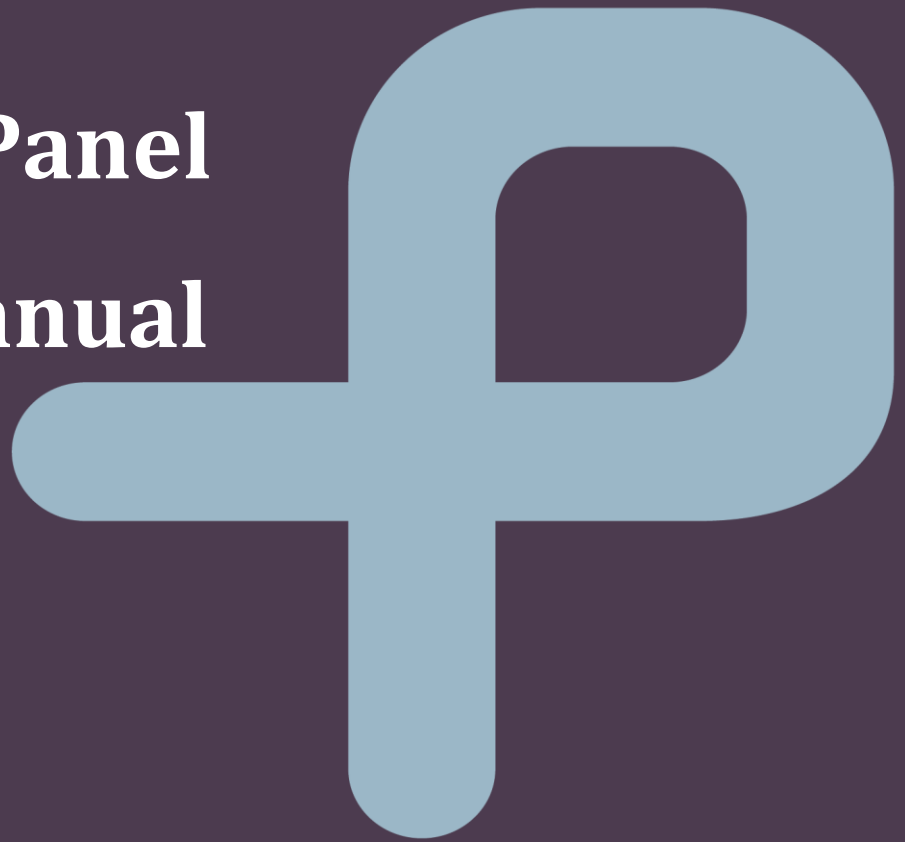# Capture Systems

Capture Panel

User Manual

Capture Panel
User Manual

Capture-Systems LTD.

6 Ravnitzky St.,

Petach-Tikva 4900617

Israel

Office: +972-(0)3-3038108

support@capture-sys.com

www.capture-sys.com

Revision 1.7.1

Contact

For any questions, assistance and troubleshooting regarding this document please contact us at:

Web: capture-sys.com

Sales: sales@capture-sys.com

Support: support@capture-sys.com

Phone: +972-3-3038108

Copyright and Use Agreement

©Copyright 2021, Capture-Systems Ltd. All Rights reserved. The Capture-Systems name and logo and all related product and service names, design marks and slogans are the trademarks, and service marks of Capture-Systems Ltd.

All data, specifications, and information contained in this publication are based on information that we believe is reliable at the time of printing. Capture Systems reserves the right to make changes without prior notice.

Alerts

The following notifications are used throughout the document to help identify important safety and setup information to the user:

⚠ **IMPORTANT**: the warning icon identifies actions that may harm the system performance. If the instructions are not clear enough in the tagged section, please contact Capture's support team before performing any action.

☞ The hand icon identifies points on important information that can impact the system performance.

End clause

We welcome all feedback from our customers and will appreciate any comments regarding this manual. If you find any errors while reading this manual or parts which are not clear please send us an email and we will fix the problem.

Table of Contents

1. Introduction

Capture Control Panel, is the operating application of systems produced by Capture-Systems LTD.
This user manual describes the application abilities and the way to achieve those capabilities.
The application purpose is to provide a simple and user oriented system with full control on the system features.
There are several kinds of systems, but the operation is same for all of them (except for the mechanical limitation of one system or another).

This manual will guide the user to simple and efficient usage with the application, while getting to know the various tools in it.

2. System Features

Capture Panel, provides a complete environment for testing, integration and usage for the systems manufactured by Capture Systems. With a simple interface, you can access all the various features of the system for easy and convenient use for each user.
The application includes a simple connection to Capture-Systems products and provides a series of features for optimal and accessible operation of the system.
Some of the features are:

- Support for all Capture-Systems products. The application connects to the system using Ethernet–TCP protocol.
- Full control on all of the system axes.
  The user is given the option to activate any of the system axes.
- Real time sensors readings information (if installed).
- The ability to save points of interest (presets) for quick sending.
- The ability to save targets of interest (GPS coordinates in LLA format) for quick sending.

3. Let's Start

3.1. Capture Panel Installation

The installer instructs the user during the various installation stages.
During the installation process you can select the location where the application will be installed on your computer.

⚠️ **The application uses DLL files. The installation process will install these files automatically in the installation folder. If you need to copy the location of the application at the end of the installation, be sure to copy all of the DLL files as well.**
Failure to copy these files will cause the application to stop working properly.

At the end of the installation process, you can run the application.
The Capture Control Panel welcome screen looks like this:
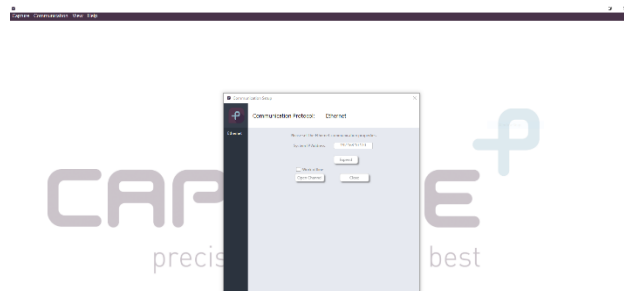
3.2. Open Communication Channel

By default, the application opens the communication window. By using the communication window, you let the application locate the system parameters automatically and open the relevant properties.

☞ The following process is our recommendation for communication setup.

Communication establish process:

1. Insert the system IP address.
☞   Make sure that your computer has the same subnet address as the system.
2. If your system doesn't use the default port, you can change it by clicking the 'Expand' button.
⚠️   **Do not change the system ports without reading the "Communication Settings" section in this guide**.
3. In cases that you don't remember the system IP address you can use the IP scanner that scans the defined address space and show the available systems.
After scanning and locating a system, you can copy its address by clicking on its row.
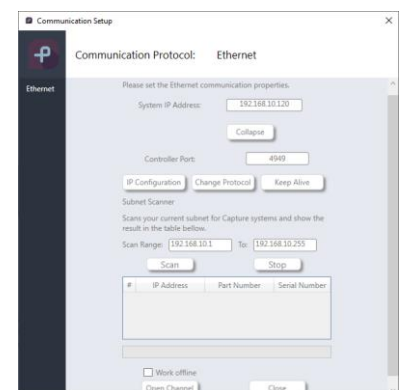
When the connection process is finished, the window will be closed, and the icon that indicates on the communication status (in the upper right corner of the window) will turn red.

Clicking on this red communication icon will disconnect the system. After the initial connection, it will be possible to connect and disconnect from the system by clicking on this icon, which will appear regularly. When the system is disconnected the icon will be yellow and clicking it will reopen the communication channel with the system and the icon color will changed to red.

If a connection is not possible (from any reason), a message indicating this will be displayed (see the "Error Handling" section to learn how to overcome connecting problems).

After the connection channel between the application and the system is opened, the various features of the system can be started.

If you chose to open the application with this method you can skip to section 4.

3.3.   Creating / Opening project

There are two options in the welcome screen:

- Create a new project.
- Open a saved project.

Creating a new project:

- Click on the 'Select a System' button in order to open the system selection menu.
- Select the desired system family.
- Select the desired system type.
  At this stage you can change the project name.
- Click on the 'Add' button.

Open an existing project

- Click on the 'Open System' button, in order to open the file browser.
- Browse using the file browser and locate the saved project file.
- Select the desired project and open it.
  During the project loading all your setting will be restored.
☞ **Please note that the application files are files that have an extension of .pt.**
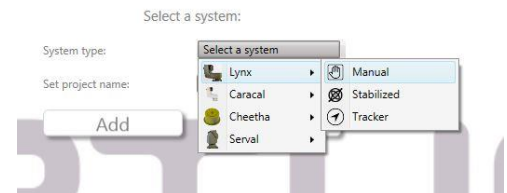
4. Application Structure

It is important to understand the application in depth, in order to take advantage of all the possibilities it has to offer the user.

The application consists of a central operating panel, through which most of the system's operations are conducted. In addition, there are a number of windows (such as the Settings and Errors windows) which we'll discuss below.
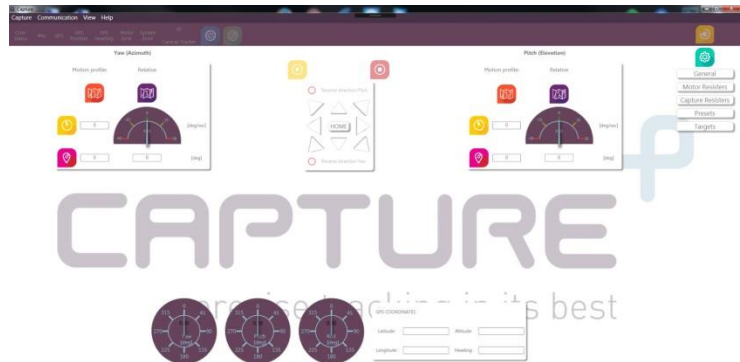
Because there are different types of systems, there are parts of the application that are common to all systems and there are those that are relevant only to a particular system family (such as Tracker systems).

In this manual we will review the full software structure.

4.1.   Upper navigation menu

The upper navigation menu have several categories:

- Capture Menu:
    - New – Opens a new system project.
    - Open – Opens the file browser in order to select a saved project file.
    - Close – Closes the current project and return back to the welcome screen.
    - Save – Saves the current project in the installation folder (by default) with the name that was given in the creation stage. In cases that a project name is undefined, the default name is the system IP address.
    - Save as – Opens the file browser so the user could save the project in his desired location with the desired name.
    - Exit – Close the application.
- Communication Menu:
    - Setup – Opens the communication setup window. Through this window the user sets up the communication method between the application and the system and can change the communication settings.
    - Refresh – Restarts the communication channel between the application and the system.
    - Disconnect – Disconnects the communication channel between the application and the system.

- View Menu:
  From this menu the user can open the various windows of the application. The user can approach this window only when the communication channel is open. Only the supported windows will be activated while the communication is active. The available windows are:
    - General Settings
    - Motor Registers
    - System Registers
    - Presets
    - Targets
    - Scan
    - Graphs
- Help Menu:
    - About – Opens the about window.

4.2.   Top bar - Status

The top bar contains general information regarding the system status and can activate some of its features. A proper status is displayed in white, as opposed to a malfunction that will be displayed in gray or red:

The applications shown in this section are (from left to right):

- COM Status – Indicates the communication status of the system.
- IMU – Indicates the communication state with the IMU sensor that connected to the system.
- GPS – Indicates the communication state with the GPS components that connected to the system.
- GPS Position – Indicates GPS position lock.
- GPS Heading – Indicates GPS heading lock.
- Motor Error – Indicates if there are errors in one of the system axes. Red indicates an error, which you can examine in the Motor Registers window.
- System Error – Indicates if there are general errors in the system. Red indicates an error, which you can examine in the Capture Registers window.
- ID – The system name.
- Stabilization – Turn on and off the system stabilization mechanism.
- Scan – Open the scanning window.
- Connect / Disconnect button

4.3. Settings column
- General – General system settings.
- Motor Registers – Detailed snapshot on the axes errors.
- Capture Registers – Detailed snapshot on the system errors.
- Preset – Set up fixed points on interest for quick operation.
- Targets – Set up fixed GPS points (LLA format) to quickly send the system to them.

4.4. Lower bar – Sensors
- Gauges displaying the motion sensor readings.
- GPS data which shows the system location data, based on the GPS readings.

4.5. Main operation panel
This is the only part that common to all types of systems.
The main operating panel components are:

• Divide into separate axes. For each axis, position and speed data is displayed.
• The axes activation buttons.
• Emergency stop button and restart button.

5. Application Operation

This section describes the application components. In order to get better experience with the application we recommend to review this section with an active system.

5.1. Motion Control

Capture's systems can work with three different control modes unless mentioned elsewhere in your specific system. The control modes are:

- Absolute positioning mode.
- Relative positioning mode (default).
- Speed mode.

You can switch between the operation modes in the 'General Settings' window.
After the communication established, all parts of the software will be open for changes (some of them are automatic and some can be changed by the user), and now the system can move.
The main operation panel, as stated, is divided into data entry zones (the zones identical for each connected axes) and operating area.

5.1.1. Insert motion data
- **Motion profile**: The current motion control profile.
- **1**. Specifies the speed value that we want to move in.
- **2.** Specifies the position value that we want to move to.
- **3.** Specifies the actual speed value of the axis.
- **4.** Specifies the actual position value of the axis.

5.1.2. Axes operation
- **Emergency stop**: Pressing on the red *stop* button immediately stops the operation of the system.
- In order to activate the system after the emergency stop. Click on the yellow *run* button.
- **Reverse** – Reverse the axis direction.
- **Home** – Sends system to 'Home' position. The system will run the 'Go to Homing' sequence.
- Operation arrows to move the various axes, according to the data entered by the user in section 5.1.1.
  The Right and Left arrows only refer to the Yaw axis.
  The Up and Down arrows only refer to the Pitch axis.
  The diagonal arrows refer to both axes together.

5.1.3. System Activation
You can send commands to the system using two methods.
- Arrow control – The system will run according to the data that is set in the *'insert motion data'* section (5.1.1).
- Joystick control – The application will read the input from a joystick that is connected to the local machine and send speed commands according to the joystick movement.

In order to switch between the operation modes, click on the desired icon. By default, the operating mode is *Arrow Control*.

5.2.   Settings

5.2.1. Communication Settings
Through this window the initial connection is made to the system.
After the initial connection, the system stores the entered data and can now connect and disconnect by clicking the communication icon in the upper right corner of the main window.
It is important to remember that after exiting the software, the communication settings are not saved. The initial connection to the system should be performed as described in Section 3.2.
After the connection established via Ethernet, the user is given the option to change the system IP address.

⚠ **Incorrect execution of the following instructions or alternatively loss of the new IP address will cause the system to be disabled and repaired only at the company's lab.**

By exercising this option, you agree and aware of the above.

In order to change the system IP address please read the following instructions carefully:
- The software must be connected to the system using Ethernet protocol.
- Enter to the communication settings window ('Communication → Setup') and click on the 'Expend' button.
- Open the 'IP Configuration' window.
- The software will read the communication data from the system and insert it to the relevant sections.
- Controller IP – The main system IP address.
- Subnet Mask: – The system subnet mask address.
- Controller Port - You can change the system port number or leave the default value.

- Make sure that the subnet of this address is the same as the subnet of the system's primary IP address.

⚠ **Failure to assign address with the same subnet will result disabling the system.**

- After setting the new value press on the 'Set' button.
- In order to apply the address change a system restart is required.

Once the system is restarted, it will be possible to connect, using the newly defined address.

5.2.2. General Settings

In this window, you can change the various system settings.

☞ Please note that not all the systems support all of those settings. The system will show you only the relevant settings for your system but in this manual we cover all those options.

The settings groups are:

5.2.2.1. General Settings

- Select the measurement unit in which the system works. The system supports the usage of degrees or radians.
- Part Number – Specify the system Part number.
- Serial Number – Specify the system serial number.
- Homing – Define values for 'home' position. Clicking on the 'Home' button in the main panel will send the system to those values.
- Acceleration – The acceleration values for the system. Changing these values can effect on the system performance.
- Motion profile definition for each axis separately.
- Set actual position – using this fields you can change the axis actual position in order to recalibrate it according to your system.

☞This functionality isn't recommended for system with absolute encoders.

After any change of this information please update the data by clicking on the 'Update Information' button.

5.2.2.2. IMU

This page represents general information about the motion sensor that connected to the system. The page includes the following information:

- Raw accelerometer data
- Calculated accelerometer data
- Raw Gyroscope data
- Option to restart the sensor

5.2.2.3. GPS Settings

This page represents general information about the GPS sensor that connected to the system.

5.2.2.4. Joystick

In the Joystick settings page, you can activate the joystick reading, validate the buttons state, set the axes dead-zone and flip the axes orientation.

- **Read Data** – After starting the data acquiring (by pressing on the 'Start' button) the system will show the current reading in the *'Axes'* grid.
- **Buttons -** You can change the system maximum speed using the joystick buttons (if it has any). After setting the maximum speed value and clicking on the *'Update'* button the application will change the maximum speed to the one that you mentioned in the relevant field.

☞ Each system has a maximum speed limit. The application won't send value that is larger than the speed limit that defined in the system specification.

- **Dead-Zone** – You can define a dead-zone for the sensor readings. This means that all the readings until this value is ignored.
- **Axes Orientation** – Flips the axes orientation.

5.2.2.5. Data Logger

In this page you can set a data logger that saves the desired data to CSV file.

In order to activate the data logger, you should set the variables that you want to log (the relevant values will be active according to your system specification), set the logging time (in milli seconds) and press on the '*Start Logging*' button.

When the logger is running an indicator will be active in the main screen. In order to stop the logger, you should press on the '*Stop Logger*' button.

In order to export your data to CSV file, press on the '*Export Log File*' button.
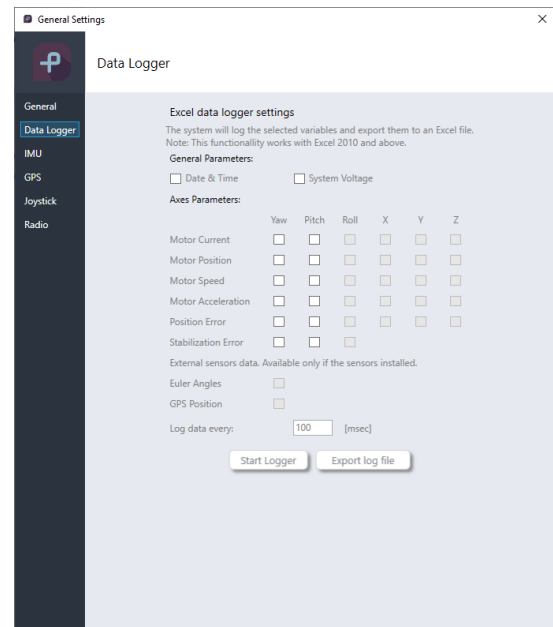
5.2.3. Presets
- Define a preset list that will be saved for later usage.
- The system supports in up to 15 presets.
- The presets represent absolute positions.
- The preset value must be set as Degrees value.
- The application using the only the data that's relevant to the connected system.
- In order to reach a preset, select the desired one and then click on the 'Run selected preset' button.
- Clicking on the 'Set all presets' button will send all the presets data to the system.
- Clicking on the 'Clear presets' button will delete all the saved presets from the system.
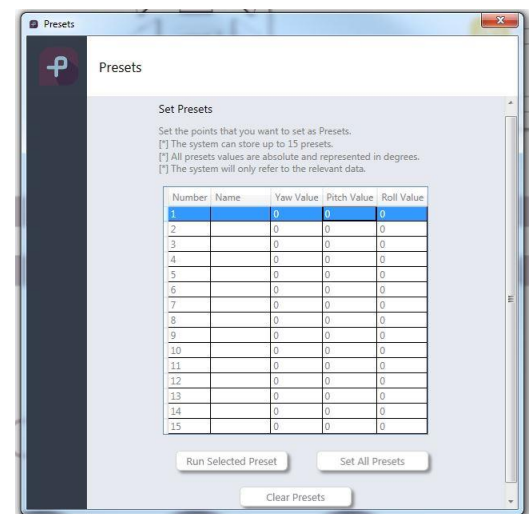

Figure 14 – Presets

5.2.4. GPS Targets

- The GPS units' format is shown according to the user selection in the General Settings.
- Set the list of GPS targets, which will be saved for quick movement later.
- In order to reach a target, select the desired one and then click on the 'Run selected target' button.
- Clicking on the 'Set all targets button will send all the targets data to the system.
- Clicking on the 'Clear targets button will delete all the saved targets from the system.
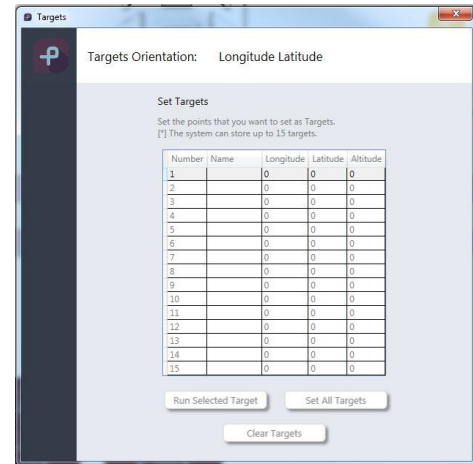

Figure 15 - Targets

5.2.5. Motor Registers

This window displays to the user an online error report about all of the system connected axes. Our systems have two main error types: Critical and Non-Critical.

- Critical Error: Defined by Error Registers 1, 2. When critical error is raised, mostly, the corresponded axis will be stopped until we will reset the error.
  Common critical errors are: Over current, Software limits switches, etc.
- Non-Critical Error (warnings): Defined by Status register. While a non-critical error is raised the corresponded axis won't stop his movement' but a warning indicator will rise in order to set the user attention. Some of the non-critical errors are just references on the system state.
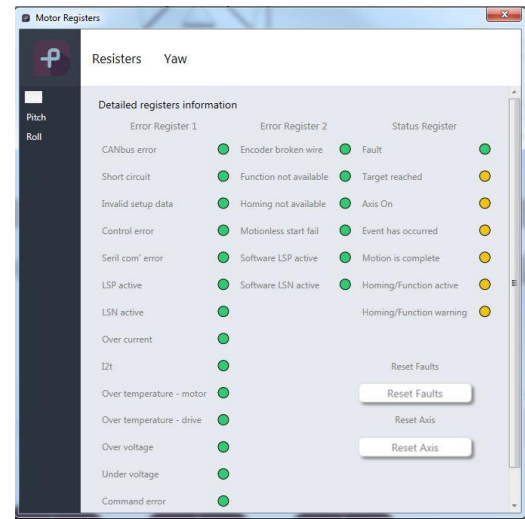

Figure 16 – Motor Registers

5.2.6. Capture Registers

This window displays to the user general online error report about the system.
The general system errors split into two categories:

Communication Errors:

indicated the communication state with all of the connected components. Since the fact that system may contain several sensors that reflects on the systems performance, the user should get detailed information about the communication state with each and every one of them.

Protocol Errors:

In cases where the user implements the communication protocol, the system will return an error byte in cases of wrong protocol implementation. After getting a command error from the system, the user can read the last error in order to learn his mistake.

5.3. Sensors

At the bottom of the main application window the sensor signals are shown (depending on the connected system). In figure 17 you can see the sensors for Tracker systems.

Figure 17 - Sensors

- Azimuth – In Stabilizes systems (without GPS) the gauge shows the Yaw reading value. In Tracker systems (with GPS) the gauge shows the absolute heading value (calculated both from the GPS and the axis position).
- Elevation – Represents the calculated value between the Pitch sensor reading and the axis position.
- Roll – Represents the Roll reading from the motion sensor.
- GPS Coordinates – Absolute GPS data, like self-position, altitude and heading.

5.4. More Options

5.4.1. Scanning

Clicking on the scan button 🞧 in the upper menu bar will open the scanning window.

Capture controller supports in three scanning patterns: Zig-Zag, Snake and Square.

In this guide we will demonstrate the Zig-Zag pattern. The implementation of the snake and square patterns are pretty much the same.

When the system performs the Zig-Zag scan, there is a diagonal movement, depending on the data entered by the user.
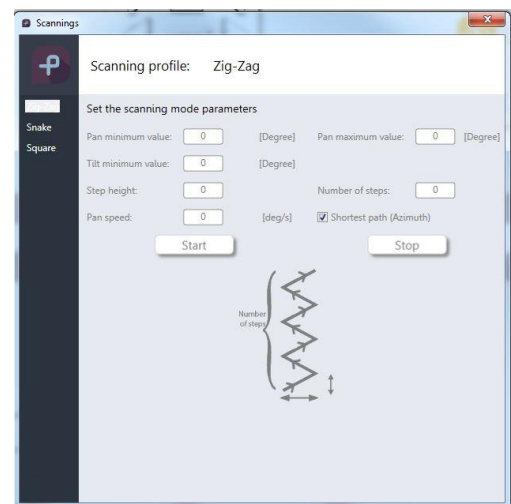

Figure 19 – Zig-Zag scan

To enter the system into automatic scan mode, the following data must be updated:

- Yaw minimum value: Scanning start point in the Yaw axis.
- Yaw maximum value: Scanning end point in the Yaw axis.
- Pitch minimum value: Scanning start point in the Pitch axis.
- Step height.
- Number of steps. The number of diagonals that the scan will performs in each cycle.
- Pan speed: Scan speed for the Yaw axis (The pitch speed derived from the scanning calculations).
- Shortest path: By selecting this option, the shortest path between Yaw Min and max will be selected as the scan path.
  By pressing the 'Start' button, the system will move to the starting point and from there, start the scan back and forth until the user initiates the stop scan by pressing the 'Stop' button.

5.4.2. Stabilization
Clicking on the stabilization button will turn the stabilization mechanism on.
The stabilization mechanism will keeps the system stabilized on the current position.
This button exists only in stabilized system. Using it will turn the stabilization state on and off.

6. Error Handling

6.1. Communication errors

While communication error occurs, the software will show a message that describes that error.
If the application is connected to the system while an error occurs the communication state icon will change to gray.

6.1.1. Communication Errors for Ethernet –TCP Protocol

1. 'Start communication failure'. The system that you're trying to connect to doesn't match the IP address that entered in the communication window.
   Make sure that your local IP address has the same subnet as the system.
2. 'Communication timeout'. The communication protocol reached the maximum amount time without getting the desired response from the controller. In order to solve this error please follow the following instructions:
   - Check the system wiring.
   - Check the system power state.
   - Validate the system IP.
   - Restart the system.
3. 'General communication error'.
   In order to solve this error follow this steps:
   - Check cables wiring.
   - Make sure that your system supports the selected protocol.
   - Validate the system IP address.
4. 'Wrong System ID'. The project type in the software doesn't match the system part number.
   In order to solve this error, close the project and open a new project that matches with your system.