X3 FINDER

Basic Operation Course

Written By: Michael J. Buckley
Director of Training

First Edition
2018
SpecOps Group Inc.

The X3 Finder Basic Operation Course is designed as a instructional for new users whom wish to become certified in the use of the X3 Finder Life Sign Detector. This course is to be used by certified instructors as a valuable training aid that details the proper configuration, use and reading of the results generated by X3 Finder.

The discussions and explanations reflect the commonly used practices and principles of teaching. Occasionally, the word “must” or similar language is used where the desired action is deemed critical. The use of such language is to remove any false interpretations and provide a clear instructions.

The X3 Finder remote sensing unit should be operated by two persons. Using the buddy system to maintain a high level of first responder safety is paramount and recommended by SpecOps Group Inc.

X3 FINDER

Basic Operation Course

Lesson 1
Introduction to the X3 Finder Sensor System

Lesson 2
Microwave Radar

Lesson 3
Scanning Basics

Lesson 4
Environmental Effects and Considerations

Lesson 5
Software and Control Unit Explained

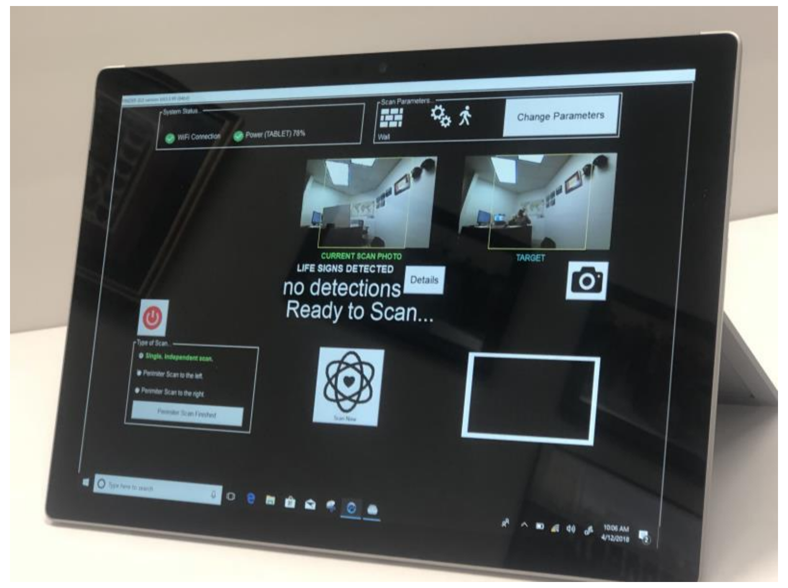
Lesson 6
The Operator & The Spotter

Lesson 1

INDEX

Introduction to the X3 Finder Sensor System

- ✓ X3 Finder Overview
- ✓ Charging System
- ✓ Arming Switch
- ✓ Tethering Port
- ✓ Control Unit



Lesson 1

INDEX

X3 Finder Overview

The X3 Finder:

- Low emitting microwave radar system.
- Weights 15lbs (6.80kg) with control unit and is buoyant up to 65lbs (29kg).
- System can be operated by one person if necessary however two person operation is recommended and will be taught in this course using the buddy system.
- Standoff life detection sensor that looks for the heart rates and respirations associated with human life.
- Like all equipment used in search operations it has limitations and these limitations must be adhered to at all times.

Charging System

- ✓ The system uses a 12v battery allowing up to 12 hours of operation before recharging the unit. The recharging time is approximately 90 minutes.
- ✓ Recharging the unit is done by plugging the battery charge packs 90 degree plug into the receptacle.
- ✓ The charging connector fits the port one way and has a threaded collar that secures the connector to the port.
- ✓ The charge pack can be left plugged into the charge port to ensure a full battery and further maintain a high level of readiness for the systems use.

Battery Charge pack with 90° connector.

90° Connector with threaded lock down collar.

Charging Port threaded cap.

Note: when leaving the X3 charging system attached for long periods of time, it is highly recommended that a surge protector or UPS system is used.

Spare batteries are always recommended for additional operational time in the field.

Lesson 1

Arming Switch

1. Red latching cover located on top of the unit ensures the toggle switch under it is in its off state
2. Latching cover in its up position with the toggle switch in its armed position. The yellow LED indicator illuminates when system in it’s ready state.
3. System disarmed and LED indicator light off to verify the system is off.
4. System secured and ready for travel or to stow.

Red Latch Switch in Off Position

Illuminated yellow LED showing the system is on.

Arming switch exposed prior to switching to the on position.

X3 Finder in it’s off and stored state.

Lesson 1

Tethering Port

1. Uses a flip top self sealing ethernet port.
2. Used in situations where remote operation might not be possible because of interference.
3. Useful when scanning wells, caves and other areas that are in geographic locations that would block two way communications.
4. comes standard with a 50’ flat wire style category 5 ethernet cable.
5. Longer ethernet cables up to 300 feet can be use and is highly recommended.

Water tight spring cap ethernet port.

Water tight spring cap closed

Lesson 1

Tethering Cable Example

2010 Guatemalan sinkhole

2010 Guatemalan sinkholes depth measured between 200ft/60m to 300ft

Longer retractable ethernet cable up to 300ft/91m

100ft/30m retractable ethernet cable.

Lesson 1

Control Unit

- The X3 is controlled remotely by a Windows 10 device.
- Communicates directly with the X3 using WiFi technology.
- The remote sensor transmits its own wireless network.
- The WiFi connection allows the operator to stand at a safe distance from the scanning device and from the target area.
- The network it creates is a closed network.

✓ The control unit will only have access to it's mated remote sensor. This means that each tablet or laptop is matched with its corresponding unit and will not work on other X3 Finder systems with its current factory settings.

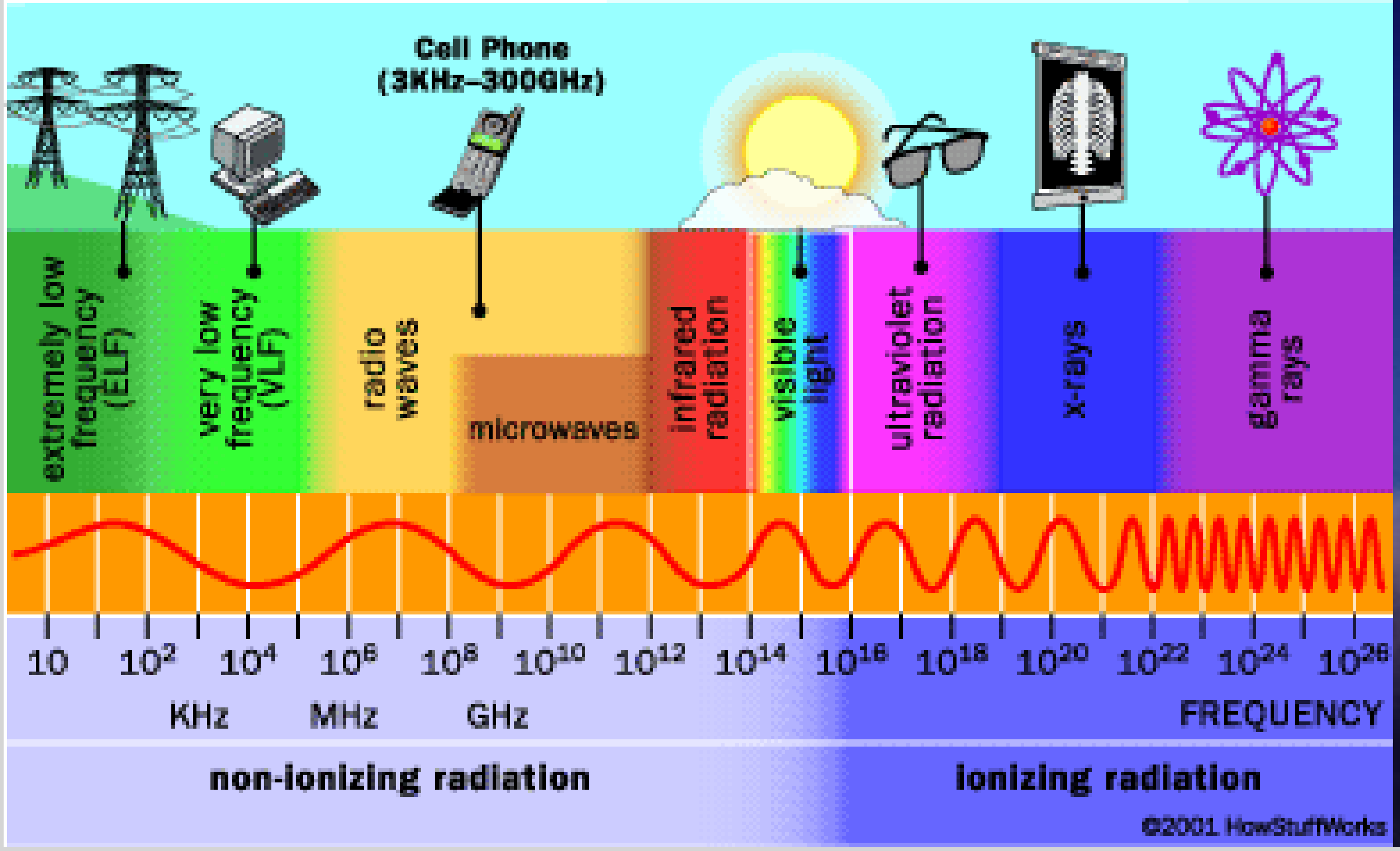
✓ Updates for the software will be detected automatically and downloaded to the control unit. Any attempts to change or alter the software or settings will result in that particular systems warrantee being voided.

WARNING

Any attempt to change or alter the software or setting will reset in that particular systems warrantee being voided.

Lesson 2

Introduction to Microwave Radar



Lesson 2

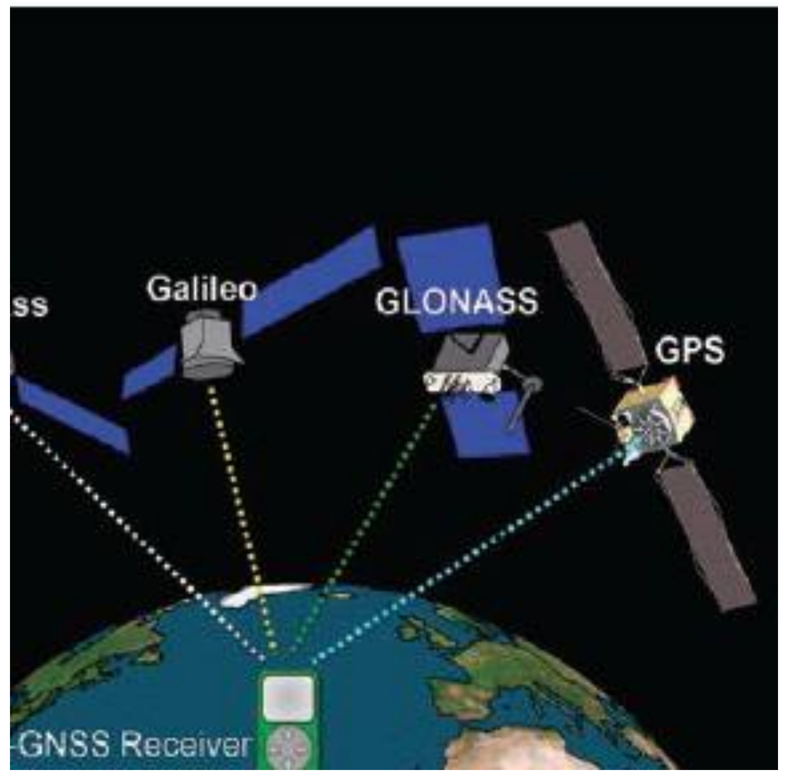
Introduction to Microwave Radar

Microwave Basics

Microwave has many uses. It is used in the medical field, industry, communications and for navigation to name a few. Most commonly the term microwave is associated with microwave ovens.

Cellular Networks

Speed detectors used in sports.



Navigation

Medical diagnosis

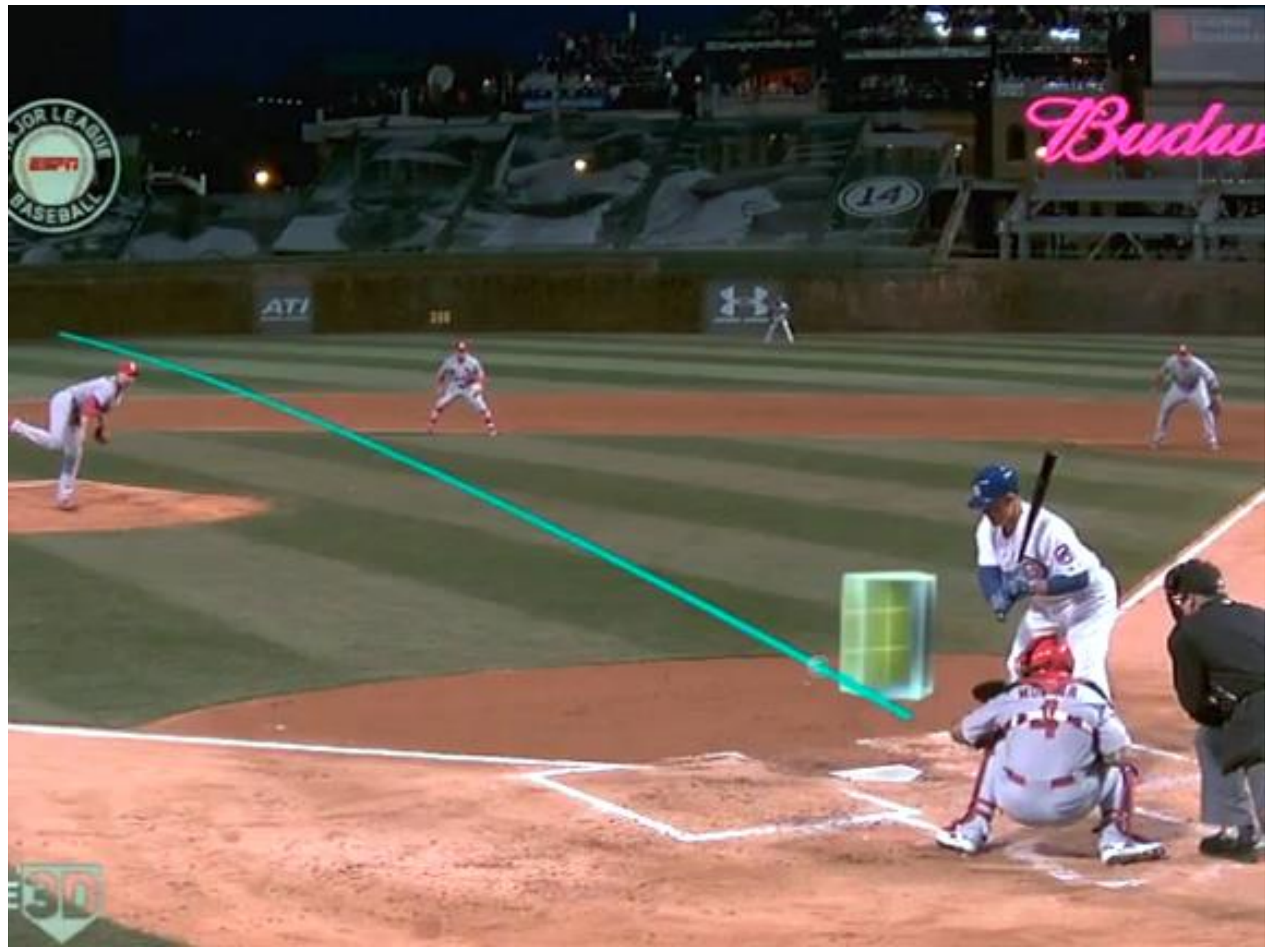
Lesson 2

Lesson 2

Radar Basics

- Radar, “Radio Detection and Ranging,” detects velocity, angle and range of objects.
- The X3 system uses a type of radar known as Continuous-Wave Radar or “*CW*.”
- This type of radar is commonly used by Law Enforcement, Major League Baseball, NASCAR Racing and tennis.

CW Hand held radar gun.



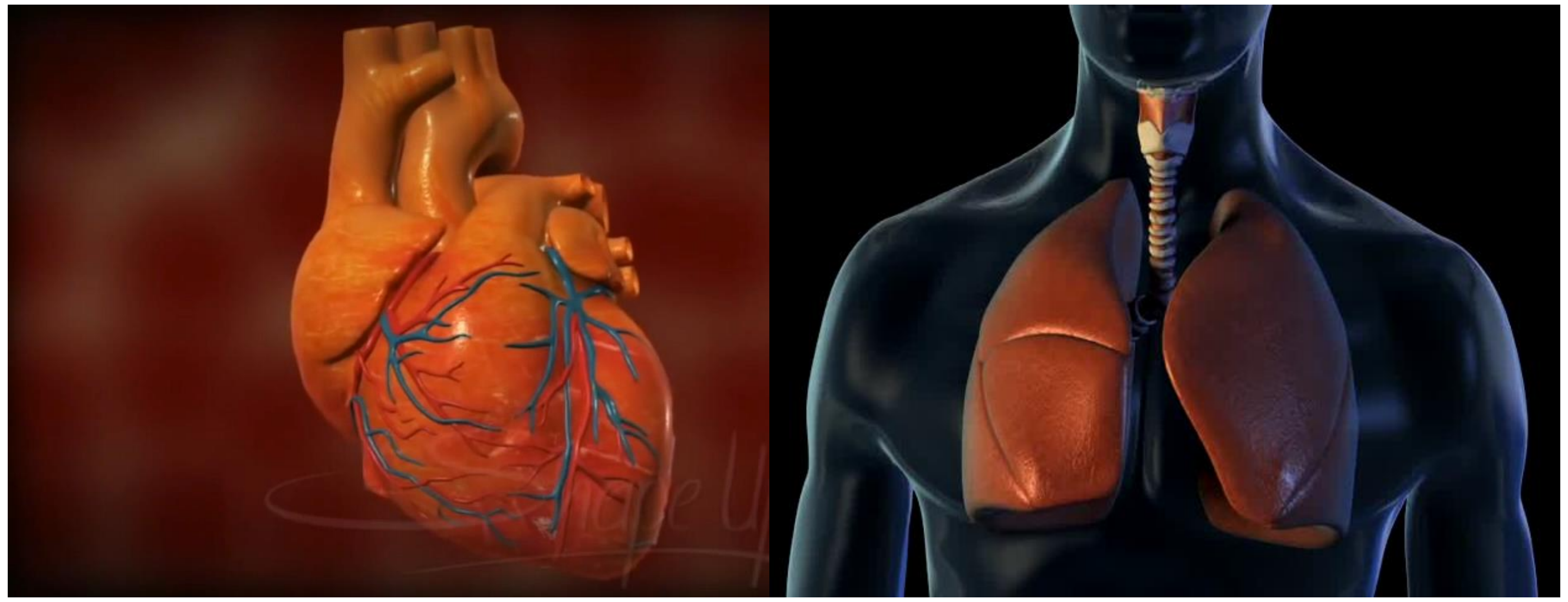
MLB Statcast tracks the baseballs speed and movement.

Radar tracks things that move

Lesson 2

Radar Basics

- Radar tracks things that move.
- The microwave radar contained in the X3 sensor is looking for movement that the human heart and lungs produce.
- The human heart moves in millimeters while lungs move the human chest wall in centimeters.



Hearts move in millimeters and lungs move the chest wall in centimeters.

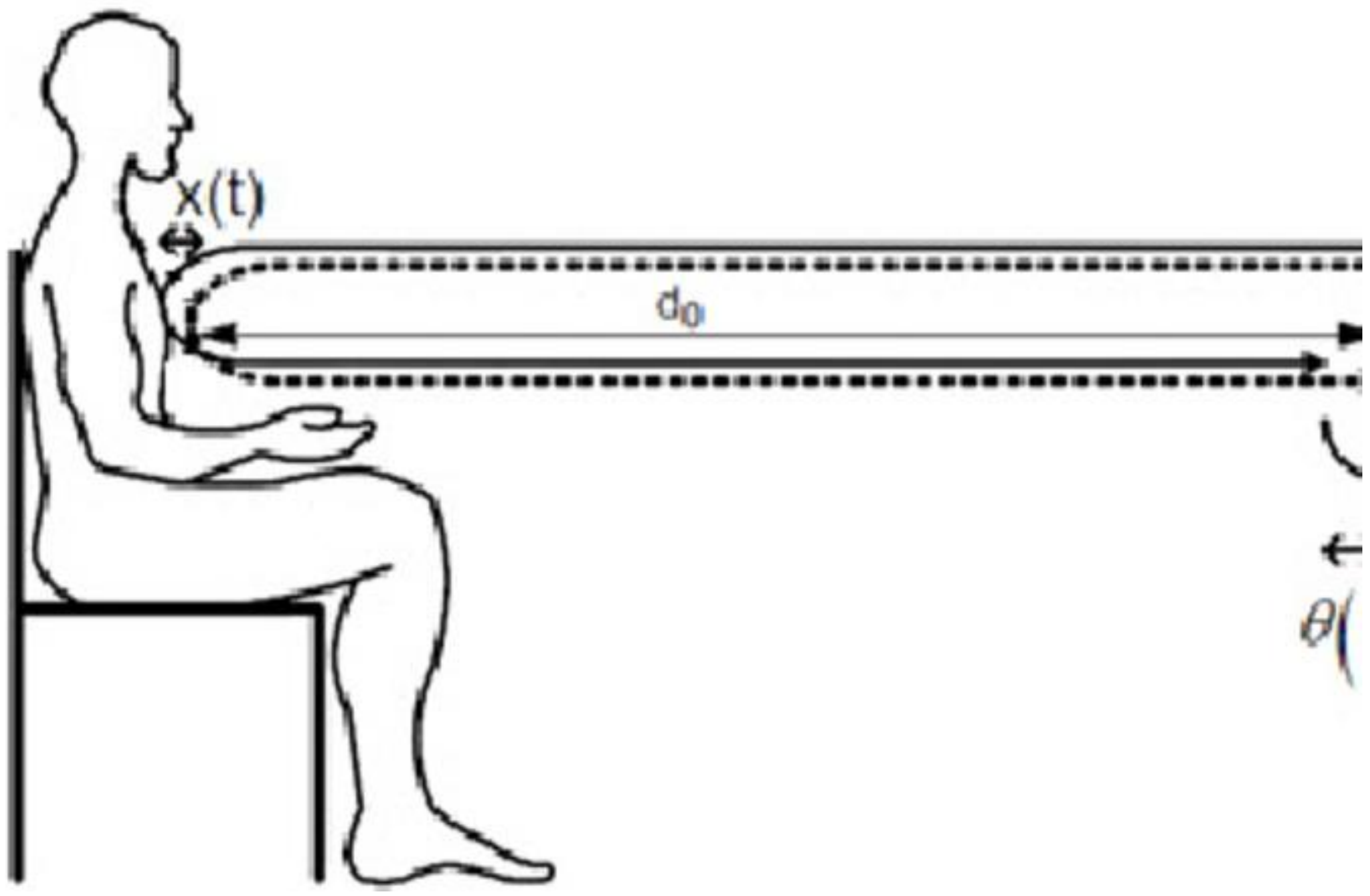


Figure 2-2 shows CW reflecting off of a human chest looking for those small changes in movement.

Lesson 2

Introduction to Microwave Radar

What does a continuous radar wave look like?

- It important to visualize what the wave looks like if we are going to setup the X3 scanning unit a scan.
- The shape of the signal is balloon shape shown in *figure 2-3*.
- Add a ripple effect to the balloon shape much like dropping a pebble in still water as shown in *figure 2-4*.

Figure 2-3 Common party ballon shape.

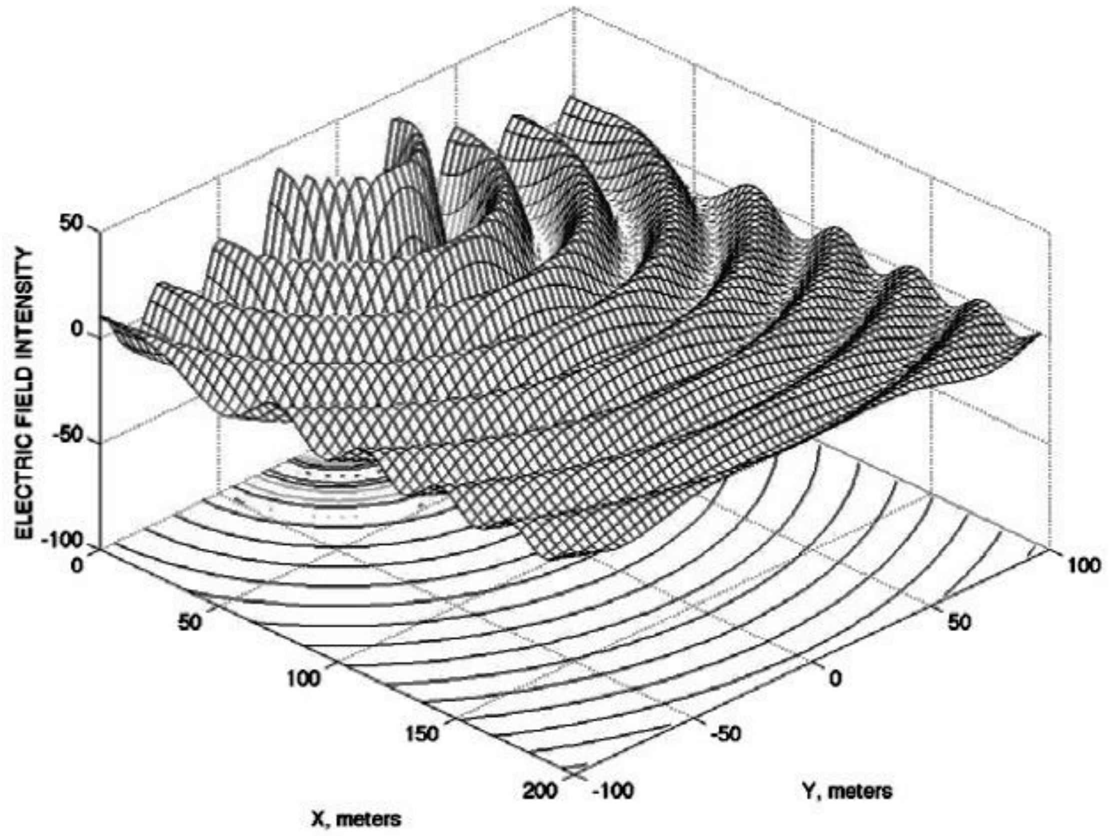


Figure 2-4 Shows a ripple effect common with radio frequency waves.

Lesson 3

Scanning Basics

Prior to starting the scanning process with the X3 remote sensor there are a few considerations that must to be made. This lesson will explain how to:

- Assess and understand the target area.
- Getting signal to the targeted area.
- Obtaining the cleanest signal possible.
- Selecting the correct settings.
- Understand the results.

Lesson 3

Scanning Basics

Placing the X3 on the ground and pointing in a direction without some forethought will most likely not yield the response or detections that you are looking for. To simplify things we have three rules of scanning and we they must be followed.

THE THREE RULES OF SCANNING

1. Get as much signal to the intended target area as possible.
2. Conduct three scans from three positions.
3. Obtain the cleanest signal possible.

NOTE: The transmitter used in this X3 Finder is capable of scanning further than the targeted area. We must also understand that the signal must get to the targeted area and have enough strength to return and be received by the X3.

Lesson 3

Assessing the Target Area

Before scanning you must first assess the target area. For example:

- Is the intended target area wooden, poured concrete, cinderblock , brick?
- Are we scanning threshold and voids or through a wall?
- Where are all bystanders and non essential personnel?

The X3 Finder is capable of scanning further then the intended area.

Assessing the Target Area

When using this system one has to take in to account that the signal will not only penetrate but it will also change direction and even bend around objects. This brings us to the first of three rules. Rule one is to *get as much signal to the intended target area as possible*.

- *Figure 3-1* shows a common cinder block wall.
- Cinder block is hollow in most cases. However rebar shown in figure 3-1 is used to reinforce cinder block walls.
- Rebar is made from metal and often spaced parallel. The signal will not penetrate metal but will go through the spaces between the rebar.

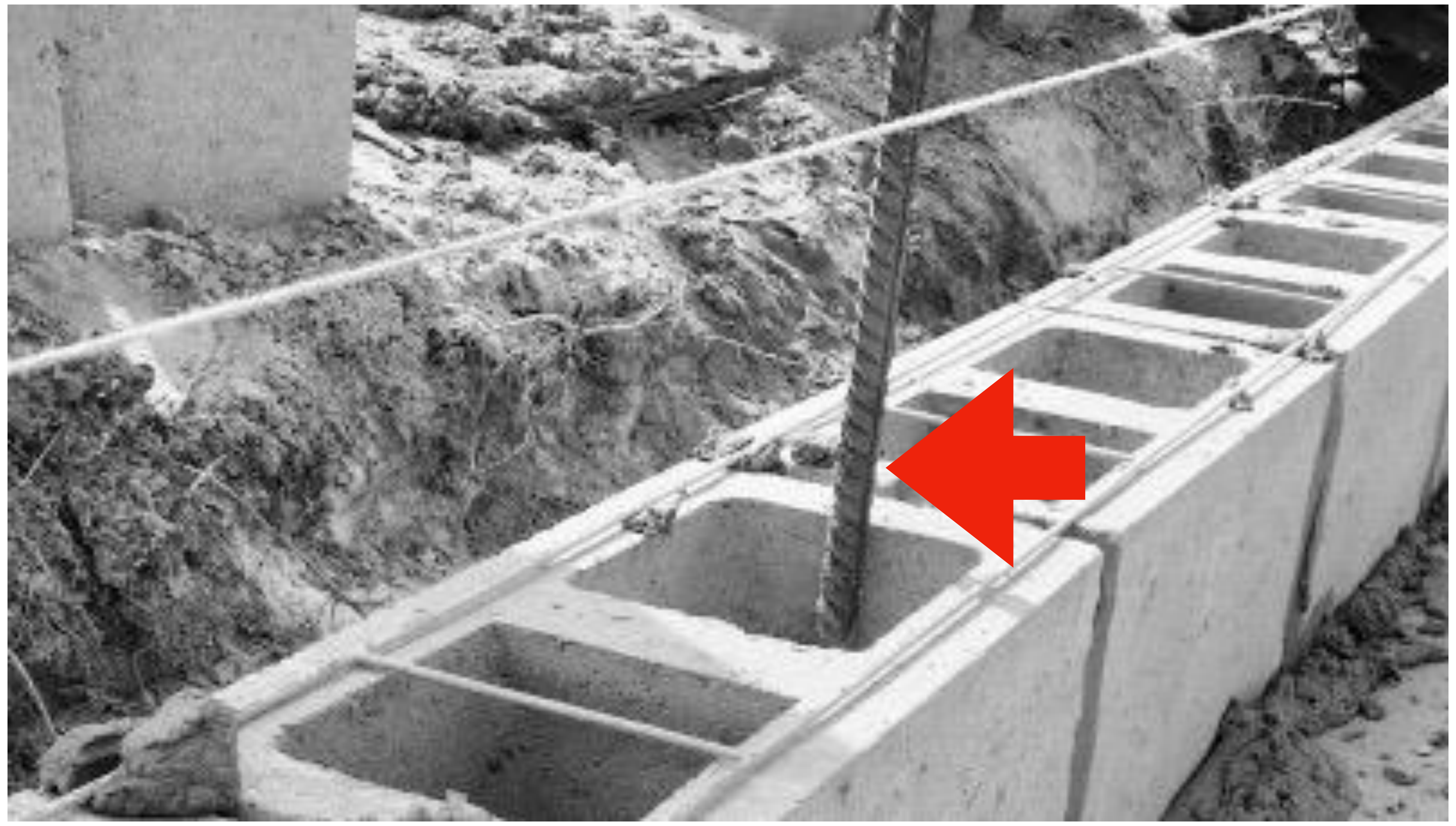


FIGURE 3-1 Rebar reinforced cinder block.

Lesson 3

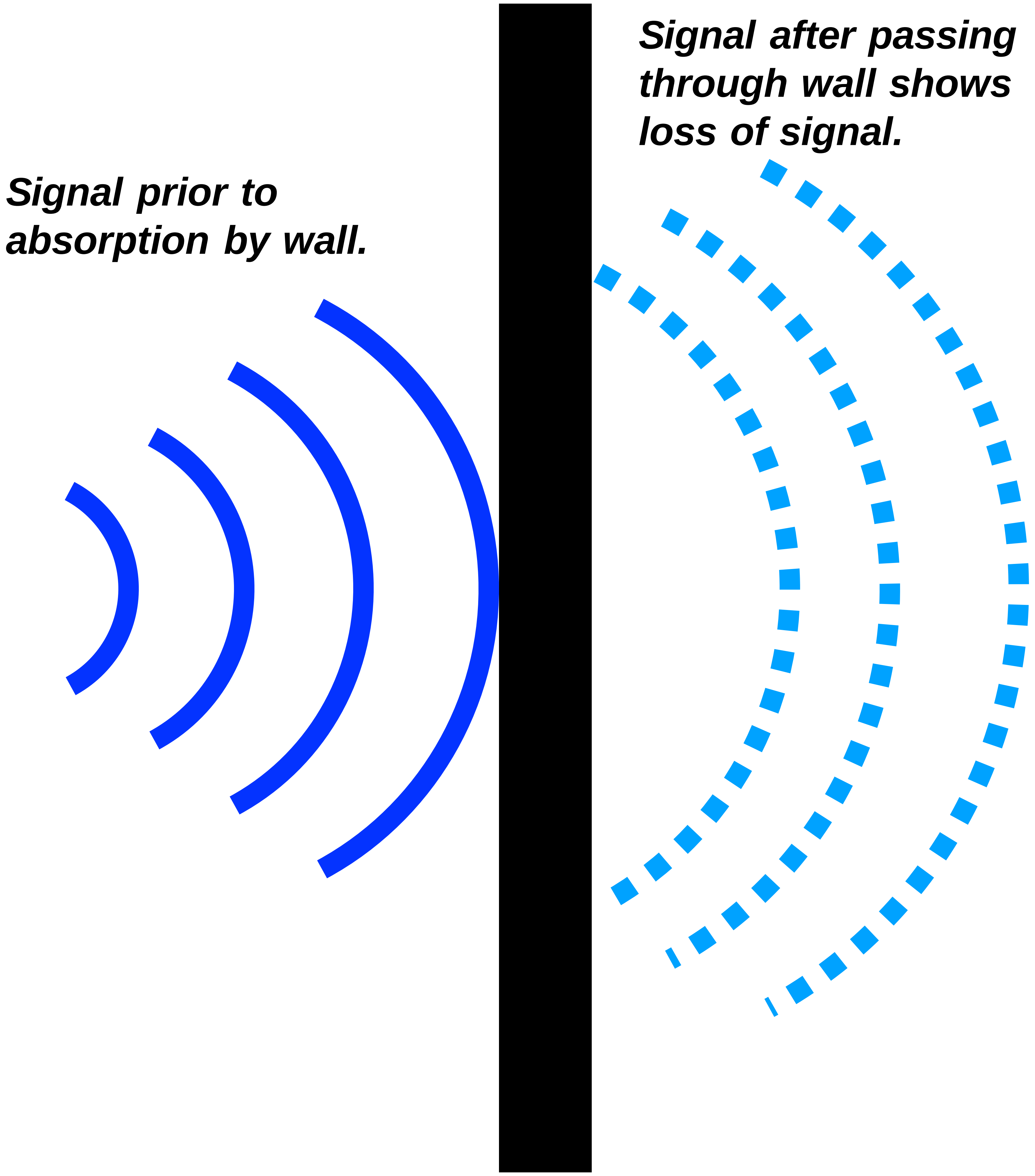
Assessing the Target Area

- Scanning through a wall *must* be the last option. Making use of voids and thresholds must be attempted first when thresholds and voids are present.
- To understand why, we will have to learn a little about wave propagation which refers to the different ways radio waves behave under certain conditions.
- When scanning through a wall a portion of the signal is absorbed although it still penetrates. The signal also must have enough energy to return through the wall to the remote sensor.
- Making use of thresholds and voids allows more of the signal to get where we need it to go.

Typical Wall

Threshold

Voids

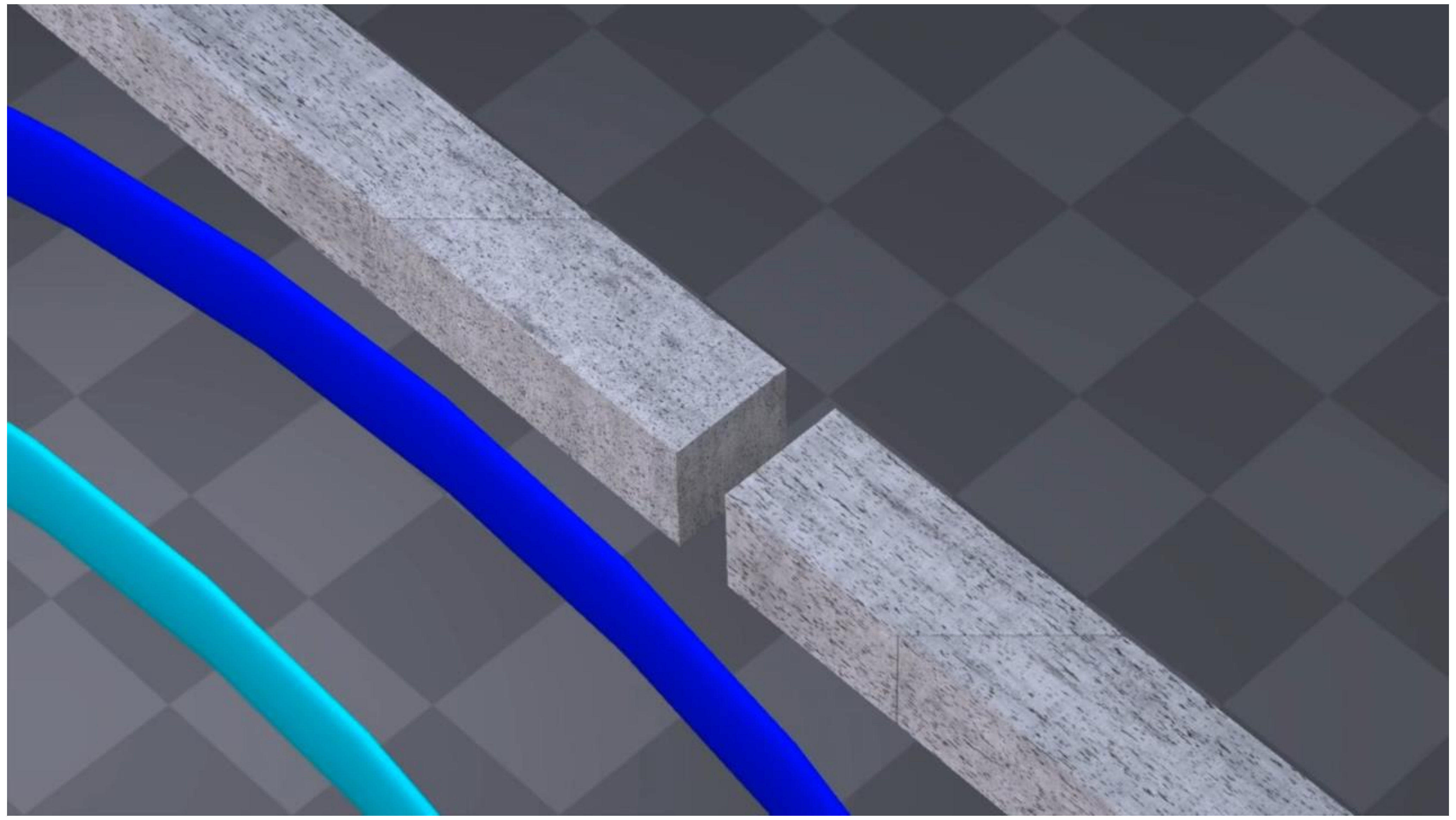


Lesson 3

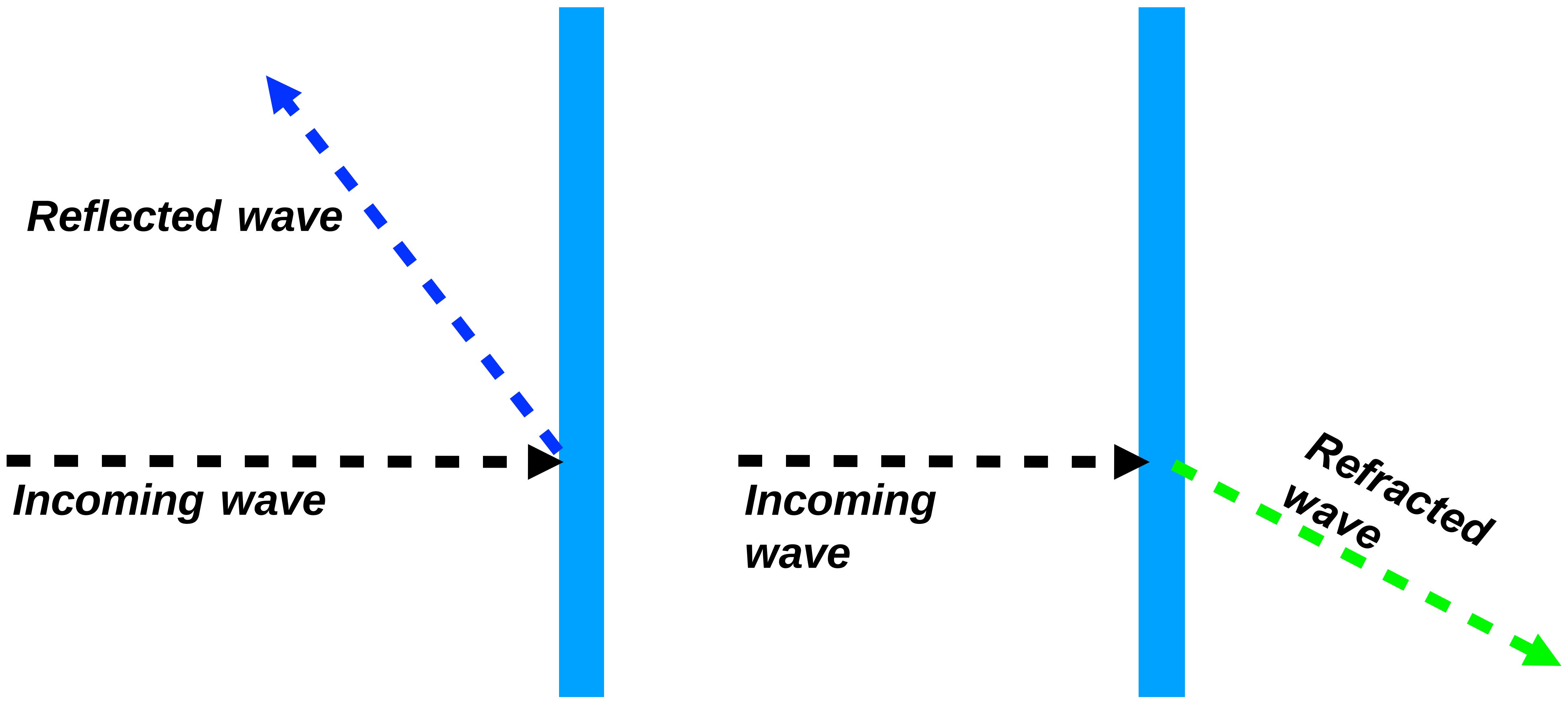
Assessing the Target Area

We will use a wall with an open door for an example. When a scan is initiated toward an open door an effect occurs known as diffraction. This is shown in *Figure 3-2*. Simply put the signal passes through thresholds such as and open door and bend around corners.

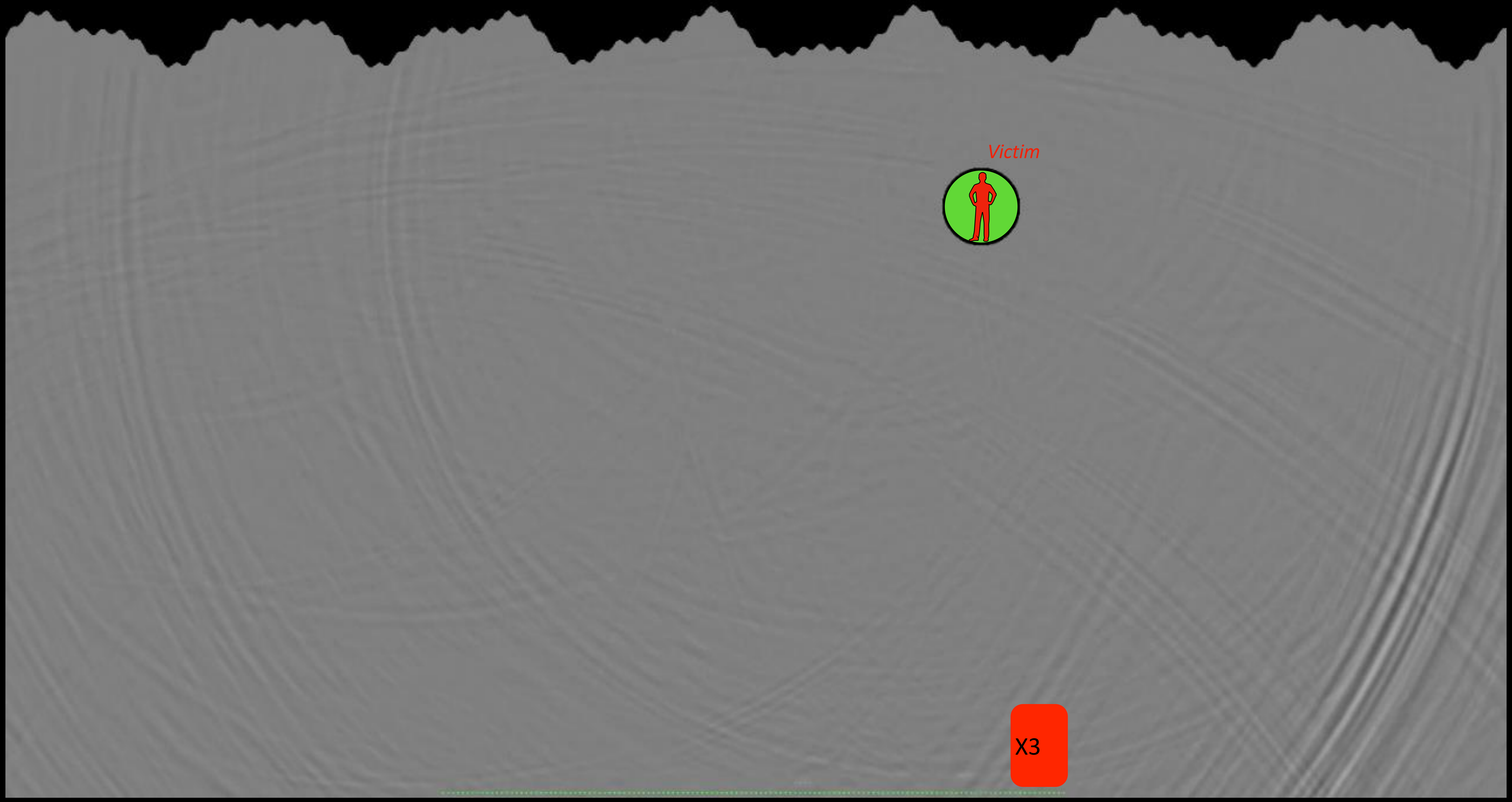
When the signal changes direction it is known as *reflection.* When a signal penetrates and then changes direction it is known as *refraction*. To sum it up the signal will pass through the doorway and bounce around the room. In this way we are getting the most signal possible to that area.



Example of Diffraction through a door opening



What does the scan wave look like?



Assessing the Target Area

Floors and Ceiling Scanning

- We discussed previously how the signal will not penetrate rebar but it can go around it. There are many patterns of rebar, depending on the structure. This may block or absorb the signal entirely. *Figure 3-3* shows crosshatch style floor rebar. Because the squares are so tight, this pattern will absorb or block the signal.
- Larger crosshatch patterns 12" or larger will allow signal through to some extent however the signal will be absorbed and reflected to a degree. In general cement floors have the highest concentration of rebar especially when they are load bearing. Cement floors must not be scanned for this reason. Wood floors however can be scanned.
- The only exception to this rule would be if there exists a void or gap in the floor at least 5"x5" (12cm x 12cm). The system must be aimed properly to allow the signal to move through the void or gap.

When scanning through a void, threshold or hole in a floor, enlarging the void is recommended when possible.

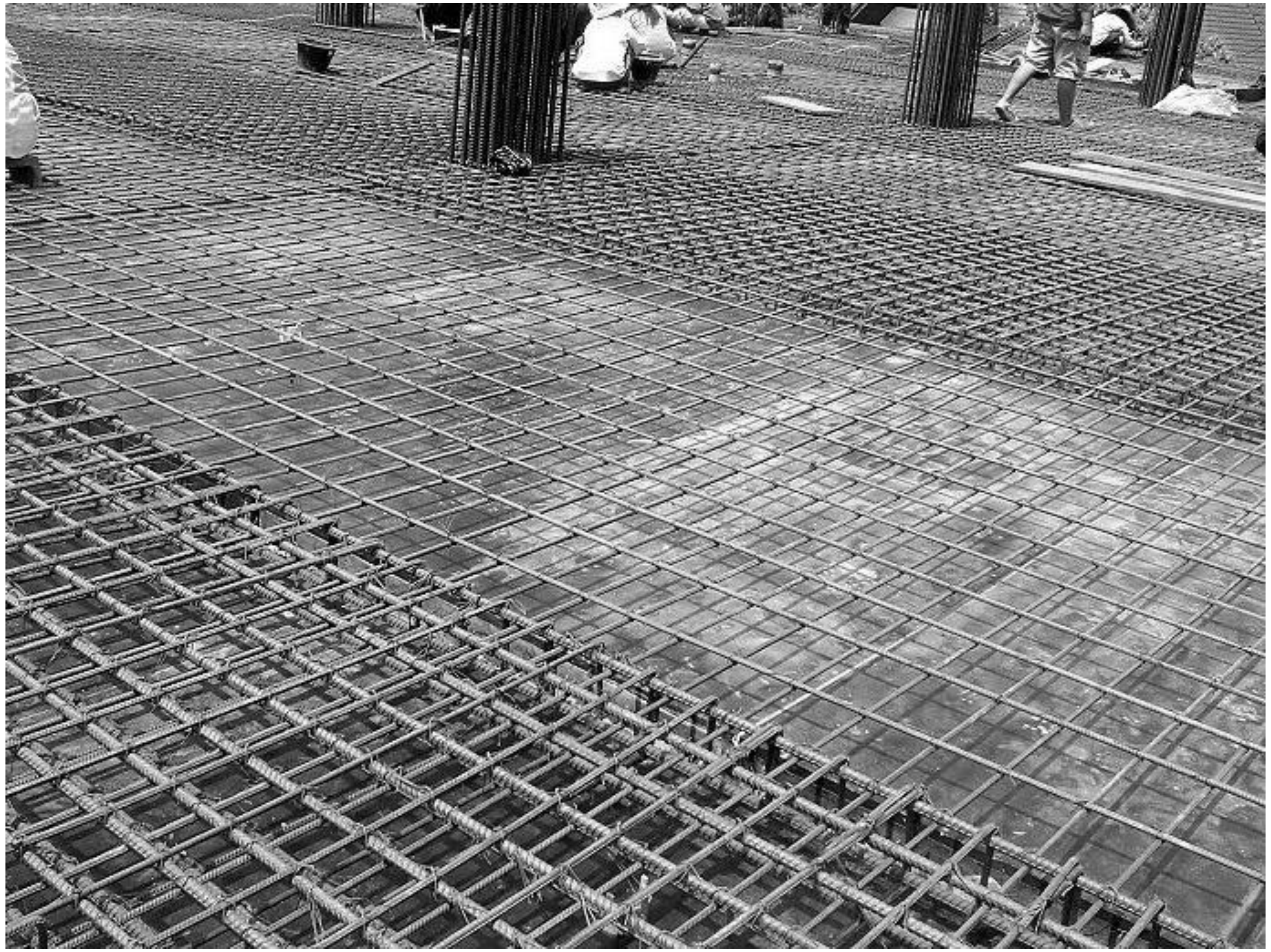


Figure 3-3 Cross hatch rebar pattern used in building floors.

Assessing the Target Area

Glass

- We know that the microwave signal will reflect, refract and diffract off of different materials in different ways. But there are other factors that we should be aware of when scanning.
- More often then not we will encounter glass windows when scanning. Glass windows can generate vibrations that are not visible to the human eye but do have the potential of interfering with a scan. Scanning through a glass window however probable is not advised and must only be attempted when all other scanning techniques have been exhausted.

Figure 3-3 Cross hatch rebar pattern used in building floors.

Assessing the Target Area

Metal Structures

- Microwave radar waves will not pass through metal. But there are conditions where we can scan the interior of structures that are made of metal.
- A good example of this are ships containers and tractor trailer contents shown in *figures 3-4* and *3-5*. Because a trailer is in most cases surrounded by metal it traps the radar signal inside. There is only one way in and one way out for the signal. At least one door must be open at least 5”x5” (12cm x 12cm) in order to scan the interior.
- Shipping or truck containers that are made from fiberglass or cloth can be scanned through the sides of the trailer. This is because microwave can pass through the fiberglass and cloth.

Figure 3-4 Trailer searched by U.S. Customs and Border Patrol.

Figure 3-5 Empty ship container.

Determining the Best Scan Location

Where you scan from is determined by the targets scenario. For our purposes a “scenario” is one of five settings that match best the type of area you are assessing to scan. Scenarios will be covered more in depth in the section titled “*Choosing the Scanning Scenario.*”

Prior to Scanning

- ✓ The sensor must be at least 15ft(4m) from a solid wall. This does not apply when scanning through a void or threshold.
- ✓ The operator, spotter and bystanders should not be within 15ft(4m) of the scanning unit prior to scanning.
- ✓ Scanning through a threshold or void must be conducted first.
- ✓ When scanning a threshold or void the sensor can be closer or in the actual threshold of void.

The operator, spotter and bystanders must stand behind the X3 sensor at least 15ft(4m) prior to scanning. It is the spotters job to This helps to eliminate a false positive reading that could occur from the sensor reading the operator, spotter or bystanders.

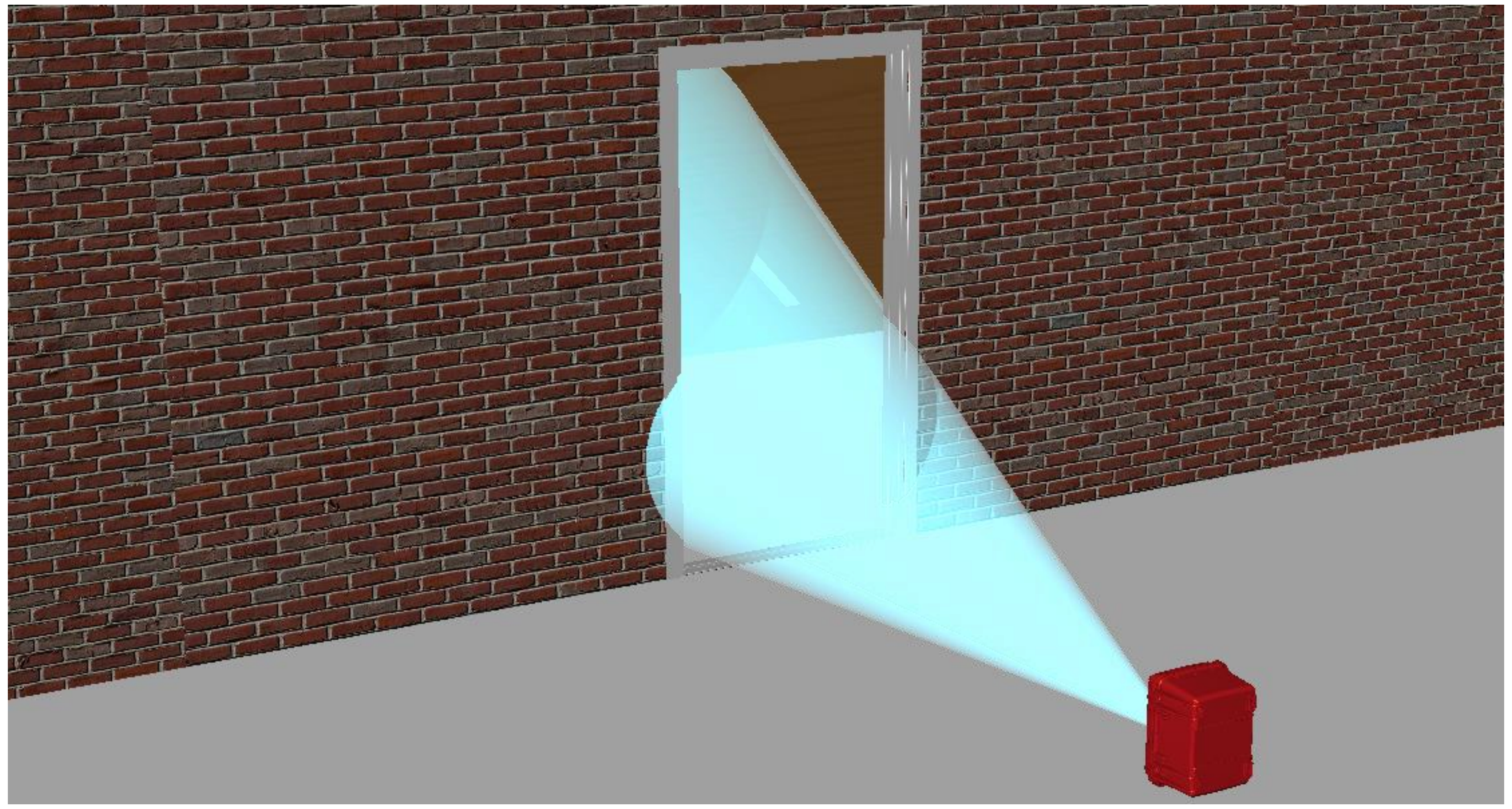


FIGURE 3-6 Doorways, open windows, holes and voids should be used as before attempting to scan through a wall.

Collective Scanning

Scanning through a threshold or void must be attempted first as shown in *figure 3-6* when possible. Another consideration when determining the best scan location is rule number two. *At least three scans must be conducted from three positions of the intended target area as shown in Figure 3-7* .

The three scan process is known as *collective scanning* and is applied in every scenario except the tunnel scenario. When conducting three scans it is important to understand where to place the unit and where to move it after the first scan.

From the point of your first scan you must move the unit in a straight line to the right or left approximately 2ft(50cm). *Figure 3-8* shows the order and direction of each of the three scans being conducted on a cinder block wall.

It is the spotters job to ensure that nobody is forward of the X3 scanning device.

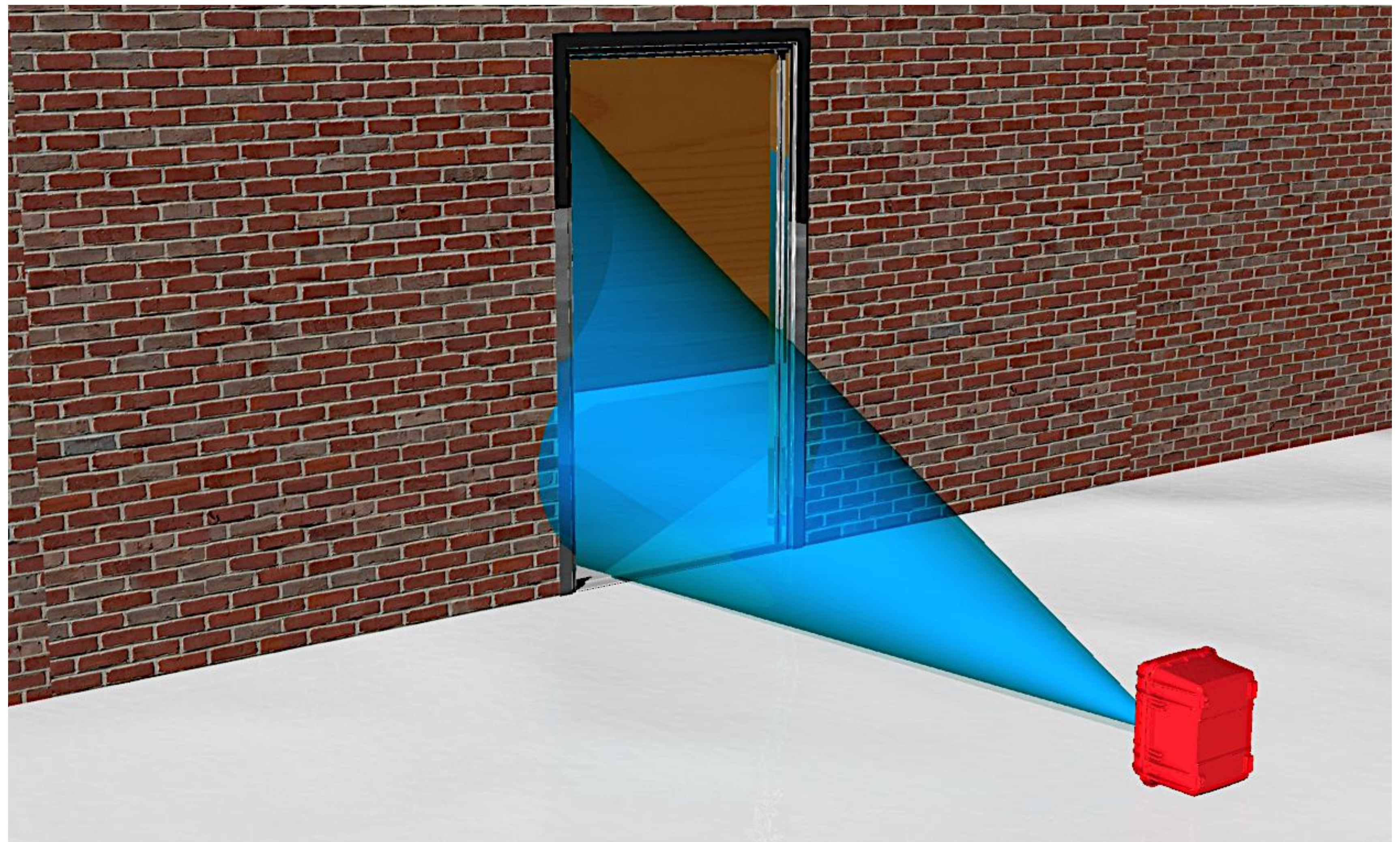


FIGURE 3-6 Thresholds and voids must be used as prior to attempting to scan through a wall.

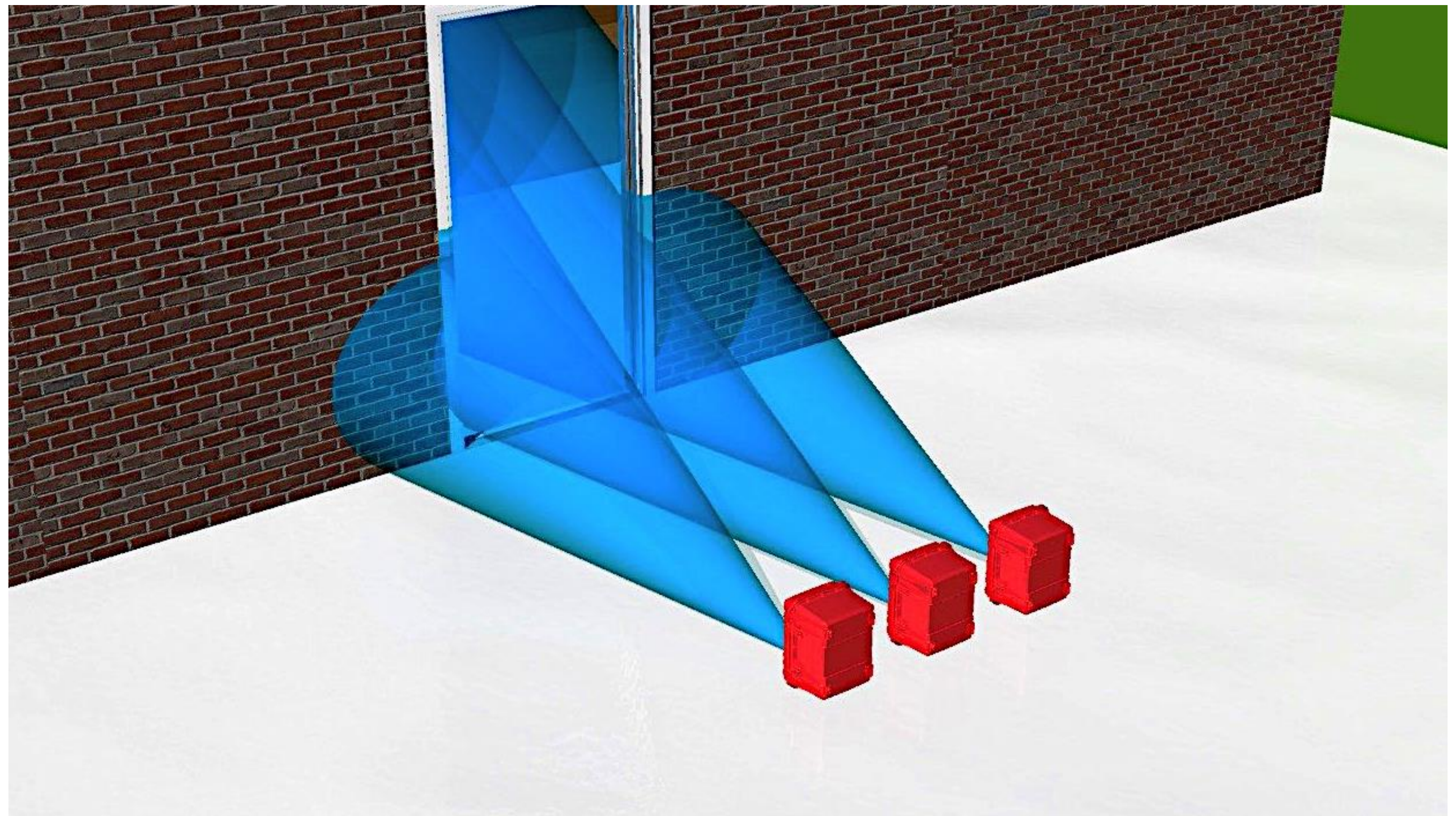


FIGURE 3-7 All scenarios except the tunnel scenario will automatically enter a three scan mode.

Getting Signal to the Targeted Area

- Getting the signal to the targeted area is the primary goal. In *figures 3-8* an *3-9* we see the signal passing through the spaces between the metal rebar found in cinder block walls.
- The X3 remote sensor signals are capable of penetrating through up to 18" of concrete. But we must also understand that a portion of the signal is absorbed as it passes through the obstruction which in this case is a cinder block wall.
- The signal also has to have enough strength to reach the target and return to the remote sensor unit. This is why we must always scan voids and thresholds before scanning solid walls.

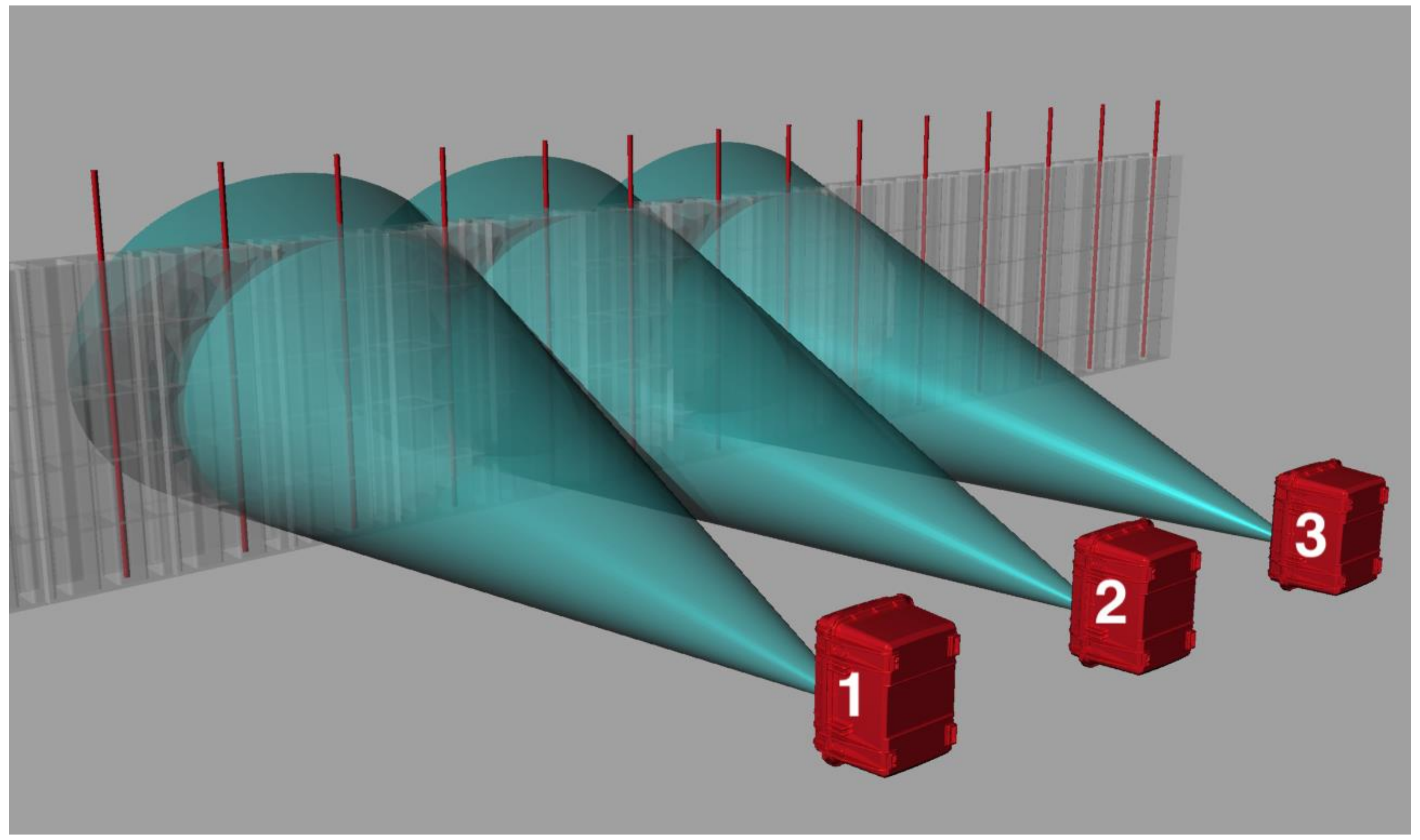


FIGURE 3-8 Shows the progression of scans and the direction while scanning a cinderblock wall with rebar.

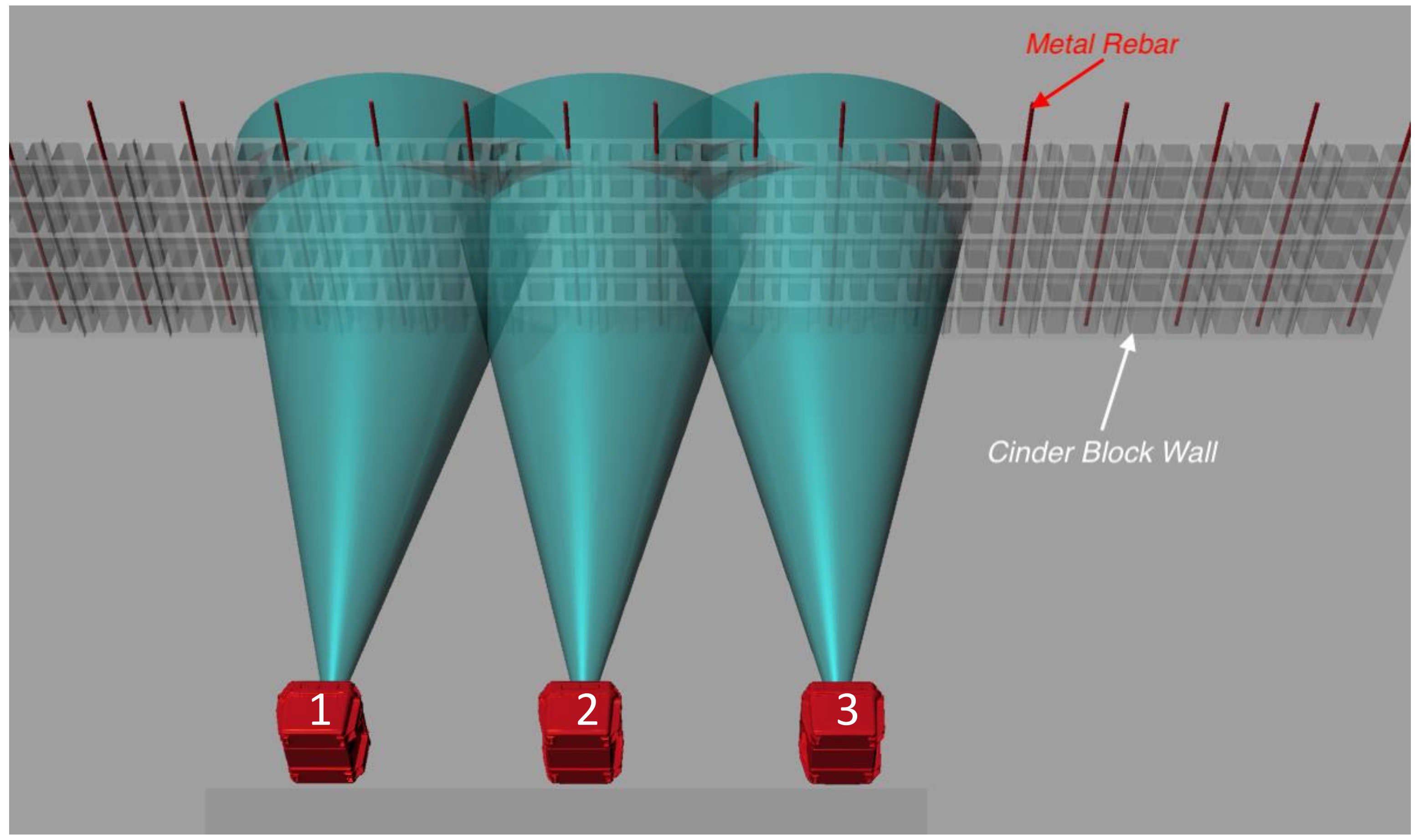


FIGURE 3-9 Scan signals will pass through the cinder block but not through the rebar shown.

Choosing a Scanning Scenario

When we have identified the type of material and configuration of that material we must than select a scenario. This selection will configure the system to work best with the scenario selected. There are five possible scenarios to choose from on the "Select Scenario" screen of the control unit.

Figure 3-10 shows what will be displayed on the control unit prior to selecting the scenario. If the wrong selection is made it can easily be changed at the scan initiation screen by using the "Change Preferences" selection which will be covered in Lesson 6.

1) *Rubble*
2) *Office*
3) *Open*
4) *Tunnel*
5) *Wall*

FIGURE 3-10 Scenario selection screen.

FIGURE 3-11 Structure collapse training simulator, Lorton Virginia Search and Rescue Training Area.

FIGURE 3-12 Open field Lorton Virginia Search and Rescue Training Area.

Figure 3-13 Tunnel training site with 45° bend to the right located at Italian First Responder Training Facility located in Montelibrettese, Italy.

FIGURE 3-16 Proper placement of the remote sensor.

Rubble Scenario

Rubble Scenario

Rubble is a generic term and represents only one aspect of collapse. If the layout consists of voids, chunks of debris or compacted debris, this would constitute rubble.

What we do know is that “rubble“ consists of many objects which to a radar are looked at as clutter and areas of reflection. Lots of clutter means the signal will do a lot of bending, bouncing and scattering. The rubble setting configures the system to better deal with all of this clutter as shown in *figure 3-11*.

FIGURE 3-11 Structure collapse training simulator, Lorton Virginia Search and Rescue Training Area.

Note: Glass vibrates and reflects signal.

Do not attempt to scan through glass.

Lesson 3

INDEX

Office Scenario

- The office selection would be used in a setting such as the paragraph title suggest.
- Offices tend to have many objects such as desks, chairs, computer and are considered to be objects that create clutter for the signal. The signal will bend around objects and change directions off of these objects.
- The office setting will configure the antennas to work better under with the conditions common to and office setting.
- The Rubble setting would work in large offices or settings with large amounts of clutter. This clutter has the same similarities as debris from a collapse.

Note: Glass vibrates and reflects signal.

Do not attempt to scan through glass.

Lesson 3

INDEX

Open Scenario

This setting is best used in open field and open spaces. One example would be a victim that is incapacitated laying in field depicted in figure 3-8. Where a motionless victim might not be seen by the human eye, the victims heart and lungs are moving.

Dense forest with fully leaved trees will absorb and reflect the signal. When attempting to scan in vegetation the distance of scanning will greatly be diminished.

FIGURE 3-8 Open field Lorton Virginia Search and Rescue Training Area.

Tunnel Scenario

- Tunnel scanning is a scenario that will produce in many cases the best results. When the tunnel selection is used, the system is configured to work more efficiently in this particular scenario. Only one scan will be needed and is the only exception to three scan rule.
- A tunnel will confine the waves in it's enclosure. As the signal travels forward in the tunnel it reflects off of walls allowing the signal to reach around corners. This same effect also applies to both conventional tunnels and non conventional tunnels. A non conventional tunnel would be a cargo container or cargo hole of an aircraft. The metal sides would focus and contain the waves in the enclosed area as shown back in *figures 3-4 and 3-5*
- *Figure 3-13* shows a tunnel training facility. This setting simulates a underground tunnel found in many urban settings. This tunnel is over 200ft(60)m in length and 50ft(15m) wide and bends 30 degrees at the mid point.

Figure 3-13 Tunnel training site with 45° bend to the right.

Lesson 3

Scuola Di Formazione, Montelibrettese, Italy. National Search and Rescue Training Center.

Lesson 3

Wall Scenario

- When no thresholds or voids are present scanning using the "Wall" setting can be used. The scanning sensor however, must not be any closer than 15ft(4m) from the wall to be scanned.
- Distancing the remote sensor from a wall is necessary to give the signal waves room to spread out. If the unit is placed against or too close to a wall as shown in *Figures 3-14* and *Figure 3-15,* the waves could bunch up resulting in an invalid scan.
- *Figure 3-16* shows the X3 remote sensor properly placed 15ft(4m) from the intended target area. The operator, spotter and bystanders must be no closer then 15ft(4m) behind the remote sensor. The reason for this is to eliminate the possibility of a false positive being generated by the operator, spotter or bystander. False positives will be discussed in section 4.

FIGURE 3-16 Proper placement of the remote sensor.

FIGURE 3-14 sensor too close to a cinder block wall.

FIGURE 3-15 sensor too close to a cinder block wall.

Lesson 4

Environmental Effects and Considerations

- When using microwave radar one thing we must consider is the environment around us. The X3 life sign detector was designed for the aftermath of a critical incidents. Critical incidents such as geological events, extreme weather, explosions and structural defects to name a few.
- For the purpose of this lesson we will be focusing on noise and clutter that are found in intact, damaged or destroyed infrastructures.

Environmental Effects and Considerations

- Civil infrastructure is made up of many facets used by todays civilization. Electricity, water, gas and phones are normal aspects of infrastructure. Infrastructure has certain characteristics that effects microwave radar in general.
- Simple devices such as WiFi routers, fluorescent lights, generators, and air conditioning create noise that could interfere with radar. Debris, equipment, vehicles and even people creates clutter that creates reflections. Clutter and noise are referred to as *unwanted signals*.
- If we go back to the year 2017 on September 17th, Hurricane Maria devastated the island of Puerto Rico. The islands entire infrastructure was devastated and in many areas destroyed.
- *Figure 4-1* is a satellite view of Cataño Puerto Rico at night. *Figure 4-2* shows Cataño days after hurricane passed. The electrical infrastructure has been greatly diminished. No electricity means no power for machinery, lights and other things that may create unwanted signals.

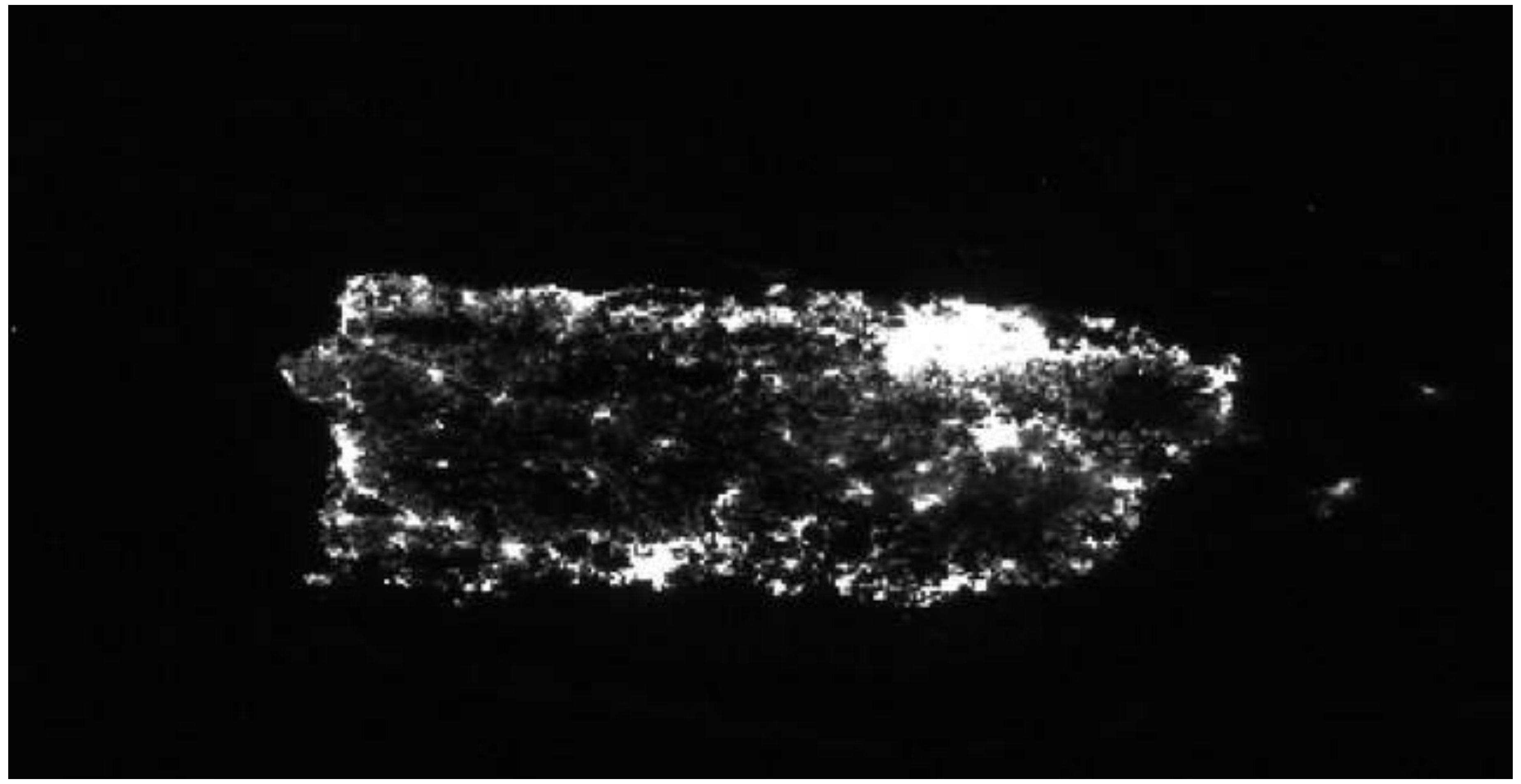


FIGURE 4-1 The island Puerto Rico with intact infrastructure.

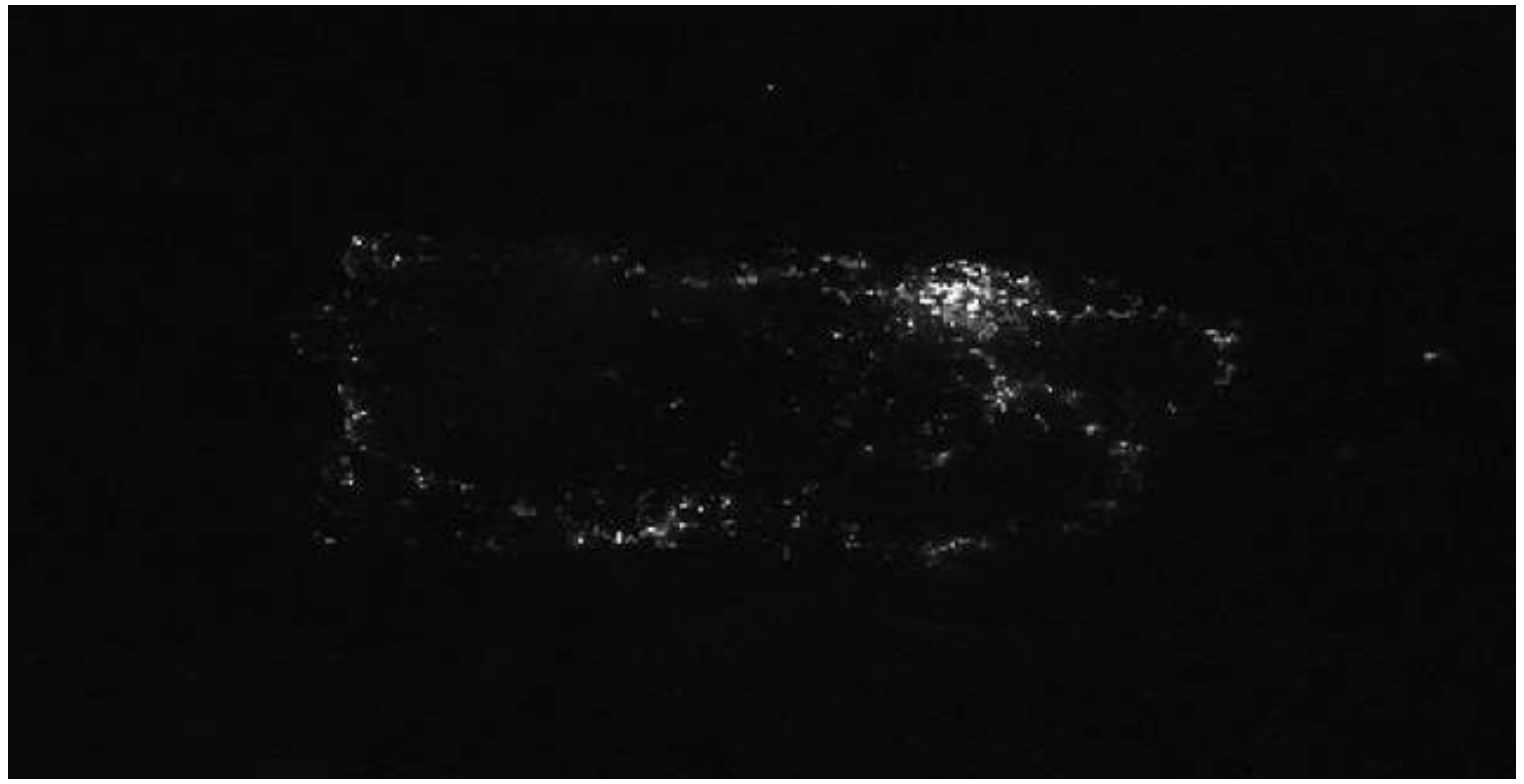


FIGURE 4-2 The island of Puerto Rico with severely damaged infrastructure.

Lesson 4

Effects of Infrastructure

When scanning a small area such as a house or building there are things we can do to lessen the effect of unwanted signals to some degree. Turning off generators, vehicles or simply asking bystanders to move while scanning can reduce unwanted signals.

This brings us to rule number three of scanning, *"obtain the cleanest signal possible.”*

Lesson 4

Effects of Infrastructure

Some examples of machines and devices common to most intact infrastructures

are.

- *WiFi routers*
- *Fluorescent lights*
- *Generators*
- *Transformers*
- *Air conditioning*

These machines and devices create noise that could interfere with radar. Debris, equipment, vehicles and even people create clutter for radar. This is referred to as *unwanted signals*.

Lesson 4

Filters and Unwanted Signals

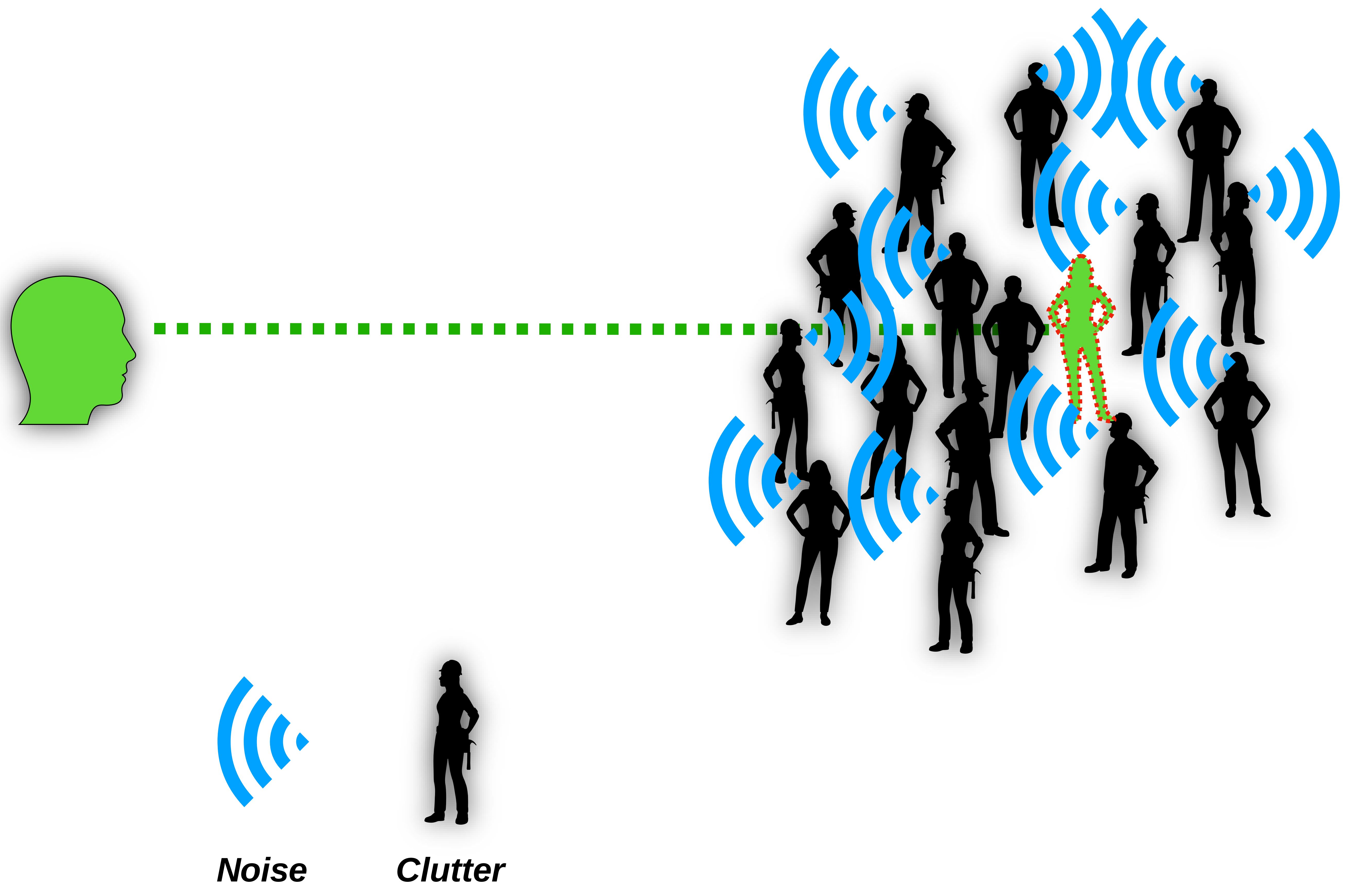
In the previous section we were introduced to unwanted signals which consists of noise and clutter. Now we will dig a little deeper and get a simple understanding of how the X3 Finder deals with unwanted signals.

Noise is anything that interferes with seeing a signal. The signal X3 Finder is looking for is "heart rate & respiration."

Clutter can be an object that might create radar returns that may interfere with radars normal operation.

EXAMPLE

1) You have a room with two hundred people all talking at once. Your goal is to find one person. It would be difficult to isolate the voice or see the person you are looking for.
2) Removing people from the room will increase your chances to locate visually and audibly as the target becomes more pronounced.
3) You are effectively ***filtering*** both ***noise*** and ***clutter*** by removing unwanted people. This same principle applies to getting the best signals from a scan to locate heart rate and respiration.



Lesson 4

Filters and Unwanted Signals

How can we get a cleaner signal?

- One way is to identify ***unwanted signals*** and create ***filters*** to deal with those unwanted signals. It sounds simple enough but it is very complex. The development of new filters is continuos. Future system software updates is how more filters can and will be added.
- To sum it up, filters attempt to eliminate clutter and noise. Once again the goal is to eliminate as many sources of noise and clutter to ***obtain the cleanest signal possible.***

Lesson 4

False Positives & False Negatives

When scanning there is always a possibility of a false positive or false negative. We may receive a response that indicates a target where none exists or we may get a reading that indicates no target when one is exists.

False Positive

When we receive a reading indicating human life where none are actually present it is called a false positive. These false positives can be caused by unwanted signals. In general a false positive is a ghost target as a result of unwanted signals.

False Negative

When we receive a reading indicating human life where none is actually present it is called a *false positive*. A false positives can be caused by unwanted signals. In general a false positive is a ghost target as a result of unwanted signals.

NOTE:

To reduce instances of false positives we must continuously strive to:

1. ***g**et as much signal to the intended target area as possible.*
2. ***conduct three scans from three positions.***
3. ***obtain the cleanest signal possible***

Lesson 4

False Positives & False Negatives

- It is important to put false positives and negatives into perspective. Humans and machines are susceptible to a false positives and negatives. To this point we have only discussed false positives and negatives in relation to the X3 system. It is equally important to look at human false positives and negatives.
- Time and time again humans have been tricked by what they believed to have seen or heard. For example a human may claim with great certainty they spotted a person walk into a building prior to an incident. More often than not initial incident information is convoluted and unreliable at best which can result in a false positive.
- In the end both human and machine are susceptible to false positives and negatives. However the big difference is X3 is not susceptible to fatigue, mental stress or sleep deprivation. The system does not get hungry or cold from long hours of searching all of which could produce a higher level of false positives and negatives.

To reduce instances of false positives we must continuously strive to follow the three rules of scanning.

- ✓ *Get as much signal to the target area as possible.*
- ✓ *Conduct at least three scans from three positions.*
- ✓ *Obtain the cleanest signal possible.*

Lesson 5

X3 Software and Control Unit

Overview

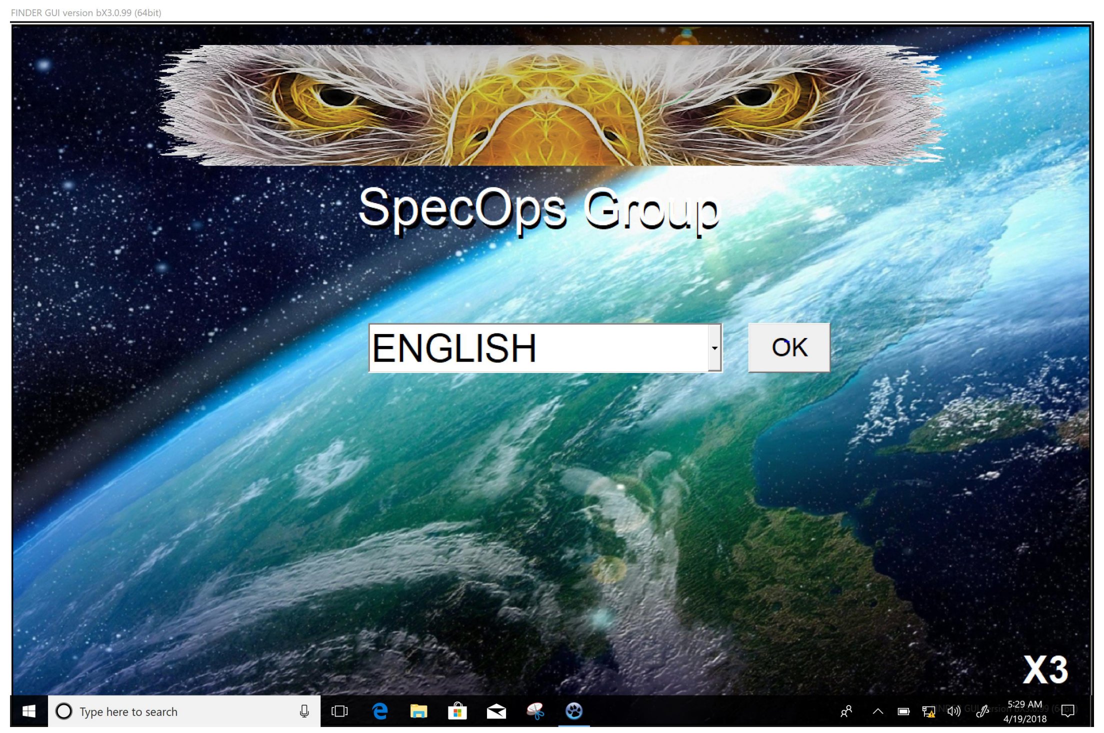
In this lesson you will learn how to turn on the control unit and use the software. The control unit is a simple Windows 10 driven device that is automated to a great degree for the user.

Lesson 5

X3 Software and Control Unit Expained

The Control Device Explained

The X3 control device is a simple hardened Windows 10 driven unit. A complete X3 Finder system comes with a control unit and the remote sensor. However the software can be loaded on any Windows 10 driven device as long as the device meets the software specifications.



Lesson 5

X3 Software and Control Unit Expained

Step One: System Startup

- Starting up the control unit is very straight forward. You will be walked through each step of the process screen by screen.
- Our first task is to switch on the remote sensor and control device to initiate the startup process. On the control unit you will see a standard Windows 10 startup screen and then the desktop. The network connection software will load while the X3 control software is loading in the background as shown in *figure 5-1*. This will remain visible until all connections are made and then the USB server software will move to the background.

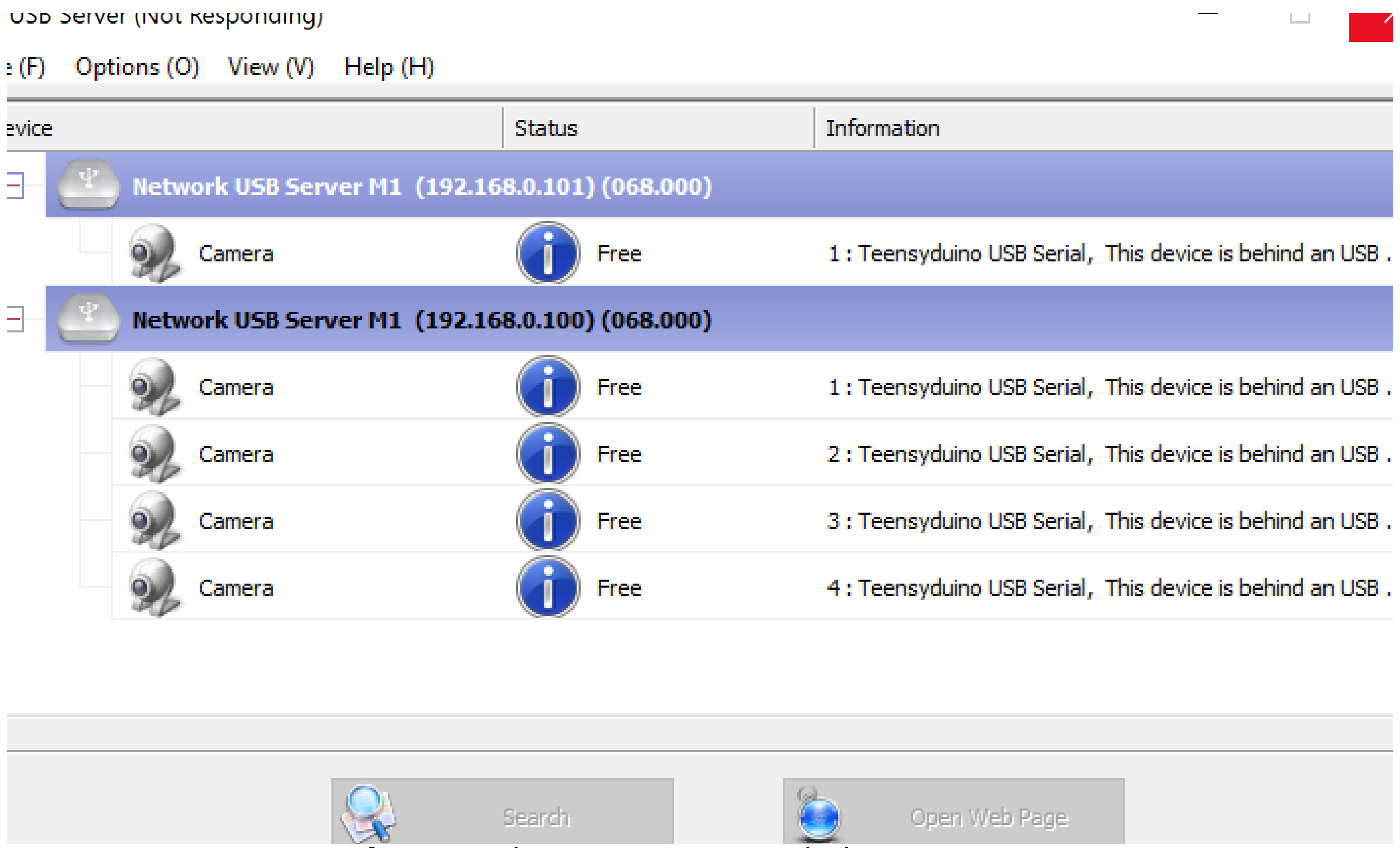


Figure 5-1 USB server software making connections with the X3 remote sensing unit.

X3 Software and Control Unit Expained

Step One: System Startup **(cont)**

As the USB server makes connection a series of five tones will be heard and then a multi-tone signifying the connection process is complete. You will see five circles and five check marks to confirm good connection with the remote sensor. These indicators confirm connection between the control unit and the remote sensor as shown is shown in figure 5-2.

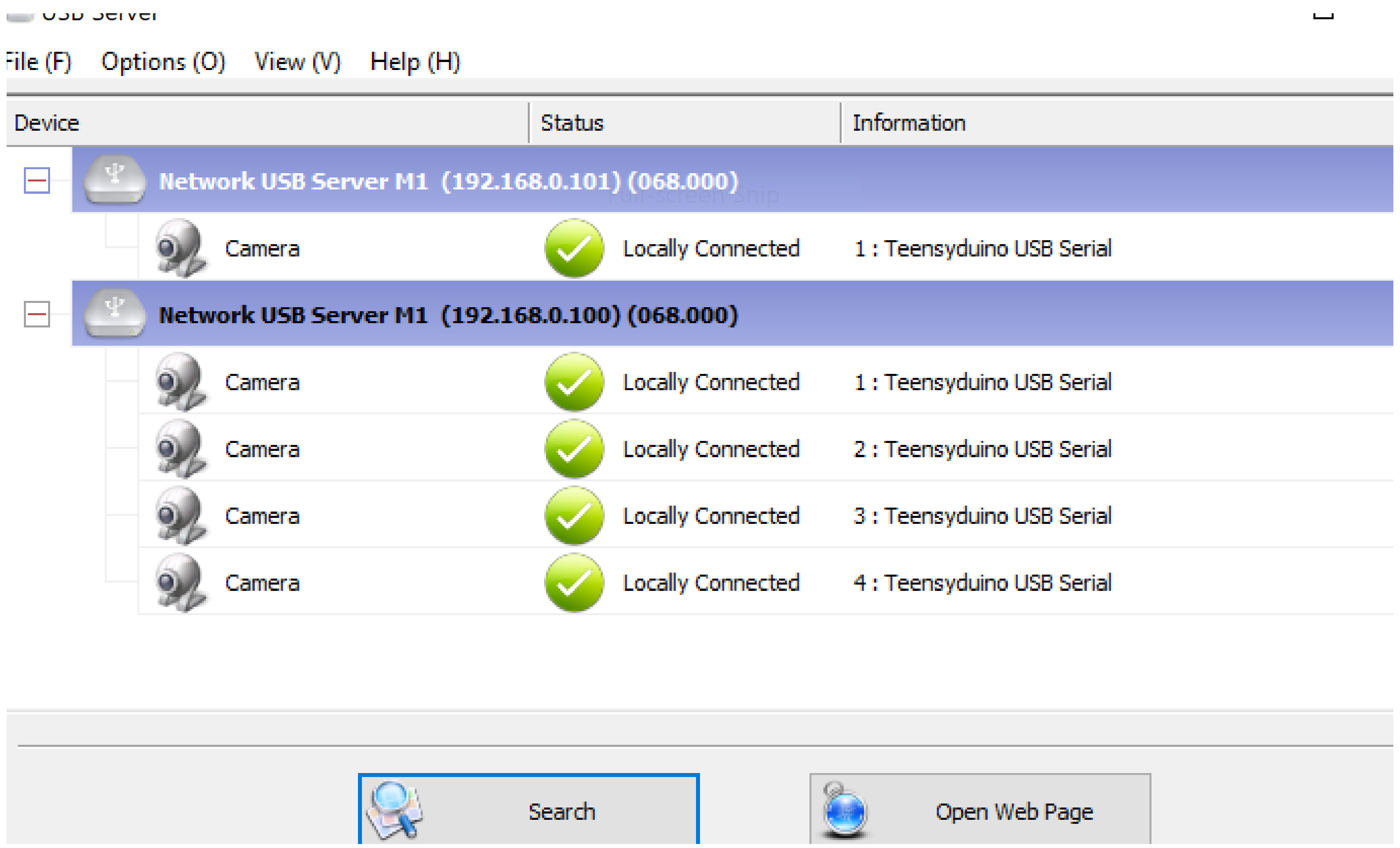


Figure 5-2 USB server software showing the connections are established.

X3 Software and Control Unit

Step Two: The Graphical User Interface “GUI”

You should be looking at the “SpecOps Group” splash screen. The USB server software will move to the background shown in *figure 5-3*. Your first interaction will be selecting the language of your choice and press “OK.” Languages will continue to be added with software updates.

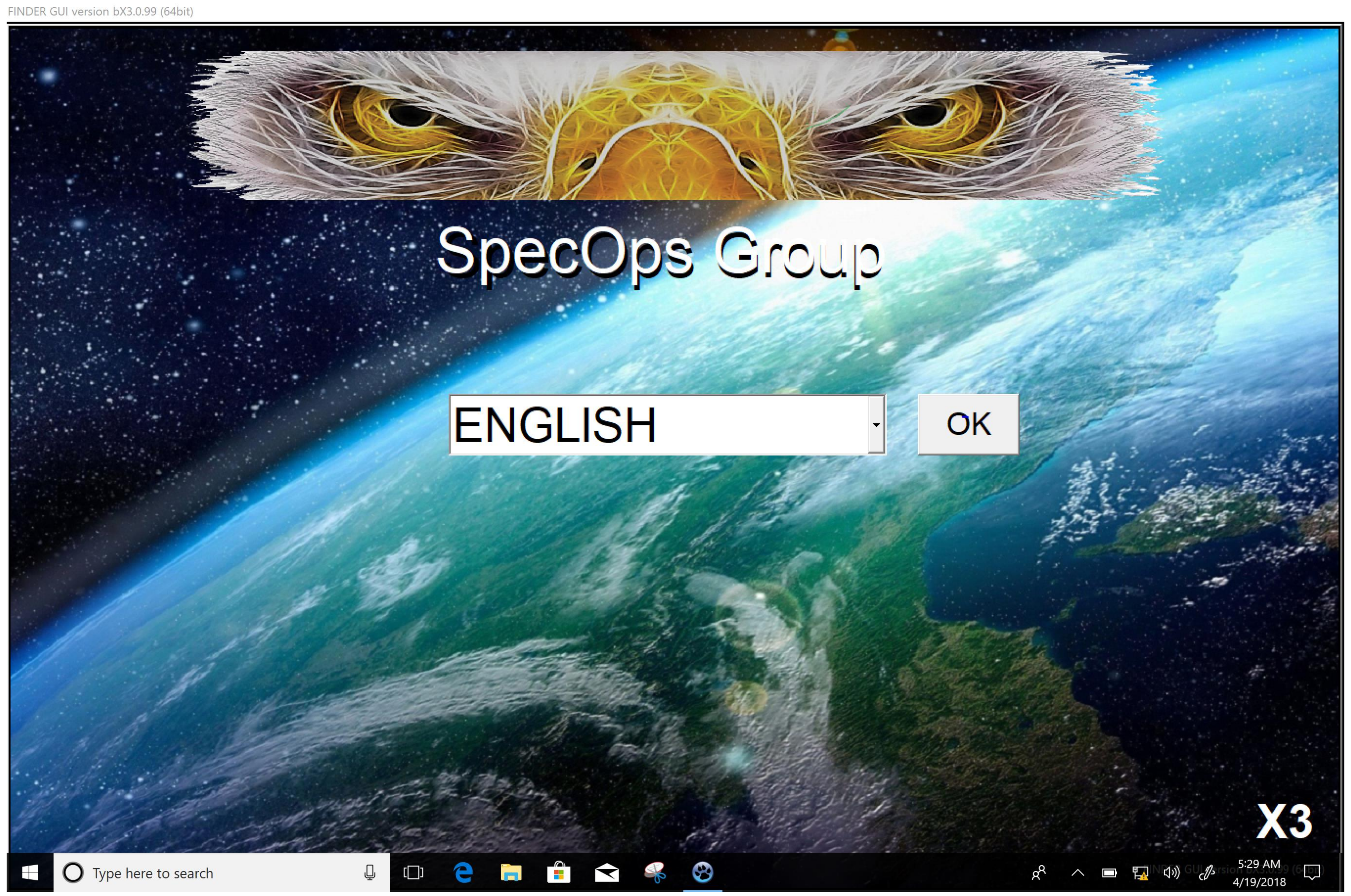


Figure 5-3 Control unit splash screen with language selection.

Step Three: Selecting a Scenario

Once you have pressed okay the next screen you will see the scenario selection menu. In Lesson 3 "*Choosing the Scanning Scenario,*" we covered the different scenarios and where best to use them. Select which scenario best represents your target area as shown in *figure 5-4*.

Figure 5-4 Scenario selection screen.

X3 Software and Control Unit

Step Four: Scan Initiation Screen

Once you have selected a scenario the scan initiation menu will appear shown in *figure 5-5*. If we further look at *figure 5-6* we will see a box in the top left side of the scan initiation menu labeled *"System Status".* This monitors the WiFi connection between the control unit and the remote sensor. You will also see the control devices power level.

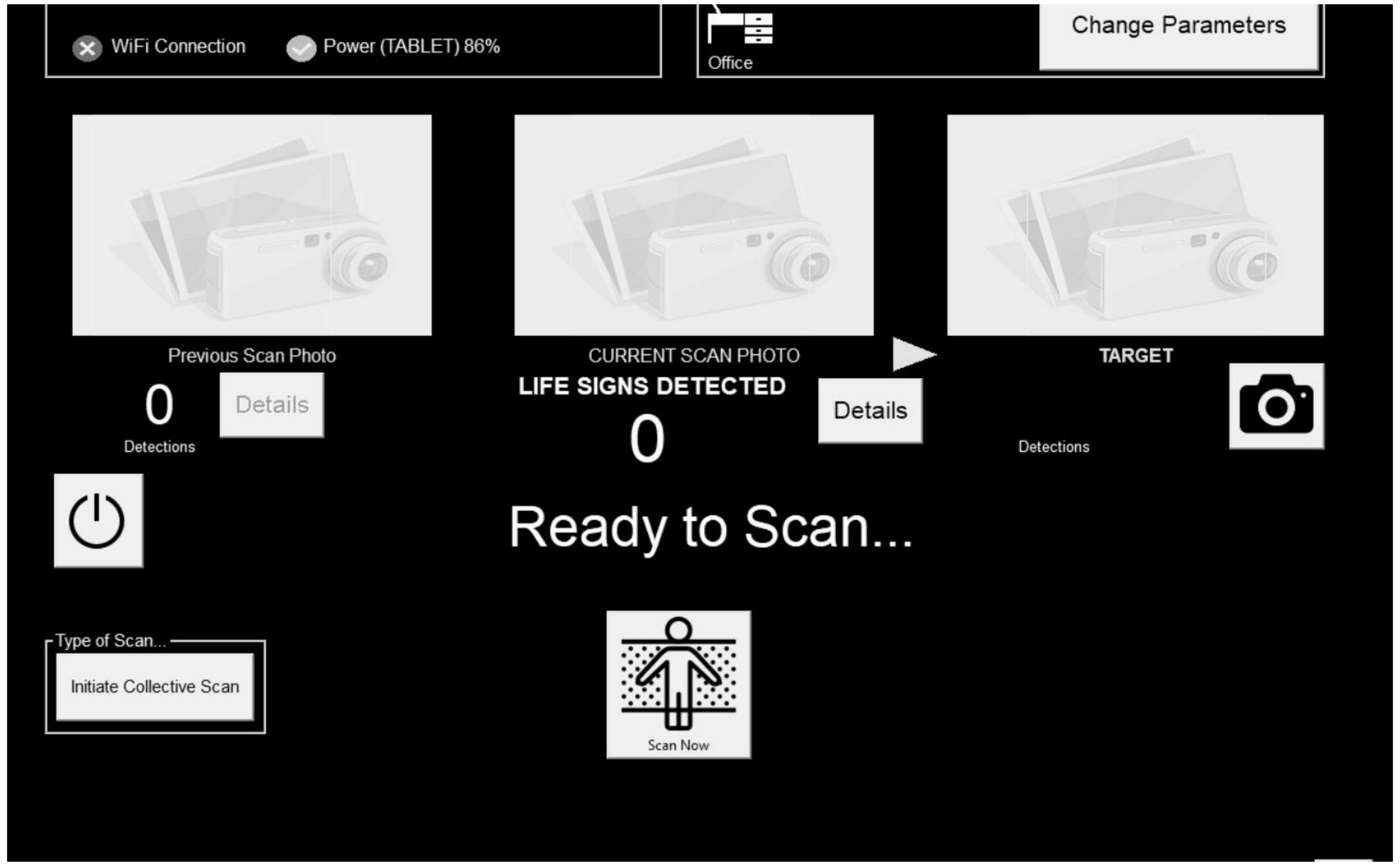


Figure 5-5 Scan initiation screen.

If we move to the right clockwise you should be looking at "Change Parameters" shown in figure 5-8. This area shows you your current scenario selection. Pressing change parameters allows you to go back and change scenario and change filter selection if needed.

Figure 5-8 Change Parameters allows the user to change the scenario and filters used.

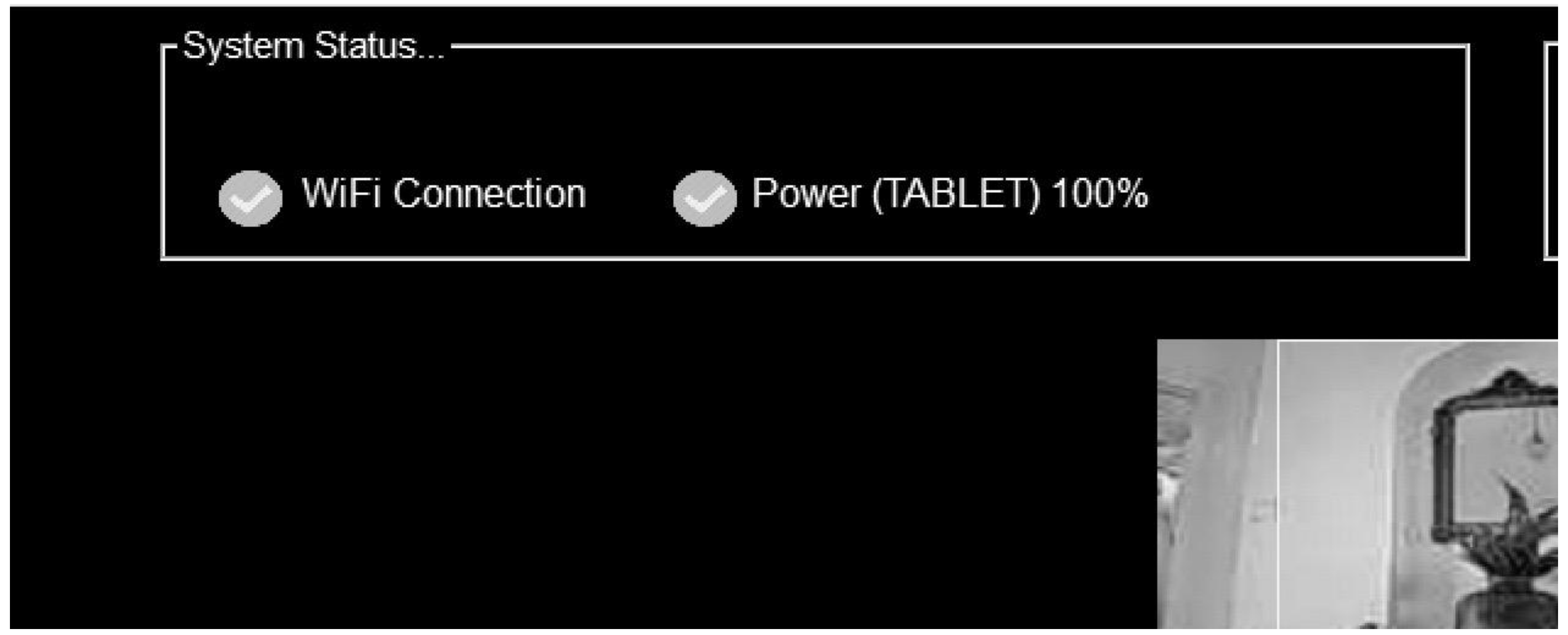


Figure 5-6 System Status

Lesson 5

X3 Software and Control Unit

Changing Parameters

If we move to the right clockwise you should be looking at "***Scan Parameters"*** shown in ***figure 5-8.*** This area shows you your current scenario selection. Pressing change parameters allows you to go back and change scenario and change filter selection if needed.

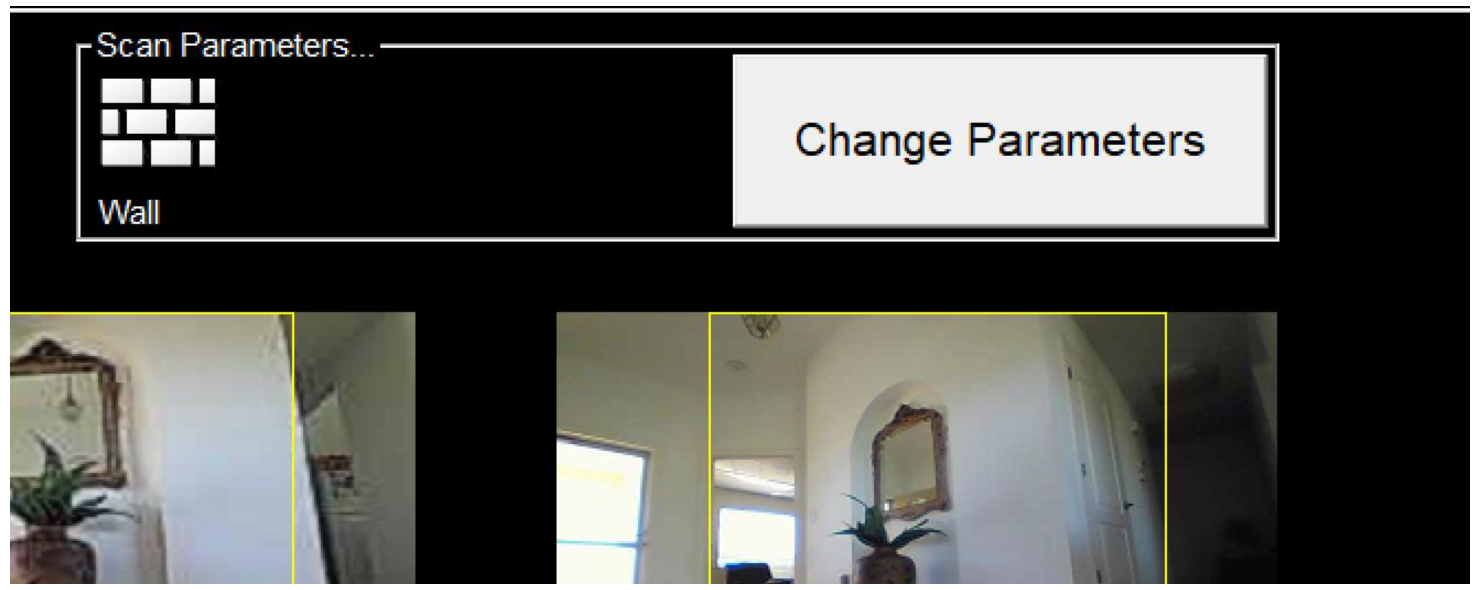


Figure 5-8 System Status

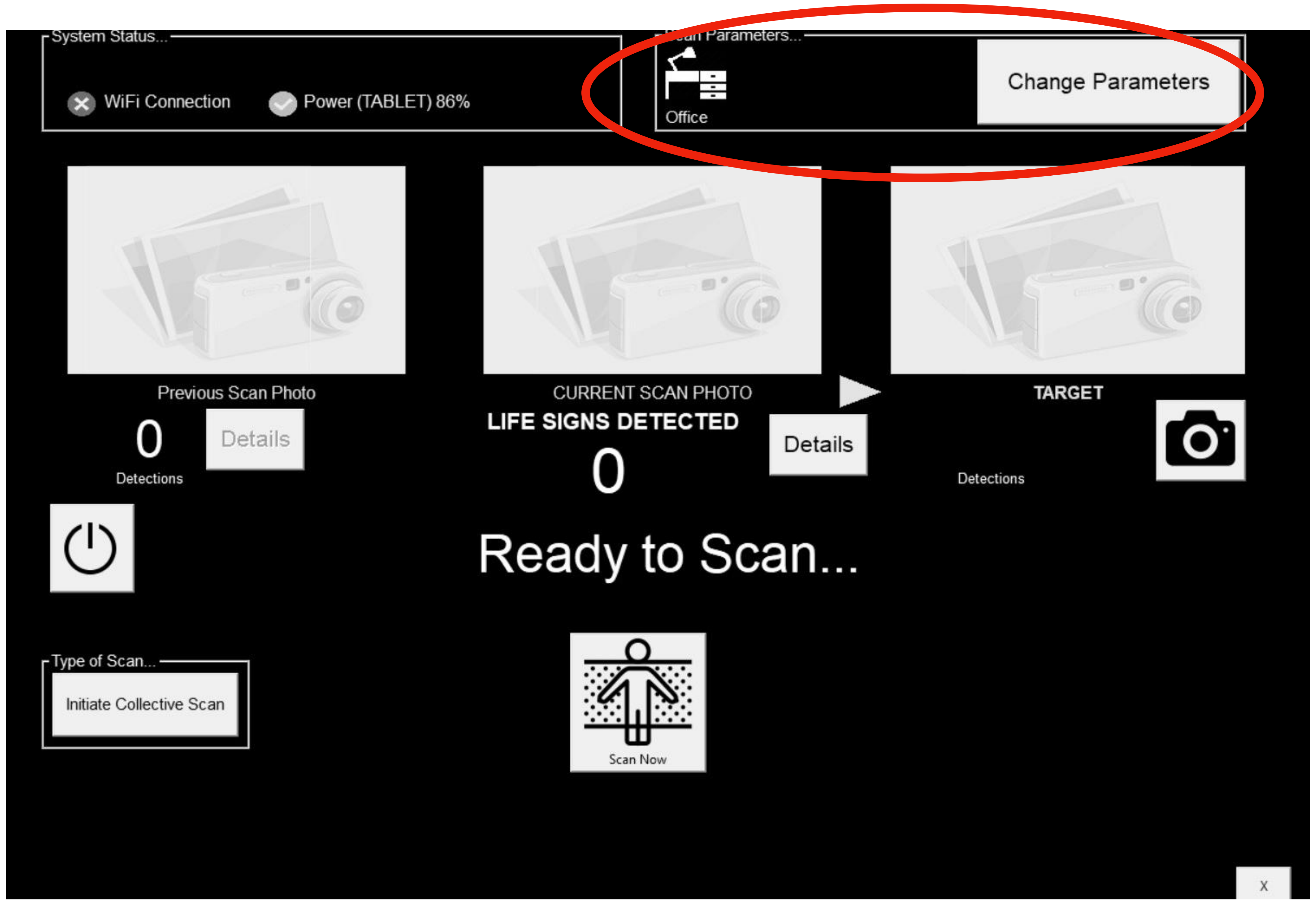


Figure 5-6 Scan initiation screen.

X3 Software and Control Unit

Step Five: Targeting

In *figure 5-8* you will see a targeting window that is located above and to the left of the camera icon. This is used to line up the area you are about to scan. Face the remote sensor with the camera facing in the general of the area to be scanned. Simply push the camera icon and wait a few seconds. A picture will appear within the yellow square that your target should be in shown in *figure 5-8*. Re-adjust the remote sensor as needed and press the camera icon again to verify the targeted area is correct.

Perimeter Scan

Perimeter scan is a process that will be added to the system in a later update. The perimeter scan update allows the system to give a general location of a target. Currently the system tells us a general direction of the life detection. When perimeter scan becomes available for use it will be automatically activated through a simple software update.

Figure 5-8 Targeting system used to line up scan.

X3 Software and Control Unit

Step Six: Scanning

- With the remote sensor lined up on the target you are ready conduct a scan. This is done by pressing the “Scan Now” button shown in *Figure 5-10*.
- When you have pressed the scan initiation button, you will be brought to the “Scanning Process” screen shown in *figure 5-12*. This screen indicates with a green arrow what phase the scanning process is in.
- The process screen has importance. During this process nobody should be moving or talking. The scan process last approximately 60 seconds. Once the scan process has completed a green arrow will move down to the “power down” phase. When the *download data* and

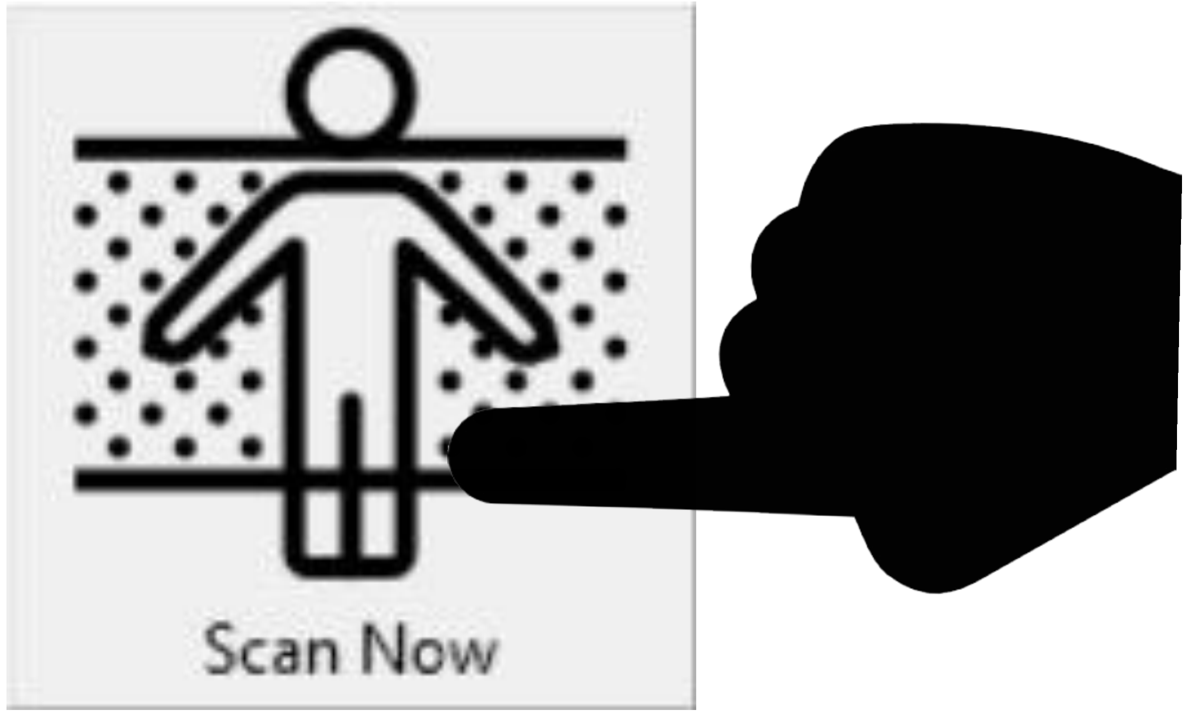


Figure 5-10

X3 Software and Control Unit

Step Six: Scanning (*cont*)

- When the *download data and processing phase* has been reached, moving and talking can be resumed. You will not interfere with the results. While on the process screen you will also note an abort button to the bottom left shown in *Figure 5-11*. This will initiate a scan abort when pressed. However it takes a minute to cycle through and stop the scan.
- Another window thats in the scanning process screen is the antenna health window. Located in the bottom right corner it monitors the health of the antennas. There are four receivers and one transmitter highlighted in bright green. If any antenna is not working as designed it will highlight in red. Any malfunctions of the system should be reported to your X3 representative. Do not attempt to take apart the system as this will instantly void it’s warrantee.

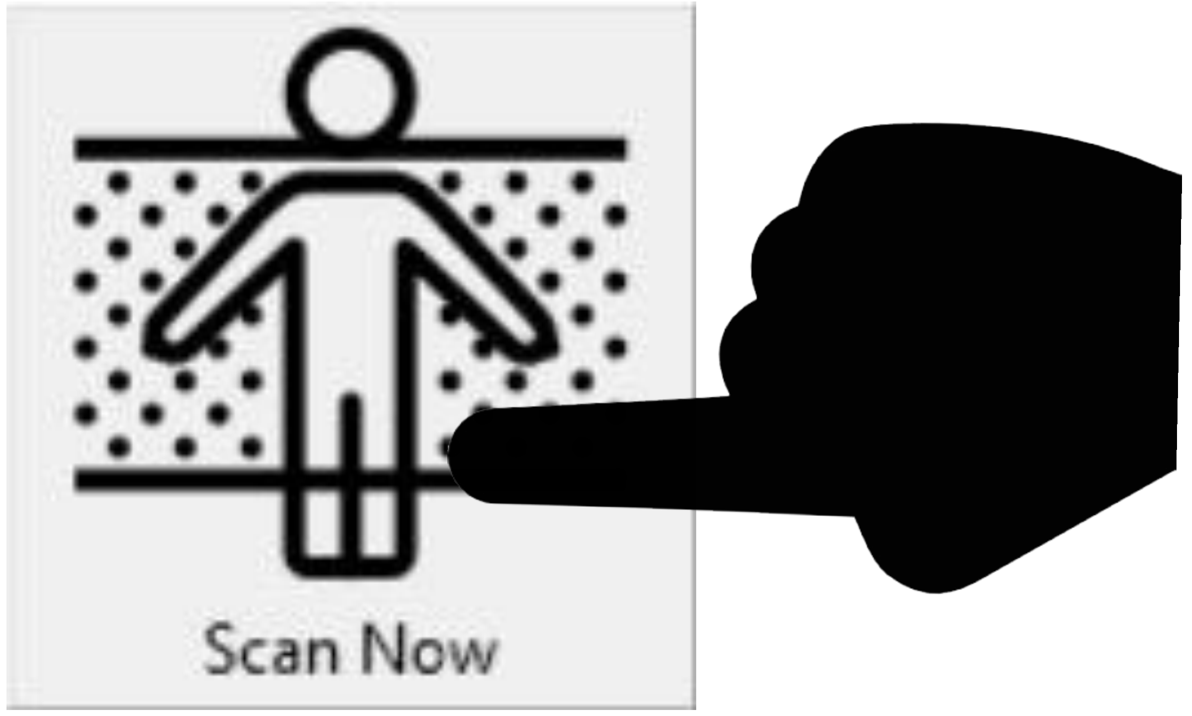


Figure 5-10

X3 Software and Control Unit

Step Seven: Results

- To the left of the target window is the "Current Scan Photo" window shown in *figure 5-13*. When you scan a target the system photographs the target area and populates that photo into the "Current Scan Photo" window.

Directly below the "Current Scan Photo" window you will see the scan results. There are three possible scan results:

(1) No Detections which means the system has not detected what it is looking for.

(2) A number next to detections

(3) A range of number next to detections such as 1-2 detections or 3-4 detections and so on.

Figure 5-13 Photo of scan area that will populate when scan process is fully complete.

X3 Software and Control Unit

Power Off Button

Figure 5-14 shows the off button which uses the universal symbol for power on and off. But remember to also close the red latching cover as shown in **Lesson 1**, ***figure 1-6.***

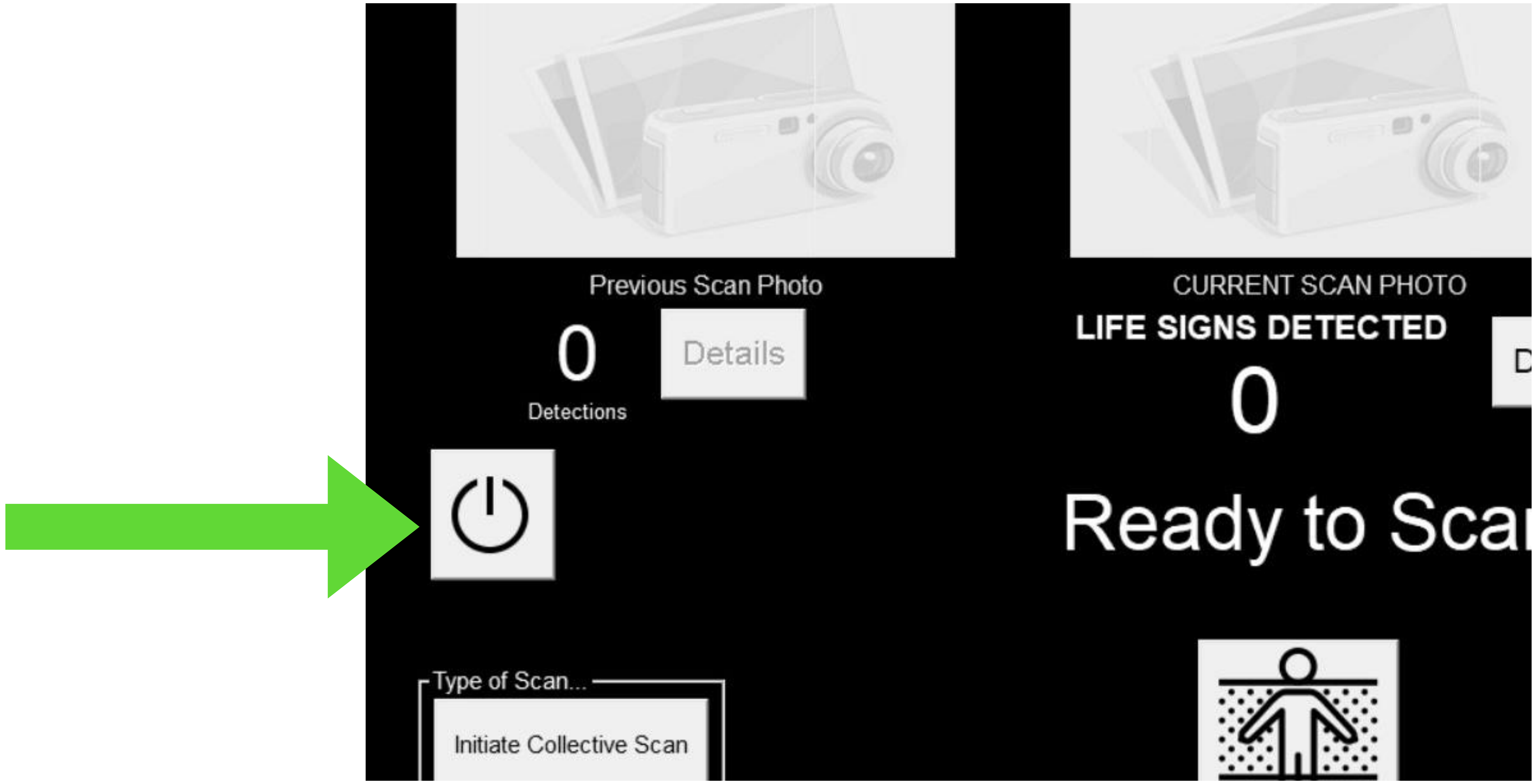


Figure 5-14 Scan initiation screen.

The Operator & The Spotter

The scanning team is made up of one operator and one spotter. The operator and spotter must be certified by a certified X3 Finder Instructor.

It is important to understand each team members role. But it is equally important that both the operator and spotter are both trained to the same level. They must work together as a team.

FIGURE 5-1 Mexico City, Mexico 2017. Operator and spotter work together to determine the target area.

The operators role is to:

- ✓ Perform equipment and system checks of the X3 Finder.
- ✓ Assess and understand the target area
- ✓ Determine the best scan location.
- ✓ Observes environment considerations.
- ✓ Conducts scans and reports detections.

The spotter role is to:

- ✓ Provide safety overwatch for operator.
- ✓ Assist operator in the assessment and understanding of the target area to scan.
- ✓ Observes environment considerations that may be present.
- ✓ Control bystanders.
- ✓ Record results.
- ✓ Acts are RTO (Radio Transmitter Operator)

Lesson 6

The Operator & The Spotter

Scanning as a Team

- When scanning is in process the operator and the spotter must be listening and watching for anything that might be an unwanted signal.
- The operator must have *complete operational command* of the area that is being scanned. The scanning team must both assess the target area together before, during and after the scan.
- The spotters main job is to allow the operator to focus on operating the X3 Finder. The spotter must also move unnecessary bystanders out of the target scan area.
- The spotter and operator must continually listen and watch for any possible unwanted signals. Anyone in the immediate area should be kept quiet while the scan in in progress.
- More importantly the spotter must observe and maintain the operators level of safety if the operator is to focus on operating the X3 Finder.

FIGURE 5-1 Mexico City, Mexico 2017. Operator and spotter work together to determine the target area.

Lesson 6

The Operator & The Spotter

Bystanders

A bystander is simply any human that is not a victim that may interfere when scanning. Even thought the system filters out bystanders to the left, right and behind the sensor rule number two of scanning still applies, "***obtain the cleanest signal possible.***"

FIGURE 5-2 Operator and spotter should stand back from device at least 15ft/4m.

We must always:

- ✓ constantly scan the area for bystanders and remove them.
- ✓ bystanders must remain behind the scanning team who must be 15ft(4m) behind the remote sensor.
- ✓ check beyond the scanning target area for bystanders.

FIGURE 5-3 Mexico City, Mexico 2017. There are six bystanders in this picture. The scanning team has to take operational control over the scanning area.

FINDER

X3

SPECOPS GROUP

PROTECTING THOSE WHO PROTECT US

1819 Main Street Suite 400
Sarasota FL. 34236

www.specops-group.com

1.800.652.5117