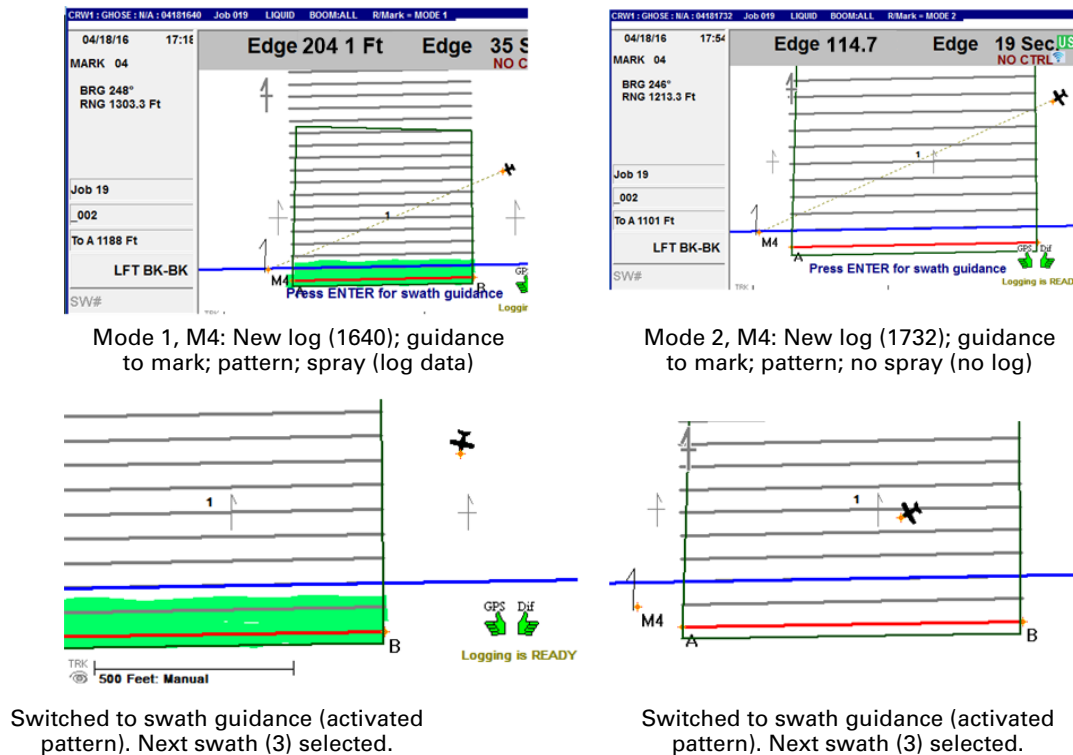
Figure 9-5: Same mark, different modes, full data

Subscription Authorization

To obtain an optional subscription, contact your Satloc Dealer or Satloc Support. On receipt of your subscription code:

1. Go to the Subscription Authorization screen (KEYPAD > SETUP > SETUP > SETUP > SETUP > Subscription Authorizations).
2. Select subscription.
3. Enter your subscription code and accept it. The message "**The Above Indicated Feature is ACTIVE**" (the feature in the Select Subscription field) appears at the bottom of the screen.

Customized Settings

When you customize settings the changes are saved to the Bantam hard drive. The user settings are stored in the ABTrac.ini (initialization) file and transferred (copied) to a USB drive as the 'Pilot Settings'. Because you can transfer (copy) the changes to a USB drive:

- You can change settings on one system and transfer the new settings to another Bantam system. You then can begin using the second system immediately without having to change the setup.
- You can store different settings on different USB drives and swap the drives depending on the jobs and settings you want to access.

Path to Pilot Setting (transfer the ABTrac.ini file):

Then select from:
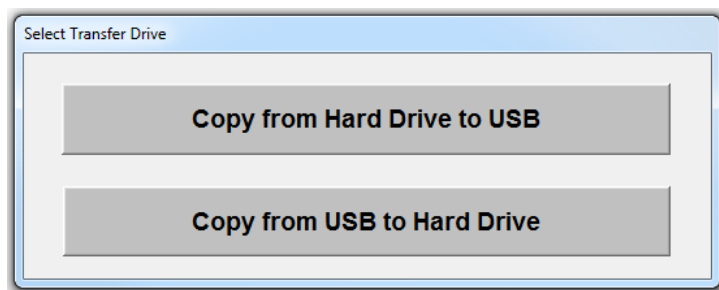
For more information on transferring/copying files, see "Transferring Files" on page 61.

To restore default factory settings, press:

Appendix A: The Simulator Console

To load/activate the simulator, select Internal Simulator during the startup procedure. See "Simulate GPS" on page 7.

    a.   Left and right turns. Radius decreases (so tightest turn) toward outer edge of turn box. Touch outside turn box (but within console) to stop turning and maintain new heading.
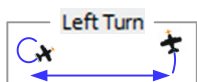
Note: To maintain a turn (to circle) instead of proceeding on the new heading, touch outside the console. Touch inside the console to stop circling - see 'a-ii. Right circle 1-2-3'. (The heading indicator (big white) circle is the best 'touch-stop' location within the console.)

a-ii. Right circle 1-2-3

b. Spray On/Off

c. Reset heading 0.0

d. Heading +/- 180°

e. Set user Lat/Lon - see f

f. User Lat/Lon:
  (i) Use e to set,
  (ii) Use g to 'go to'

g. Go to user Lat/Lon - see f

h. Slow down *

i. Speed up *
(Max: 181 mph / 291 kph)
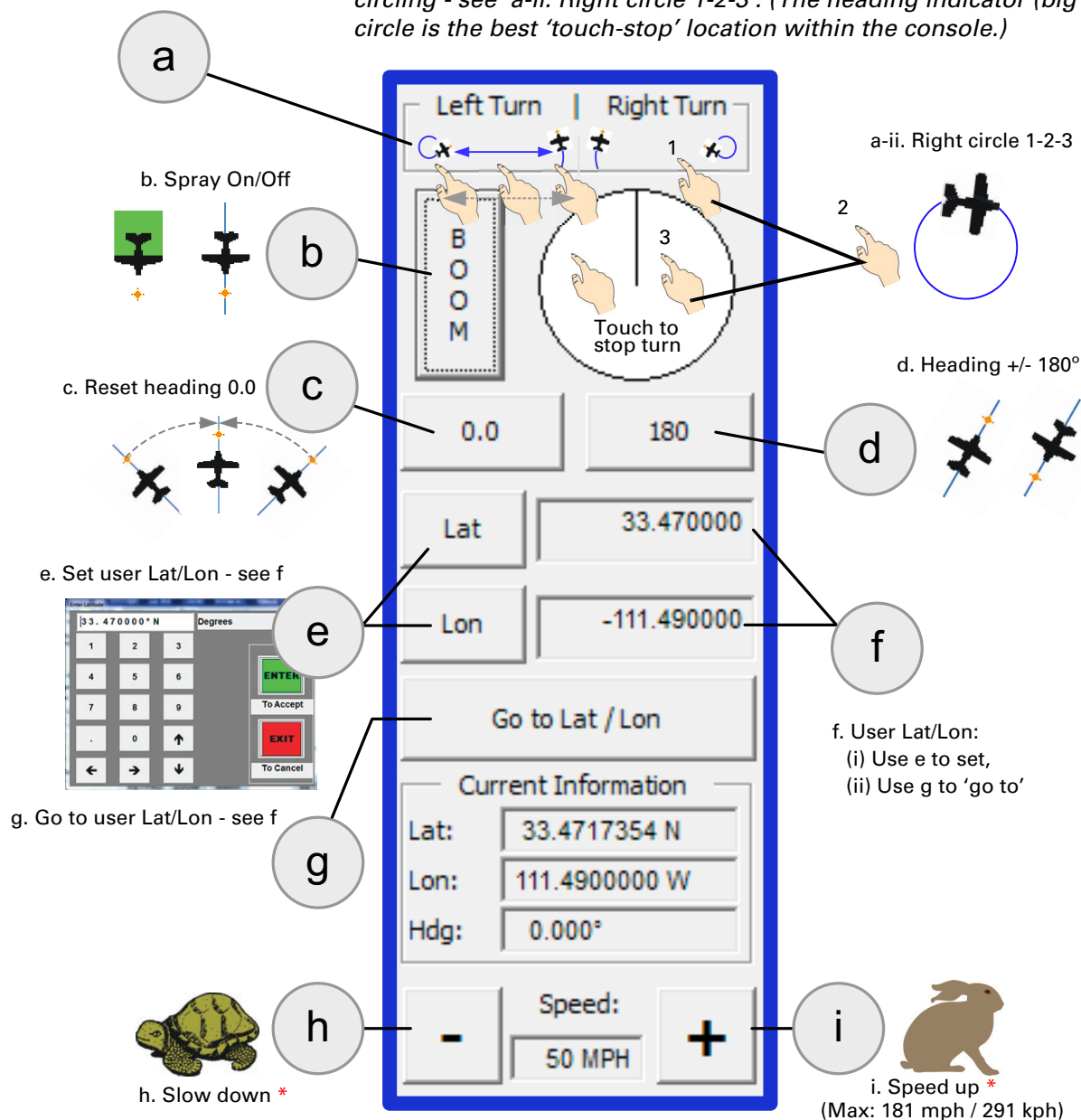
* Speed: 1 click = 1 mph / 3 kph; 'hold down' for continuous decrease/increase

Note: If troubleshooting IntelliFlow with the simulator on, speed must be less than 10 mph / 16 kph.

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Appendix B: Index of Navigation Paths
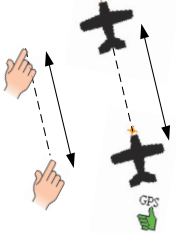
Index of Navigation ('Path to')

Notes:
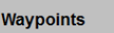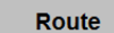
1. *Paths start with KEYPAD unless otherwise indicated.*

2. *'n' indicates number and will be single digit (1-9) or multi-digit (10-999) unless otherwise indicated (for example by stating '1-9' in column 1).*
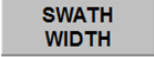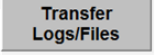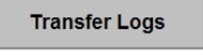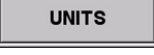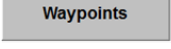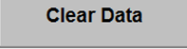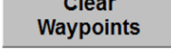
Operation/Feature	Path
Aircraft: Center at map bottom	[SETUP] > [SETUP] > [SETUP] > [SETUP]
Aircraft: Include in log	[SETUP] > [SETUP] > [LOGGING SETUP] > [Clear Logs]
AirTrac ('About AirTrac')	[INFO 0] > [SETUP]
Calculator	[KEYPAD] [KEYPAD] (Double click)
Display (fields, lightbar - 2 fields)	[SETUP] > [SETUP] > [LIGHT BAR] > [SETUP]
Display (fields, screen - 5 fields)	[SETUP] > [SETUP] > [SCREEN] > [Displays]
Double Spray Warning: (Lightbar)	[SETUP] > [SETUP] > [LIGHT BAR]
Edge Warning: (Lightbar) Type (Time or Distance), Start and End Triggers (seconds or ft/Km)	[SETUP] > [SETUP] > [LIGHT BAR] > [Edge Warning]
Exit (to Windows or shutdown)	[CLEAR ←] [CLEAR ←] (Double click)
Flight Path: Track	[SETUP] > [SETUP] > [SETUP] > [SETUP]
Flow control: Constant or monitor; mode (liquid); target rate; volume; resets (volume and total area).	[SETUP] > [SETUP] > [FLOW CTRL] [INFO 0] [INFO 0] (Double click)
Flow control: Controllers - reset	[SETUP]
Flow control: Parameters (controller meter calibration, target rate, volume, volume reset)	[SETUP] > [SETUP] > [FLOW CTRL] > [SETUP] > [Set Controller Parameters]
Flow control: TAD/diagnostics and trouble shooting; version	[SETUP] > [SETUP] > [FLOW CTRL] > [SETUP] > [Set Controller Parameters] > [SETUP]

Operation/Feature	Path
Flow control: Test Valve(s)	[SETUP] > [SETUP] > [FLOW CTRL] > [SETUP] > [Test Valve]
	[SETUP] > [SETUP] > [FLOW CTRL] > [SETUP] > (*continued next row*)
	[Set Controller Parameters] > [SETUP] > [Test Valve(s)]
Flow control: Version	[SETUP] > [SETUP] > [FLOW CTRL] > [SETUP]
	[SETUP] > [SETUP] > [FLOW CTRL] > [SETUP] > [Set Controller Parameters] > [SETUP]
Job: Clear/Close (from screen)	[CLEAR ←] > [JOB 9] > [ENTER]
Job: Delete (clear/remove permanently)	[CLEAR ←] > [JOB 9] > n > [ENTER]
Job: List/load (with patterns and polygons)	[INFO 0] > [JOB 9] (select > ENTER to load)
Job: Recall (set/load) see also Job: List/Load above	[SET] > [JOB 9] > n > [ENTER]
Job: Save	[SAVE →] > [JOB 9] > n > [ENTER]
Job: Start new log on job load	[SETUP] > [SETUP] > [LOGGING SETUP]
Language	[SETUP] > [SETUP] > [SCREEN]
Left and Right Displays - lightbar	[SETUP] > [SETUP] > [LIGHT BAR] > [SETUP]
Left and Right Displays - screen	[SETUP] > [SETUP] > [SCREEN] > [Displays]
Lightbar: Display fields (2)	[SETUP] > [SETUP] > [LIGHT BAR] > [SETUP]
Lightbar: Type (select)	[SETUP] > [SETUP] > [LIGHT BAR]
Log: ON/OFF	[SETUP]
Log: Setup (label, pilot, aircraft, logging interval and speed, new log per job)	[SETUP] > [SETUP] > [LOGGING SETUP]

Operation/Feature	Path
Log: View (view list, select to view on map)	**INFO 0** > **LOG** **SETUP** > **SETUP** > **LOGGING SETUP** > **View Logs**
Mark: Delete (permanently - all current)	**SETUP** > **SETUP** > **SETUP** > **Clear Data** > **Clear Marks**
Mark: List (with job and log)	**INFO 0** > **MARK 4**
Mark: Return to (set/recall) – 1-9	**RETURN 7** > **n**
Mark: Return to (set/recall) 1-9 (n) or 10-99 (nn)	**SET** > **MARK 4** > **nn** > **ENTER** (n for 1-9)
Mark: Return-to mode	**SETUP** > **SETUP** > **SETUP** > **SETUP**
Mark: Save 1-9 (Quick Key - number pad)	**MARK** > **1** **2** **3** (etc.)
Mark: Save 10-99	**SAVE →** > **MARK 4** > **nn** > **ENTER**
Mark: Zero (spray off becomes M0)	**SETUP** > **SETUP** > **SETUP** > **SETUP**
Mode: (screen - Normal/Dark; day/night)	**SETUP** > **SETUP** > **SCREEN**
Mode: Flow control - liquid	**SETUP** > **SETUP** > **FLOW CTRL**
Mode: Return to mark mode	**SETUP** > **SETUP** > **SETUP** > **SETUP**
Pan (and Zoom) control panel Quick Key (ZOOM) Keypad (ZOOM PAN)	**ZOOM** **ZOOM PAN**
Pan (interactively on map)	Touch and drag (zoom/pan window must be open)

Operation/Feature	Path
Pattern: Auto repeat	**SETUP**
Pattern: Auto-apply (to polygon - 'Enter Poly Pat')	**ENTER** > **POLY 6** > **PATTERN 1**
Pattern: Cycle through (pattern shows in data panel)	**PATTERN 1**
Pattern: Left/Right	**SETUP** (Button label in data panel switches L>R>L) **RGT BK-BK** **LFT BK-BK** (Press in data panel)
Pattern: Offset; apply offset	**INFO 0** > **PATTERN 1** **SETUP** > **SETUP** > **SETUP** > **Patterns**
Pattern: Return to most recently active. (Loads pattern and provides guidance - parent job is not loaded).	**SET** > **PATTERN 1** > **ENTER**
Pattern: Set/Change - no A|B line set	**SETUP**
Pattern: Set/Change - A|B line set	**CLEAR** > **PATTERN 1** > **ABC ↑** (A|B line/swath array retained)
Pilot: Include in log	**SETUP** > **SETUP** > **LOGGING SETUP**
Polygon: Auto-apply A|B/pattern to	**ENTER** > **POLY 6** > **PATTERN 1**
Polygon: Create/modify (by Job)	**INFO 0** > **POLY 6** **SETUP** > **SETUP** > **SETUP** > **Polygons**
Polygon: Create (by flying, add/subtract poly points on map)	**POLY 6** **POLY 6** (Double click)
Polygon: Delete (clear permanently)	**CLEAR** > **POLY 6** > n > **ENTER** Polygon 'n' for active job
Polygon: Guidance to	**SET** > **POLY 6** > n > **ENTER** Polygon 'n' for active job

Operation/Feature	Path
Route: Activate/Load	**ROUTE 8** (Cycle through routes with guidance to W1) **SET** > **ROUTE 8** > n > **ENTER**
Route: Clear (from screen)	**CLEAR ←** > **ROUTE 8** > **ENTER**
Route: Delete (clear permanently)	**CLEAR ←** > **ROUTE 8** > n > **ENTER**
Route: Recall (set/load)	**SET** > **ROUTE 8** > n > **ENTER**
Route: Save (create, add waypoints). Created route auto-saves on entry of first waypoint; no waypoint, no save.	**SETUP** > **SETUP** > **SETUP** > **Waypoints** > **Route** n **ENTER** (Route is saved on saving first waypoint) **INFO 0** > **WPT 5**
Scale Ratio ('System Scale') (Sets zoom)	**SETUP** > **SETUP** > **SCREEN** > **SETUP**
Screen Language	**SETUP** > **SETUP** > **SCREEN**
Screen Mode: (Normal/Dark [day/night])	**SETUP** > **SETUP** > **SCREEN** **SET** **SET** (Double click)
Screen Motion	**SETUP** > **SETUP** > **SCREEN**
Screen Orientation	**SETUP** > **SETUP** > **SCREEN**
Screen: Display fields (5)	**SETUP** > **SETUP** > **SCREEN** > **Displays**
Screen: Setup (mode, displays, orientation, motion, language)	**SETUP** > **SETUP** > **SCREEN**
Subscription: (Authorization)	**SETUP** > **SETUP** > **SETUP** > **SETUP**
Swath: List unsprayed (in current pattern. Lists individual and ranges.)	**INFO 0** > **SWATH 2**

Operation/Feature	Path
Swath: Set width	**SWATH 2** **SETUP** > **SWATH WIDTH**
Swath: Unsprayed (in current pattern. Lists individual and ranges.)	**INFO 0** > **SWATH 2**
System Scale (Scale Ratio) (Sets zoom)	**SETUP** > **SETUP** > **SCREEN** > **SETUP**
Transfer: Logs/Files (Logs, Jobs, KML, Marks, Waypoints, Pilot Settings, Profiles)	**SETUP** > **SETUP** > **LOGGING SETUP** > **Transfer Logs/Files**
Transfer: Logs only	**LOG** > **Transfer Logs**
Turns: Display (track flight path)	**SETUP** > **SETUP** > **SETUP** > **SETUP**
Units: Local Time Offset, Global Units (US/Metric/Nautical), Coordinates	**SETUP** > **SETUP** > **UNITS**
Version number ('About AirTrac')	**INFO 0** > **SETUP**
Waypoint: (Create/add/modify)	**INFO 0** > **WPT 5** **SETUP** > **SETUP** > **SETUP** > **Waypoints**
Keypad (flying) save - saves to active route or route 01 if no route active	**SAVE →** > **WPT 5** n **ENTER**
Waypoint: Activate/Load/Guide to	**WPT 5** (Cycle through route's waypoints w/guidance)
Menu method, load route first	**SET** > **ROUTE 8** > n > **ENTER** **SET** > **WPT 5** > n > **ENTER**
Waypoint: Delete - all	**SETUP** > **SETUP** > **SETUP** > **Clear Data** > **Clear Waypoints**
Waypoint: Delete - individual (Load route first)	**SET** > **ROUTE 8** > n > **ENTER** **CLEAR ←** > **WPT 5** > n > **ENTER** Waypoint 'n' for active route

| Operation/Feature	Path
Zoom (and Pan) control panel	**ZOOM** (Quick Key) **ZOOM PAN** (Keypad)
Zoom: Switch between auto zoom and manual zoom (ZOOM Quick Key)	**ZOOM** **ZOOM** (Double-click)
Zoom: Zoom Level (% - zoom scales and steps in and out)	**SETUP** > **SETUP** > **SCREEN** > **SETUP**

Appendix C: Satloc Cloud Subscription

Activate Satloc Cloud Subscription

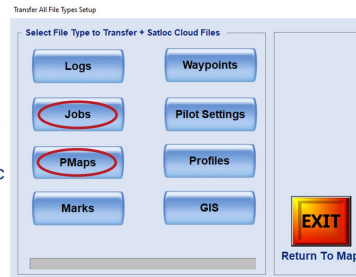Contact your local dealer to set up a Satloc Cloud subscription.

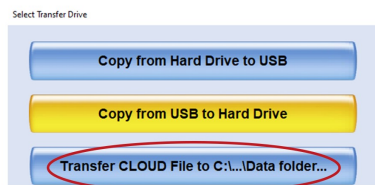## *Transferring Files into Bantam 2 from Satloc Cloud from the Moving Map Screen*
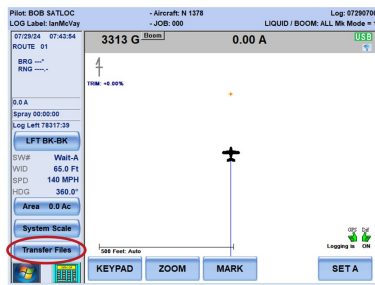
Step 1   **Step 2**

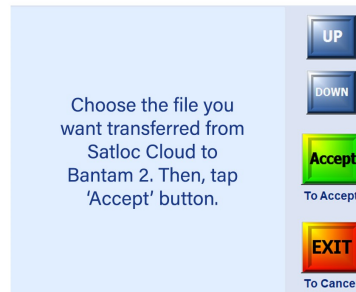Choose 'Jobs' or 'PMaps' to transfer from Satloc Cloud to Bantam 2.

Step 3   **Step 4**

Choose the file you want transferred from Satloc Cloud to Bantam 2. Then, tap 'Accept' button.

Logs are automatically uploaded to the cloud as a standard feature.

Transferring Files into Bantam 2 from Satloc Cloud from the Keypad

Step 1   **Step 2**   **Step 3**   **Step 4**   **Step 5**

KEYPAD > SETUP > SETUP > SETUP > Satloc CLOUD

Logs are automatically uploaded to the cloud as a standard feature.

How-To Use Satloc Cloud

A "Satloc Cloud Setup Reference Guide" is located on Satloc's website under the "Resources" tab. This reference guide contains:

1. Adding Users
2. Adding Pilots
3. Adding Aircraft
4. Assigning an Aircraft to a Unit
5. Adding Jobs
6. Sending a Job to an Aircraft
7. Downloading and Aircraft Log

Appendix D: KML Features

Import KML file into Satloc Bantam 2

1. Insert USB key into the cockpit connector on panel.
2. Press "Transfer Files" button on Map Screen. "Transfer All File Types Setup" will appear.
3. Press Button "KML" button.
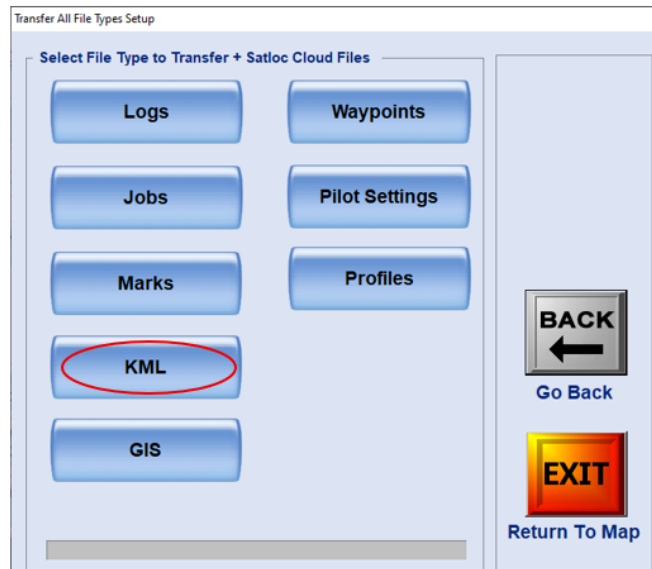
4. Select "Copy from USB to Hard Drive."
   a) This will copy all KML files from the USB drive to a special KML temporary holding folder on the Bantam2.
   b) During the file transfers you will observe a progress bar indicating the file transferred to the Hard Drive.
   c) When the KML files are copied to the Hard Drive, they will remain until needed. For example, converting them to an internal JOB file.

How to Convert KML to a SATLOC JOB file on the Bantam2 System

1. Select the KEYPAD and press INFO > KML.
2. A list of all the KML files saved on the Bantam 2 system appears. These are the files that were copied from the original USB drive.
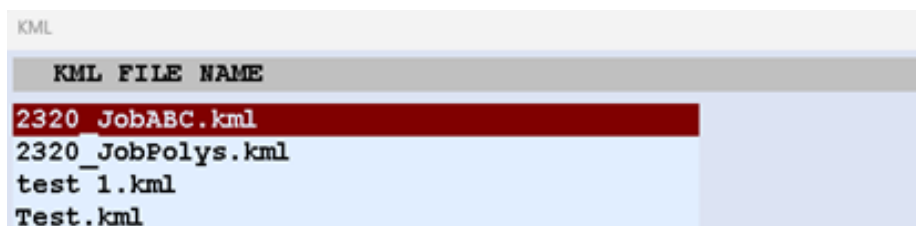
3. From the list, select the KML file you wish to convert to a Satloc JOB on the Bantam 2, then press "ACCEPT."
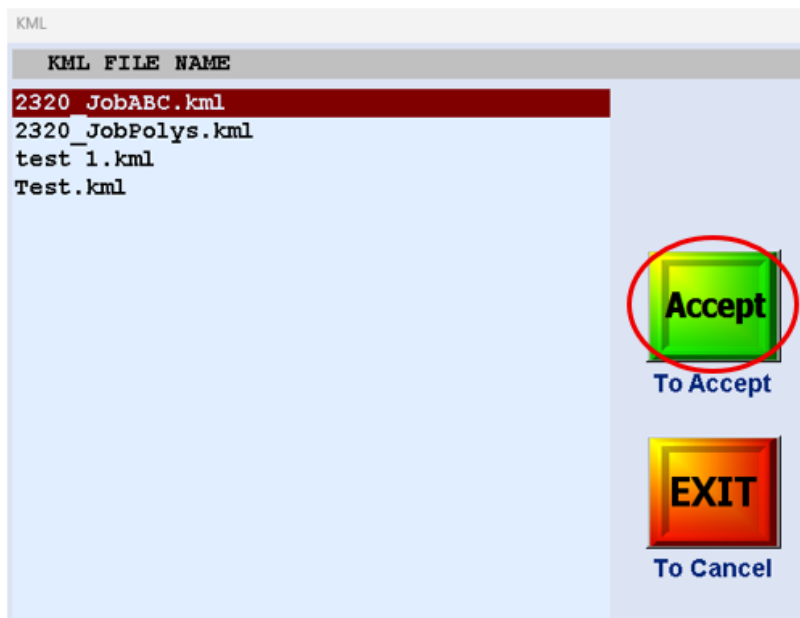
- The **Bantam2 system will now convert automatically your selected KML file to a JOB file and copy it to the: C:\SatlocB2\Date folder.** This is where all the other JOB files resided.

- After the initial conversion, the system will automatically display the new converted KML as a regular JOB on the MAP Display.

Note: The KML file name that you transfer to the Bantam2, will be the same name given to the final JOB name.

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22.   **EXPORT RESTRICTIONS**. Licensee agrees that Licensee will comply with all export control legislation of the United States, Canada, Australia and any other applicable country's laws and regulations, whether under the Arms Export Control Act, the International Traffic in Arms Regulations, the Export Administration Regulations, the regulations of the United States Departments of Commerce, State, and Treasury, or otherwise as well as the export control legislation of all other countries.

23.   **PRODUCT COMPONENTS.** The Product may contain third party components. Those third party components may be subject to additional terms and conditions. Licensee is required to agree to those terms and conditions in order to use the Product.

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25.   **FORUM FOR DISPUTES**. The parties agree that the courts located in the Sate of Texas of the United States and the courts of appeal there from will have exclusive jurisdiction to resolve any disputes between Licensee and Satloc concerning this Agreement or Licensee's use or inability to use the Software and the parties hereby irrevocably agree to attorn to the jurisdiction of those courts. Notwithstanding the foregoing, either party may apply to any court of competent jurisdiction for injunctive relief.

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GOVERNING LAW. This agreement and any disputes relating to, concerning or based upon the Product shall be governed by and interpreted in accordance with the laws of the State of Texas.

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