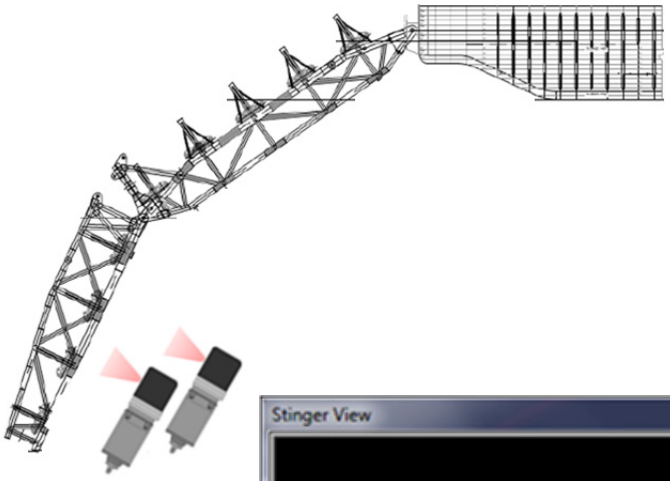
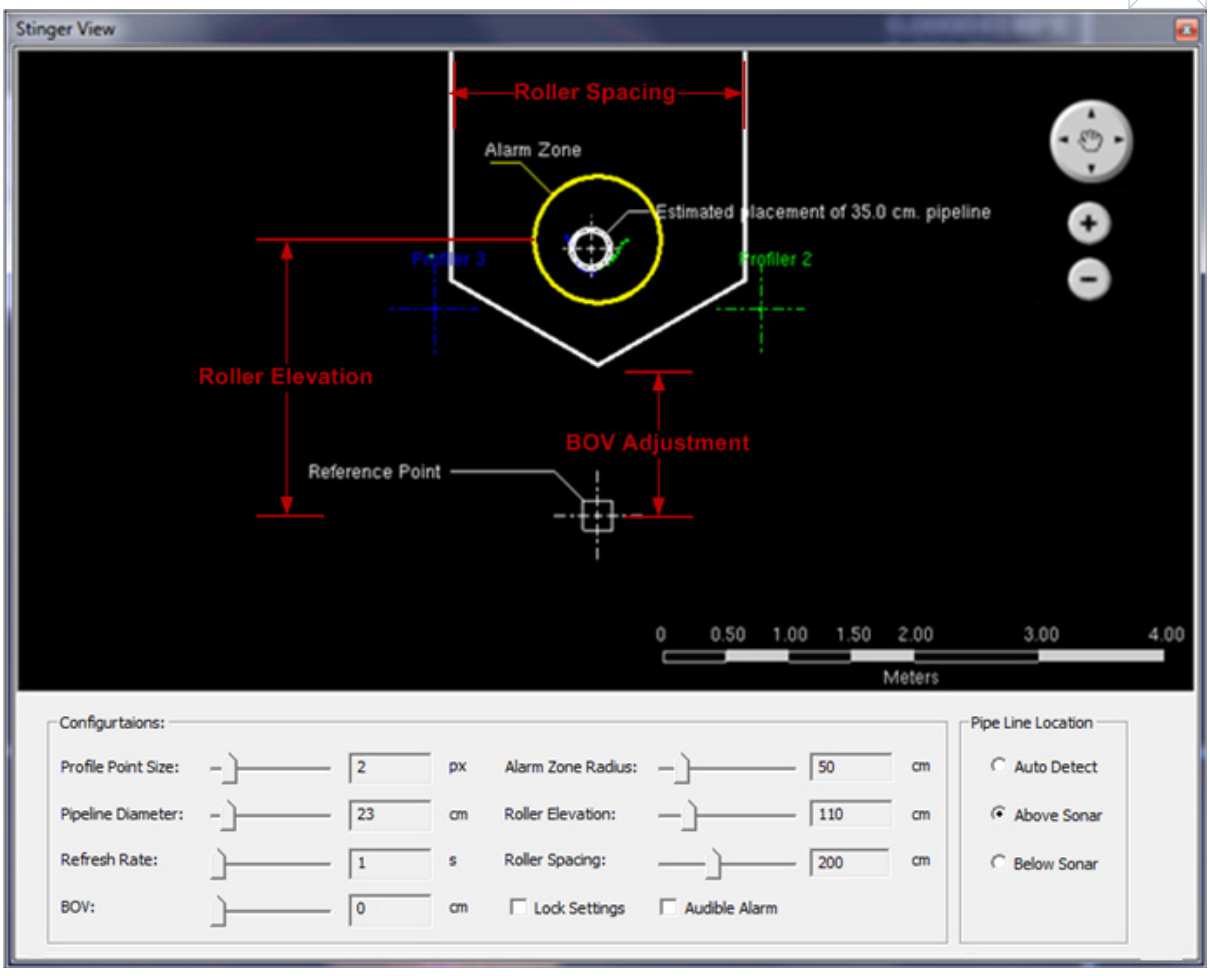
# Operator Manual

KONGSBERG

## MS1000 Software

### Stinger Monitoring System





## Document information

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***The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. You must be familiar with the contents of the appropriate manuals before attempting to operate or work on the equipment.***

***Kongsberg Mesotech disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.***

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# 1 INTRODUCTION

The MS1000 Stinger Monitoring System monitors the Over-bend or Sag-bend condition during the pipeline-laying operation and aids the vessel operator in making proper adjustments.

Each system has a pair of profiling sonar heads installed in separate locations on the stinger frame. The pipeline profile can be extracted and merged in the MS1000 software to estimate the pipeline location.

This manual describes the components of the MS1000 Stinger Monitoring System and provides instructions on how to configure the system.

Refer to the MS1000 user manual, Kongsberg Mesotech document number 901-10017002, for detailed information on the full operation of the MS1000 software.

## 1.1 MS1000 Stinger Monitoring System Overview

The MS1000 Stinger Monitoring System incorporates the following components:

- Two 1171 profiling sonar heads
- MS1000 Processor
- MS1000 Software dongle with Stinger Monitoring option

From the MS1000 software, click the MS1000 logo to open the **About MS1000** dialog to confirm the Stinger Monitoring option is enabled.

Figure 1 MS1000 Stinger Monitoring - option confirmation

# 2 CONFIGURATION

## 2.1 Measuring Offsets

### 2.1.1 Profiling Sonar Head Installation Locations

A pair of profiling sonar heads shall be installed > 1.0m from the pipe wall within the stinger. The sonars require an unobstructed view of the pipe.

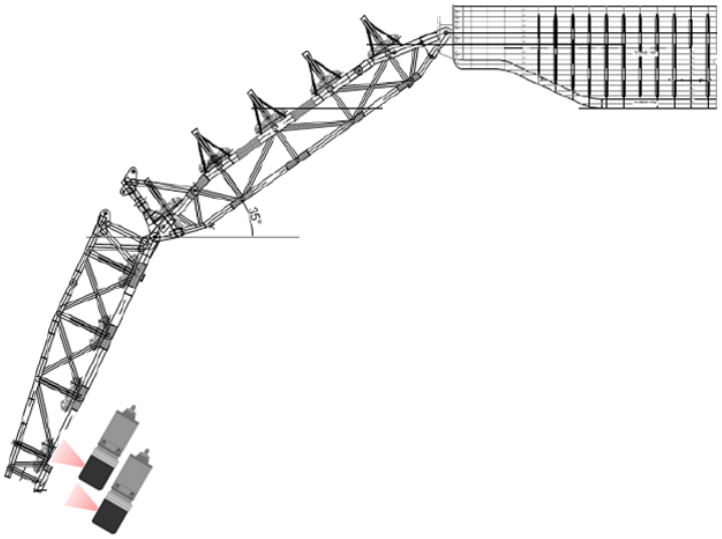


Figure 2 Side view of the stinger and profiling sonar heads

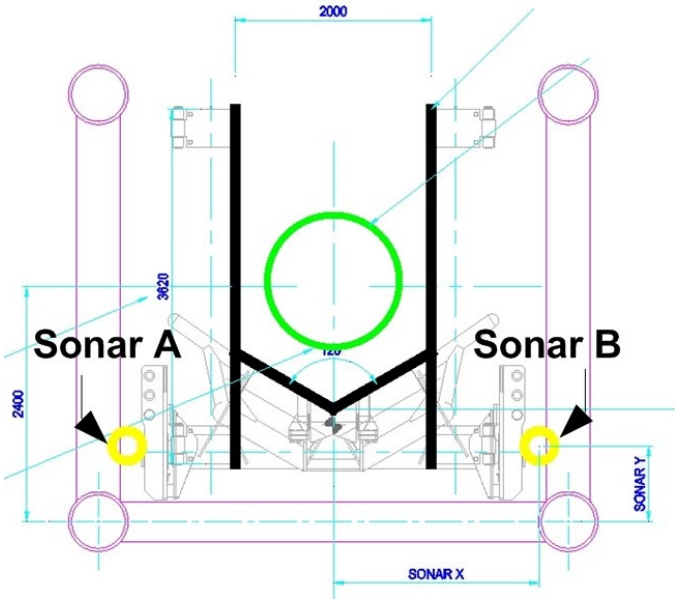



Figure 3 Rear view of the stinger and profiling sonar heads

### 2.1.2 Offsets

Select a reference point on the Trencher and measure the following offsets for each profiling sonar head relative to the reference point:

X: Positive Starboard

Y: Positive Forward

Z: Positive Up

Pitch: Positive Bow Up

Roll: Positive Starboard Down

Yaw: Positive Clockwise

## 2.2 Detecting the Sonar Heads

Power up the sonar heads, run the MS1000 software, click the **Setup** tab, then click the **Connect Sonar** button.

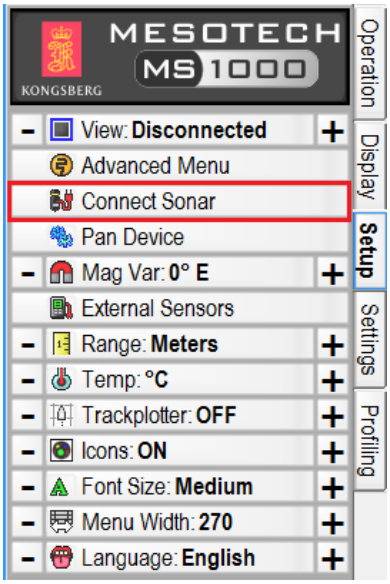



Figure 4 Control Panel – Setup Tab – Connect Sonar Button

From the **System Configuration** dialog box, click the **Detect Heads** button to detect the sonar heads.

After all three sonar heads are detected, click on each sonar head and rename the sonar head to **PORT or STBD (Starboard)** according to their installation location. Use the sonar head serial numbers for identification.

Click **OK** to complete the sonar head detection and naming.

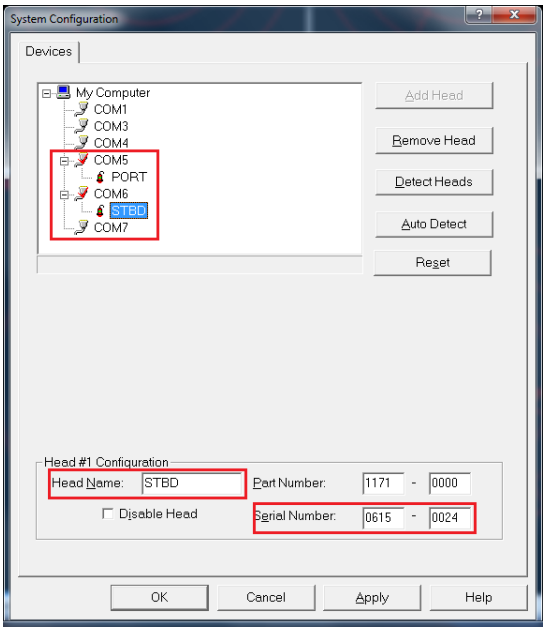



Figure 5 Sonar name assignment

## 2.3 Running the Sonar Heads

Click the **System** menu on the bottom right and select **Run** to start the system.

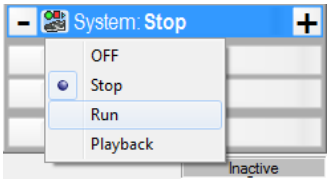



Figure 6 System operation start/stop

The MS1000 software will create one sonar display for each sonar head. The window positions can be arranged freely by selecting the **Display** tab, clicking the **Layout** button, then dragging a window and dropping it on another window to customize the layout.

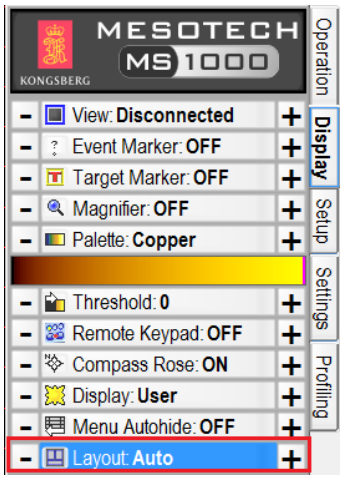



Figure 7 Control Panel – Setup Tab – Layout Button

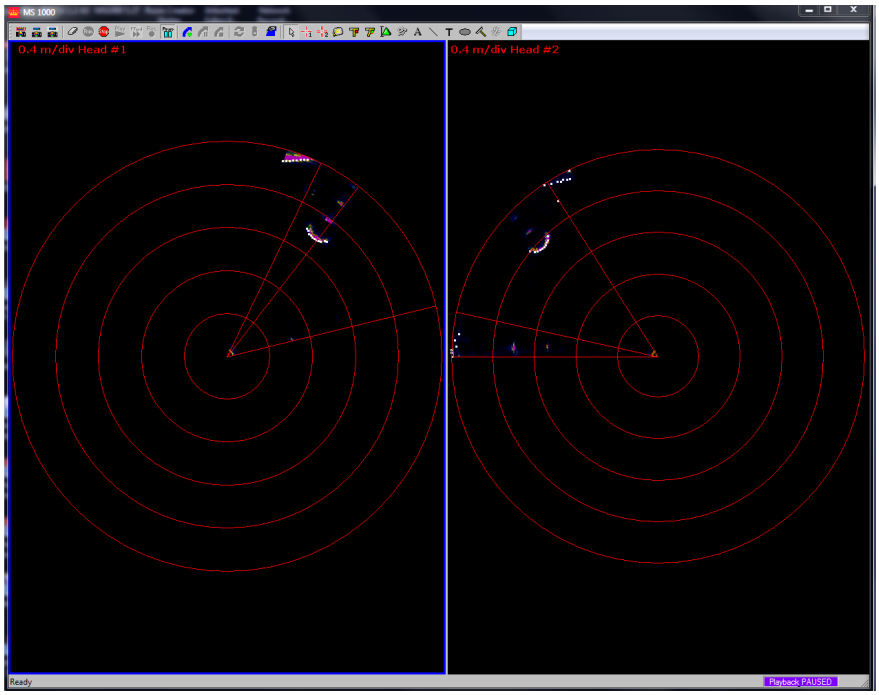



Figure 8 Example of a sonar display layout

## 2.4 Setting Offsets in the MS1000 software

Right-click on any of the sonar displays and select the **Offset** menu**.**

Click on each sonar head and enter the measured offsets into the **Mounting Offsets** boxes. Leave the **Horizontal Mounting** box checked.

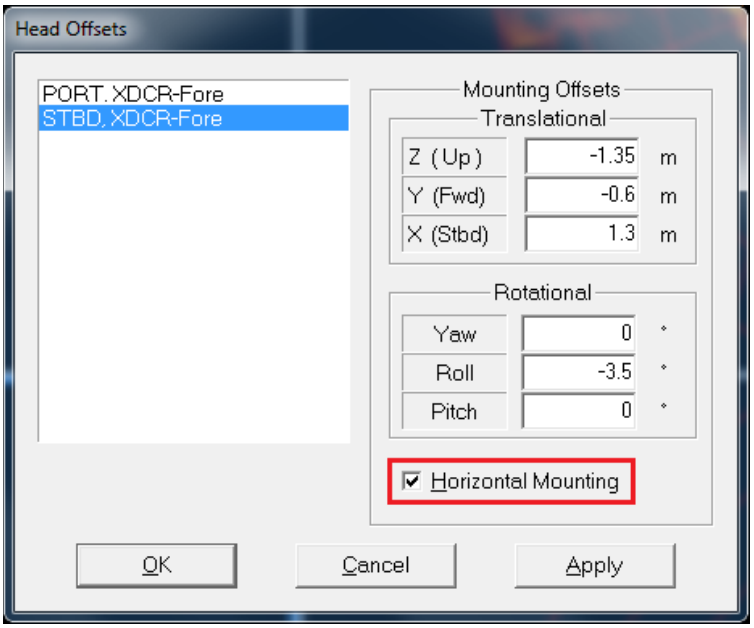



Figure 9 Profiling sonar offsets

## 2.5 Setting the Sonar Orientation

The profiling sonar heads can be installed in either a **Transducer Fore** or **Transducer Aft** orientation.

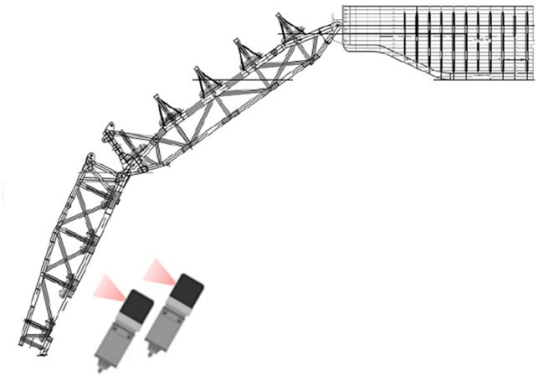


Figure 10 Transducer Fore orientation

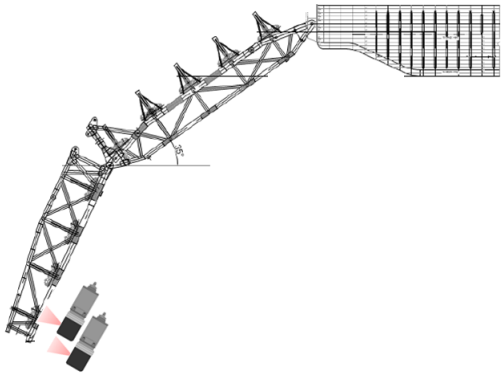


Figure 11 Transducer Aft orientation

From the MS1000 software, select the **Operation** tab, then click the **Orientation** button to set the orientation to match the physical installation.

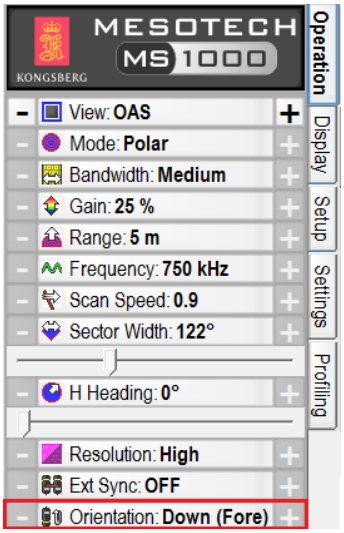



Figure 12 Control Panel – Setup Tab – Orientation Button

# 3 OPERATION

## 3.1 Enable Stinger Monitoring

From the MS1000 software, select the **Setup** tab, then set the **Stinger Monitoring** button to **ON** to enable stinger monitoring.

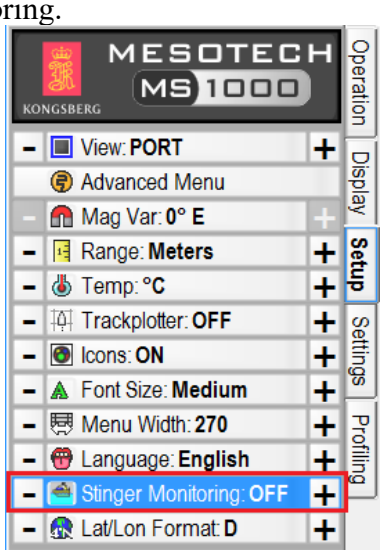
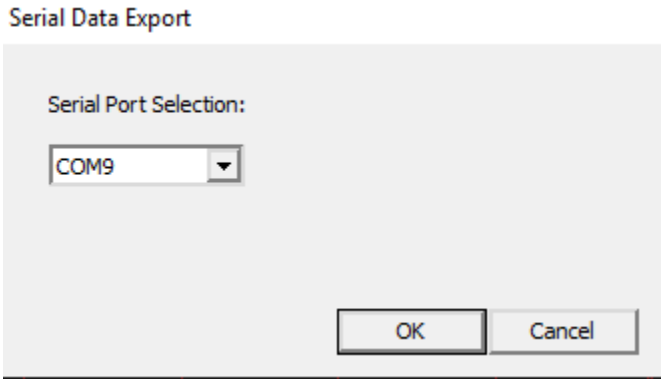



Figure 13 Control Panel – Setup Tab – Stinger Monitoring Button

Select a COM port, then click **OK** to export the monitoring information on the selected serial port at 9600 bps. Click **Cancel** to enable Stinger monitoring without serial output.



The serial output data format is:

**$KMSTM,a,hhh.hh,lll.ll,dddd,bbb.bb.LLL.LL,xxx.xx,zzz.zz,q,*hh<CR><LF>**

Where

- **$KMSTM** = Header
- **a** = One field for the number of sonars used to compute the pipe position (e.g. 1 or 2).
- **hhh.hh & lll.ll** = Local clearance offsets for both vertical and horizontal (lateral) from bottom pipe to roller box.
- **dddd** = Outer pipe diameter in millimetres.
- **bbb.bb** = Roller box height relative to ref. point.
- **LLL.LL** = Lateral offset of roller box relative to ref. point.
- **xxx.xx** = Sonar lateral offset from ref. point.
- **zzz.zz** = Sonar vertical offset from ref. point.
- **q** = Quality Flag (0, pipe is not detected; 1, pipe is detected).
- **hh** = Checksum (exclusive OR checksum between $ and *).
- **<CR><LF>** = Carriage return and line feed.

## 3.2 Adjust Stinger Monitoring Settings

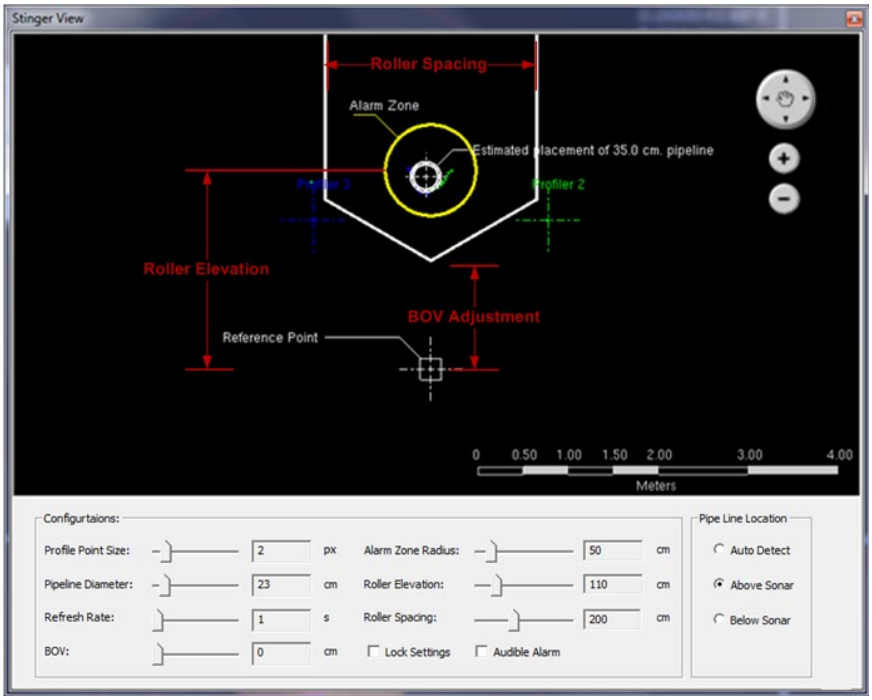



Figure 14 Stinger Monitoring Window and settings

- **Profile Point Size:**
  Adjust the pixel size of the profile points.
- **Pipeline Diameter:**
  Adjust the pipeline diameter between 4 cm to 200 cm to match the actual pipeline diameter. Use the mouse scroll key or keyboard arrow key to make fine adjustments.
- **Refresh Rate:**
  Set the stinger monitoring window update rate.
- **BOV:**
  A fictive point representing the Bottom Of a Virtual “zero inch” diameter pipeline.
- **Alarm Zone Radius:**
  Adjust the radius of the alarm zone. Audible and Visual alarms will be triggered if the estimated pipeline moves out of the alarm zone.
- **Roller Elevation:**
  Adjust the pipeline roller elevation.
- **Roller Spacing:**
  Adjust the pipeline roller spacing.
- **Pipeline Location:**
  Depends on the sonar installation location - the pipeline can be either above or below the sonar. Selecting the correct pipeline location will improve the pipeline estimate. If the pipeline location is unknown, select **Auto Detect**.
- **Lock Settings:**
  To lock the current settings and avoid changing settings by accident.
- **Audible Alarm:**
  To enable/disable the audible alarm.
- The operator can use the on-screen widget to pan and zoom in/out the stinger monitoring window.

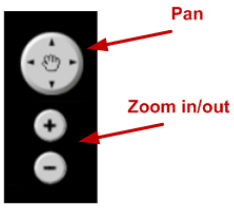



Figure 15 Pan/Zoom control widget

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