FOG DATA SCIENCE

REVEAL PORTAL

USER MANUAL

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FOG's REVEAL Portal Users' Manual

I. Foreword. The FOG Data Science Portal, FOG REVEAL, uses (opt-in) unstructured geo-spatial data to correlate devices to dates, times and locations. FOG REVEAL is a highly effective forensics tool that assists Law Enforcement and Security Agencies in their efforts to develop leads that can result in the identification of known and unknown suspects, persons of interest, associates, witnesses and locations. Information that was previously "unknown" or knowable only through the investment of significant time in efforts such as witness interviews, reviewing surveillance video and travel records can now be revealed in minutes via a desktop or laptop computer. The base line for this capability is the passive collection of (opt-in) signals emitting from personal electronic devices such as smart phones, tablets and laptops that result in the daily collection of more than 15 billion signals globally.

This system is very efficient in identifying and displaying devices and signals. However, caution must be given that, when applying this analysis, users remain cognizant of the fact that even with known dates, times, places and device ID numbers there is no guarantee that every query will result in all the devices and/or signals germane to that geographical location or range of time being identified. While our signals' processing efforts will cleanse and normalize the data to provide the best possible results, there are several reasons why all signals are not captured and understanding why will help in investigatory efforts.

A. In some cases, the magnitude of the daily and global collection and storage of these billions of signals can lead to computer processing limitations. One example might be a single query that asks for identification of signals and devices from a large number of geographical locations stretched over a considerable range of time. In this case, the system's data retrieval and processing capabilities juxtaposed to the rapid response times (seconds) required to reply to the analyst's request may result in some devices and signals not being processed and displayed. These drops are decisions made by the computer to complete its response timeline.

B. Another case may be an analyst initiating a query too soon after an occurrence. It takes approximately 24 hours to process and store a daily collection of signals. With that in mind, users must be cognizant of the fact that queries made within that processing period can result in searches reduced in terms of the numbers of devices and signals identified. However, the daily updating and refresh of signals data will allow a user to continuously update queries to obtain new results. Better results occur after 48 hours, best results after 72 hours. The emphasis is this is not capable of analyzing real time crimes (Crimes occurring that day or the day after).

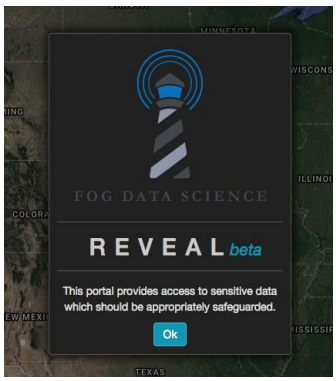
C. Unrelated to the processing capability, other reasons for a lack of identification of devices that might have been present but not displayed can be explained as simply as devices being present but the open apps on their devices not reaching out to other apps and transmitting at that particular time and location.

D. Other variables, such as the analyst's selection of the physical dimensions of an electronic fence resulting in signals being offset and displayed outside of the geo fence may also have an impact on not being able to identify each and every signal and/or device.

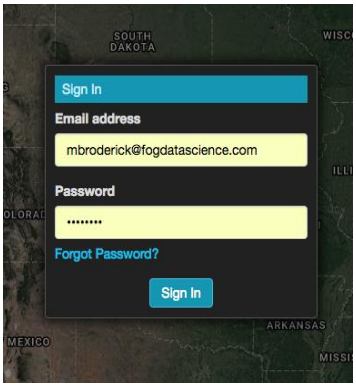
Many of these later cases can be mitigated and lead to previously unidentified devices and signals by simply re-running the query again several days later if an initial query was close to the processing wait out time; by extending or reducing the size of a geo fence; or by making even minimal changes to the dates and/or times. When compared to current investigatory procedures, the benefits of this analytical tool far outweigh any of the aforementioned shortcomings, particularly in terms of savings in money and in work hours. Analysts and investigators are now empowered with the capability to sit at a desk and, in a relatively short period of time, identify potential suspects, witnesses, associates, locations and routes previously unknown.

II. Accessing the FOG REVEAL Portal.

The opening page of the REVEAL Portal has a warning sentence. The warning is to remind users that, although they are not dealing with "classified" data, they are dealing with data that is, in many cases, sensitive and should be handled and safeguarded accordingly



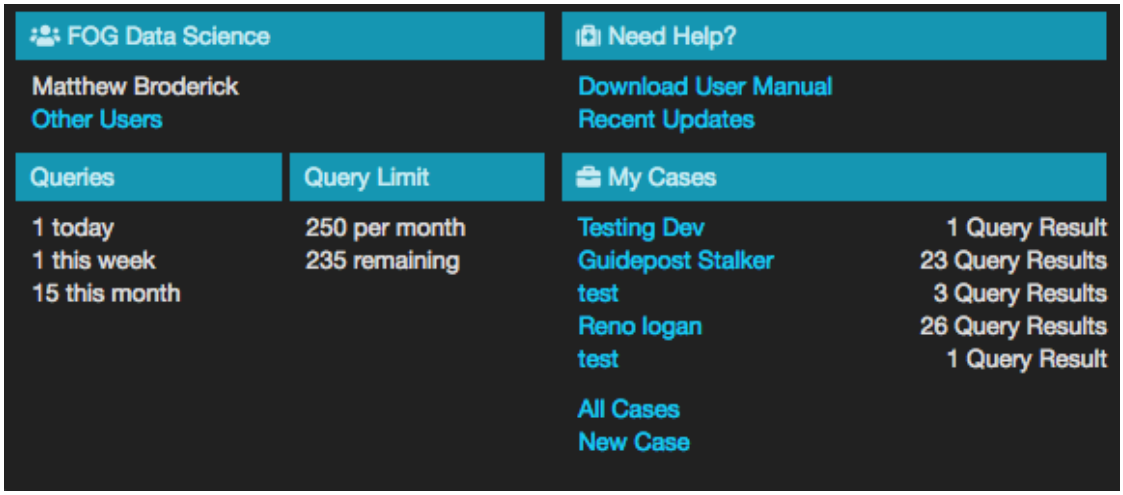
Screen Shot 1



Screen Shot 2

A. Sign In. Once the user is reminded of the sensitive material within and checks the "OK" shown on Screen Shot 1, above, a second screen will appear (Screen Shot 2, above) requesting the user "Sign In" enter their email address and password.

B. Overview Screen. After the user's address and password have been completed, checking the "Sign In" box will bring up a third screen. This screen will display FOG Data Science in the top box, followed by the user's name. Below the user's name are 3 separate boxes titled Queries, Query Limit and Cases (Screen Shot 3, below).



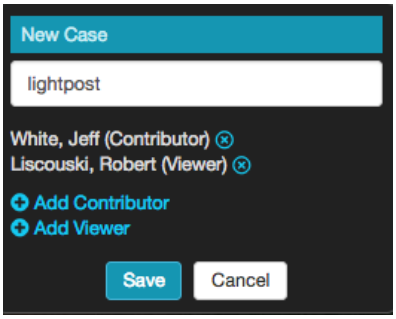
Screen Shot 3

C. Downloads/Recent Updates. The upper right corner of Screen Shot 3, above, contains the Portal's user manual which is available for immediate download.

D. Queries and Query Limit. Queries contains the cumulative total of all queries that have been used in the current month. It allows a user to keep track of how many queries have been used that day, past week or current month for better insight on allocating queries to caseloads. Query Limit provides the status of the total number of free and prepaid queries allowed each month and the number of unused ones remaining. Exceeding the per-month allocation can lead to additional charges for each query conducted over the allotted amount. The remaining line resets to the full

monthly allocation at the beginning of each calendar month. Any recent updates that did not require a formal change to this manual will be posted here.

Screen Shot 4



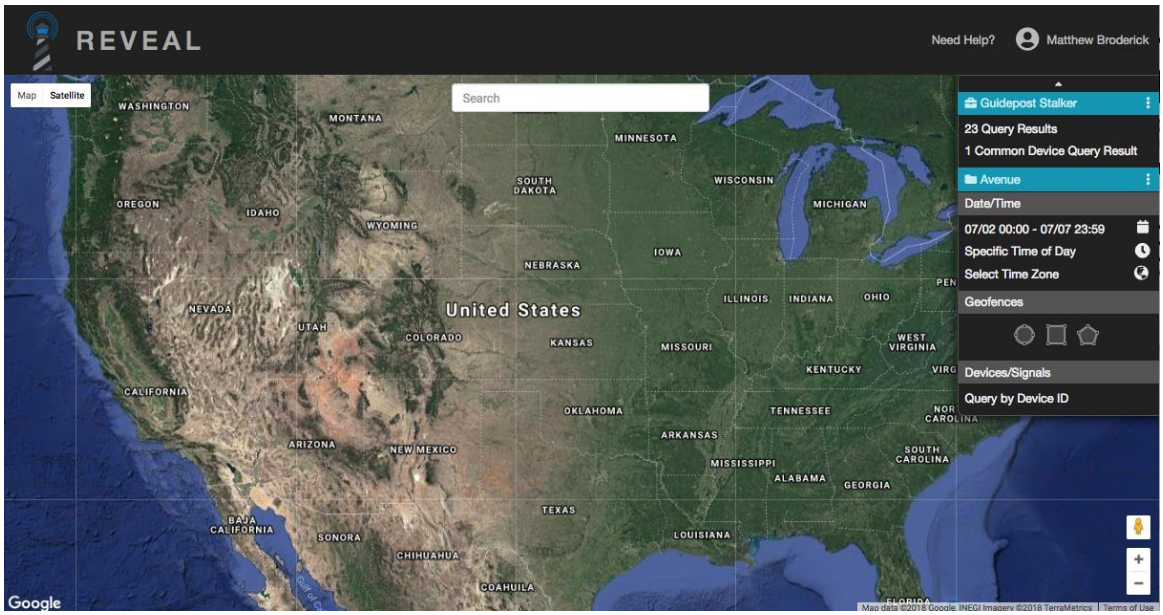
Screen Shot 5

E. **The "My Cases Box"** located on the lower right of screen, Screen Shot 4, above, allows the user to immediately select a previous case (Only the previous 5 cases will initially be shown on the screen). Previous Cases not shown will appear through **"All Cases".** The number of query results that were run for each case appears to the right.

F. **A New Case** can be entered by typing in the case's name in the box that appears when **"New Case"** shown in Screen Shot 5, above, is opened. After entering the name of the new case, additional personnel can be provided access to either view or to contribute to the case by selecting the "+Add Additional User" title.

G. **Opening the REVEAL Portal** occurs once a previously named case is selected, or a new one entered. The REVEAL portal will then open to the main screen shown in Screen Shot 6, below. The following paragraphs describe the tools resident within the portal overall and how to use and maximize their capabilities

III. Screen and Portal Orientation, Nomenclature and Symbols



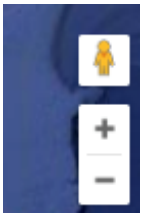
Screen Shot 6

The FOG REVEAL Portal was designed with symbols and wording that are easy to understand and user intuitive. Once a case selection has been entered, a main screen will appear, Screen Shot 6,

above, with **"Mapping Capabilities"** on the upper left, a Search box in the upper middle and the **"Portal Dashboard"** on the right side of the screen.

A. Mapping Tools. The choices satellite or map located on the left-hand side of the screen, as depicted in Screen Shot 7, below, allows the users to select how the query locations and searches will appear. The default view is the Satellite map with labels (states, cities, etc.). Clicking on the box labeled Map will not only change the appearance to a flat Satellite map view but will also bring up a drop box that asks if the user would like to change to a terrain view. Mapping symbols on the lower right side of the screen, Screen Shot 8, below, provides the user with common Google mapping tools such as the standard zooming in (+) and out (-) symbols and the yellow figure street level view, picture rotation and viewing angle are also resident.

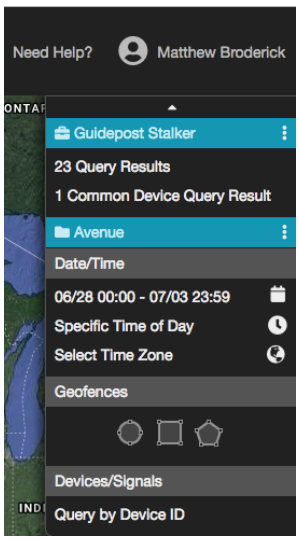
Screen Shot 7


Screen Shot 8

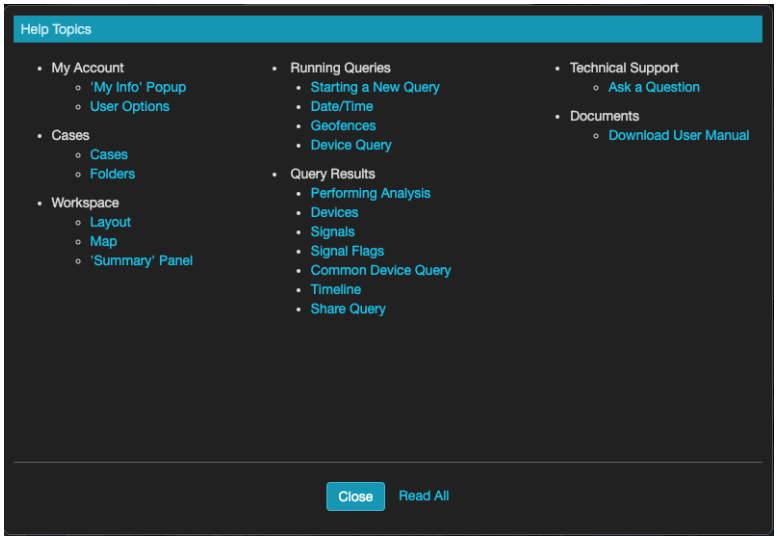
Screen Shot 9

B. Finding a Location/Search. Screen Shot 9, above, is located in the upper center of the screen and is one of the key discriminators in query searches. Locations, whether general, address specific or lat/longs are central to locating devices and signals. In the **"Search box",** type in the name of the lat/long or the location/address you want to query. Once a location is entered, a GPS marker representing the exact location displayed in the search box will appear as a geospacial overview on the main screen.

C. Analytic and Diagnostic Tools. Screen Shot 10, below, is located in the dashboard displayed on the right hand side of the map. Shown are the major functions of the dashboard: Need Help and User's Name with embedded features, Named Cases, Query Results, Case Folder, Date/Time/Zones, Geofences, Devices/Signals and Query by Device ID. Embedded in these settings are capabilities for running, naming and filing queries; common device searches; sharing and supervisor intereactions; assigning cases to users; and adding/deleting or changing names of cases, queries and folders.



Screen Shot 10



Screen Shot 11

1. Need Help? is located in the top right corner of the portal as shown in Screen Shot 10, above. Clicking on it will open up Screen Shot 11, above, with 7 sites to help users answer many of the more common questions concerning how to access user information. Questions such as how to maneuver through the portal and understand how it operates, as well as how to get help if functionality still isn't clear, is within this window.

a. My Account provides users with information concerning how to find out the status of their queries, the cases they are listed under and ways to make changes to passwords or to label new cases.

b. Running Queries provides new users with how to get started running a new query**.**

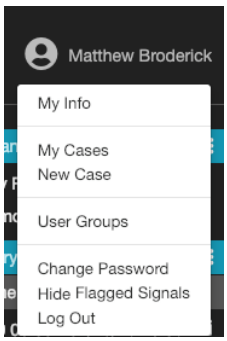
c. Technical Support tells users where to send questions if they need assistance.

d. **Workspace** helps new users orientate themselves to key functions on the dashboard such as the map layout and where to find Cases and Queries.

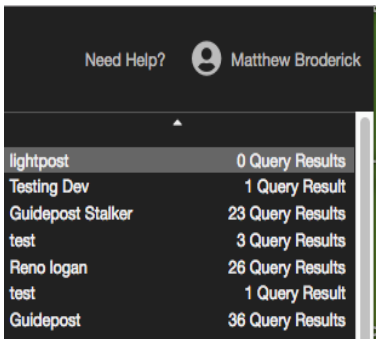
e. Query Results describes how signals and devices are acquired, or not acquired, what an analyst should be cognizant of when devices and signals are displayed, what types of information are being given, how to run a simple query and the definitions of many of the items within a query. This includes a list of Signal explanations that help users understand what the symbols mean that may appear next to signals and to help better understand what type of signal it is or how it was acquired.

f. Documents is a way of downloading and accessing the SOP.

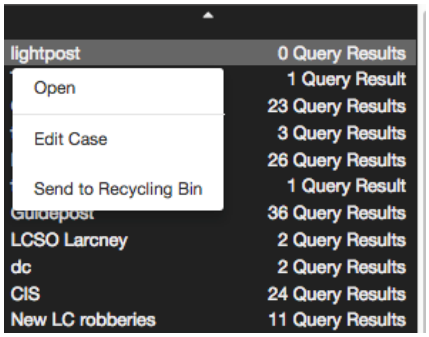
2. User's Name is located at the very top right of the screen as shown in screen shot 10, above. Clicking on the user's name or the icon will create a drop down menu with 7 topics and 4 major categories, as shown in Screen Shot 12, below.



Screen Shot 12



Screen Shot 13



Screen Shot 14

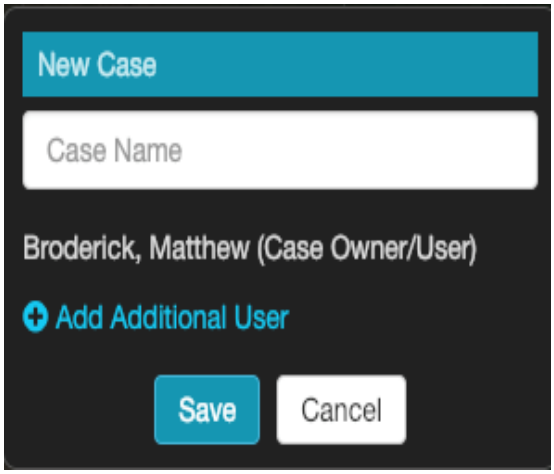
a. My Info. Clicking on this box will send the user back to the beginning screen that appeared after first logging in Screen Shot 3 that showed numbers of queries allotted, used and remaining and cases worked and on file.

b. My Cases. As depicted in Screen 13**,** above**,** the listing allows the user to quickly view and access a listing of all previous cases and the query usage associated with those cases. Screen Shot 14, above, shows that if the user wants to open or recycle bin the case all they have to do is click on that section. Screen Shot 15, below, also shows that they can "Edit" a case to either change or modify the case's name or open it to an additional co-worker. Any person within that department already authorized by FOG Data to use the portal will appear on a dropdown screen and can be added to that case.

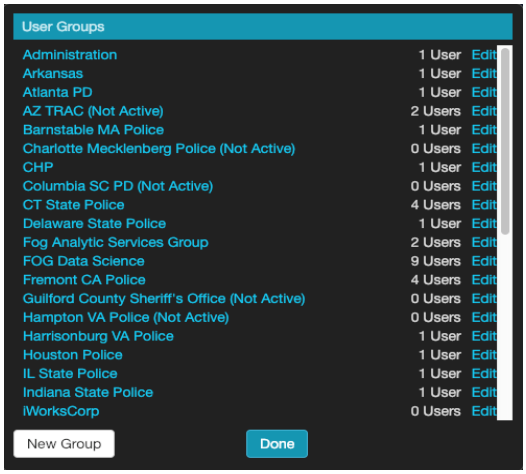
c. New Cases. This tool, as depicted in Screen Shot 15, below, allows for the addition of a new case and, by clicking on "+ Add Additional User" can select, from a drop down list the name(s), additional people who will also be working on the case.

d. User Groups. As shown in Screen Shot 16, below, are used at the Supervisor level. **Groups** can be case officers working on similar crimes such as a Gang Task Force, CID, Drugs, CI, etc., or entire Departments. This tool not only allows Supervisors to see what cases are being worked, it also allows them to see how many users are working on a particular project, edit a case officer/analyst, add a new user, change the name of a case or view queries associated with particular cases.

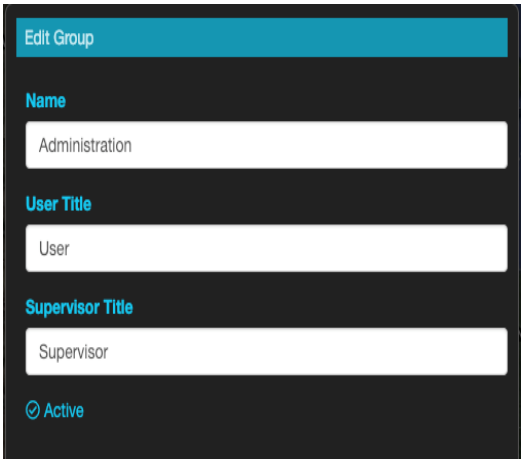
(1) Tapping on the blue **"Edit"** to the far right of the name, Screen Shot 17, below, allows adding or editing of the Group's name, the user(s) name(s) and supervisor's name or, by clicking on the active box on the lower left, uncheck and deactivate the Group.
(2) Tapping on the **"New Group"** box in the bottom left of the screen allows for the addition of a new Group, named users and supervisor, Screen Shot 18, below.
(3) Tapping on a **Group's Name** allows a supervisor to see who is assigned to this Grouping, add the details required when adding a new user and see the Group's monthly query status. (Screen Shot 19).
(4) Tapping on a blue highlighted group name will bring up a screen showing the users within that group, the status of their queries and a box in the lower left of the screen saying **New User,** Screen Shot 19, below. Opening up the new user box will allow new users to be added to that file as well as the user's email address, the number of queries allocated and the position or billet of the user, Screen Shot 20, below.
(5) Tapping on a user name will bring up a box with 2 choices, Screen Shot 21, below. The first one is **"Edit",** which allows editing of the user's name, billet, email address and how many queries a month they are allotted, Screen Shot 22, below. The second choice is "**View Cases (Read Only)".** This allows supervisors (or other authorized persons) to review the cases a person in a group is working on but not add or alter the material within, Screen Shot 23, below.



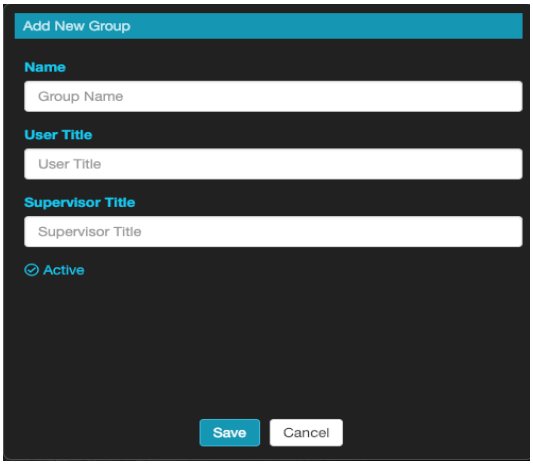
Screen Shot 15



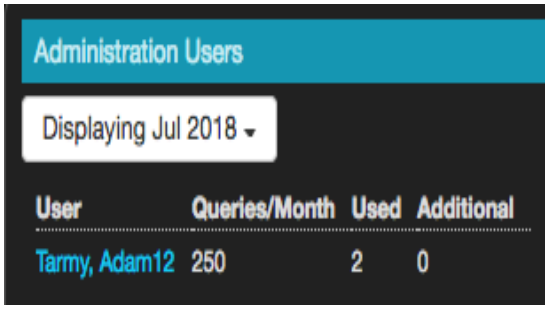
Screen Shot 16



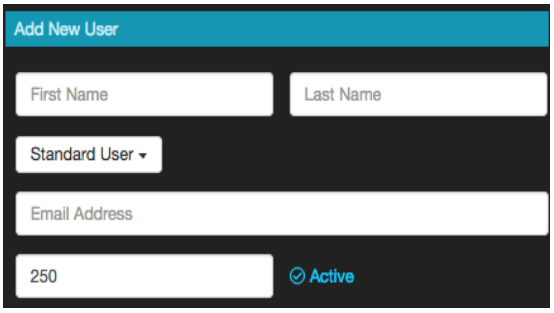
Screen Shot 17



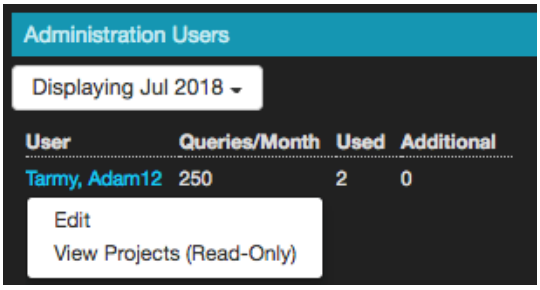
Screen Shot 18



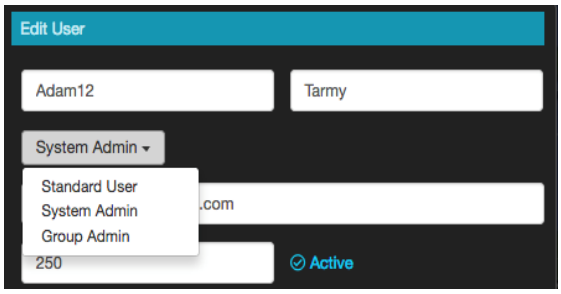
Screen Shot 19



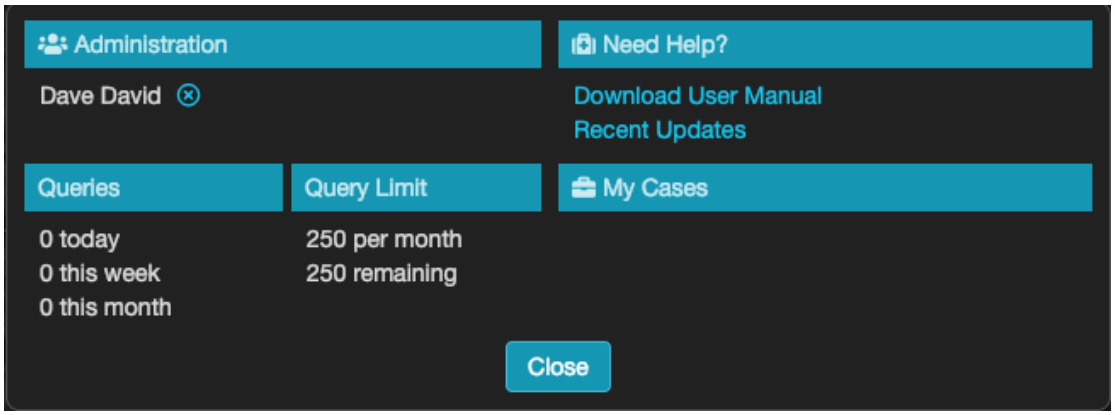
Screen Shot 20



Screen Shot 21



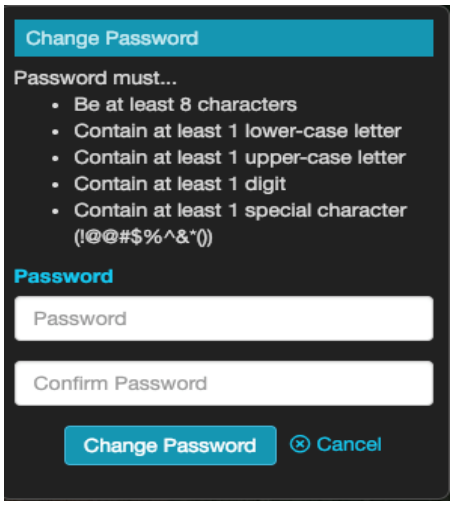
Screen Shot 22



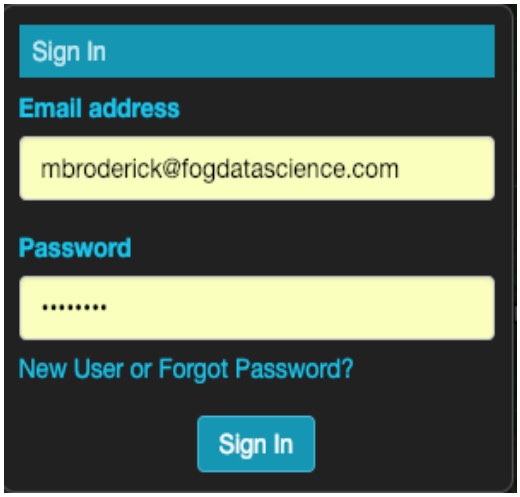
Screen Shot 23

e. **Change Password and Log Out** directions and function are shown in Screen Shots 24 and 25, below. Once Log Out is selected, log out is instantaneous but automatically brings the user back to the "Log In" screen.

f. **Hide or Show Flagged Signals**, Shown in Screen Shot 12, above, allows the user to either disregard or display the different explanations for signal strength, origin and reliability within individual queries.



Screen Shot 24

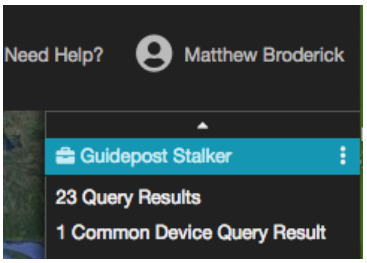


Screen Shot 25

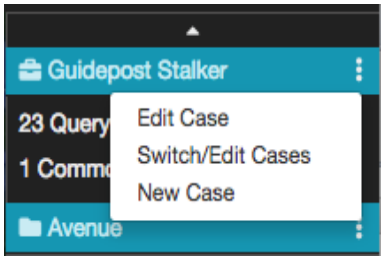
3. Cases. The next main section of the dashboard, located directly below the user's name, begins with the blue highlighted box and name of the case selected when the user opened the portal, Screen Shot 26, below. This part of the Portal has a lot of redundancy (i.e., adding a new case, changing a name, adding people, etc.,) all of which were to save time going back into another part of the portal to find these features. The **"3 white dots"** to the right of the case's name opens a box that allows the user to **Edit** a case, **Switch Folders/Edit a Case** or **Add a** New Case (Screen Shot 27, below).

a. Editing, Screen Shot 28, below, allows the user to change the name of the case as well as add **authorized co-workers access** to the case.

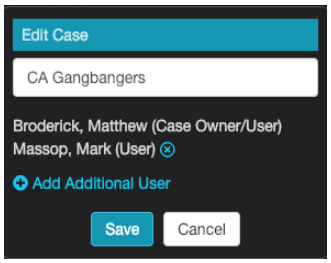
b. Switching/Editing Cases, Screen Shot 29, below, opens the screen to a list of all user cases, allowing the user to quickly switch from their present case to another case without having to go back to the beginning opening screen in the portal. As soon as the user selects the case they want a drop down menu, Screen Shot 30, below, will appear. Selecting **"Open"** will engage the portal to immediately load and open up the selected case. The drop down also allows the user to edit the case, similar to Screen Shot 28, or delete the case and send it to the **Recycling bin**.



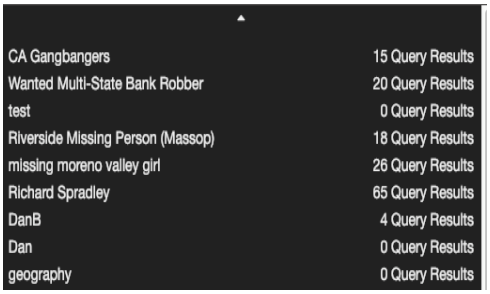
Screen Shot 26



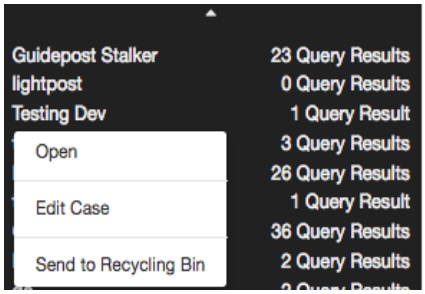
Screen Shot 27



Screen Shot 28

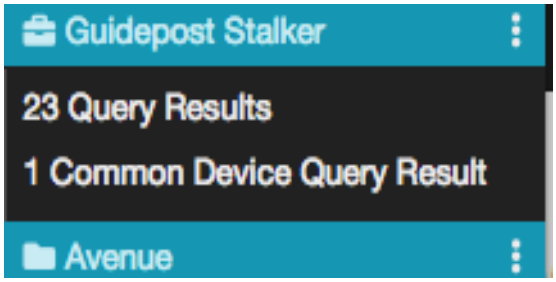


Screen Shot 29

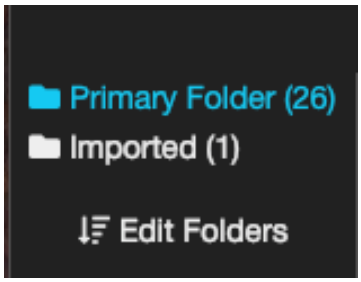


Screen Shot 30

4. Query Results, Screen Shot 31, below, is the heading directly beneath the project's name. The numbered **"Query Results"** box will open up, Screen Shot 32, below, with a menu on the left side of the screen. Unnamed, the folders and subfolders will appear as in the Screen Shot. If named, the name will replace the word Primary Folder. In both cases, the number of queries within each folder will be displayed.

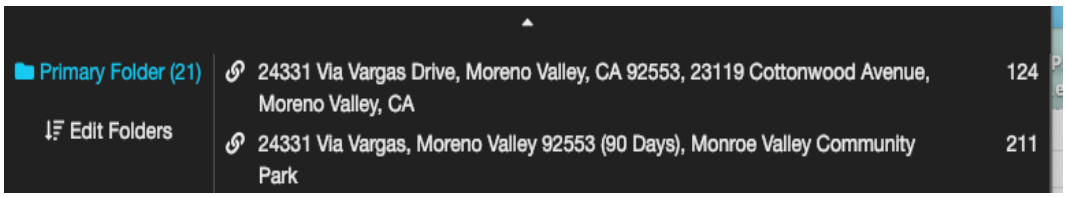


Screen Shot 31



Screen Shot 32

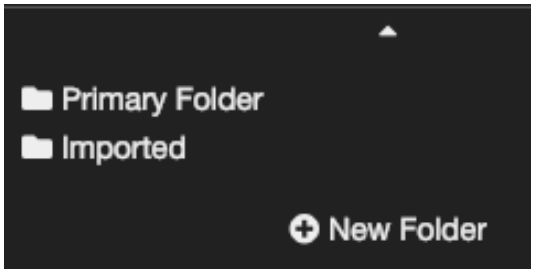
Clicking on a folder will bring up a named listing of all the queries, by type, in that folder, as well as the number of signals within each listed query, Screen Shot 33, below.



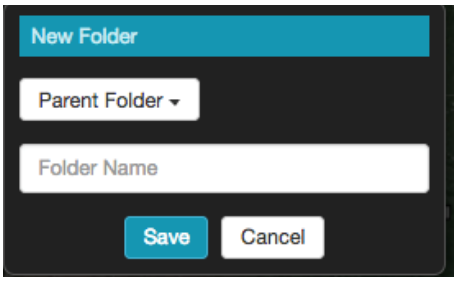
Screen Shot 33

a. Edit Folders, shown in the bottom left of Screen Shot 33, above, brings up a **New Folder**, Screen Shot 34, below. The user has three choices. One is to add a new folder by tapping on the New Folder icon and a **New Folder Template**, Screen Shot 35, below, will appear. Screen Shot 36, below, is a continuation of making the **New Folder** showing the dropdown menu choices under **Parent Folder**. The second choice is to edit the existing folders shown above **"Edit Folders"** in Screen Shot 33, above. The template for making those changes appears when the user taps on the word **"Main"** as shown in Screen Shot 37, below. The third choice is to delete a folder by using the **"Recycling Bin**" in Screen shot 37, below.

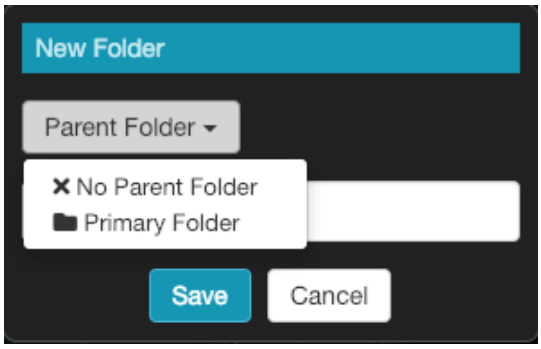
b. New Folder Editing, continued. Screen Shot 35, below, allows the user to type in the name of a **New Folder** and decide whether it will be a stand-alone folder or be a sub-folder under and existing Parent folder. **"No Parent Folder"** means it will be a stand along folder. If the desire is to add it as a sub-folder under and existing parent folder, all that is required is to select the parent folder from the dropdown menu and then type in the name of the new folder. If the user wants to move a subfolder to become a main folder or vice versa, clicking on the selected **Main** Folder in the upper left of Screen Shots 33 and 34 and it will bring down a menu with 3 choices, Screen Shot 37, below. If the user desires the next query to be run to go into a specific, listed folder then selecting **"Set Folder for New Query"** will set that action up and that folder's name will be displayed on the menu in the blue box underneath Query Results. The same editing tasks listed in the beginning of this paragraph, **Editing a Folder** by making it a **Parent** or a **Sub**, as shown in Screen Shots 35, 36, below, can also be done here in Screen 37. The user can also **Recycl**e or delete the file using this box.



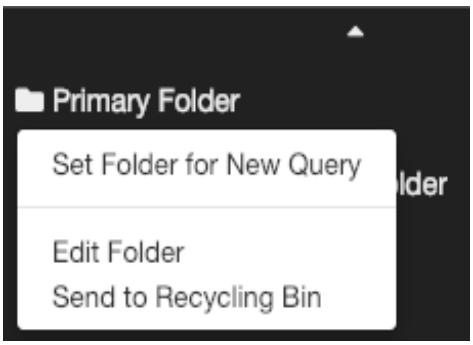
Screen Shot 34



Screen Shot 35

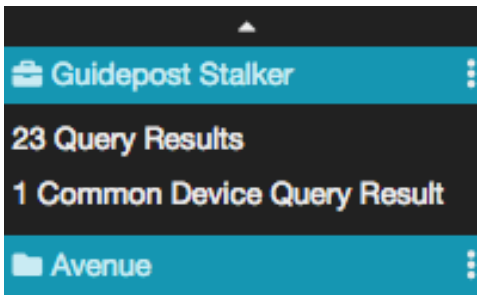


Screen Shot 36

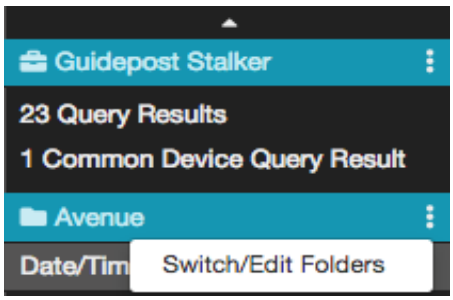


Screen Shot 37

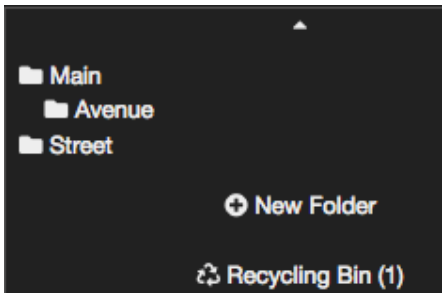
c. **Switch/Edit Folders.** The blue box under **Query Results** is the folder that is currently being used to store new queries, Screen Shot 38, below. Tapping on the **3 white dots** to the right of the name will bring up **Switch/Edit Folders**, Screen Shot 39, below. Clicking on that box will bring up Screen Shot 40, below, which has already been described in paragraph b. above.



Screen Shot 38

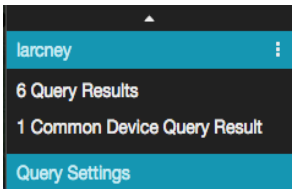


Screen Shot 39



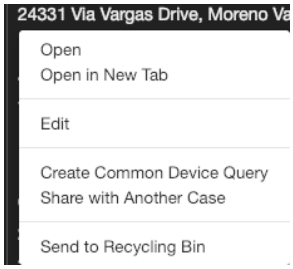
Screen Shot 40

Screen Shot 41



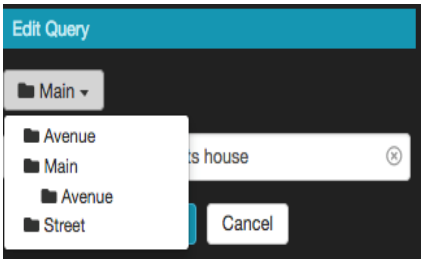
Screen Shot 42

d. **Query List**. Queries are labeled and will be listed as either **Fence Queries, Device Queries or Common Queries,** Screen Shots 41 & 42, above**.** A **Fence Query** is one that is restricted to an area defined by an electronic fence around a specific location or address and will be named by that geo location or, in some cases, with a sequential number if the same geo area was previously run. A **Device Query** is a pattern of activity within a specified date/time ranging from a single day up to 90 days and can be searched back to Jun of 2017. Its locations may include local, regional or global travel and it will be shown as a numbered device until the user changes its name. A **Common Query** is one that looks for devices that are common to 2 or more geo-locations. All 3 will have the start and ending dates/times the query was run in parenthesis to the left of their name. All 3 will be explained in more detail later in this manual.

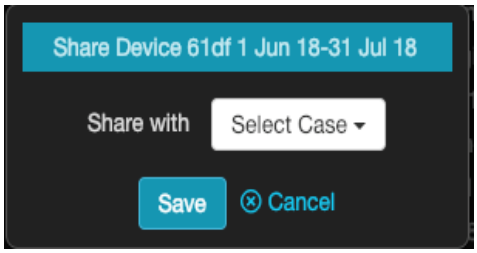


Screen Shot 43

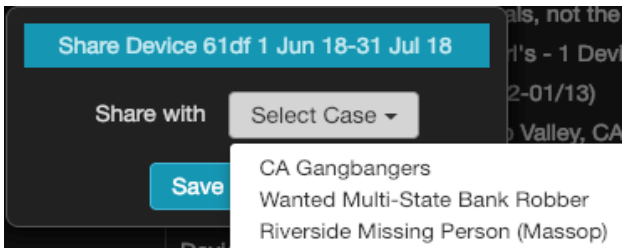
Screen Shot 44



Screen Shot 45

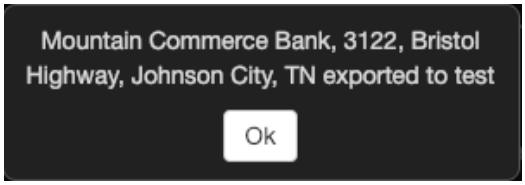


Screen Shot 46

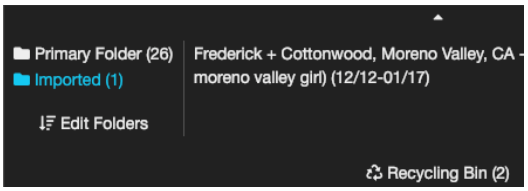


Screen Shot 47

e. **Selecting a Query** by tapping on any individual query will result in a box appearing with 5 options, Screen Shot 43, above. Selecting **"Open"** will result in a pictorially displayed mapping of the devices and their signals, Screen Shot 44, above. The second option allows a user to store a particular in a tab by selecting **Open in a New Tab**. A tab will appear in the upper portion of the screen and queries and information relating to that particular query will be stored in the tab for quick reference. The third option allows the user to **Edit the Query**, Screen Shot 45 above, by either re-naming it or moving it to another folder as previously explained in paragraphs 4. a. and b. above. The fourth option, **Create a Common Query**, is described in detail in paragraph (1) below. The fifth option, **Share with Another Case**, allows queries from one case to be shared with another case. When this choice is selected, Screen Shot 46, above, will appear. Tapping the Select Case will provide a list of all the users cases in the portal, Screen Shot 47, above. After a case is selected, hitting the save button will bring up Screen Shot 48 below, that shows the query was exported to the case selected. The query also remains and is not deleted from the original case. The query that is being shared will be displayed in the sharing case as shown in Screen Shot 49, below. The final option is the ability to **Send to Recycling Bin** where the data will be saved for other future uses.

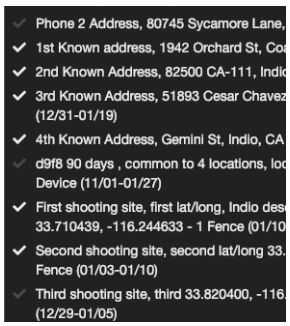


Screen Shot 48

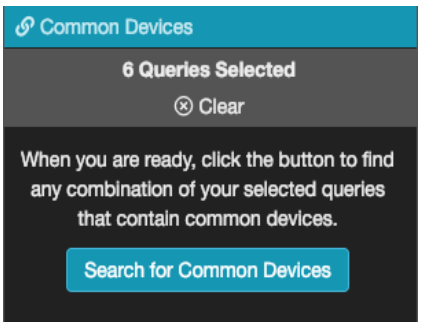


Screen Shot 49

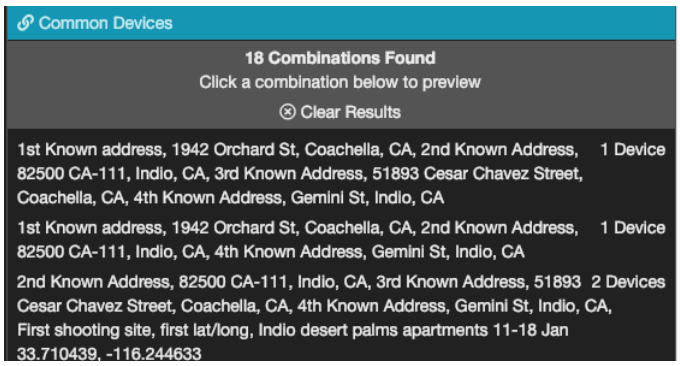
(1) Create a Common Device Query is used to determine if any devices are common to multiple locations. There is no limit to the number of queries that can be selected for a common query but, the more added, the longer the process may take. To initiate the **Common Devices** process, merely touch a query from the query list and a check mark will appear to its left, Screen Shot 50, below. You can check, or uncheck, if running a second query or you decided not to include one, and as you select the number chosen will appear on a new screen to the right and parallel your original screen as shown in Screen Shot 51, below. Once you are thorough selecting which queries you want to search for common devices, hit the green "**Search for Common Devices**" button on the right-hand screen. The results will be listed on the right screen with the all the common device combinations found and the ones with the most common queries listed first, at the top, and the least number towards the bottom, Screen Shot 52, below. The top of the screen shows the number of common queries run and tells the user to **click on a combination below to preview**. The user can then review and decide which ones they want to retain them by first selecting one, clicking and have it open up on the dashboard screen under primary folder, depicted in Screen Shot 53, below. If the user decides to save the Common Query, selecting the Orange "**Save Common Device Query**" button at the bottom of the page, as shown in Screen Shot 54, below, will save it to the common query list. Whether you chose to add the query or reject it, you can return to the remainder of the list by selecting the white button**, Back to Query Combinations** below the Save Common Device Query button, Screen Shot 54, below, and repeat the process. When you select a Common Query, it is added to the list of Common Queries and displayed in two places. One is by a small white link symbol to its left and also placed in a list above your regular query listing, Screen Shot 55, below. The other place it is displayed is on the Dashboard, as shown is Screen Shot 53, below. When a query is selected and the no common devices are found, a "**No Devices Found"** display will appear, as show in Screen Shot 56, below.



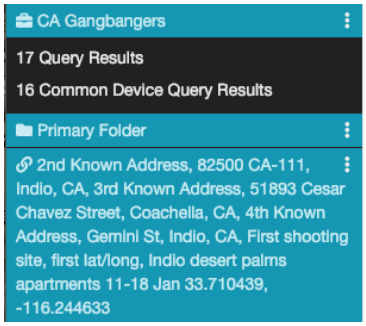
Screen Shot 50



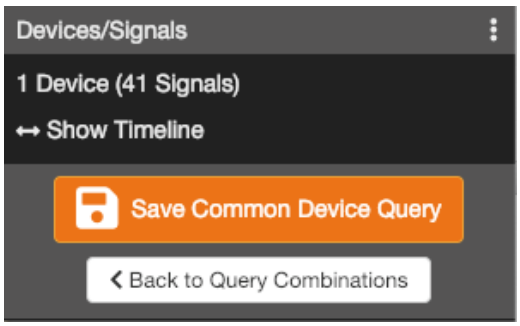
Screen Shot 51



Screen Shot 52

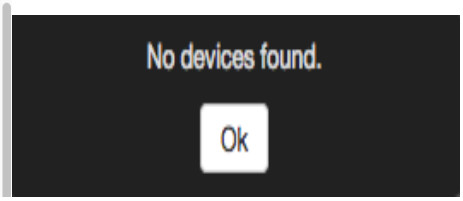


Screen Shot 53



Screen Shot 54

Screen Shot 55



Screen Shot 56

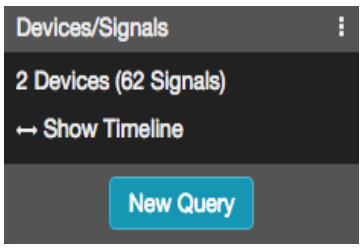
(2) A Fenced Query, as depicted in screen shot 57, below, will result in a display of single red dots representing individual devices and their associated signals. A single device may represent multiple signals; therefore, the number of devices does not always equal the number of signals. Multiple signals from a single device occurs when a device remains in one position while simultaneously continuing to broadcast signals over an extended period of time.

(3) A Device Query, as shown in Screen Shot 58, below, depicts device(s) and associated signal locations over an unconstrained or non-fenced geographical area. **Red Numbered Circles or Clusters** may appear when an area is inundated with a large number of devices and signals and viewing them is easier when they are rolled up or consolidated. This also happens when a map is zoomed out, allowing devices and signals within a general vicinity of each other to roll up. In these cases, the **Numbers within the Red Clusters** represent the number of signals in that geo-location, not the number of devices. Clicking on the circles, or zooming in on the map, will allow the user to drill down and to individual devices and their associated signals. An improved way to query clusters has been added and is discussed in detail in paragraph V., F. at the end of the SOP.

(4) Selecting a Query from the list of previous run queries will place the address searched, or the edited name of the query, into the first box on the dashboard. The number of devices and signals associated with that query will appear on the map and replace the label "**Query by Device ID**" with "**New Query**" in the last box on the dashboard, Screen Shot 59, below. The Show Timeline feature will be discussed in greater detail later in paragraph IV.

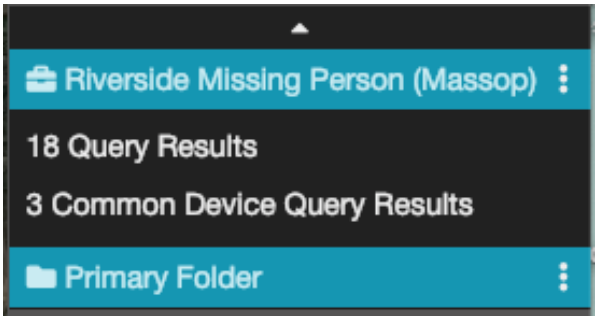
Screen Shot 57

Screen Shot 58

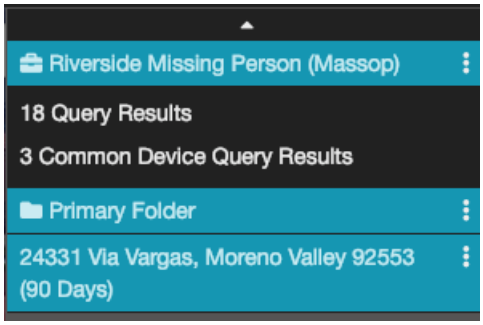


Screen Shot 59

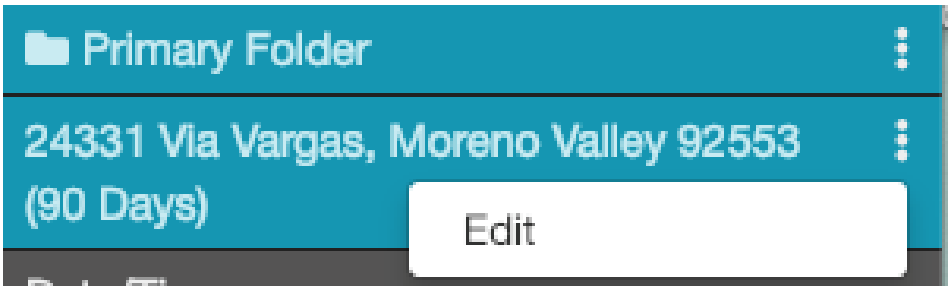
5. **Query Settings** box will appear as shown in Screen Shot 60, below, with the Case name at the top in the blue box, the number of Queries in the box and the name of the Folder the last query was placed in the blue box at the bottom. As a previously run query is selected, or a new one added**,** the name **o**f that query will appear in a blue box below the folder name, Screen Shot 61, below. Should the user choose to re-name the query or change the folder, clicking on the 3 dots to the right of the name will bring up **"Edit"** as shown in Screen Shot 62, below.



Screen Shot 60

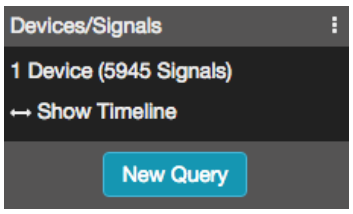


Screen Shot 61

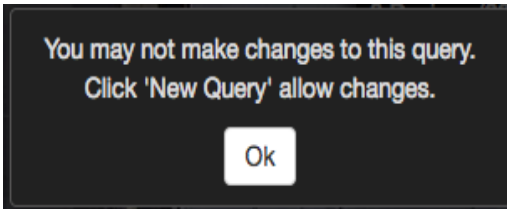


Screen Shot 62

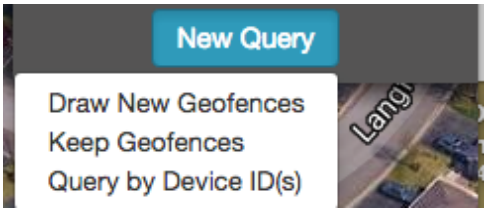
a. **Changing a Query or Running a New Query.** Once a Query is selected, it appears in the blue box below the case's name (previously shown in Screen Shot 60, above). This indicates that the query has been opened on the map and the devices and signals associated with that query are displayed at the bottom of the dashboard under **"Devices and Signals"**, Screen Shot 63, below. Trying to run an entirely new and unrelated query, or to change the parameters of the Query that is open (same location and fence but different dates or times), requires the user to first open the "**New Query**" box at the bottom of the dashboard. Trying to run another Query or a change prior to that will result in the message shown in Screen Shot 64, below. The user will not be able to proceed until the New Query box, Screen Shot 65, below, is clicked.



Screen Shot 63



Screen Shot 64

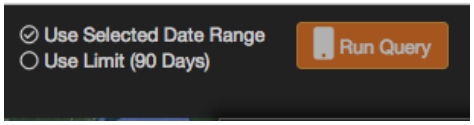


Screen Shot 65

b. **New Query Choices** appear when the New Query box is clicked, Screen Shot 65, above.

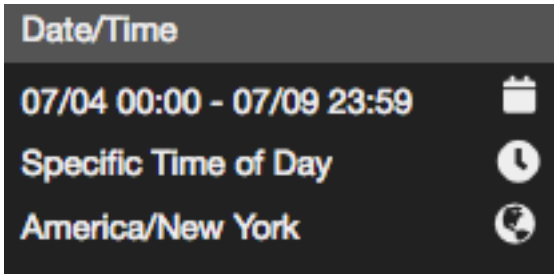
(1) **Draw New Geofences** is selected when the user wants to run an entirely new and unrelated query. A new geolocation is typed into the **Search Box** at the mid-top of the screen and the normal procedures for date/time, drawing a geofence and **Run Query** is applied. The result will be an entirely new named query that will be added to the project query list.
(2) **Keep Geofences** is selected when the user would like to only change dates and or times to the current query. Changes to dates and/or times are made and **Run Query** is selected. A newly numbered query will be added to the project query list. It is recommended that numbered queries be given names to help facilitate keeping track of the new data as the search gets bigger.
(3) **Query by Device ID(s)** is selected when the user would like to do a current history search of 1 or more devices within that query. **Selected Device ID numbers** are pasted into the **Device Box t**hat will appear at the mid-top of the screen (Screen Shots 66 & 67, below). Up to 10 devices may be selected at one time. The next step is to select a particular date range for the search or the use limit 90 days box. The final step is to select **Run Query**. This action will also initiate a new query and query count to the project query list.

Screen Shot 66

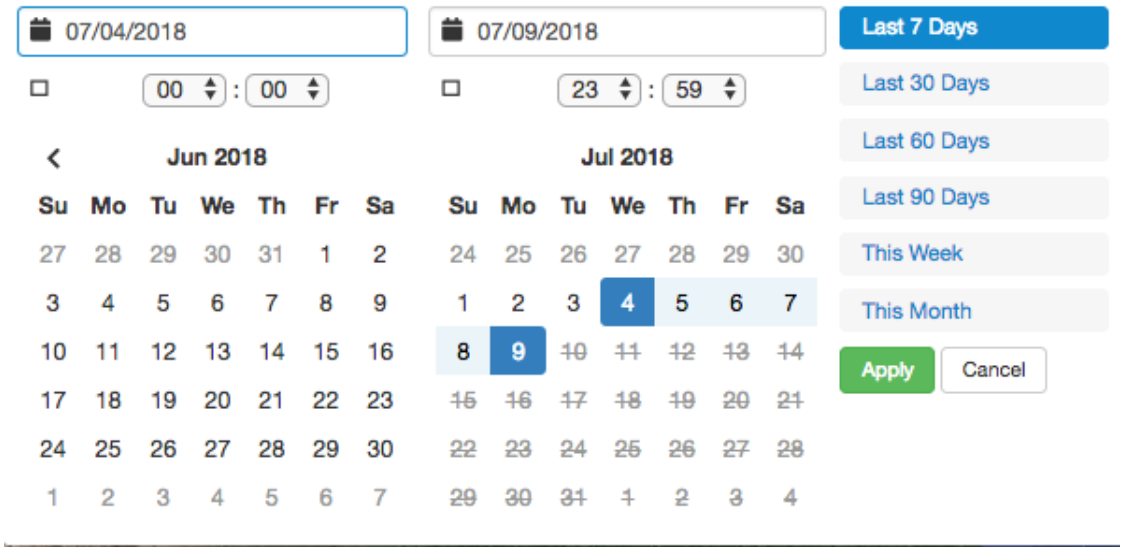


Screen Shot 67

6. **Date and Time** entries are required for all query selections whether the exact date or time is known or not and can be entered either as estimates or as accurate as down to the specific month, day, hour and minute. The initial Date and Time block is shown in Screen Shot 68, below.



Screen Shot 68



Screen Shot 69

a. The Date and Time Calendar is displayed when the small white calendar to the right of the Date/Time box in Screen Shot 68 is tapped. The interactive calendar, Screen Shot 69, above, allows manipulation of dates and times and will open to the previous and the current month with a one week date range default. Once the calendar is opened, the user is provided with the following selections:

(1) Date Selections can currently only go **back to Jun of 2017** (this is as of Jan 2019). That reach back will increase in coming months, years. The reason for this constraint is the systems collection and storage capability. The system collects over 16 billion signals a day, worldwide, and has to cleanse these signals down to an average of 5 billion before they are stored on the server. This process takes a minimum of 24 hours to complete, but reasonable results aren't available until 48 hours and greatly improved if the user waits 72 hours. This needs to be understood so that expectations are not lost because users or supervisors thought the system could be used on incidents occurring in the last 48 hours. The 48 hour minimum results in a line through the current day and previous day on the calendar. A line will also appear on the furthest day back from the current day, thereby fencing in any possible start or ending dates. When days are selected, they will become highlighted in blue on the calendar and will also be displayed numerically in the upper left boxes of the calendars. Two calendars will always appear, even when only one day is selected. The maximum period that can be searched at any one time is 90 days.

(2) Hours and Minutes are the second step in the date/time selection process and are located directly above the months for both the start and finish day. Both a start time and an end time must always be entered. Even if only one day is represented or both start days and end days occur in the same calendar month. The **start time** still has to be entered on the **left calendar** and **an end time** has to be entered on the **right calendar**. The default times will always start with 00:00 and end with 23:59. Times are entered in local times. The date has to be tapped each time before entering a starting time and before entering an ending time.

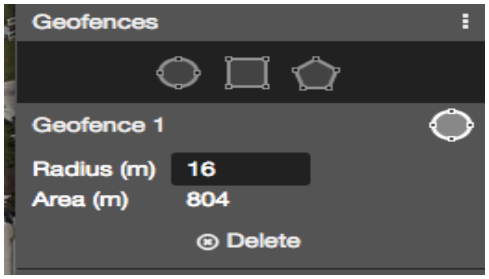
(3) Bundled Day Options are offered on the far right of the screen. All are specific periods of time from 7 days to 90 days and current week to current month that are short cuts to having to select individual days on the calendars. A search of a device's recent history and activity can be completed as far back as Jun of 2017; however, no individual search can exceed 90 days. Individual **90 day searches** can be conducted in any combination of consecutive days as long as they are within the furthest day back to furthest day forward boundary.

(4) The Apply Box must be checked once all the dates and times are selected.

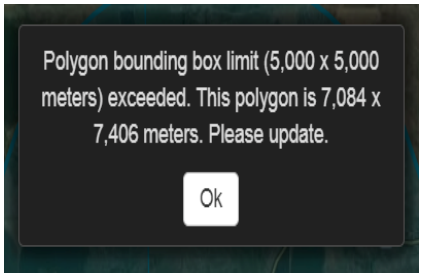
b. Time Zones. Time zones are automatically calculated according to the geographical location provided and the signals. Signals opened on the map or in the signals list will show both local and UTC times.

7. Geofences are located near the bottom of the dashboard. There are **3 geometric symbols** below the title, Screen Shot 68, below. The first is a circle, the second can be used as either a square or a rectangle and the third is a polygon that allows the user to customize the shape of the fence to the user's choosing. The electronic fences limit and define what parts of the geographic location the query will search. It's suggest the user first use the plus sign on the far left of the map to enlarge the geo-area that has been identified. Next, select one of the three geometric fence options and, with the curser, drag the figure over to the site and click. This allows the selected fence to be established at the targeted area and automatically inserts the correct time zone. Once they are initially place on the targeted area, the fences can be adjusted to match the specific dimensions desired. It is recommended that users start big when applying a fence and work their way down on successive queries. This is especially true when doing comparative analysis searching for a device located within several fenced locations (searching for a similar device that appears in multiple locations). Signals, particularly those acquired from cell towers, vary in accuracy and can result in offsets to their exact locations. This may cause a user to miss an

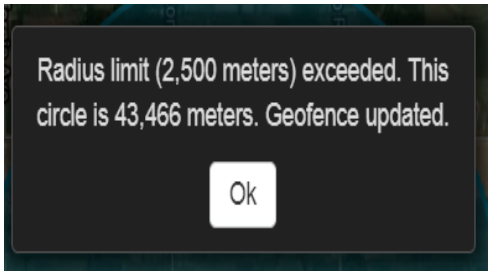
important signal that was lying just outside a smaller fence. Conversely, some caution needs to be applied when using large fences in urban areas. A user would probably not want to fence a large area of a major city at noon because the returning search will probably result in an overwhelming number of devices and signals. **Queries that exceed 100,000 signals** will result in the overage signals being dropped.



Screen Shot 70



Screen Shot 71



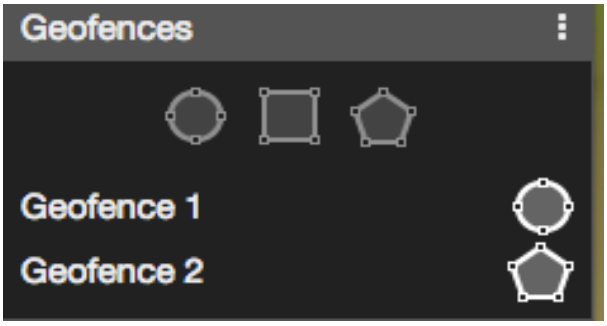
Screen Shot 72

a. **Fence Numbers** are shown once a fence is selected and applied. The system will assign it a number as shown in Geofence Screen Shots 70, above.

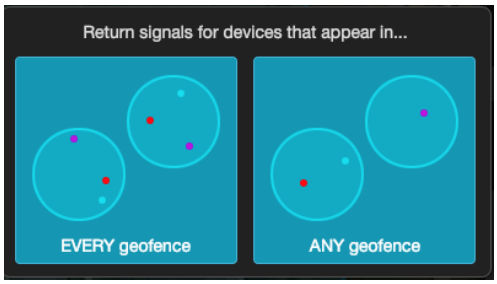
b. **Sizing a Geofence** to fit a particular are can be accomplished by clicking on the fence on the map to expand or contract its size. In this sample case, Screen Shots 71 & 72 above, as the geofence is drawn it brings up a Radius and Area calculator that changes as you expand or contract the fence.

c. **Multiple Fences in One Location** can be applied to a single query. As an example, Screen Shot 73, below, might be to simultaneously check a parking lot and a building that are not adjacent to each other but within the same geolocation being searched, allowing the user to apply two or more fences to that one query. In these instances, the Geofences Block will show the number of fences used and what shape was used for each fence, Screen Shot 74, below. When using multiple fences, a diagram, as shown in Screen Shot 75, below will ask if you want return signals only for devices common to all fences or any devices within any fences, regardless of commonality

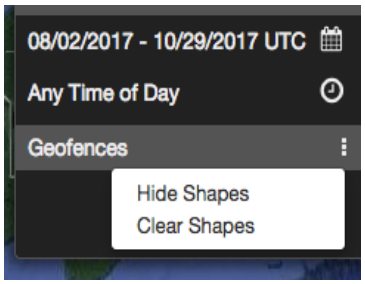
Screen Shot 73



Screen Shot 74



Screen Shot 75



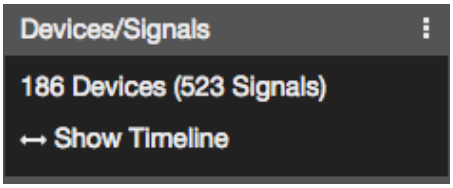
Screen Shot 76

d. Additional Selections. As shown in screen shot 76, above, the 3 White Dots to the right of "Geofences" allows 2 additional selections.

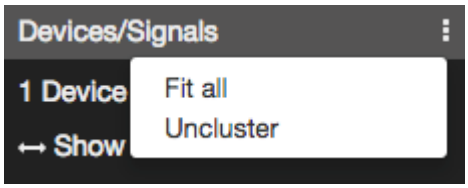
(1) Hide Shapes allows a user to view the signals and devices on the screen without interference from the fence.

(2) Clear Shapes allows the user to erase a fence either to select a different one or to run a search that goes beyond the boundaries of the current fenced location, such as in a pattern of life.

8. Devices/Signals. As depicted in Screen Shot 77 below, **Devices/Signals** is the next major heading following Geofences. Once a Query has been opened, the box below will list the total number of devices and signals in that Query and will also display it on the map. As a reminder, the user is cautioned to remember that a single device can represent any number of signals.



Screen Shot 77

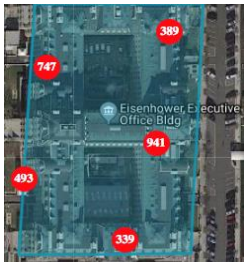


Screen Shot 78

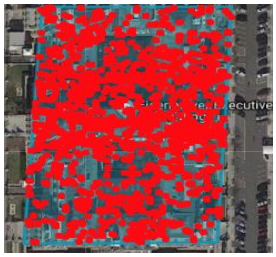
a. Device/Signals choices appear once a Query has been opened. Three white dots will appear to the right of Devices/Signals, Screen Shot 77, above. Clicking on the 3 white dots will open a box with two selections, **"Fit All"** and **"Uncluster"**, Screen Shot 78, above.

(1). Fit All can be used when the user zooms out on a map and wants the signals to cluster until they all reside in one geo area. Useful when trying to see from a Macro view on a map, Screen Shot 79, below.

(2). Uncluster is used when signals initially appear as clusters on a map and the user wants to quickly break them down either into smaller clusters or into individual signals, Screen Shot 80, below. A new way to view clustered signals has been added and can be seen in paragraph V. F. at the end of the SOP.



Screen Shot 79


Screen Shot 80

Screen Shot 81

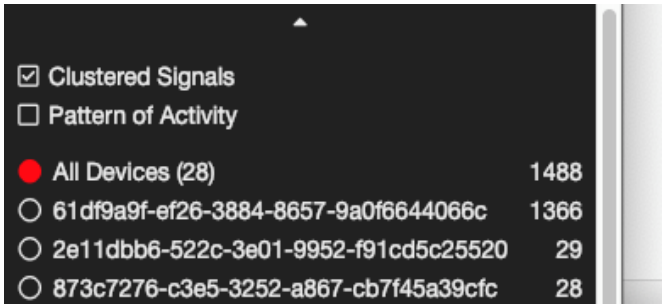
b. **Displaying all the Devices** listed under a project can be done by clicking on the number of Devices (Signals)Heading (example: 186 Devices and 523 Signals in Screen Shot 77 above) which will open up and list all the devices in descending order by number of signals, Screen Shot 81 above. Once opened, all the devices and signals associated with that Query will appear and be listed by a unique Device registration number and, to their right, the number of signals associated with those Devices. **Device registration numbers** are machine generated alphanumeric serials that the software uses to associate specific signals to a particular device. Their association is only unique to this program's server and portal tools. Cell phones have advertising IDs embedded within their phones. If in possession of a phone and its **advertising ID,** a correlation can be made between that phone and the alphanumeric numbers used in the portal. The reverse is not possible-using the registration numbers to identify individual mobile device numbers or owners.

c. **Clustered Signals,** shown in Screen Shot 81, above, allows the user to check and cluster or un-cluster the devices and signals displayed on the map.

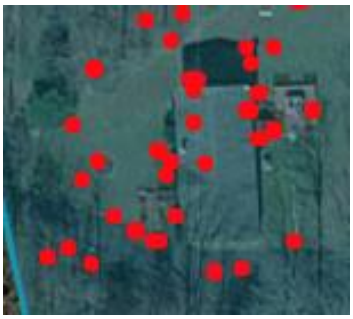
d. **Pattern of Activity,** shown in Screen Shot 81, above, is located directly below Cluster Signals. It graphically shows travel patterns of devices as depicted in Screen Shot 82, below.


Screen Shot 82

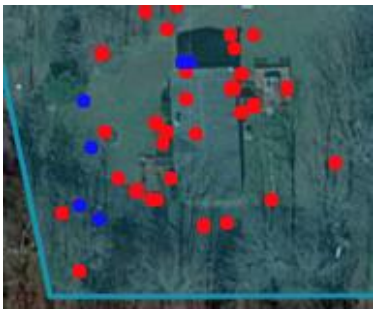
e. **All Devices**. The number in parenthesis to the immediate right of the All Devices heading is the number of devices that were discovered. The number to the far right of the screen indicates the number of signals from those devices. Signal origins, strengths and abnormalities can also be found by turning on the **Show Flagged Signals** in the drop down menu under the users name. The circle shown in screen shot 83, below, will be red. This means that all the individual devices within an open query will show up as red on the map, Screen Shot 84, below. Clicking on the circles again will turn off all the devices on the map, Screen Shot 85, below. Clicking on select for a particular device will allow that color to appear and be quickly identified from the remaining devices, Screen Shot 86, below. Clicking select on more than 1 device will cause those devices to be displayed in different colors for easier identification on the map, Screen Shot 87, below. Clicking on the red circle will turn off all the red dots and only display the color you selected, Screen Shot 88, below. Clicking on the individual devices will bring up a pop down menu, Screen Shot 89, below.



Screen Shot 83

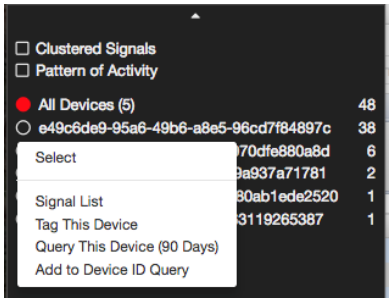

Screen Shot 84


Screen Shot 85

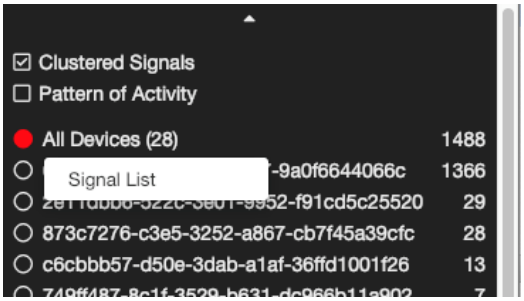

Screen Shot 86

Screen Shot 87


Screen Shot 88



Screen Shot 89



Screen Shot 90

(1) **Signal Lists.** Clicking on the block that shows the number of devices and signals, Screen Shot 77, above, brings up the list of all individual devices and signals in that query, screen Shot 83, above. Clicking on an individual device from the list of devices brings up a dropdown screen as shown in Screen Shot 89, above. Clicking on **Signal List** in the dropdown will open up a complete **CSV Signals file** for all the Devices listed in that individual Device. Clicking on the red doted "**All Devices**" will bring up the signals list box shown in Screen Shot 90, above, for all the Devices within that query. Screen Shots 91 & 92 are examples of those Files. A **File** shows all the signals detected by that device, their lat/longs and their date/times. (Screen Shots 91 & 92, below. **Exporting** these lists to a **CSV File** and then to an Excel spread sheet is explained in greater detailed in paragraph VI below.

All Devices (48 Signals)

Device	Date/Time Local	Date/Time UTC	Latitude	Longitude
b996d821-52d3-4a9b-b61c-80ab1ede2520	01/10 14:51 EST	01/10 19:51 UTC	37.904995	-77.442764
e49c6de9-95a6-49b6-a8e5-96cd7f84897c	01/15 17:01 EST	01/15 22:01 UTC	37.905025	-77.442665
9d476373-92ff-43a5-9ce8-b9a937a71781	01/17 08:32 EST	01/17 13:32 UTC	37.9049	-77.44276
9d476373-92ff-43a5-9ce8-b9a937a71781	01/17 09:33 EST	01/17 14:33 UTC	37.9049	-77.44276

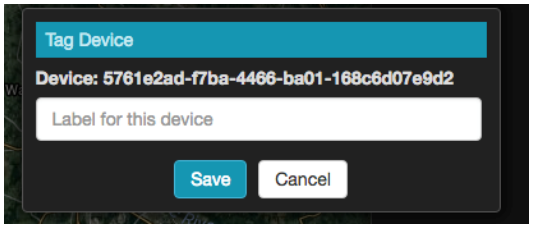
Screen Shot 91

Device a0954038-2057-3097-a762-9273a6f74554 (27 Signals)

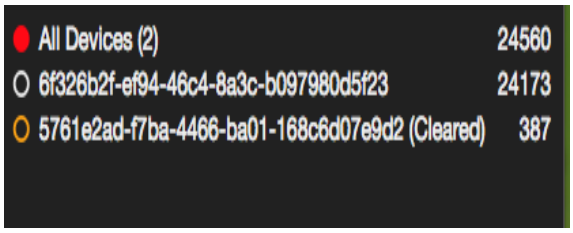
Device	Date/Time Local	Date/Time UTC	Latitude	Longitude
a0954038-2057-3097-a762-9273a6f74554	01/04 08:10 CST	01/04 14:10 UTC	36.179363617	-86.515209488
a0954038-2057-3097-a762-9273a6f74554	01/05 08:25 CST	01/05 14:25 UTC	36.179130736	-86.514998463
a0954038-2057-3097-a762-9273a6f74554	01/05 08:52 CST	01/05 14:52 UTC	36.179027594	-86.515506459
a0954038-2057-3097-a762-9273a6f74554	01/05 08:53 CST	01/05 14:53 UTC	36.178980485	-86.51656268
a0954038-2057-3097-a762-9273a6f74554	01/07 16:36 CST	01/07 22:36 UTC	36.179029	-86.516084
a0954038-2057-3097-a762-9273a6f74554	01/07 16:36 CST	01/07 22:36 UTC	36.178940681	-86.515816287

Screen Shot 92

(2) Tag This Device is a way to save a selected Device of interest. User must first assign it a name and then click on save. The selected Device is then identified as labeled in a column to the right of that device (in this case, named cleared) in the Devices listing, Screen Shots 93 & 94, below.



Screen Shot 93

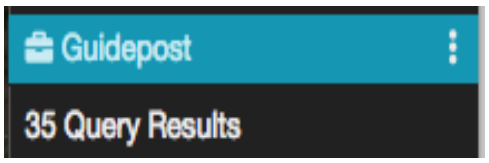


Screen Shot 94

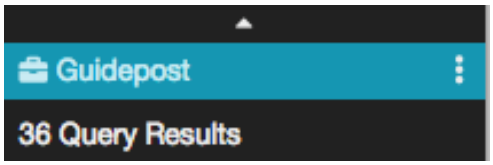
Screen Shot 95

(3) Query This Device (90 Days) will show a 90 day pattern of activity for the most recent 90 days and, if a fenced query, will automatically break it out of its fenced location and will display it geographically over the full range of time of the query, Screen Shot 95, above. When running the 90 day query, a particular location can be typed in the "**Search box",** at the top of the screen as shown In Screen Shot 9, at the beginning of the SOP, that will allow the user to see if a particular device was at that particular location during any period within that range of time. After this

Query is run, it will be added as a New Query within the **Device Query Results** heading (Screen Shots 96 & 97 (before and after), below.



Screen Shot 96

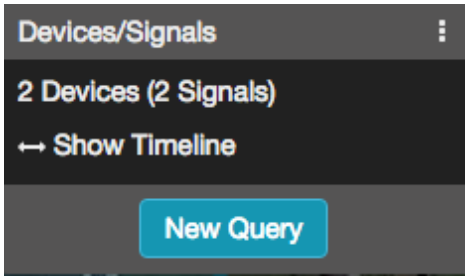


Screen Shot 97

Screen Shot 98

(4) Add to Device ID Query. One feature of this box is to search where a device has been over a selected Date Range. Click on the "**Add to Device ID Query**" on the menu in Screen Shot 89, above, and the device's identification number will automatically appear in the Query Search box at the top of the map, Screen Shot 98, above. The user can select 90 days of a more definitive range of dates and times by selecting "**Date Range".** This cannot be done until the white arrow at the top of the device list is clicked and the list clears the screen, exposing the date/time calendar box on the dashboard. The user can select any desired date range of the device's activities. Selecting the red "**Run Query"** , will then geographically display the query across the map. More importantly, it also allows the user to run and observe multiple selected devices running simultaneously to see if there are common places where they cross or come together. Once run, they will also be added as a new Query to the current project.

IV. Timelines



Screen Shot 99

Screen Shot 100

Once the user clicks on **Show Timeline**, located in the black space at the bottom of the dashboard under **"Devices/Signals**", Screen Shot 99, above, a timeline of up to 90 days, Screen Shot 100, above, will appear across the top of the screen. Displayed under each date are the number of signals that were identified on that particular day. If individual devices with a query, vice queries, are selected up to 10 devices can be displayed. They will be color-coded in sequentially layered lines beneath the dates. Timelines can be used within or outside fenced areas; however, the vast majority are displayed as a timeline outside a fenced area.

A. **The First Step** in running a timeline, either on a named query or on a single device, is to open up a query. Once opened, the box below **"Devices and Signals"** will read **"Viewing Timeline"** and will initiate the appearance of the timeline at the top of the page, the number of signals recorded per day depicted under each date, and the signals for that day depicted on the map below. Starting with the first date, which will be highlighted by a **blue dot**, and by clicking on the left-hand arrow, the blue dot will move sequentially across the dates while simultaneously changing the location of the signals on the map to correspond to that particular day's signals. For more granularity, the time line can be viewed in hours vice days.

B. **Device vs Query Timelines** can be used when the user only wants to see a device timeline. After opening up the query and **high-lightening the circle** next to the desired device, select show timeline and only that devices signals will appear on the chart.

C. **Movement by Seconds Interval.** The timelines speed across the dates can be adjusted in intervals of seconds by typing the number of seconds the user wants into the white box to the left and then selecting the Interval (sec) arrow to its left.

D. **Exiting the Timeline** can be initiated through the **x Button** at the far right of the line.

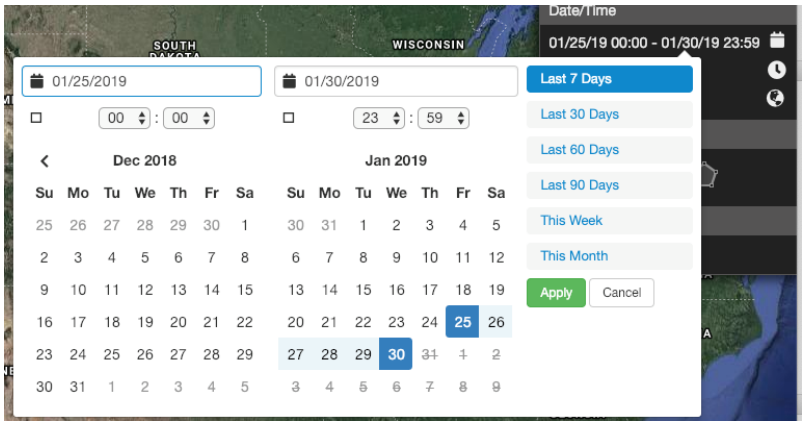
V. Steps for Conducting a Single Site Query.

Queries are used in conjunction with either a known or an approximate geographic location together with either an estimated or a known date and time. After logging into the portal, a world map will appear displaying a dashboard with the previously explained search tools, Screen Shot 101, below.

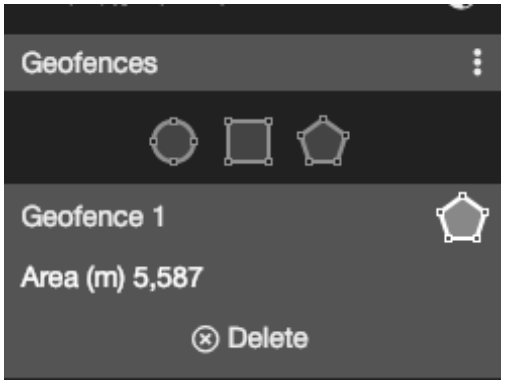
Screen Shot 101

Screen Shot 102

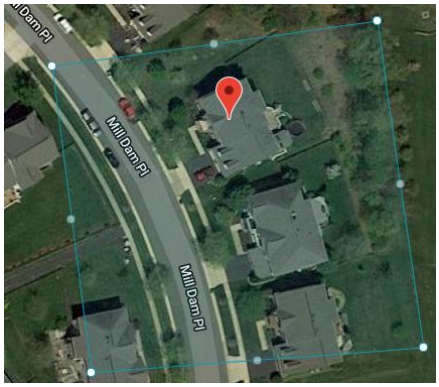
A. **Find a Location Box** is the first step in a starting new Query and requires entry with either a lat/long, geographic location or an exact address entered in the search box shown in Screen Slide 102, above. This will automatically trigger the Google map to move and open to that site and pin point its exact location.



Screen Shot 103



Screen Shot 104

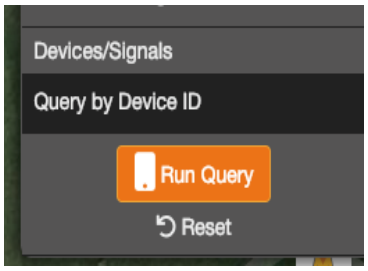


Screen Shot 105

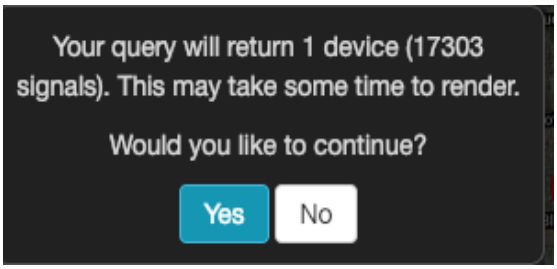
B. **Date/Time** is the second step in starting a new Query, Screen Shot 103, above. The user must enter both a beginning and ending date and times (a beginning and ending time must also be given for a single date). All times applied should be in local times. Once completed, select **Apply**. Even though search dates may only fall on one calendar, the minutes for beginning the period (left calendar) and ending the period (right calendar) must be used and the date(s) touched before adding the times.

C. **Geofences** selection is the third step required in starting a new Query. There are 3 types of geofences that can be applied and dragged to the map.
1. Geofence types One is a circle, one is a square and the third is a free hand form, Screen Shot 104, above. Enlarge the site on the map, select one of the geometric figures, move the cursor to the geographic area or address and click and apply/adjust the fence. As previously discussed, there are limitations to the size of fenced areas. When a geofence is drawn, it automatically selects and posts the name of the time zone that fence is in within, Screen Shot 105 above.

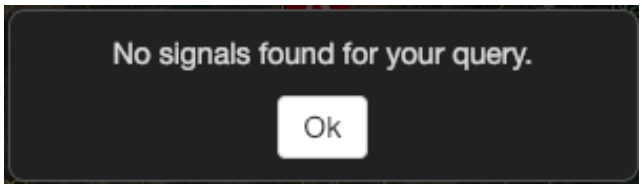
D. **Run Query** is the final step in running a new Query. The **"Run Query"** button will appear below the geofence box, Screen Shot 106, below. Once the Query is initiated, a screen may appear and ask if the user understands that the process **"May take some time to render "** because of the size of the search criteria and will also ask if the user **"would like to continue".**, Screen Shot 107, below. The normal response is yes. Once the Query is completed, it will either provide a notice saying "**no Signals found for your query",** Screen Shot 108, below, or it will display the devices and signals within that fenced in area. The picture in Screen Shot 109, below, is what a typical single location site query would look like.



Screen Shot 106



Screen Shot 107



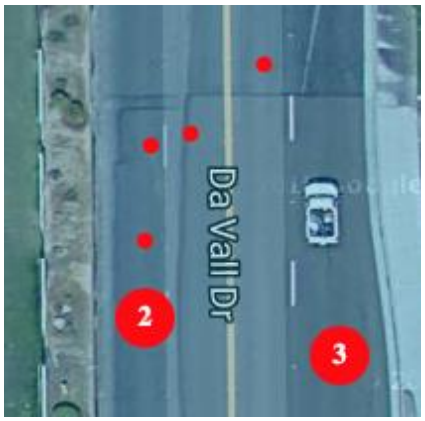
Screen Shot 108

Screen Shot 109

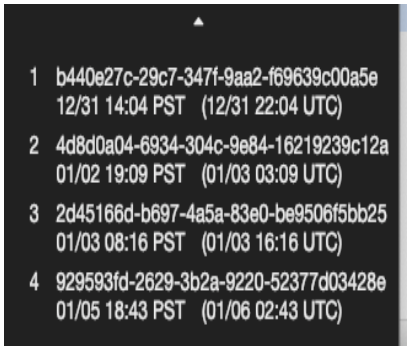
E. **Query Results.** When a query is requested for an extended period of time, and the fence is dropped to allow for a search of signals worldwide, the signals may first appear as large, red circles with numbers in the middle, Screen Shot 110, below. This happens because the map feature is in a macro view and all the signals within that large geo radius are rolled up into one large dot. Example: When a map is zoomed out (say to a metropolitan area) all the local signals will roll up, cluster and be displayed as large circles. The number within the circles represents the number of signals, not devices, within each. As the analyst zooms in on a particular cluster or circle by enhancing the map or clicking on the number, the circle will continue to break down, first into smaller clusters and eventually into individual dots. Single dots represent both the individual devices found and the number of signals radiating from them. A single device that remained in one location but periodically broadcasted could have multiple signals attached to it.

F. **Opening a Device.** Placing the curser over a single dot will open it up, Screen Shot 109, above, and provide that device's registration or serial number (a number randomly assigned by the software), its latitude/longitude and the date and time(s) it was broadcasting. A device could remain in a single spot for a long period of time and, while there, make multiple broadcasts. When that device is opened up, it will show a signals list of all the times that it broadcasted. When a curser is applied to a specific device within a fenced in area, the other locations of that device within the fence will change to blue so that it can easily be identified amongst all the other devices also located in that particular fence. When there are multiple clusters, Screen Shot 110, below, and the user wants to open one up to single dots, Screen Shot 111, below, a continuous touch of the dot by the curser will open it up. Simultaneously, the data from those signals will be displayed to the right of the screen, Screen Shot 112, below. If the User would like to isolate and only look at a particular cluster, touching the white dot in the "**Show other Signals"** box at the bottom of the screen, Screen Shot 113, below, will make all the other map clusters disappear and only the individual devices from the selected cluster selected will remain, Screen Shot 114, below.

Screen Shot 110

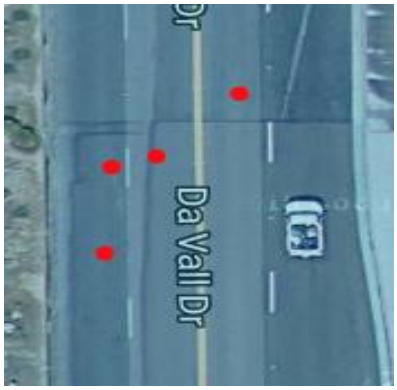


Screen Shot 111



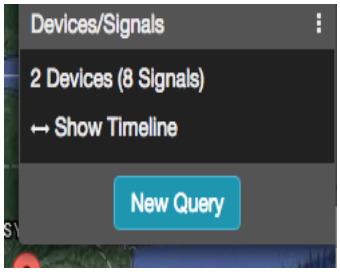
Screen Shot 112

Screen Shot 113

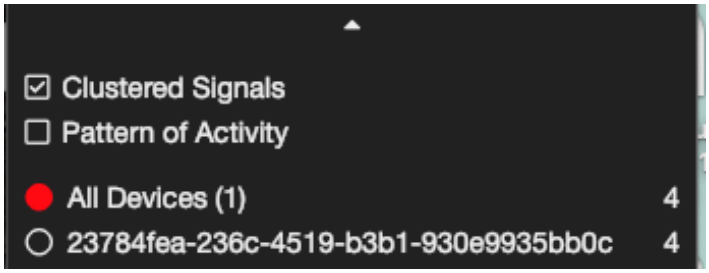


Screen Shot 114

VI. CSV Files. One way to share a Query's or an individual Device's signals' lat/long/and times with another user is through a **CSV file**. This can be done from a current Query/Device or from previously saved Queries/Devices.



Screen Shot 115



Screen Shot 116

Screen Shot 117

A. Devices/Signals. If working from a new query, go to the portion of the dashboard that says Devices/Signals, Screen Shot 115, above, and in the black box click on the numbered **Devices and Signals** (in parenthesis). A new screen, Screen Shot 116, above, will appear. Make sure the **"All Device" circle is all red.** Once clicked, it will open to a listing of all devices and at the top of the list a circle next to "All Devices". Click on "All Devices" and a pop up "**Signal List**" box will appear, Screen Shot 117, above. Clicking on the Signals List box will bring up all the devices in one list in order by date/time in both current time zone and UTC times, Screen Shot 118, below. As previously explained, Signal Lists can also be called up for individual devise using their dropdown menus.

All Devices (39 Signals)

Device	Date/Time Local	Date/Time UTC	Latitude	Longitude
fbf59069-69d5-4055-b4d7-e237ccc319c7	02/03 17:03 EST	02/03 22:03 UTC	38.602627	-77.29519
75ddea39-bbca-4073-9601-a7e64ec47bf6	02/03 18:07 EST	02/03 23:07 UTC	38.60234	-77.29552
75ddea39-bbca-4073-9601-a7e64ec47bf6	02/03 18:51 EST	02/03 23:51 UTC	38.602184	-77.29539
75ddea39-bbca-4073-9601-a7e64ec47bf6	02/03 18:53 EST	02/03 23:53 UTC	38.602184	-77.29539
75ddea39-bbca-4073-9601-a7e64ec47bf6	02/03 18:54 EST	02/03 23:54 UTC	38.602184	-77.29539
75ddea39-bbca-4073-9601-a7e64ec47bf6	02/03 18:54 EST	02/03 23:54 UTC	38.602184	-77.29539

Screen Shot 118

B. Downloading a CSV File. This capability is located by the button labeled **"Download CSV"** in the lower right of the screen, Screen Shot 118 below. The list will be downloaded to your computer and from there can be opened and transferred to an Excel Spreadsheet for attachments or for printing.

Screen Shot 119

C. Download Complete. Once the download is completed, Screen Shot 119, above, click **"Done"** and it will return the user back to the All Devices listing.

VII. Questions.

Any questions regarding the use of this Portal or any part written in the FOG User Manual can be sent to support@fogdatascience.com.