

# All-Terrain 4-D Analytical Detectometer Use Cases

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## Global Specifications

The body, cover, and interactive screen of the All-Terrain Analytical Detectometer are impervious to water, corrosive substances, and extreme temperatures.

The cover for the interactive display screen has an electromagnetic closure. It activates the display screen when it is opened and turns the screen off when it is closed. There are solar charging cells on the exterior of the cover. See Figure 1.

In addition to the solar charging cells on the cover's exterior, there is also an AC power adapter input and an USB port on the left side of the device. See Figure 2.

Scanning is done with a Detector Beam that emanates from the top of the device. See Figure 3 for its location. It is effective for analyzing solids and liquids. The diameter and/or depth of a scan can be adjusted using the Amplification Lever. See Figure 1.

At the top of the Detectometer there is also a laser. This laser serves a two-fold purpose: 1) Cutting specimens for removal and storage, and 2) Self-defense in a hostile environment. The Amplification Lever is used with the laser beam to increase its intensity. There is a safety switch on the right side of the device that must be activated before the laser can be engaged. See Figure 2.

The sensor, shown in Figure 3, has two modes. In the first mode, the sensor is continuously monitoring the environment for toxic or hazardous materials. In the second mode, the sensor is detecting and recording information from the Detector Beam. The first mode is incorporated into the second mode while the Detector Beam is activated.

The camera has both photo and video capabilities and GPS data is incorporated into all files. In addition to longitude and latitude information, the Detectometer also records cardinal direction and elevation.

The beam for the flashlight is located on the top of the device. The Off/On switch is on the right side. This feature assists with nocturnal and subterranean data collection. Diameter and intensity of the beam can be adjusted with the Amplification lever.

There is a multi-directional microphone that captures audio that can be saved to a file. The speaker on the Detectometer allows the user to listen to the audio segments.

The interactive screen has touch sensitivity, stylus response, and voice activation capability. Technical specifications for the stylus and voice activation features are beyond the scope of this project.

Wi-Fi, USB, and satellite connectivity allow a range of options for data transfer. All data is continuously auto-saved to a temporary data file on the Detectometer and is available for auto-transmission to another location.

There is a database of taxonomies to help identify sensor readings. Asynchronous satellite communication allows display of summary sensor readings within the <Immediate Notification Window>.

Figure 1: Exterior Front View

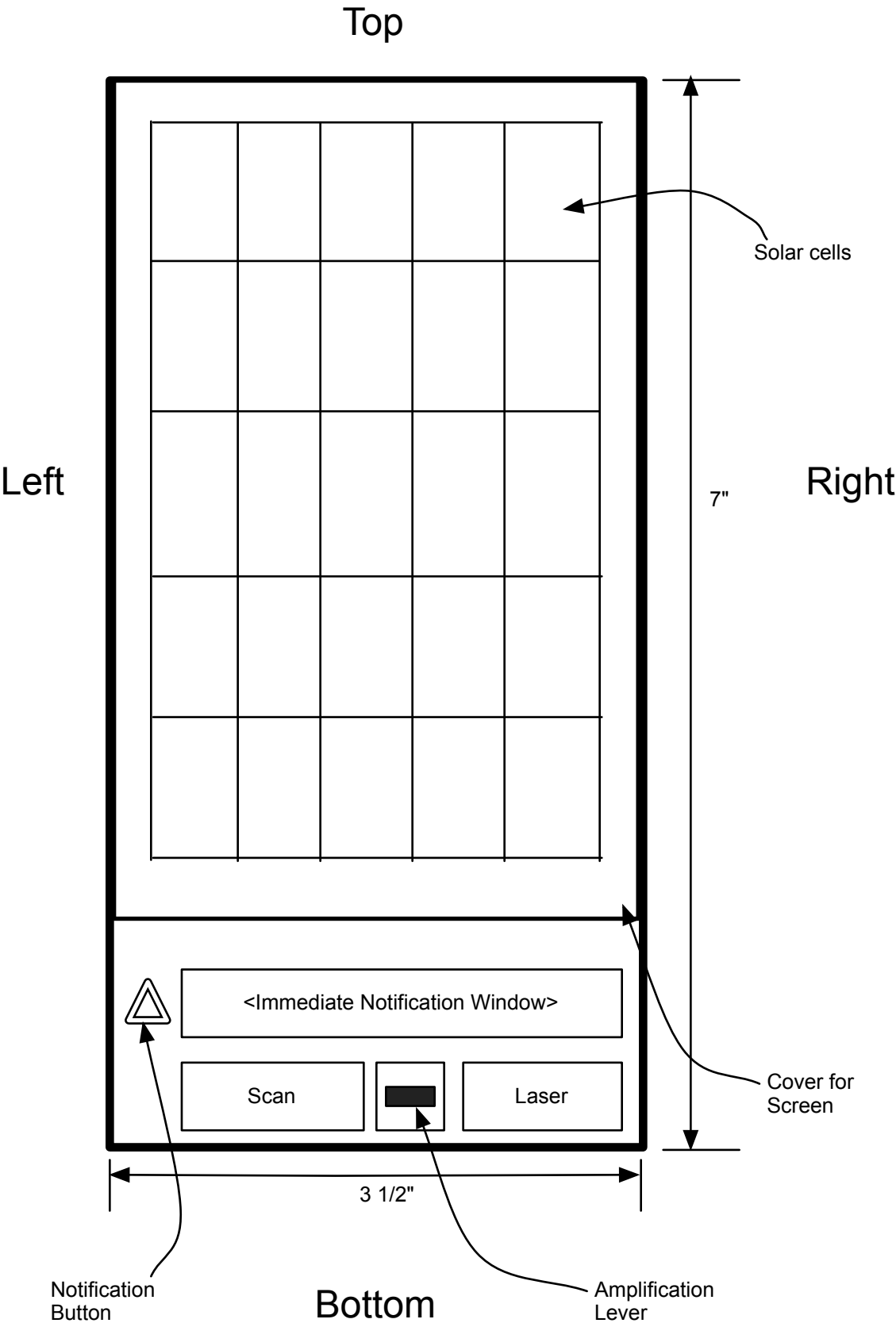


Figure 2: Exterior Side Views

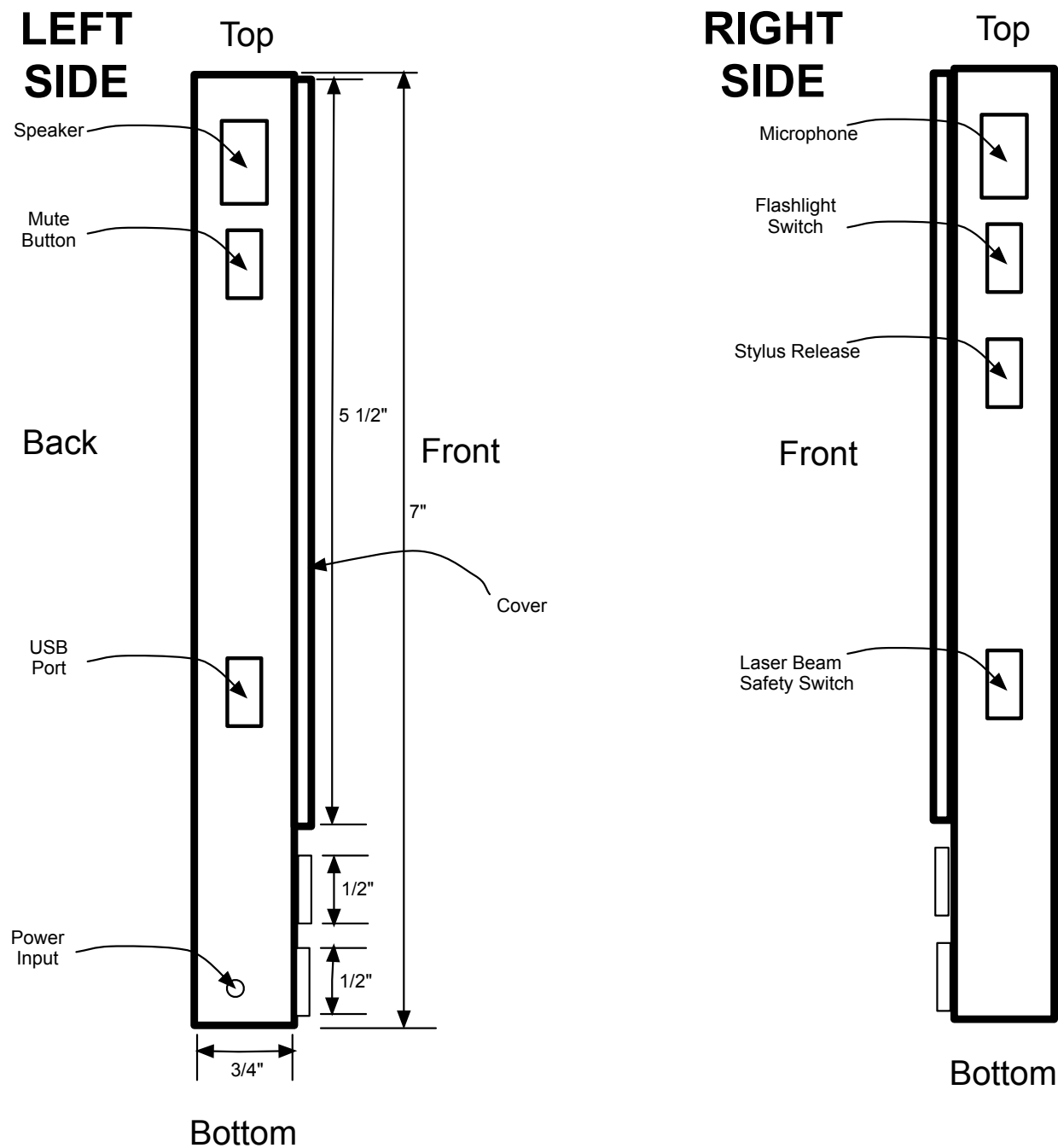
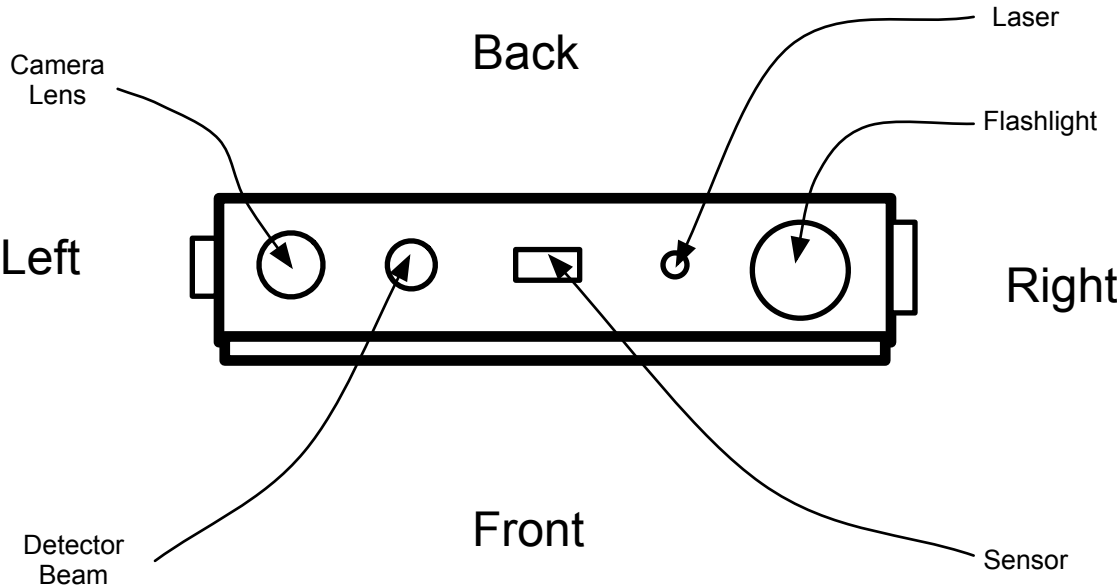


Figure 3: Exterior Top View



## Overview: All-Terrain 4-D Analytical Detectometer

| #  | Use Case Name                                    | Last Updated |
|----|--|--------------|
| 1  | User Performs Simple Analysis Scan of an Object  | 12/9/2013    |
| 2  | User Performs Complex Analysis Scan of an Object | 12/9/2013    |
| 3  | User Creates Notes Regarding Research            | 12/9/2013    |
| 4  | User Creates an Audio File                       | 12/9/2013    |
| 5  | User Creates a Photo                             | 12/9/2013    |
| 6  | User Saves Information to a File                 | 12/9/2013    |
| 7  | User Searches for Saved File                     | 12/9/2013    |
| 8  | User Encounters a Hazard                         | 12/9/2013    |
| 9  | User Cannot Engage the Touch Screen              | 12/9/2013    |
| 10 | User Engages Flashlight                          | 12/9/2013    |
| 11 | User Engages Laser                               | 12/9/2013    |

## Use Case 1: User Performs Simple Analysis Scan of an Object

|                                  |  |
|----------------------------------|--|
| <i>Description:</i>              | A user scan an object at a remote site to analyze its surface composition  |
| <i>Actors:</i>                   | A scientific researcher  |
| <i>Precondition:</i>             | The user is somewhere other than his laboratory and has found an object that he would like to analyze  |
| <i>Post-Condition:</i>           | User clicks 'Save File'  |
| <i>Primary Scenario:</i>         | A user finds an object to scan and saves the collected information.  |
| <i>Primary Task Flow:</i>        | <ol style="list-style-type: none"> <li>1. User flips open cover</li> <li>2. User points top edge of Dectectometer at desired object</li> <li>3. User presses 'Scan' button</li> <li>4. User views &lt;Statistics&gt; of the scan on the 'Data' screen <ol style="list-style-type: none"> <li>a. Views 'Composition'</li> <li>b. Views 'Measurements'</li> <li>c. Views 'Location' information</li> </ol> </li> <li>5. User views available identifying taxonomy in &lt;Immediate Notification Window&gt;</li> <li>6. User clicks 'Save'</li> </ol> |
| <i>Alternate Scenario 1:</i>     | User chooses not to save scan  |
| <i>Alternate Task Flow 1:</i>    | <ol style="list-style-type: none"> <li>1. Primary Task Flow (PTF), Step 1-4</li> <li>2. User clicks 'Clear Data' button</li> <li>3. User sees 'Verification Window' asking, "Please verify that you want to clear this data"</li> <li>4. User responds to 'Verification Window' <ol style="list-style-type: none"> <li>a. Clicks 'Cancel' to return to 'Data'</li> <li>b. Clicks 'Clear All Data' to return to empty 'Data' screen</li> </ol> </li> </ol>  |
| <i>Technical Specifications:</i> | <p><i>Cancel</i></p> <ul style="list-style-type: none"> <li>- Contained in 'Verification Window'</li> <li>- Returns user to information on 'Data' screen</li> </ul> <p><i>Clear All Data</i></p> <ul style="list-style-type: none"> <li>- Within 'Verification Window'</li> <li>- Deletes all scan data held in temporary auto-save</li> <li>- Returns user to empty 'Data' screen</li> </ul>  |



*Clear Data*

- Opens 'Verification Window'

*Composition*

- Shows a listing of the elements in the object and their percentages

*Immediate Notification Window*

- Displays a label or name for the object if the sensor readings can be identified by the mainframe database (e.g. "tiger", "gold", "bomb")

*Location*

- GPS Longitudinal and Latitudinal tags of object
- Elevation of object
- Direction of object from researcher
- Distance from researcher

*Measurements*

- Shows aspects such as sizes and weight

*Save*

- Takes user to the 'Save' Window. See Use Case 6.
- Saved as a '.Data' file

*Scan button*

- Activates 'Detector Beam'
- Triggers 'Sensor' to begin collecting data from 'Detector Beam'

*Statistics*

- Listings are displayed as barrel menus to accommodate space needs if necessary
- Composition
- Measurements
- Location

*Verification Window*

- Contains: 'Cancel' and 'Clear All Data' buttons
- Is triggered when user clicks 'Clear Data' button
- Displays the message: "Please verify that you want to clear this data"

**Figure 4: 'Data' Screen—Simple Analysis**

Top

Left Right

| Data  | Notes | AV | Search |           |   |           |   |           |   |          |          |          |
|---|-------|----|--------|-----------|---|-----------|---|-----------|---|----------|----------|----------|
| <h3>Statistics</h3> <p>Composition:</p> <table style="width: 100%;"><tr><td>Element 1</td><td style="text-align: right;">%</td></tr><tr><td>Element 2</td><td style="text-align: right;">%</td></tr><tr><td>Element 3</td><td style="text-align: right;">%</td></tr></table> <p>Measurements:</p> <table style="width: 100%;"><tr><td>Aspect 1</td></tr><tr><td>Aspect 2</td></tr><tr><td>Aspect 3</td></tr></table> <p>Location: Longitude, Latitude,<br/>Elevation, Direction,<br/>Distance</p> <div style="display: flex; justify-content: space-around; margin-top: 20px;"><span>Clear Data</span><span>Save</span></div> |       |    |        | Element 1 | % | Element 2 | % | Element 3 | % | Aspect 1 | Aspect 2 | Aspect 3 |
| Element 1   | %     |    |        |           |   |           |   |           |   |          |          |          |
| Element 2   | %     |    |        |           |   |           |   |           |   |          |          |          |
| Element 3   | %     |    |        |           |   |           |   |           |   |          |          |          |
| Aspect 1  |       |    |        |           |   |           |   |           |   |          |          |          |
| Aspect 2  |       |    |        |           |   |           |   |           |   |          |          |          |
| Aspect 3  |       |    |        |           |   |           |   |           |   |          |          |          |

<Immediate Notification Window>

ScanLaser

## Use Case 2: User Performs Complex Analysis Scan of an Object

|                           |   |
|---------------------------|---|
| <i>Description:</i>       | A user wants to attain data beyond the surface of the object he is scanning   |
| <i>Actors:</i>            | A researcher  |
| <i>Precondition:</i>      | The user has opened the Detectometer and is pointing it in the direction of the desired scan  |
| <i>Post-Condition:</i>    | User can view scan data according to a specific x,y,z coordinate and/or moment in time  |
| <i>Primary Scenario:</i>  | The user scans an object in order to pinpoint data at a precise location or moment in time  |
| <i>Primary Task Flow:</i> | <ol style="list-style-type: none"> <li>1. User simultaneously engages the 'Amplification Lever' and the 'Scan' button <ol style="list-style-type: none"> <li>a. Pressing the lever towards the top of the Detectometer increases the depth of the scan</li> <li>b. Pushing the lever inwards (toward the back of the Detectometer) increases the width/diameter of the scan</li> <li>c. The length of time that the lever is engaged is the duration of the scan</li> </ol> </li> <li>2. User views the outline of the scan forming on the 'Data Focus' grid as he engages the lever and button</li> <li>3. User views 'Reference Marker' moving on 'Scan Timeline'</li> <li>3. User releases 'Amplification Lever' and 'Scan' button when extent of desired scan is reached</li> <li>4. User moves 'Reference Markers' to desired points of data <ol style="list-style-type: none"> <li>a. To a point in the Scan Timeline</li> <li>b. To a point on the 'Data Focus' grid</li> </ol> </li> <li>5. User views &lt;Composition&gt;, &lt;Measurements&gt;, and &lt;Location&gt; for that data point</li> </ol> |

## *Technical Specifications:*

### *Amplification Lever*

- Pressing the lever up increases the depth of the scan
- Pressing the lever in increases the diameter of the scan
- Scanning includes the element of time based on its duration

### *Data Focus Grid*

- Displays X, Y, and Z coordinates of scanned object in outline form
- Statistics can be pinpointed within a scan through placement of a 'Reference Marker' on the X, Y, Z coordinates

### *Reference Marker*

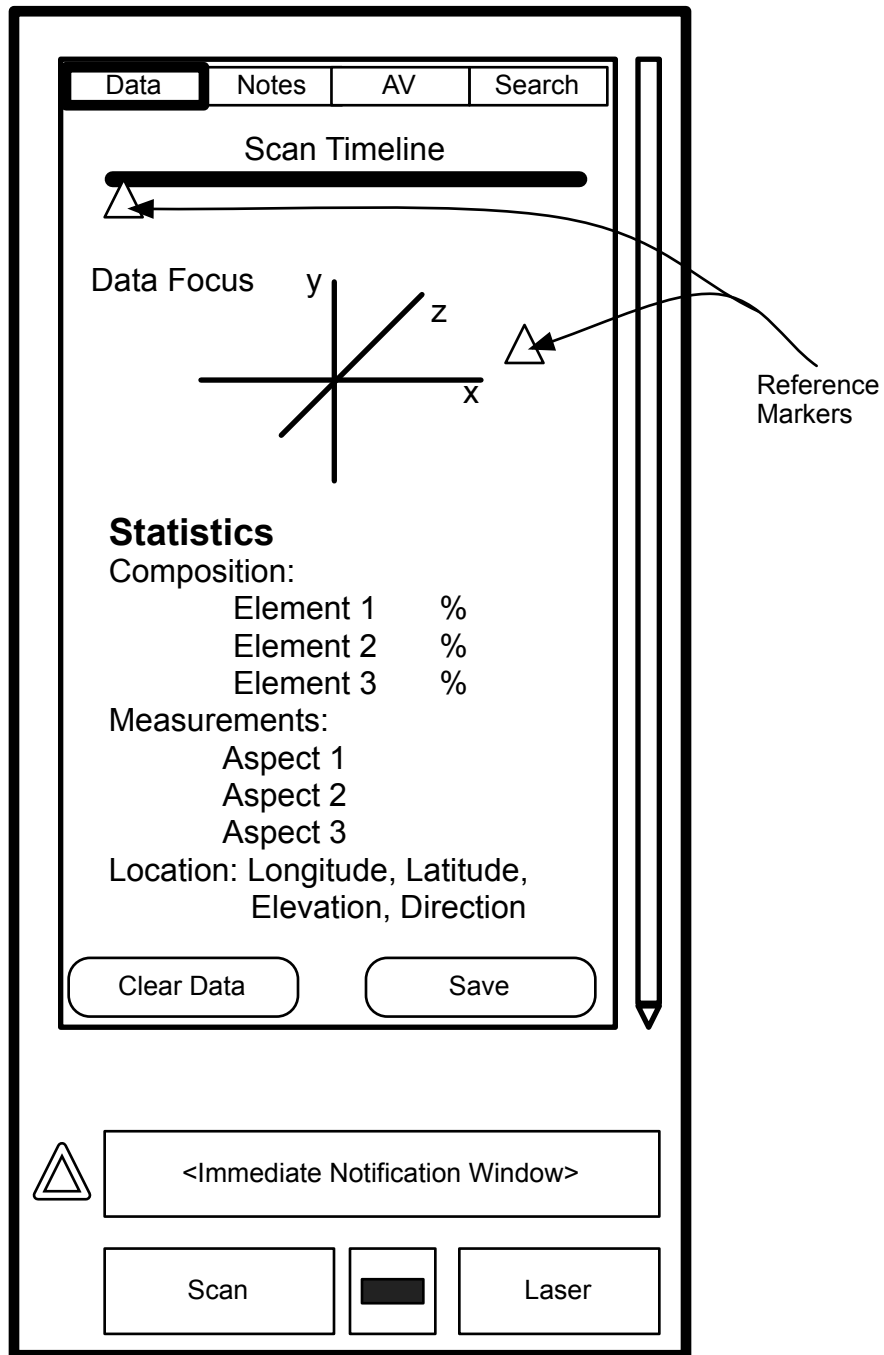
- Arrows used on 'Data Focus Grid' and 'Scan Timeline' to pinpoint the desired statistics from a scan
- Title box appears as arrow is moved
  - Displays time for arrow within timeline
  - Displays X, Y, Z coordinates for arrow within grid

### *Scan Timeline*

- Displays the duration of the scan
- Statistics can be pinpointed based on time within a scan through movement of the 'Reference Marker' along the timeline

### *Statistics*

- See Use Case 1

**Figure 5: 'Data Screen—Complex Analysis**

## Use Case 3: User Creates Notes Regarding Research

*Description:* A user has scanned an object and would like to add notes to the data collected

*Actors:* A scientific researcher

*Precondition:* The user has information that he would like to notate

*Post-Condition:* User clicks 'Save'

*Primary Scenario:* A user creates notes and saves them to a file

*Primary Task Flow:*

1. User clicks 'Notes'
2. User clicks letters with fingers on the 'QWERTY interface'
3. User clicks up/down arrows to scroll through <Text> entered
4. User clicks 'Save'

*Alternate Scenario 1:* User wants to delete or erase notes

*Alternate Task Flow 1:*

1. Primary Task Flow (PTF), Steps 1-3
2. User deletes text
  - a. Moves cursor with finger to desired location and hits 'Delete' key on QWERTY interface until desired results are achieved
  - b. Clicks the 'Clear Notes' button to erase everything on the screen
3. User clicks 'Save'

*Technical Specifications:*

### *Clear Notes*

- Erases all entered text

### *QWERTY Interface*

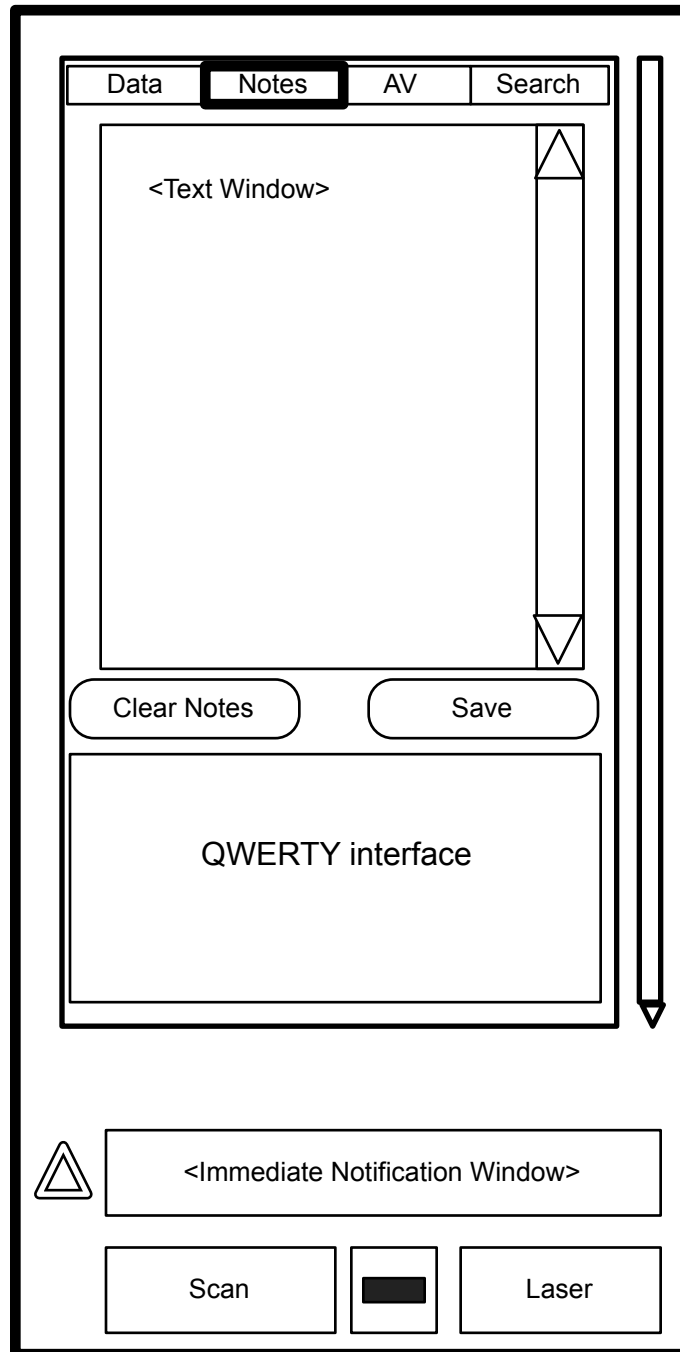
- A touch-sensitive screen keyboard
- Key tapped momentarily expands as it is selected

### *Save*

- See Use Case 6
- Saved as a '.Note' file

*Text Window*

- Allows keyboard data entry
- Touch sensitive for highlighting and cursor movement
- Scroll feature is triggered if text length exceeds visibility within window. Width does not exceed <Text Window> width visibility.
- Text is left aligned

**Figure 6: Notes Screen**

## Use Case 4: User Creates an Audio File

|                               |   |
|-------------------------------|---|
| <i>Description:</i>           | A user would like to create an audio file   |
| <i>Actors:</i>                | A scientific researcher   |
| <i>Precondition:</i>          | The user has something he would like to record  |
| <i>Post-Condition:</i>        | User clicks 'Save'  |
| <i>Primary Scenario:</i>      | A user captures an audio recording in order to save it to a file  |
| <i>Primary Task Flow:</i>     | <ol style="list-style-type: none"> <li>1. User clicks 'AV'</li> <li>2. User clicks 'Record'</li> <li>3. User captures sounds</li> <li>4. User clicks 'Stop'</li> <li>5. User clicks 'Save'</li> </ol>   |
| <i>Alternate Scenario 1:</i>  | User wants to delete recording  |
| <i>Alternate Task Flow 1:</i> | <ol style="list-style-type: none"> <li>1. Primary Task Flow (PTF), Steps 1-4</li> <li>2. User clicks 'Delete'</li> <li>3. User views 'Verification Window' message</li> <li>4. User responds to 'Verification Window' <ol style="list-style-type: none"> <li>a. Clicks 'Cancel'</li> <li>b. Clicks 'Delete Audio'</li> </ol> </li> </ol>  |
| <i>Alternate Scenario 2:</i>  | User wants to play the recording  |
| <i>Alternate Task Flow 2:</i> | <ol style="list-style-type: none"> <li>1. Primary Task Flow (PTF), Steps 1-4</li> <li>2. User views 'Recording Timeline' <ol style="list-style-type: none"> <li>a. Opts to begin listening at 00:00 in recording</li> <li>b. Moves right edge of progression bar to indicate time at which recording should begin to play</li> </ol> </li> <li>3. User clicks 'Play'</li> <li>4. User listens to audio</li> </ol> |
| <i>Alternate Scenario 3:</i>  | User wants to increase the sound level of the recording   |
| <i>Alternate Task Flow 3:</i> | <ol style="list-style-type: none"> <li>1. Primary Task Flow (PTF), Steps 1-2</li> <li>2. User engages 'Amplification Lever'</li> <li>3. PTF, Steps 3-5</li> </ol>   |



*Technical Specifications:**Amplification Lever*

- Increases the sound out put of the speaker when recording is played

*Audio controls*

- Buttons: 'Delete', 'Play', 'Record', 'Save', and 'Stop'
- Recording Timeline

*Cancel button*

- Returns user to 'AV' screen with audio recording maintained

*Delete button*

- Triggers 'Verification Window'

*Delete Audio button*

- Returns user to 'AV' screen with audio recording erased from temporary auto-save

*Play button*

- Plays audio recording through Detectometer speaker

*Record button*

- Turns microphone on to record sounds

*Recording Timeline*

- A progression bar that visualizes the length of the recording
- User can select a point in time by moving the right edge of the progression bar

*Save button*

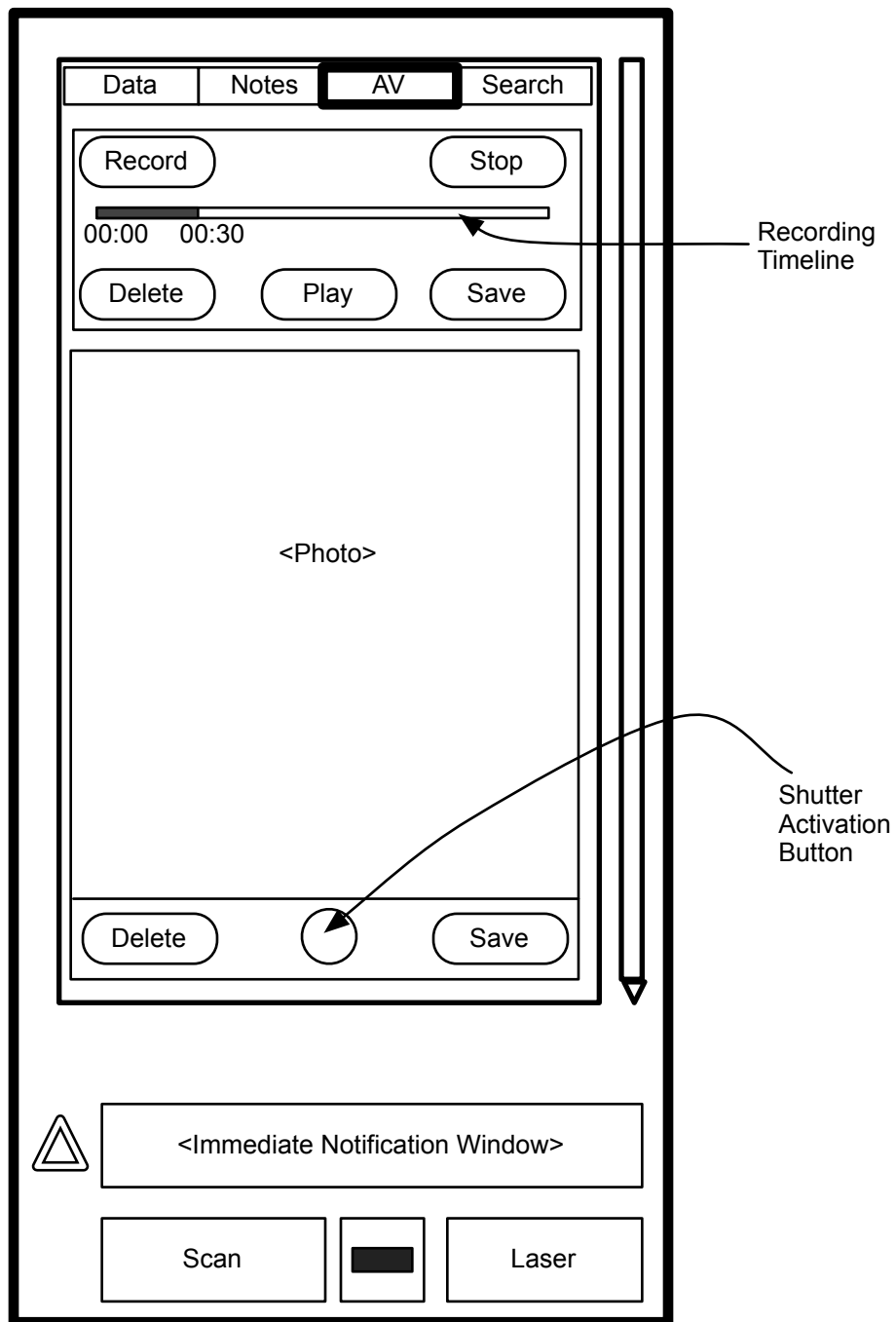
- See Use Case 6
- Saved as a '.Aud' file

*Stop button*

- Turns microphone off

*Verification Window*

- Message: "Please verify that you would like to delete this audio recording"
- Buttons: 'Cancel' and 'Delete Audio'

**Figure 7: Audio/Visual Screen**

## Use Case 5: User Creates a Photo

|                               |   |
|-------------------------------|---|
| <i>Description:</i>           | A user would like to create photo   |
| <i>Actors:</i>                | A scientific researcher   |
| <i>Precondition:</i>          | The user has something he would like to photograph  |
| <i>Post-Condition:</i>        | User clicks 'Save'  |
| <i>Primary Scenario:</i>      | A user takes a photo in order to save it to a file  |
| <i>Primary Task Flow:</i>     | <ol style="list-style-type: none"> <li>1. User clicks 'AV'</li> <li>2. User clicks 'Shutter Activation' button</li> <li>3. User views photo on screen</li> <li>4. User clicks 'Save'</li> </ol>   |
| <i>Alternate Scenario 1:</i>  | User wants to delete photo  |
| <i>Alternate Task Flow 1:</i> | <ol style="list-style-type: none"> <li>1. Primary Task Flow (PTF), Steps 1-3</li> <li>2. User clicks 'Delete'</li> <li>3. User views 'Verification Window' message</li> <li>4. User responds to 'Verification Window' <ol style="list-style-type: none"> <li>a. Clicks 'Cancel'</li> <li>b. Clicks 'Delete Photo'</li> </ol> </li> </ol>  |
| <i>Alternate Scenario 2:</i>  | User wants to create a video  |
| <i>Alternate Task Flow 2:</i> | <ol style="list-style-type: none"> <li>1. User clicks 'AV'</li> <li>2. User presses and holds 'Amplification Lever'</li> <li>3. User clicks 'Shutter Activation' button or 'Record' button</li> <li>4. User releases 'Amplification Lever'</li> <li>3. User views video on screen as it is being captured</li> <li>4. User clicks 'Shutter Activation' button or 'Stop' button to end recording</li> <li>5. User clicks 'Save' on 'Audio' segment or 'Photo' segment of screen</li> </ol> |

*Technical Specifications:**Amplification Lever*

- Converts camera to video recorder
- Incorporates Audio controls with Photo controls

*Audio controls*

- See Use Case 4

*Cancel button*

- Closes 'Verification Window'
- Returns user to 'AV' screen with photo still displayed

*Delete button*

- Triggers 'Verification Window'

*Delete Photo button*

- Erases photo from 'AV' screen and memory
- Closes Verification Window
- Returns user to 'AV' screen

*Photo controls*

- 'Delete', 'Save', and 'Shutter Activation' buttons

*Save button*

- See Use Case 6
- Photos are saved as a '.Photo'
- Videos are saved as a '.Vid' file

*Shutter Activation button*

- Engages the camera lens to take a photo
- Photo is displayed in AV <Photo> window

*Verification Window*

- Message: "Please verify that you would like to delete this photo"
- Buttons: 'Cancel' and 'Delete Photo'

## Use Case 6: User Saves Information to a File

|                           |   |
|---------------------------|---|
| <i>Description:</i>       | A user has information for which he would like to create a permanent file   |
| <i>Actors:</i>            | A scientific researcher   |
| <i>Precondition:</i>      | The user has clicked 'Save'   |
| <i>Post-Condition:</i>    | User clicks 'Close'   |
| <i>Primary Scenario:</i>  | A user selects a location for storing his information and creates a file in which to store it   |
| <i>Primary Task Flow:</i> | <ol style="list-style-type: none"> <li>1. User selects &lt;Location&gt; from options listed on barrel menu</li> <li>2. User selects &lt;Drive&gt; from options on barrel menu</li> <li>3. User selects &lt;Folder&gt;</li> <li>4. User types &lt;File Name&gt; using QWERTY interface</li> <li>5. User clicks 'Save File'</li> <li>6. User views 'Verification Window' message</li> <li>7. User clicks 'Close'</li> </ol> |

### *Technical Specifications:*

#### *Cancel button*

- Closes 'Save Window'
- Returns user last active screen

#### *Close button*

- Closes 'Verification Window'
- Returns user to last active screen

#### *Drive*

- Auto-suggests options as user types

#### *File Name*

- Text field with 40 character maximum

#### *Folder*

- Auto-suggests options as user types

#### *Location*

- Auto-suggests options as user types

#### *Save File button*

- Appends 'Type' to end of file: '.Data', '.4D', '.Notes', '.Aud', '.Vid', '.Photo'
- Saves file to selected destination
- Triggers 'Verification Window'

*Verification Window*

- Messages
  - “File has been saved”
  - “There has been an error. Please try saving again.”
- Buttons: ‘Close’

**Figure 8: Save File Window**

Data Notes AV Search

**Save**

Location:

Drive:

Folder:

File Name:

Cancel Save File

QWERTY interface

<Immediate Notification Window>

Scan [Black Square] Laser

## Use Case 7: User Searches for a Saved File

|                           |   |
|---------------------------|---|
| <i>Description:</i>       | A user accesses a previously created file for viewing   |
| <i>Actors:</i>            | A researcher  |
| <i>Precondition:</i>      | The user wants to access a permanent file   |
| <i>Post-Condition:</i>    | User views the selected file  |
| <i>Primary Scenario:</i>  | The user pulls up a previously saved file   |
| <i>Primary Task Flow:</i> | <ol style="list-style-type: none"><li>1. User clicks 'Search'. See Figure 9.</li><li>2. User enters information into fields to narrow search<ol style="list-style-type: none"><li>a. Enters a &lt;Location&gt;</li><li>b. Enters a &lt;Drive&gt;</li><li>c. Enters a &lt;Folder&gt;</li><li>d. Enters a &lt;File Name&gt;</li><li>e. Clicks file 'Type'</li></ol></li><li>3. User clicks 'Search'</li><li>4. User views &lt;Listings&gt; in 'Results'. See Figure 10.</li><li>5. User scrolls through listings</li><li>6. User clicks on a listing</li><li>7. User clicks 'Get File'</li><li>8. User views file on appropriate screen<ol style="list-style-type: none"><li>a. A data file will open on the 'Data' screen</li><li>b. A note/text file will open on the 'Notes' screen</li><li>c. An audio file will open on the AV screen</li><li>d. A photo or video will open on the AV screen</li></ol></li></ol> |

*Technical Specifications:**Cancel button*

- Takes user off 'Search' screen
- Returns user last active screen

*Drive*

- Auto-suggests options as user types

*File Name*

- Text field with 40 character maximum

*Folder*

- Auto-suggests options as user types

*Get File button*

- Closes 'Results' window
- Opens selected file listing in appropriate screen

*Listings*

- A barrel menu of returned search results

*Location*

- Auto-suggests options as user types

*Possible Results*

- Asynchronously gives the number of files to which search parameters apply as they are entered by the user

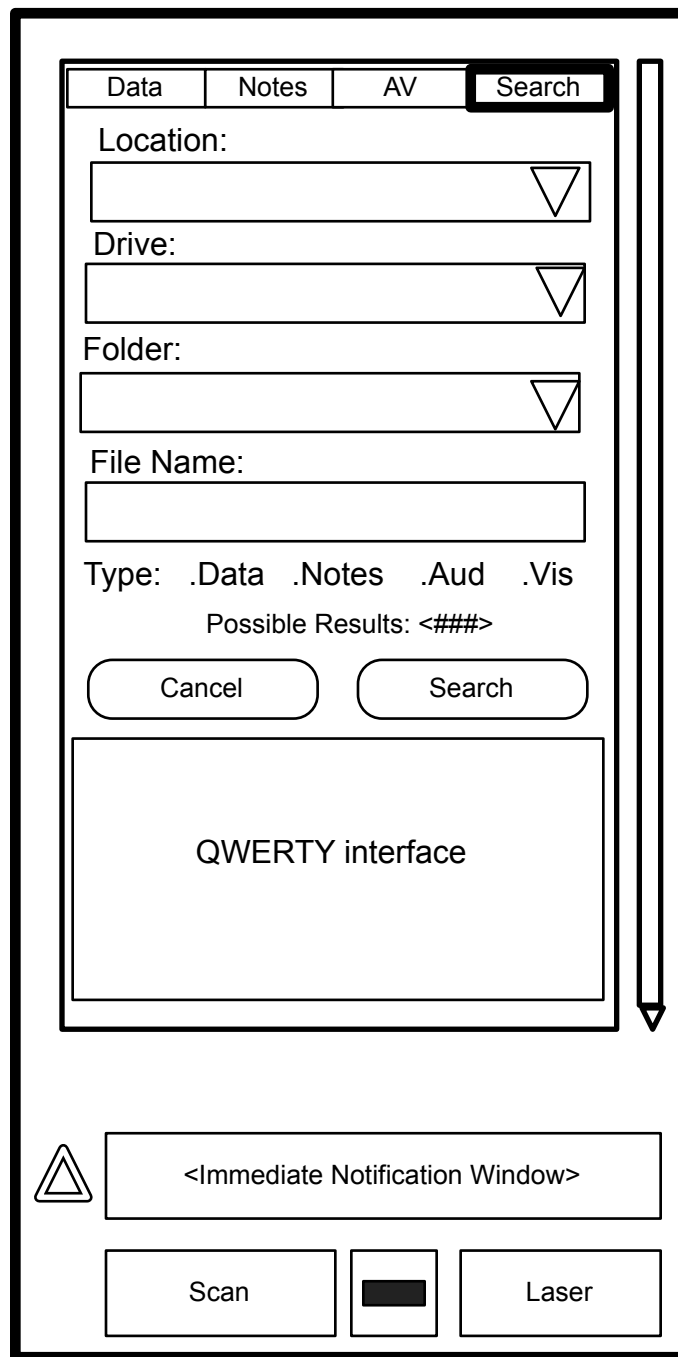
*Search button*

- Removes QWERTY interface from screen
- Displays 'Results' window

*Type*

- Narrows search according to file format
- File formats: '.Data', '.4D', '.Note', '.Aud', '.Vid', '.Photo'



**Figure 9: Search Screen**

The diagram illustrates the Search Screen interface. At the top, a horizontal menu bar contains four tabs: "Data", "Notes", "AV", and "Search", with the "Search" tab highlighted. Below the menu, the interface is organized into several sections. The first section contains four dropdown menus labeled "Location:", "Drive:", "Folder:", and "File Name:", each with a downward-pointing triangle icon. Below these is a "Type:" label followed by four radio button options: ".Data", ".Notes", ".Aud", and ".Vis". A text label "Possible Results: <###>" is positioned below the radio buttons. Two rounded rectangular buttons, "Cancel" and "Search", are located below the "Possible Results" text. A large rectangular area labeled "QWERTY interface" occupies the lower half of the screen. To the right of the main content area, a vertical scrollbar is visible. At the bottom of the screen, there is a notification area consisting of a triangle icon and a box labeled "<Immediate Notification Window>". Below this are three buttons: "Scan", a button with a solid black square icon, and "Laser".

| Data | Notes | AV | Search |
|------|-------|----|--------|
|------|-------|----|--------|

Location:

Drive:

Folder:

File Name:

Type: .Data .Notes .Aud .Vis

Possible Results: <###>

Cancel Search

QWERTY interface

<Immediate Notification Window>

Scan ☐ Laser

**Figure 10: Search Results**

Data Notes AV Search

Location:

Drive:

Folder:

File Name:

Results:

- Listing 1
- Listing 2
- Listing 3
- Listing 4
- Listing 5

Get File

<Immediate Notification Window>

Scan [Black Square Icon] Laser

## Use Case 8: User Encounters a Hazard

|                           |  |
|---------------------------|--|
| <i>Description:</i>       | A user becomes aware of a danger in the environment through notification from the Detectometer   |
| <i>Actors:</i>            | A researcher   |
| <i>Precondition:</i>      | The user comes into proximity with an environmental hazard   |
| <i>Post-Condition:</i>    | User presses 'Notification' button   |
| <i>Primary Scenario:</i>  | The Detectometer senses an environmental danger and notifies the researcher  |
| <i>Primary Task Flow:</i> | <ol style="list-style-type: none"> <li>1. Detectometer senses an environmental hazard               <ol style="list-style-type: none"> <li>a. A toxin</li> <li>b. A carcinogen</li> <li>c. Radioactive matter</li> <li>d. Predatory animal pheromones</li> <li>e. Explosives</li> </ol> </li> <li>2. User hears alarm being emitted from speaker</li> <li>3. User views message in the &lt;Immediate Notification Window&gt;</li> <li>4. User responds to environment</li> <li>5. User presses 'Notification' button               <ol style="list-style-type: none"> <li>a. Once to silence</li> <li>b. Twice to clear</li> </ol> </li> </ol> |

### *Technical Specifications:*

#### *Immediate Notification Window*

- Triggered by sensor reading
- Displays a warning message based on sensor readings
- Messages are transmitted from mainframe database via satellite

#### *Notification button*

- Pressing button once silences alarm being emitted by speaker
- Pressing twice clears warning message from <Immediate Notification Window>

## Use Case 9: User Cannot Engage the Touch Screen

*Description:* A user is in an environmental condition that prevents him from utilizing the touch screen capabilities of the device

*Actors:* A researcher

*Precondition:* The user is wearing biohazard and/or insulating gloves that prevent him from utilizing the touch interactive feature of the screen and needs an alternative method for interaction

*Post-Condition:* User replaces stylus

*Primary Scenario:* The user engages the Detectometer with the stylus

*Primary Task Flow:*

1. User presses the 'Stylus Release' button
2. User grasps stylus from the front of the Detectometer
3. User clicks the interactive screen with the stylus to navigate and make notation
4. User enters information on each of the desired screens
5. User returns stylus to its slot on the front of the device

*Alternate Scenario 1:* The user engages the Detectometer using voice command

*Alternate Task Flow 1:*

1. User activates Voice Command interface
2. User engages Voice Command software to enter information into each of the desired screens

### *Technical Specifications:*

#### *Stylus*

- Attached to front of Detectometer
- Must be released by pressing 'Stylus Release' button

#### *Stylus Release button*

- Located on the right side of the device

#### *Voice Command Software*

- Phase II of Detectometer development
- Outside scope of this project

## Use Case 10: User Engages Flashlight

*Description:* A user is in a low-light environment and needs a flashlight

*Actors:* A researcher

*Precondition:* The user is in an environment where he does not have sufficient lighting

*Post-Condition:* User turns off flashlight

*Primary Scenario:* The user turns the flashlight on and off

*Primary Task Flow:*

1. User presses the 'Flashlight Switch' on the right side of the device
2. User points top of Detectometer in the direction of desired visibility
3. User engages 'Amplification Lever' to increase diameter and intensity of beam of light
4. User presses 'Flashlight Switch' to turn flashlight off

*Technical Specifications:*

*Amplification Lever*

- Increases the diameter of the beam by pressing up
- Increases the intensity of the beam by pushing in

*Flashlight switch*

- On/off switch

## Use Case 11: User Engages Laser

|                                  |  |
|----------------------------------|--|
| <i>Description:</i>              | A user is in need of a tool for cutting  |
| <i>Actors:</i>                   | A researcher   |
| <i>Precondition:</i>             | The user needs to acquire a field sample or act in self-defense  |
| <i>Post-Condition:</i>           | User re-engages the 'Laser Beam Safety' switch   |
| <i>Primary Scenario:</i>         | The user turns the laser on and off  |
| <i>Primary Task Flow:</i>        | <ol style="list-style-type: none"> <li>1. User disengages the 'Laser Beam Safety' switch on the right side of the device</li> <li>2. User points top of Detectometer to aim the laser beam</li> <li>3. User presses the 'Laser' button on the front of the device</li> <li>4. User directs the laser beam by moving and rotating the Detectometer <ol style="list-style-type: none"> <li>a. To cut a sample to take back to the lab</li> <li>b. To protect himself from attack</li> </ol> </li> <li>5. User releases the 'Laser' button</li> <li>6. User flips the 'Laser Beam Safety' switch back to its original position</li> </ol> |
| <i>Alternate Scenario 1:</i>     | The user disengages the 'Laser Beam Safety' switch without activating the laser  |
| <i>Alternate Task Flow 1:</i>    | <ol style="list-style-type: none"> <li>1. User disengages the 'Laser Beam Safety' switch</li> <li>2. User does not push 'Laser' button within the next 60 seconds</li> <li>3. User views 'Warning message' in &lt;Immediate Notification Window&gt;</li> </ol>   |
| <i>Technical Specifications:</i> | <p><i>Immediate Notification Window</i></p> <ul style="list-style-type: none"> <li>- Message: "Warning! Laser Beam Safety"</li> </ul> <p><i>Laser Beam Safety switch</i></p> <ul style="list-style-type: none"> <li>- Prevents the laser from firing accidentally</li> <li>- Warning is triggered in &lt;Immediate Notification Window&gt; if switch is disengaged and laser is inactive more than 60 seconds</li> </ul> <p><i>Laser button</i></p> <ul style="list-style-type: none"> <li>- This button triggers laser for the extent of time that it is pressed</li> </ul>   |