Lasso Radar based Tank Level Telemetry

Lasso Technologies, LLC Capabilities

The advent of wireless communication and GPS technologies has enabled businesses worldwide to capitalize on wireless sensing and location services. Lasso Technologies provides both Cellular and Satellite based wireless communications technologies used for asset management, monitoring, control, and machine status. Lasso builds the controls and web pages needed to convey sensor and GPS data back to the user so that they can gain a better understanding of their business processes. Sensors and interfaces are provided to the customer based upon what the customer intends on monitoring. Lasso provides a complete drop in solution so that the customer can focus on their business.

- **Do not Use Lasso where transmission errors or product failure may cause environmental issues or injury.**
- **Please visit our licensing terms at http://www.lasso.com/terms**
- **For support contact support@lasso.com or call 866-392-0923.**
- **Special shipment packaging is required of Lithium Metal batteries and they Can *Not* be shipped on passenger aircraft. Consult your shipper before shipping.**

Features

- Lasso's radar product uses a time of flight radar technology.
- Lasso's Radar and Satellite Telemetry technology has patents and patents pending.
- The Lasso products can communicate using Globalstar Satellites, Verizon cellular network, or local Wi-Fi hot-spots.
- The satellite solution is one way communication from the Radar to the web site.
- Satellite communication for use virtually anywhere in the world.
- Lasso's products are used to communicate with many types of: pressure, temperature, level, chemical, generator, fuel gauges, ultrasonic, and engine controls.
- Sensor data and GPS coordinates are returned to Lasso.com web pages.
- The web can send data via text, email or phone alerts.
- Raw Data can be pulled from the servers by the customer using an API for use on their portal. Date, time, and serial number filters can be sent.
- IP68 enclosure.
- All Lasso data has SSL encryption on our web site and while sending data via API.
- Easily replaceable AA batteries.

Satellite Modem

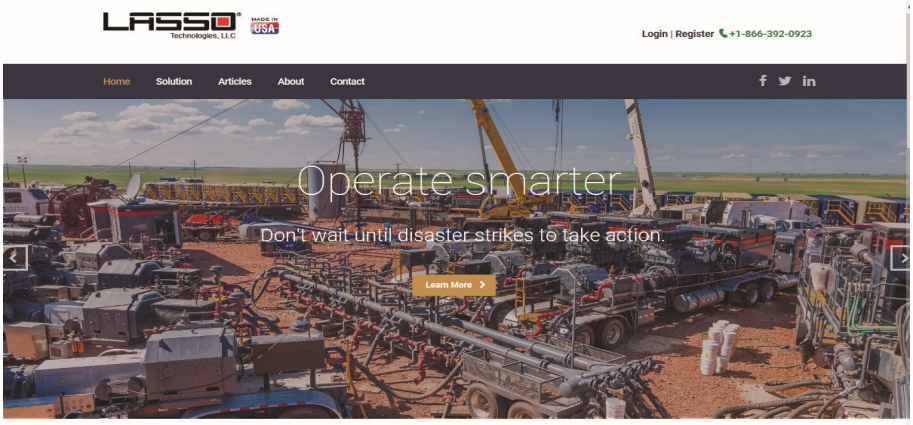
- The satellite communication is provided through the Globalstar network.
- Globalstar is the world's largest provider of mobile satellite voice and data services. Globalstar offers these services to commercial and recreational users in more than 120 countries around the world. A network of ground stations provides connectivity from 40 satellites to the public switched telephone network and Internet. A satellite must have a Gateway station in view to provide service to any users it may see. 24 Globalstar Gateways are located around the world, including 7 in North America.
- The Radar gathers sensor and GPS data at specified intervals and initiates satellite transmission through the Globalstar modem located on the Lasso circuit board.

Installation

- Mount Radar so that the lid FACES THE SKY!
- Use the keypad and display to adjust data and GPS reporting frequency, gallons per inch, and distance to bottom of tank.
- Mount Radar on top of tank. Radar will typically penetrate plastic containers to measure fluid depth. Dependent upon plastic thickness and chemical being detected. Try not to mount Radome too close to wall of tank. Experiment by pressing wake early button. Use Bonding Tape but do Not block Radome.
- Go to www.lasso.com to see your sensor values after several minutes.
- Make sure that ENCLOSURE LID IS SCREWED ON TIGHTLY or water may enter enclosure and cause damage.

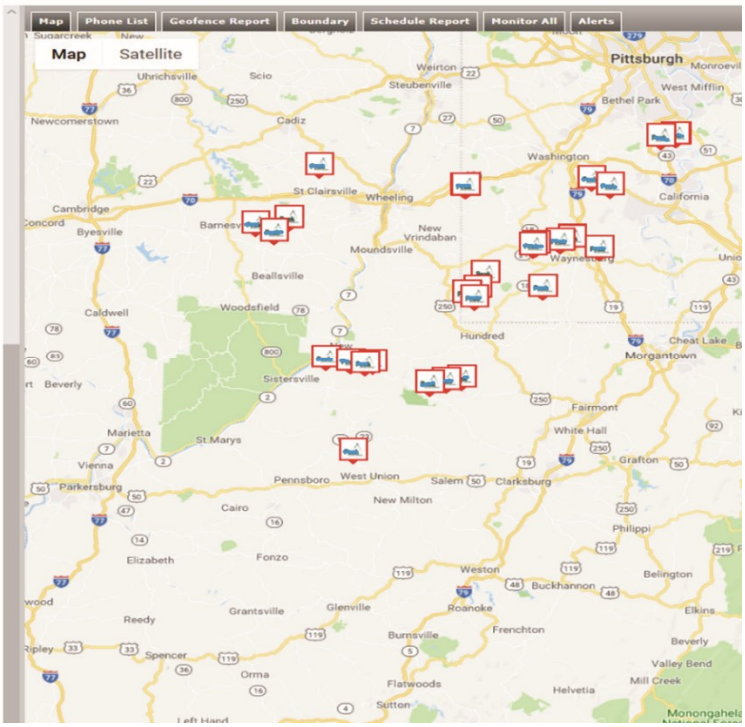
Web Operation

Go to www.lasso.com. User registration is required to access most of these pages. Login top right and enter registration. Click on Home to see your Radars. Password can be changed under My Account. Other users can be added.



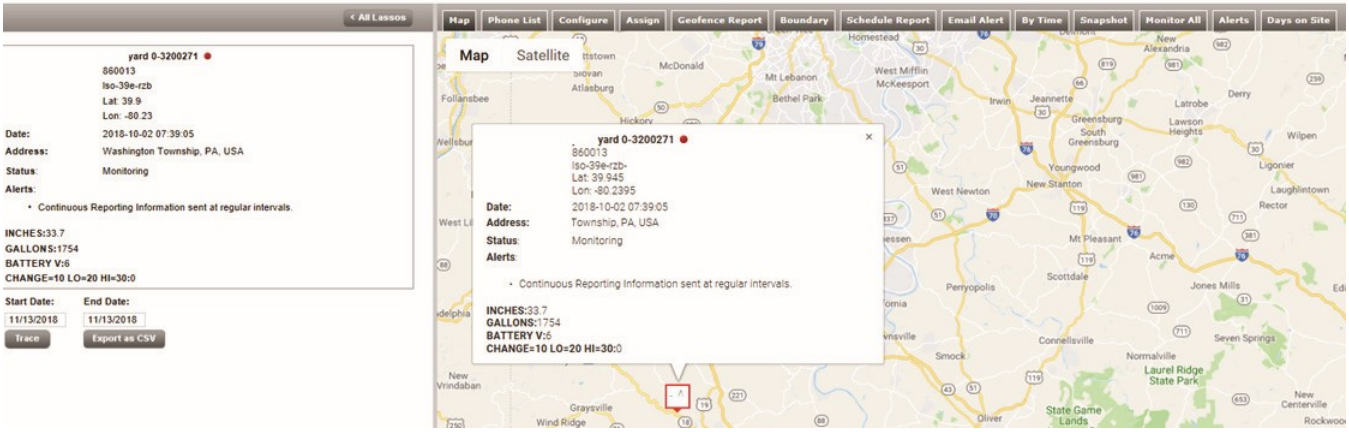
Home

- After logging in, Select HOME and see all of your Radars.
- Click **(Details)** in the left frame to see any specific unit.
- Change the name of the Radar under the Configure tab which you will see.
- Click on any thumbnail on the map to see the address of the unit.
- The red and green dots in the left frame indicate if that Lasso has called in the last day.



Map

After selecting **(Details)** in the left frame, select the View Tab. Mouse over an icon to see where it is currently located. Select Map or Satellite view in the top right. Zoom in and out.

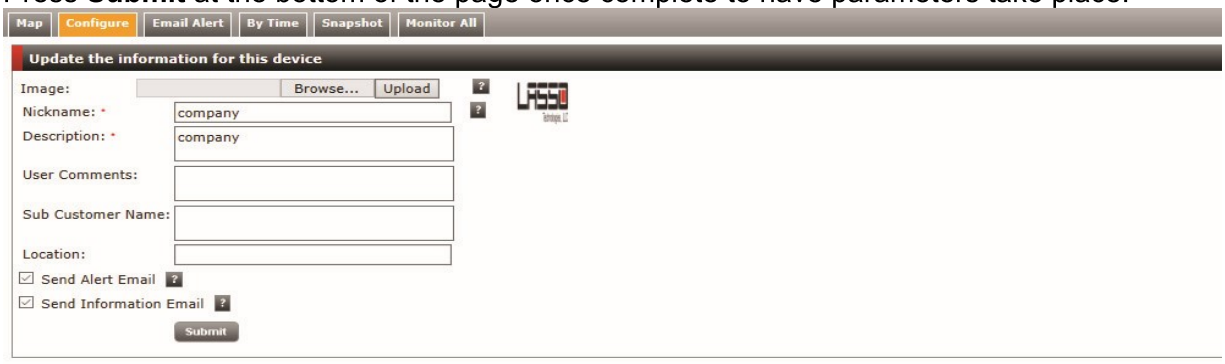


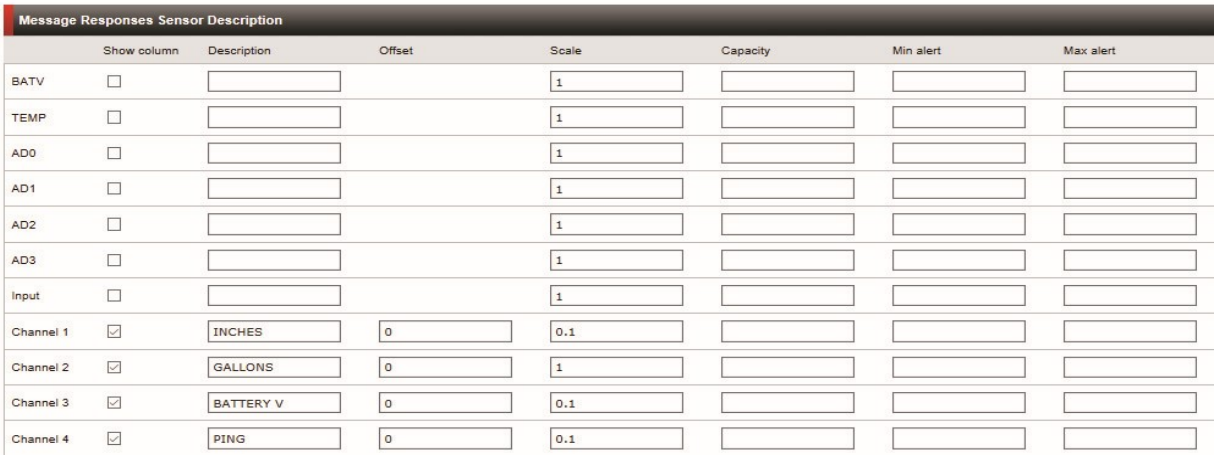
Configure

Select the Configure tab to configure the definition of this unit. Units are already configured so this is typically not required. NOT ADVISABLE TO ALTER THIS SCREEN.

- **UPLOAD** a thumbnail by Browsing for a jpg or other image file and press Upload.
- **Nickname & Description** . Click Submit once entered. Refresh.
- **Show Column.** This will select if you want this field shown on the Snapshot or By Time tab.
- **Description** Description of the reading you are taking for the Snapshot and By Time tab
- **Scale** Enter the scale to convert from raw computer value from satellite to your units.
- **Capacity** Maximum tank volume in or level. Used on the bar graph as % that the tank is full.
- **Min Alert** If the tank volume falls below this an email will be sent. Leave blank of no alert .
- **Max Alert** An Alert will be sent if the tank level exceeds this value. Value of 6000 will create an email when Gallons is more than 6000 (test value). Do not rely on for critical monitoring situations in case satellite message fails or other adverse technical issues occur.
- **Send Alert Email** Excess fluid levels will be sent to the distribution list.
- **Send Information Email** status reports sent to the distribution list at specified time intervals.
- **Depth inch** depth of fluid in tank. Depth=Distance to bottom - ping
- **Gallons** in the tank using the lookup table based upon depth. Example below has MAX=6000 to create an alarm email if level is more than 6000 gallons. Normally MAX left blank
- **Bat Volt** Replace batteries when less than 3.4 volts .
- **Ping** Distance in inches that sensor currently sees from sensor face to fluid .

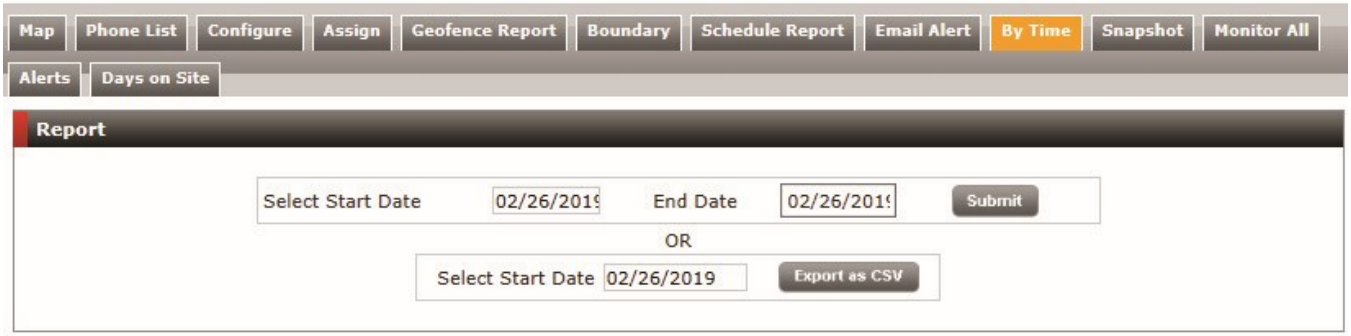
Press **Submit** at the bottom of the page once complete to have parameters take place.





By Time

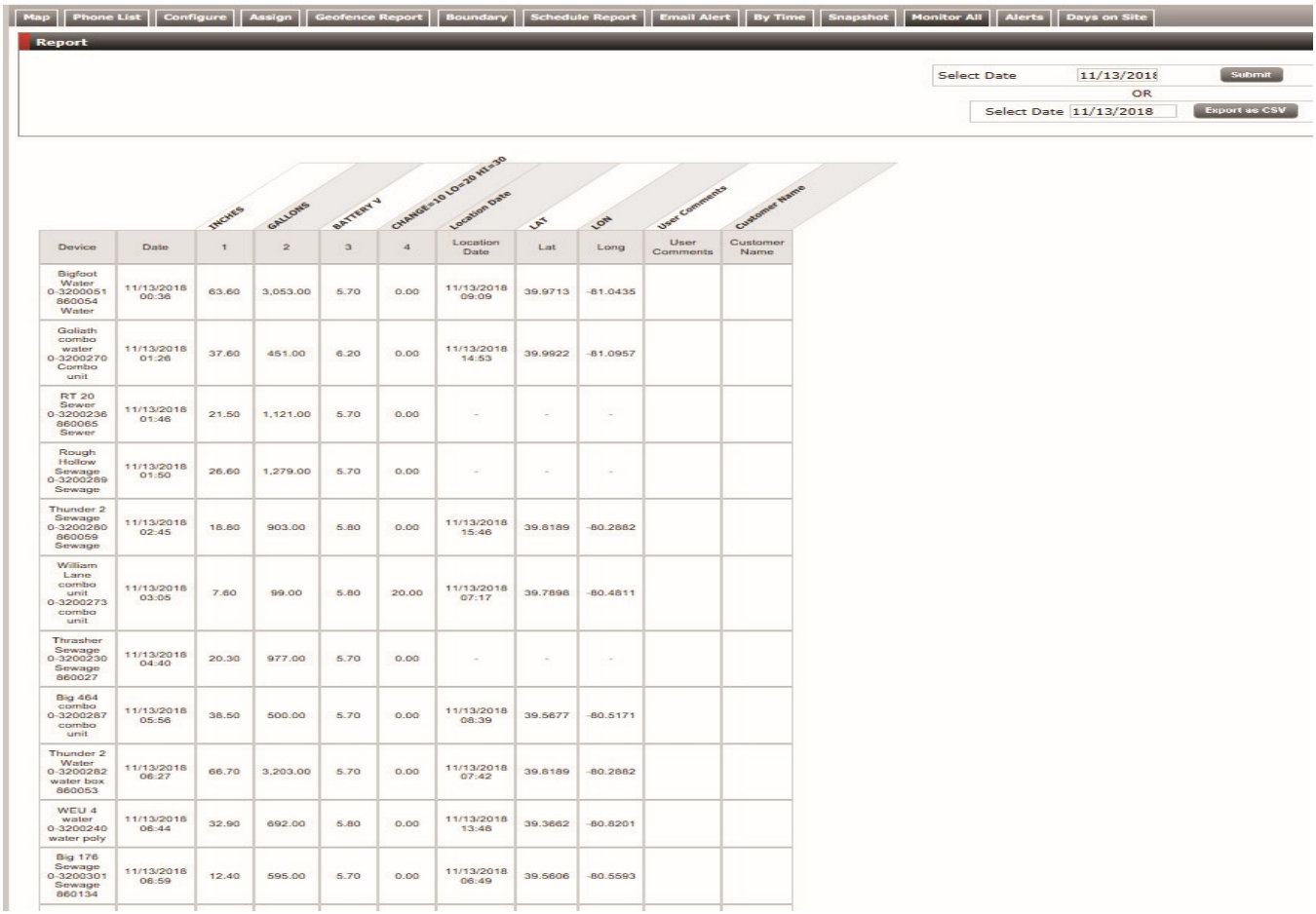
Select a date range to see your measurements in order for that range. These are the times that the readings were taken. The heading at the top were assigned on the Configure page.



	INCHES	GALLONS	BATTERY	PING
Date	1	2	3	4
02/26/2019 00:30	57.70	57.00	5.70	37.30
02/26/2019 00:33	57.70	57.00	5.70	37.30
02/26/2019 00:58	57.70	57.00	5.70	37.30
02/26/2019 01:11	57.70	57.00	5.70	37.30
02/26/2019 01:58	57.70	57.00	5.70	37.30
02/26/2019 02:37	57.70	57.00	5.70	37.30
02/26/2019 02:45	57.70	57.00	5.70	37.30
02/26/2019 03:23	57.70	57.00	5.70	37.30
02/26/2019 03:42	57.70	57.00	5.70	37.30

Monitor All

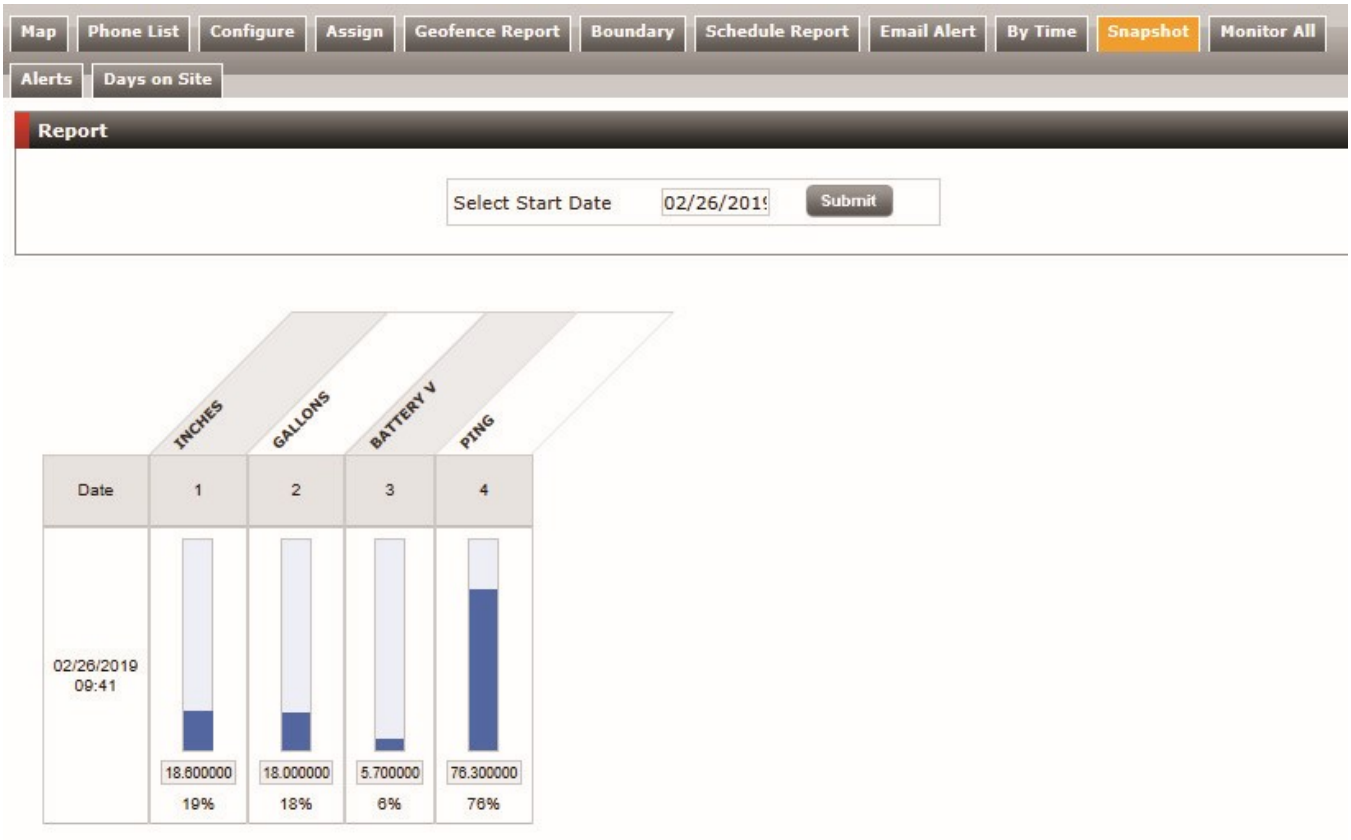
Most recent reading from all devices for the date chosen will be displayed.



Device	Date	1 (INCHES)	2 (GALLONS)	3 (BATTERY V)	4 (CHANGE=10 LO=20 HI=30)	Location Date	Lat	Long	User Comments	Customer Name
Bigfoot Water 0-3200051 860054 Water	11/13/2018 00:36	63.60	3,053.00	5.70	0.00	11/13/2018 09:09	39.9713	-81.0435		
Goliath combo water 0-3200270 Combo unit	11/13/2018 01:26	37.60	451.00	6.20	0.00	11/13/2018 14:53	39.9922	-81.0957		
RT 20 Sewer 0-3200236 860065 Sewer	11/13/2018 01:46	21.50	1,121.00	5.70	0.00	-	-	-		
Rough Hollow Sewage 0-3200289 Sewage	11/13/2018 01:50	26.60	1,279.00	5.70	0.00	-	-	-		
Thunder 2 Sewage 0-3200280 860059 Sewage	11/13/2018 02:45	18.80	903.00	5.80	0.00	11/13/2018 15:46	39.8189	-80.2882		
William Lane combo unit 0-3200273 combo unit	11/13/2018 03:05	7.60	99.00	5.80	20.00	11/13/2018 07:17	39.7898	-80.4811		
Thrasher Sewage 0-3200230 Sewage 860027	11/13/2018 04:40	20.30	977.00	5.70	0.00	-	-	-		
Big 464 combo 0-3200287 combo unit	11/13/2018 05:56	38.50	500.00	5.70	0.00	11/13/2018 08:39	39.5677	-80.5171		
Thunder 2 Water 0-3200282 water box 860053	11/13/2018 06:27	66.70	3,203.00	5.70	0.00	11/13/2018 07:42	39.8189	-80.2882		
WCU 4 water 0-3200240 water poly	11/13/2018 06:44	32.90	692.00	5.80	0.00	11/13/2018 13:48	39.3662	-80.8201		
Big 176 Sewage 0-3200301 Sewage 860134	11/13/2018 06:59	12.40	595.00	5.70	0.00	11/13/2018 06:49	39.5606	-80.5593		

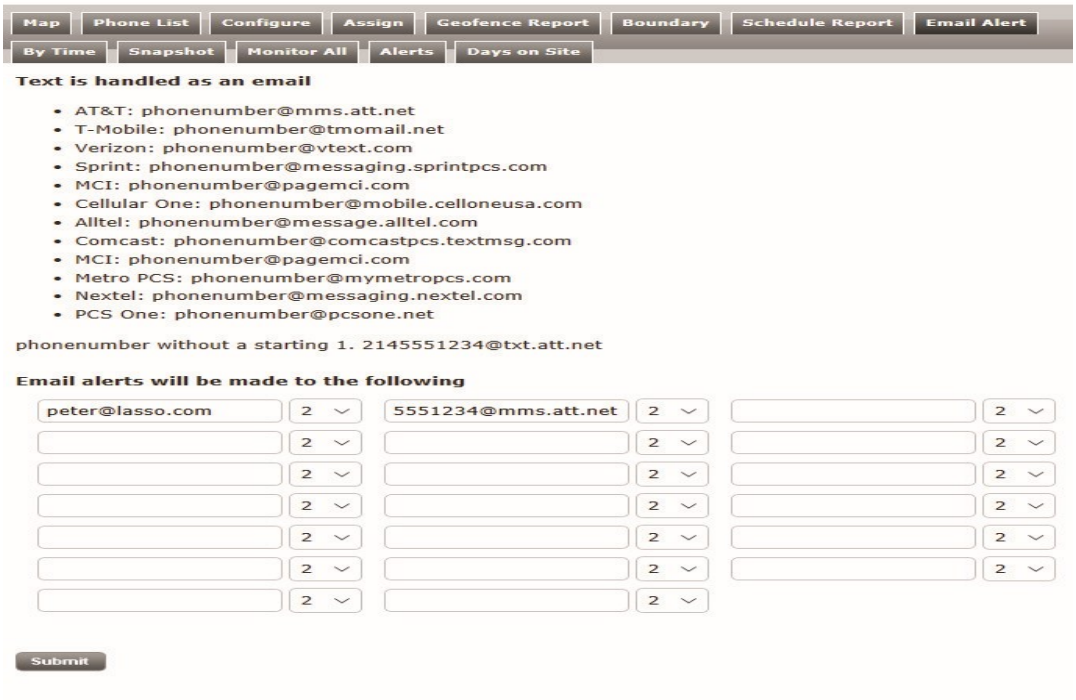
Snapshot

Select a date for the sensor of interest then click submit. See the percentage of capacity along with values most recently taken. Percentage is based upon total capacity of the tank in configuration page.



Email & Text Setup

- Assign emails or text addresses where alerts and information will be sent.
- Enter email addresses or texts as shown below.
- The drop down by each box is to set the delay in hours between info emails. If you select 12 hours, an information update will be sent at 7am and 7pm.



Email & Text Info

Assign emails or text addresses where information will be sent. INFORMATION emails can be sent at predetermined intervals using the email list. Use the drop down box by each name to select intervals between emails. All columns selected on the Configure page will be sent with the info email. Make sure to Check Send Alert and Send Information on Configure page.

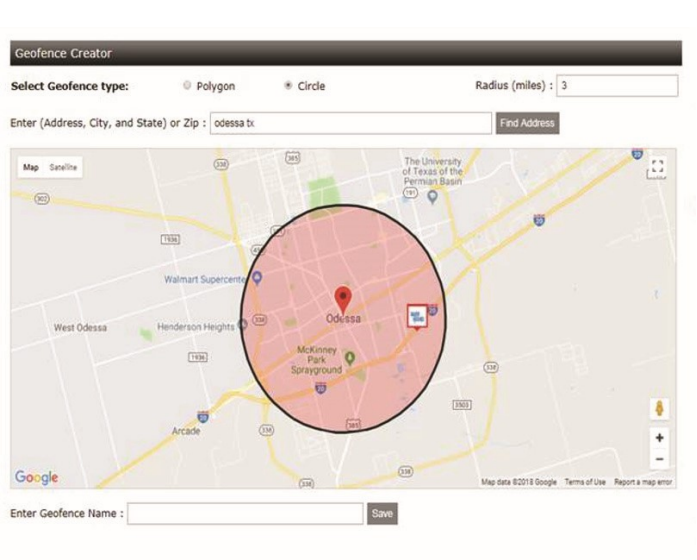
Email & Text Alerts

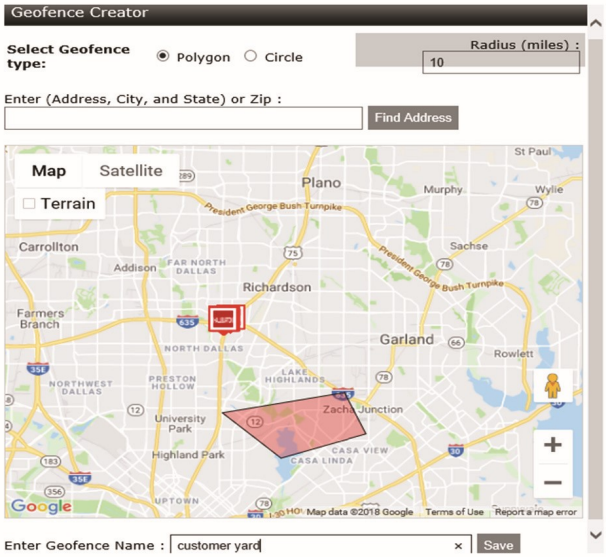
Assign emails or text addresses where alerts will be sent for Min or Max alarms. Alarm thresholds are set in the Configure page. An alert email will be sent if level is over Max or under Min Use Configure page to check box to send alerts or information.

Text and Email Alerts

Boundary

- Select the Boundary tab to configure boundaries for your various locations.
- Select your company divisions using the drop down Select Branch:
- Once the boundaries are set, you 'tag' a specific Radar to 1 or more of the boundaries that you set for your company under the Configure tab.





Add New Boundary

-You may need to hold Ctrl to enable pop ups while you left button mouse click.
-You can add a circle or polygon style of boundary.
-Enter a name for your boundary.
-Select if you want a circle or polygon boundary.

Polygon

-Click in a circular path the corners of your polygon

Circle

-Enter an address. Select *Find Address*.
-Select the radius for your boundary.

-Click Save once done.
-Scale in or out using slider on left. Get Satellite, road, or terrain view at top.
-Click on your points in a circular pattern, either clockwise or counterclockwise.

Submit

Refresh

Refresh your list once you add a new boundary.

Delete