FCC ID: ZZM-ASTIR3300

FCC Rule: CFR 47 Part 90, DA 11-1870

MiCOM Labs Report Number: AKEL02-U1

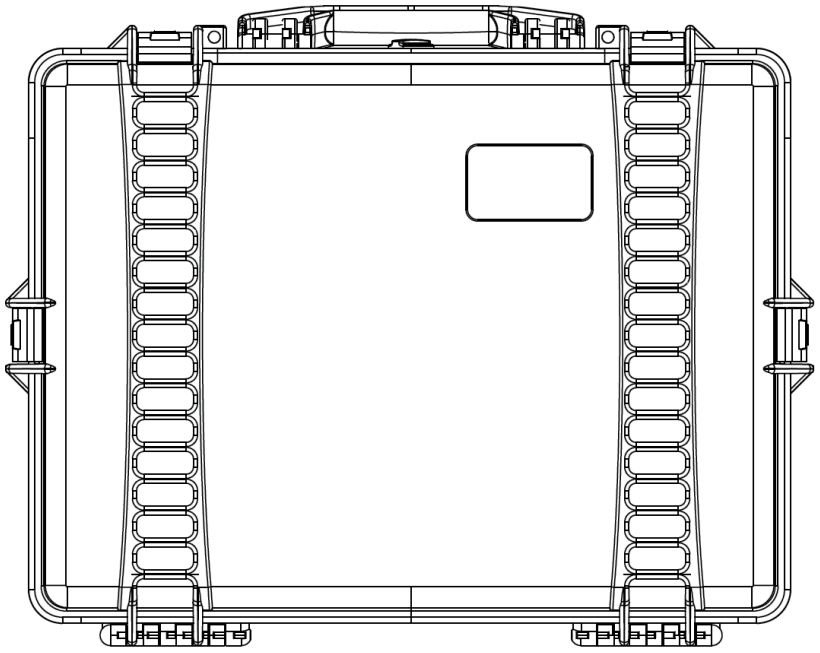
Applicant: AKELA, Inc.

Manual

OPERATOR'S MANUAL

ASTIR3300

AKELA Standoff Through-the-wall Imaging Radar



The AKELA Standoff Through-the-wall Imaging Radar is controlled under the U.S. International Traffic in Arms Regulations (ITAR) and may not be exported without proper authorization by the U.S. Department of State.

OPERATIONAL SAFETY WARNINGS

AKELA's Standoff Through-the-wall Imaging Radar (ASTIR3300) system is capable of detecting and locating personnel behind a wall from standoff distances of up to 30 meters. Care should be taken in choosing the placement of the system, as blocked walls and the presence of significant metallic infrastructure will degrade detection performance. The building material present should always be taken into consideration when operating the ASTIR3300 system, in order to obtain the most accurate results that enable the user to reach optimal tactical decisions. As an example, avoid placing the system directly in front of metal doors or known blocked walls. Failure to take the building material into account could produce inaccurate imaging results.

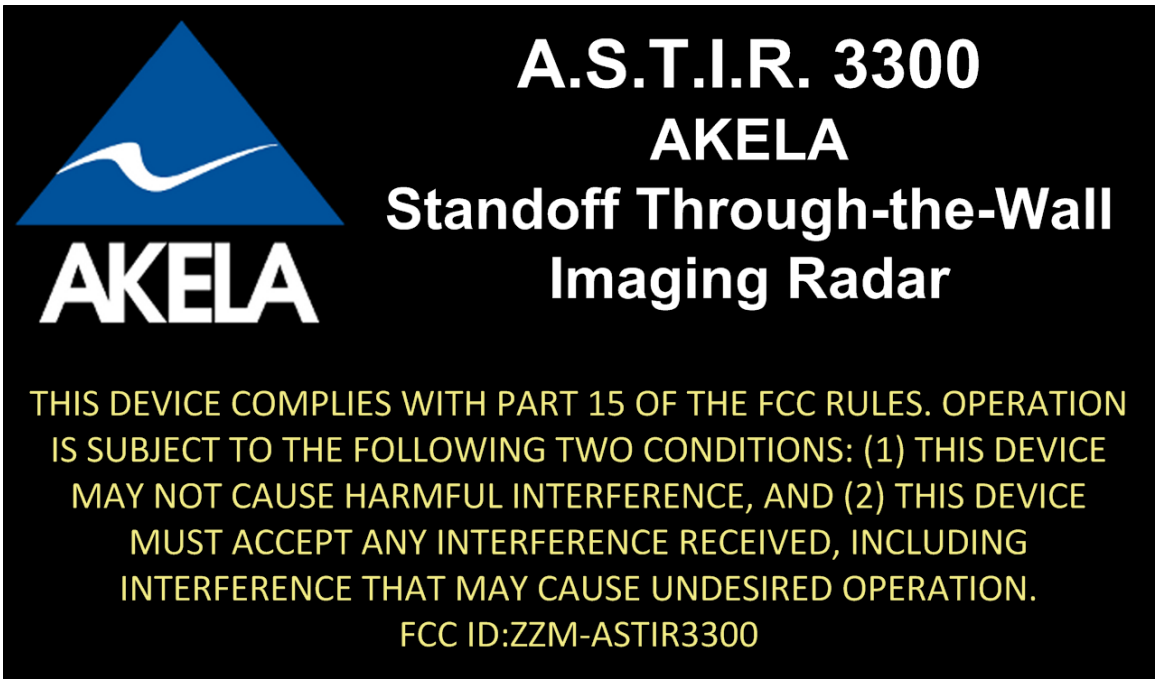
The ASTIR3300 is equipped with multiple antennas packaged in a small, lightweight, ruggedized case. The best detection performance is achieved when the area of observation falls within a $\pm$22 degree cone extending from the front of the system. Outside of the conical detection zone, the system's detection performance may be severely restricted. Care should be taken in choosing the placement of the system, to ensure that the most accurate detection results are achieved.

This consideration also extends to the placement of objects in front of the unit, directly blocking the antennas, or the movement of operators (e.g. walking in front of or behind the unit) while in operation. The degradation of system performance due to improper placement of the unit could produce inaccurate results.

When operating a system with Option 001 enabled, batteries for the ASTIR3300 should be regularly checked for signs of corrosion. The batteries should also be replaced when necessary to ensure uninterrupted operation. If the system is not expected to be operated for an extended period of time, remove the batteries from the holder and store in a dry location. Improper storage or insertion of the batteries may lead to malfunctioning of the ASTIR3300 system.

The connectors used on the ASTIR3300 are designed to withstand regular use in the field. However, prior to operating the unit, check the state of the connectors and ensure they are in working order.

FCC COMPLIANCE



Warning

Do not open the unit. There are no user serviceable parts inside the unit.
Do not attempt to service the unit yourself. Refer all servicing to factory service only. Opening the unit for any reason will void the manufacturer's warranty.

This device is approved for use by the FCC under FCC Order DA 11-1870, FCC ID ZZM-ASTIR3300.

This device complies with part 15 of the FCC Rules and the Product Specifications noted on the Declaration of Conformity. Operation is subject to the following conditions:

• The device may not cause harmful interference.
• The device must accept any interference received, including interference that may cause undesired operation.

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1. INTRODUCTION

1.1 Product Overview

AKELA's ASTIR3300 is a through-the-wall radar imaging system developed specifically for use in first responder and law enforcement operations. The system transmits and receives on single frequencies over the 3101 to 3499 MHz frequency range. Analysis of the returned signals provides information that can be used to determine the presence, location, speed and size of objects in the surrounding area. Processing of this information over time provides the capability to detect and track the location of both stationary and moving individuals within a building structure.

Unlike other through-the-wall systems which must be placed in direct contact with or in close proximity to a wall, AKELA's ASTIR3300 provides the ability to place the system at standoff distances of up to 30 meters. This increase in standoff distance significantly increases the likelihood of keeping the system operator out of harm's way. Additionally, the increased standoff distance provides a wider viewing angle and allows for detections on multi-level structures from a single position.

The ability to detect and locate stationary and moving individuals through building walls from significant standoff distances provides increased situational awareness and considerable tactical advantage to law enforcement personnel. The knowledge of whether there is someone inside a building, their location, and the internal layout of the building, can completely change the operational tactics used, and thereby increase the probability that an operation will successfully conclude without harm to law enforcement personnel, safety personnel, and the public.

ASTIR3300's packaging is shown in the figure below. The small, lightweight case has dimensions of 20 x 17 x 9 inches, and weighs 17.7 lbs. The ASTIR3300 is deployed by placing the system in front of a building on a stationary object such as a tripod, table, or vehicle roof, and orienting the system towards the area of interest. The system is controlled by software running on a computer or laptop connected to the ASTIR3300 through a wired connection.

While AKELA radars are software-controlled, allowing flexibility in areas of signal processing and graphics display, the RF parameters for the ASTIR3300 are all fixed by default.

Upon startup, the system can start displaying detection results within seconds. The use of multiple antennas provides the ability to not only detect the presence of individuals, but also to determine an individual's approximate location in both range and cross-range.

2. EQUIPMENT DESCRIPTION AND DATA

2.1 Equipment specifications

System dimension and weight

Length: 20 inches (50.8 cm)
Width: 17 inches (43.2 cm)
Height: 9 inches (22.9 cm)
Weight: 17.7 lbs (8.03 kg)

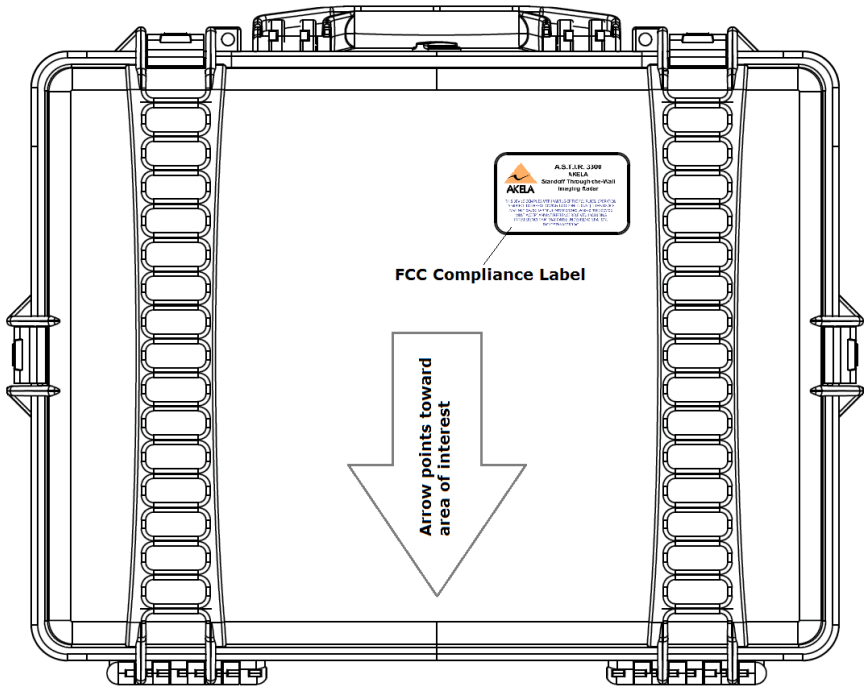
Battery (Option 001)

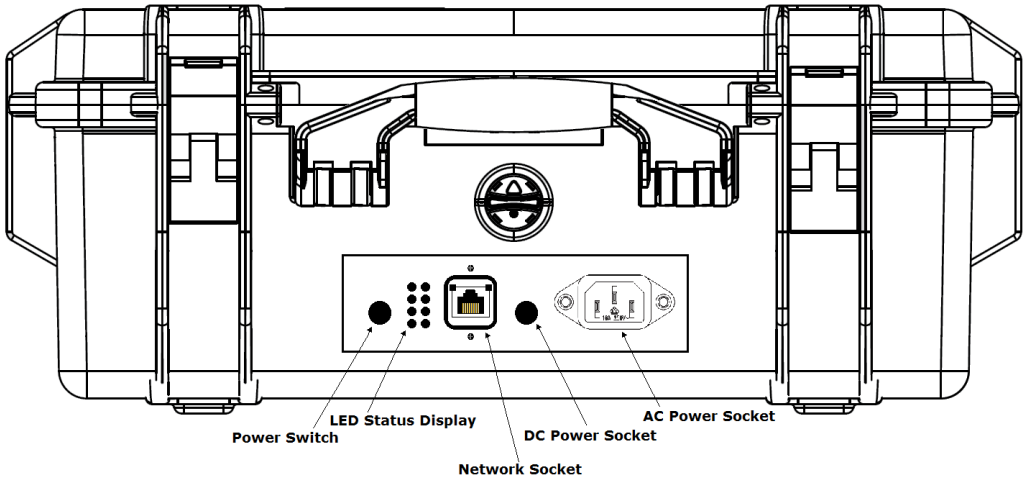
Type: Single use
Standard size: AA
Quantity: 8
Note: For longest operating life, Energizer type L91 Lithium batteries are recommended.

Temperature

Operational Range: -4~122 F (-20~50° C)

2.2 Location and description of major components





3. THEORY OF OPERATION

The AKELA radar sensor at the core of the ASTIR3300 system operates in a stepped frequency, continuous wave (CW) mode. All of the operating parameters are digitally controlled by the software. The radar sensor is programmed to operate over the frequency range of 3101 to 3499 MHz.

The radar transmitter employs direct digital synthesizers (DDS) as reference frequency generators to control the output of a voltage controlled oscillator (VCO). Use of a DDS allows precise control over transmitter frequency. The nominal output power of the radar is 31.6 mW (+15 dBm) Effective Isotropically Radiated Power (EIRP).

Scanning is performed by transmitting on one system antenna and receiving sequentially on each of the other antennas at a specific frequency for a fixed duration of time before stepping to the next operating frequency point. Once all of the frequencies over the specified range (for the ASTIR3300, this range is 3101 – 3499 MHz) have been covered, the frequency scan cycle is repeated for the next pair of antennas in the sequence of possible antenna combinations. Scanning through the operating frequencies and switching through the transmit and receive antenna pairings are performed automatically and continuously.

ASTIR3300 System Configuration	
Operating Bandwidth (MHz)	398
Operating Range (MHz)	3101 – 3499
Operating Scan Rates (points/sec)	15,300
Frequency Step (MHz)	2
Frequency Points per Scan Cycle	200
Output Power EIRP – Peak Instantaneous	31.6 mW (+15 dBm)

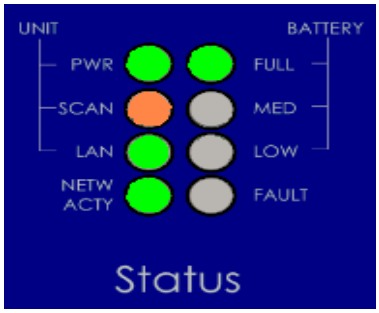
An operational configuration optimized for law enforcement and first responder applications has been chosen for the ASTIR3300 system and is summarized in the table above. The parameters for the configuration are a scan rate of 15,300 frequency samples per second, an operational bandwidth of 398 MHz over the frequency range 3101 – 3499 MHz, and a frequency step of 2 MHz. These parameters have been chosen based on the anticipated operational needs.

The scan rate allows for approximately six complete scan cycles through all of the antenna pairings per second, enabling the detection of moving individuals as well as the small and breathing motions of stationary individuals. ASTIR3300's operational bandwidth allows sufficient resolution for detecting multiple individuals located within close proximity of each other. The selected frequency range below 3500 MHz provides superior penetration of signals through common building materials compared to higher frequency bands. The frequency step of 2 MHz over the 398 MHz bandwidth translates to an unambiguous detection range of 75 meters, providing a significant margin on top of the specified 30 meter standoff distance.

4. OPERATOR INSTRUCTIONS

4.1 Operator controls and indicators

The control buttons and LED indicator lights associated with the ASTIR3300 system are shown in the figures below.



PWR	Indicates whether radar is on or off.
SCAN	Is illuminated every time APRD scans for data.
LAN	Is illuminated if radar is connected to a local area network.
NETW ACTY	Blinks when there is network activity (e.g. while scanning).
FULL	Battery is full. The status should always be full when using the AC power supply or AC adapter.
MED	Battery level is medium.
LOW	Battery level is low.
FAULT	Check the power supply for problems.

4.2 System operation

4.2.1 Prior to use

For systems with Option 001, if the ASTIR3300 is intended to be operated on battery power, eight standard AA batteries need to be installed prior to operation. For extended operation, we recommend using L91 lithium batteries instead. Follow the directions below for installing the batteries.

1) Open battery door on front panel of ASTIR3300.
2) Insert eight standard AA batteries, positive-end first, into compartment.
3) Close battery compartment securely.

The ASTIR3300 system is completely controlled by software. The software program allows the operator control over the system operation, advanced signal processing capabilities, and a flexible graphic display. Prior to operation, install AKELA's software on a computer or laptop that can connect to the ASTIR3300 through a wired connection. See Section 4.2.2 for software installation instructions.

4.2.2 Software installation

The installer will install APRD, AKELA's software application for operating the ASTIR3300 system, on your computer.

Installation instructions:

Insert the software installation CD into your CD drive.

In the root folder of the CD drive, right click the AKELA directory and select Copy from the context menu.

Browse the C: logical drive on your PC, and double click. Right click and select Paste from the context menu. The AKELA directory will copy into the root of the C: logical drive.

In the root folder of the CD drive, right click the provided APRD link and select Copy from the context menu.

Paste the APRD link to your Windows Desktop, or your preferred launch location.

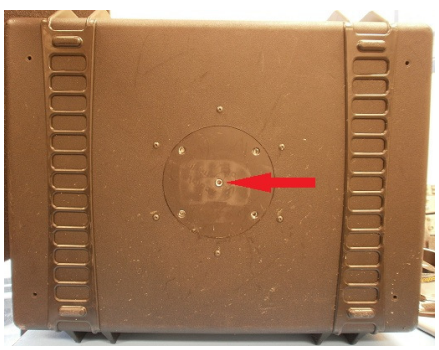
APRD has been preconfigured to run the ASTIR3300, and is now ready to run.

4.2.3 Operating the system

To operate the ASTIR3300, follow the directions below.

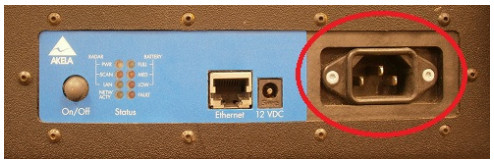
1. Place the system on a stable surface (e.g. tripod, table, top of vehicle) with the arrow pointing towards the area or building of interest. For best detection results, make sure the system is placed such that the area of interest falls within the ± 22 degree cone extending from the front of the system.

2. If placing system on a tripod, use the 1/4-20 thread mounting hole located on the bottom of the system denoted by the arrow in the image below.

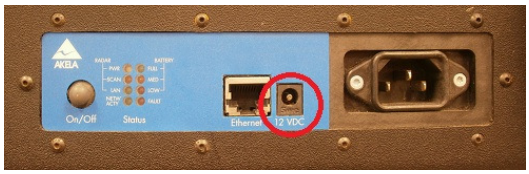


3. Once the ASTIR3300 is in position, connect network cable to the front panel as shown in image below.

4(a). If operating on AC power, connect the power cord to the front panel as shown in image below.

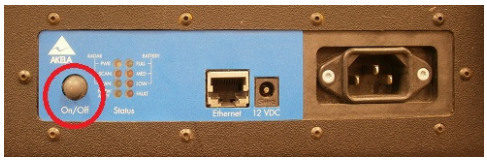


4(b). If operating on DC power, connect power cord to the front panel as shown in image below.



5. Press On/Off Switch once to turn the ASTIR3300 on. Once on, “PWR”, “LAN” and “BATTERY: FULL” lights will illuminate. If properly connected to a network, the “NETW ACTY” light turns on. When scanning, the “SCAN” light flashes.

To turn the system off, press and hold the On/Off Switch until all lights turn off.



6. Set up the network.

Your computer can connect to the ASTIR3300 using a direct 100 Base-T Ethernet connection, or through a Local Area Network (LAN).

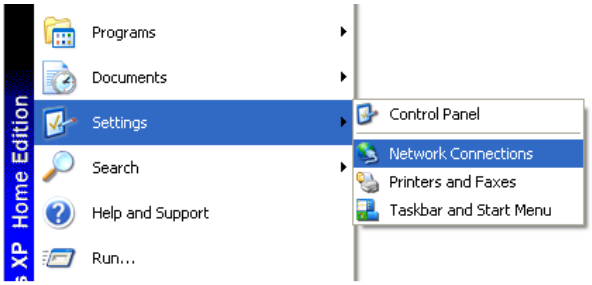
The radar does not automatically sense Ethernet TX/RX polarity. If using a direct connection and the computer Network Interface Card (NIC) or the LAN connected to the ASTIR3300 does not automatically sense polarity, a crossover cable must be used.

Each ASTIR3300 system is assigned an Ethernet Address in the range of 192.168.1.192 to 192.168.1.223 as the factory setting. This address is fixed. The radar does not implement the DHCP protocol and does not support Internet Control Message Protocol functions such as PING.

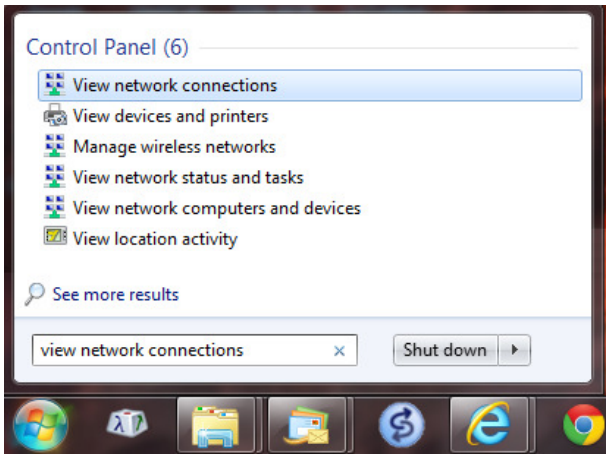
If the ASTIR3300 is connected to a LAN through a switch or router, it should be able to communicate without any changes to your computer network setting. If you cannot communicate with the ASTIR3300, verify your IP address is 192.168.1.XXX, where XXX is a number between 2 and 254. Otherwise, follow the direct connection instructions below.

If the ASTIR3300 is connected to a computer directly, the user will need to change the computer's IP address setting to a fixed IP address. To configure the IP address of your computer, do the following:

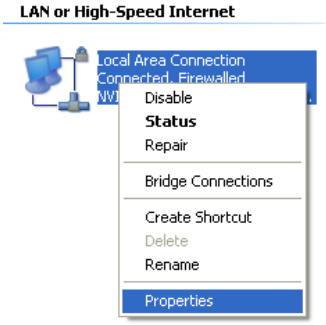
1(a). Windows XP: From the **Start** menu, select **Settings**, then **Network Connections**.



1(b). Windows 7: From the **Start** menu, select *Search programs and files*, type the following: view network connections, then press enter.

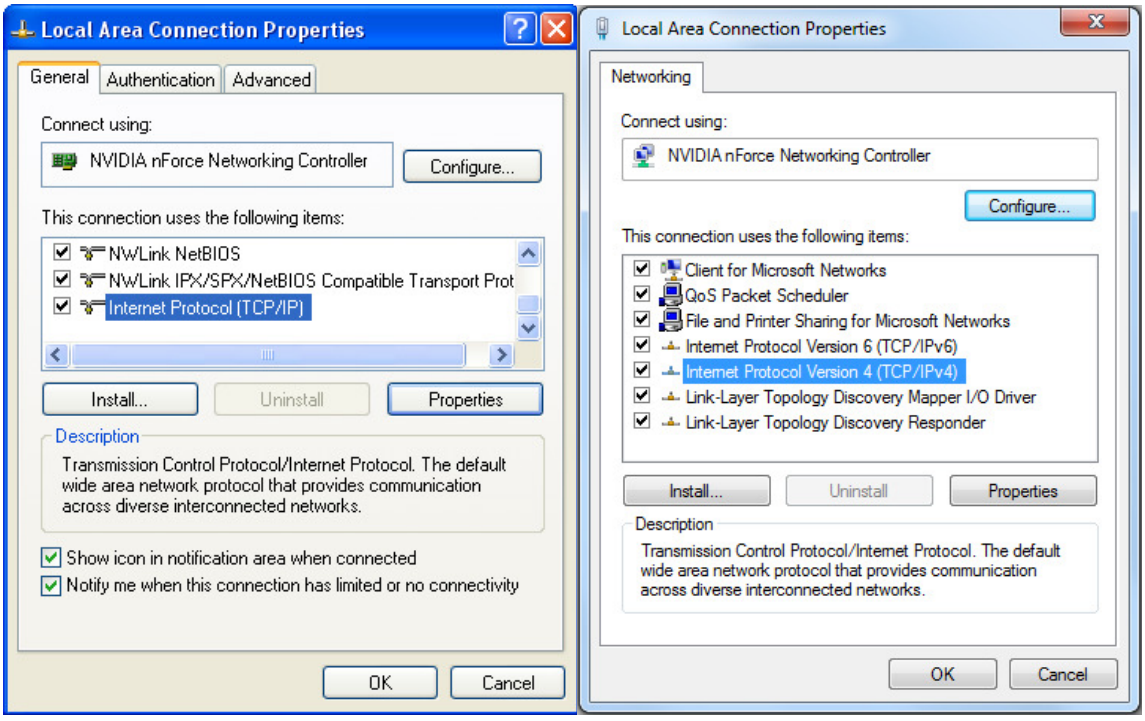


2. Right click on the Local Area Connection icon and select **Properties** from the context menu.

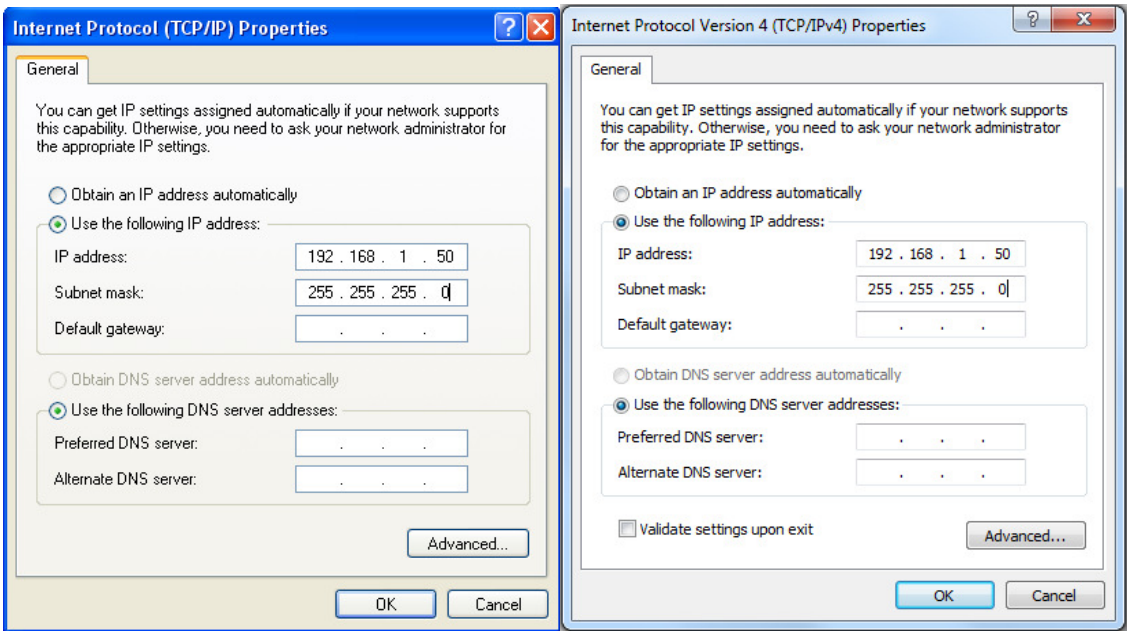


3(a). Windows XP: In the **Local Area Connection Properties** window, select Internet Protocol (TCP/IP) and click the **Properties** button. This brings up the **Internet Protocol (TCP/IP) Properties** window.

3(b). Windows 7: In the **Local Area Connection Properties** window, select Internet Protocol Version 4 (TCP/IPv4) and click the **Properties** button. This brings up the **Internet Protocol Version 4(TCP/IPv4) Properties** window.



4. Select the button for Use the following IP address, and enter an IP address as shown. The last set of digits of the address can be anything between 2 and 254 (excluding the address of the ASTIR3300.)



5. Enter the subnet mask as shown and press **OK**.

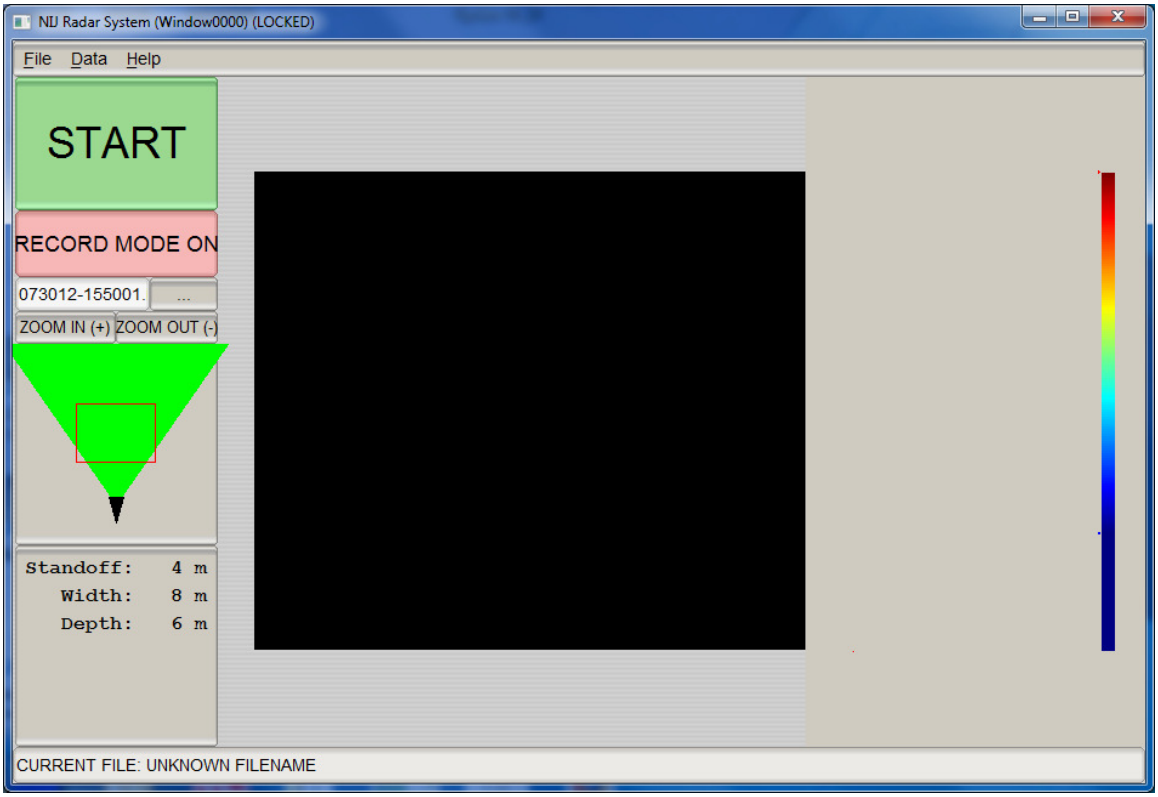
After the IP address of your computer has been set, AKELA's APRD application should be able to communicate with the ASTIR3300 normally.

On certain computers and operating systems, the user may need to disable other network connections, such as a wireless connection, that are not connected to the ASTIR3300.

Starting the APRD Application:

To start the APRD application, click on the desktop shortcut for the APRD executable, shown below. Another way to start the APRD application is to select the start menu and browse to the AKELA APRD program item.

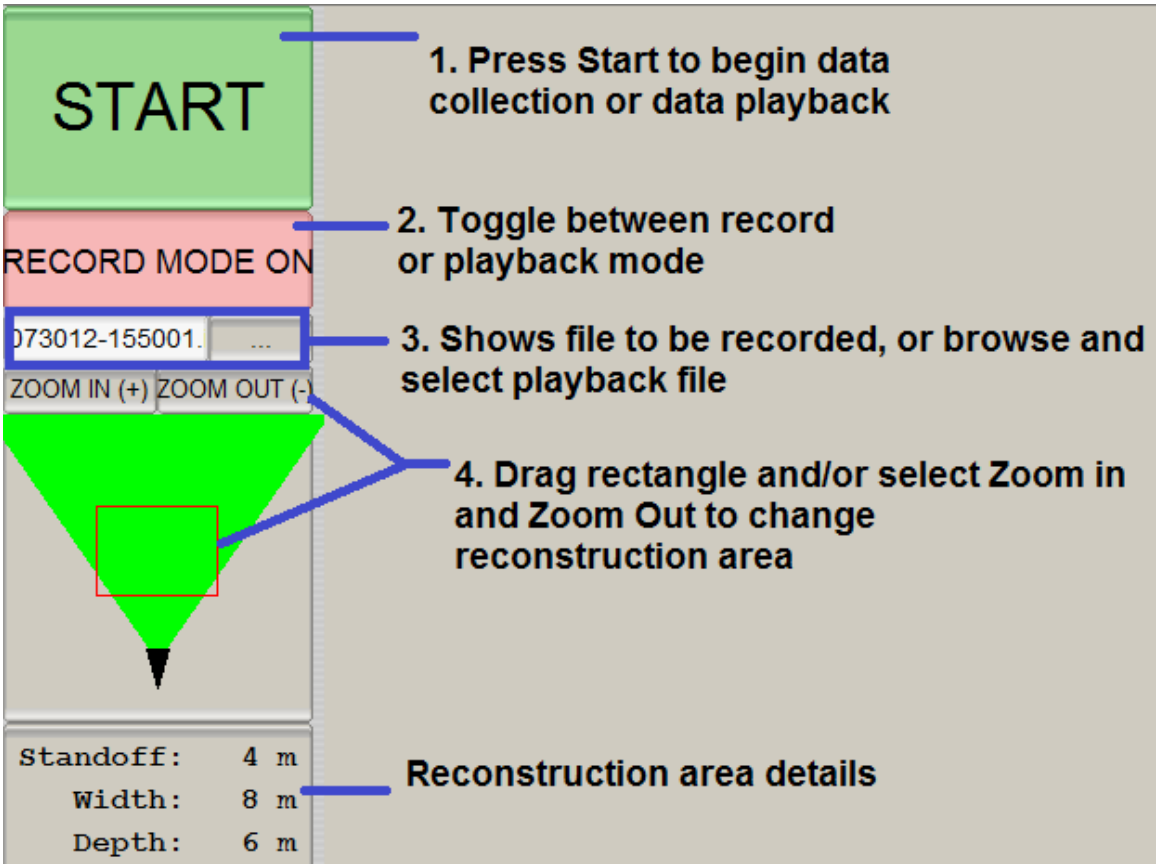
Once the program is running, the following user interface should be displayed.



Most of the user controls are located on the left column of the display area, and are designed to be as simple as possible to facilitate quick, easy operation in the field. Additional options for the user related to File management and Data playback are available through the menu bar along the top of the display.

The right side of the interface is the main display of the program, and is capable of showing the detection results in real-time as processing algorithms are applied to the acquired radar data.

4.2.4 Data Acquisition and Interpretation



To begin collecting new data:

1. Make sure Record Mode is On. Press the START button to begin data collection. The ASTIR3300 system is designed with a quick response time and starts collecting data within 2 seconds of this button being pressed. The figure above shows the location of the START button as well as the controls for adjusting the reconstruction area.

2. After data collection begins, the START button becomes a STOP button. Press the STOP button to terminate data collection. Once this button is pressed, data acquisition is completed and the data file is saved. By default, the file is saved with the date and time stamp of when the data collection began.

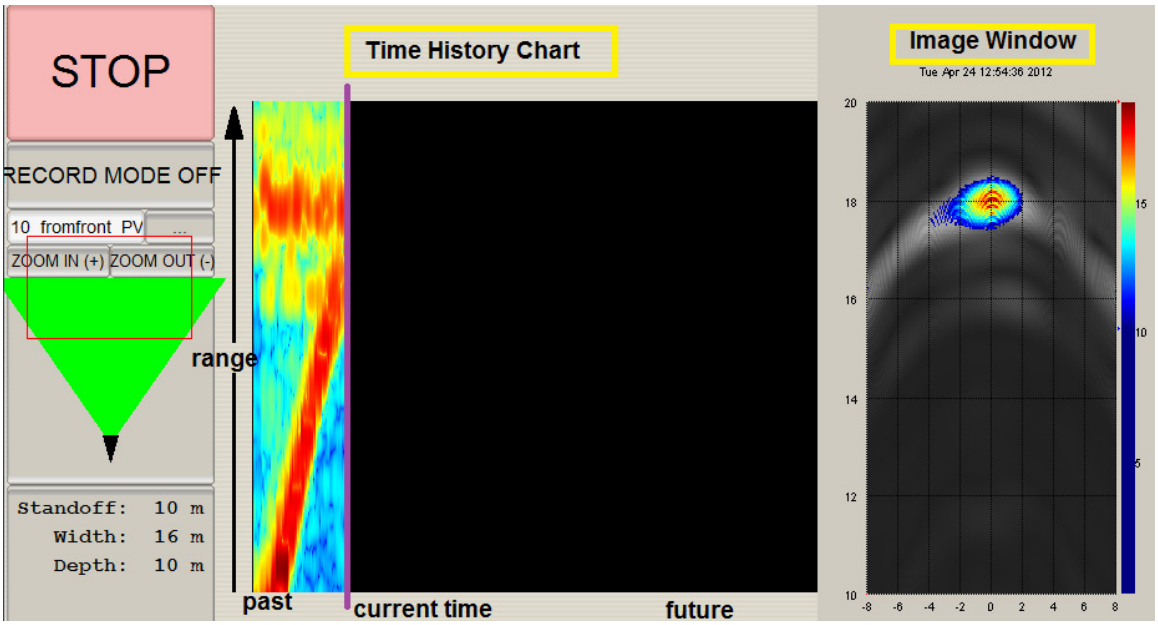
For example, if the user pressed START to begin collecting data on 7/30/2012 at 3:50:01pm, the file will be auto-saved with the following filename when data acquisition completes:

073012 - 155001.imb
(*mmddyy-hhmmss.imb*)

3. To change the reconstruction area of the image window, i.e. the horizontal and vertical axis limits of the rightmost portion of the display, the user can click and drag the red rectangle seen in the middle of the left column. The black triangle represents the location of the ASTIR3300 system, and the green triangle represents the approximate conical detection zone for the system antennas. Outside of this region, the system's detection performance may be severely restricted. The user is advised that care should be taken in choosing the placement of the system as well as the selection of the reconstruction area to ensure that the most accurate detection results are achieved.

When either the Zoom In or Zoom Out buttons are pressed, or the reconstruction area rectangle is moved, the reconstruction details are updated simultaneously in the pane at the bottom of the left column. The standoff distance indicates the distance from the front of the ASTIR3300 antennas to the nearest edge of the reconstruction area, while the width and depth represent the dimensions of the reconstruction area in cross-range and range, respectively.

After pressing the START button, the ASTIR3300 begins its data acquisition process. The display panel on the APRD user interface updates in real time to detect and track the presence and movement of individuals in the area of interest. This information is presented through the use of two displays: the Time History Chart and the Image Window.



Time History Chart

The Time History Chart enables the user to more easily detect the presence of individuals within the selected area of interest, and more importantly, track their movements over time.

The horizontal axis of the Time History Chart represents time. The vertical axis represents distance in range, as measured from the ASTIR3300 system. (The vertical axis of the Time History Chart is synchronized with the vertical axis of the Image Window, and both displays will be automatically updated whenever the reconstruction area is modified.) As data collection progresses, the Time History Chart updates one vertical strip at a time, from left to right, across the screen. The violet cursor in the figure above indicates the location of the present update. When the Time History Chart has been completely filled, the current position jumps to the far left of the chart, and new updates will continue to be recorded as the chart updates and overwrites any previous history from left to right.

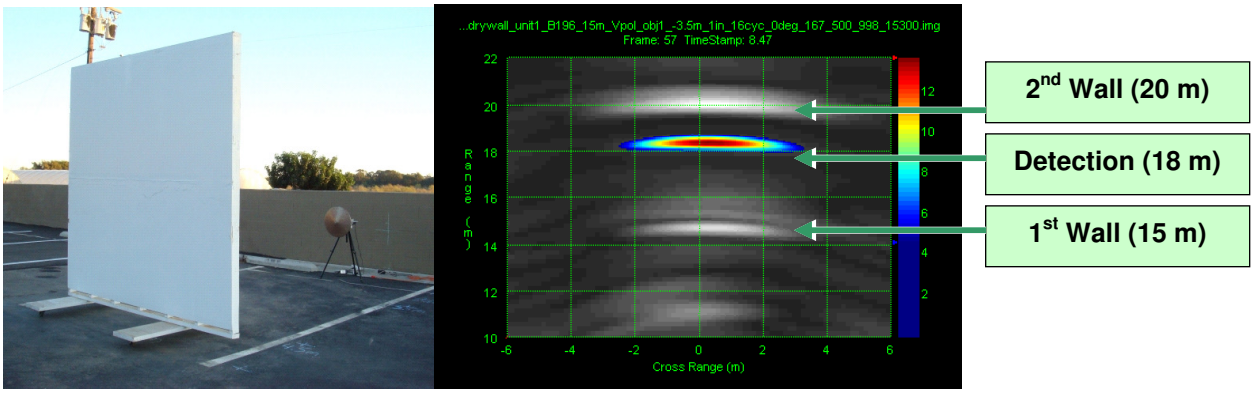
Each vertical strip of the Time History Chart indicates a Range Profile formed by extracting a single antenna combination from the radar data. The color intensity scale allows the user to see the likelihood of there being an individual or a target that is N meters in range from the ASTIR3300 system, with N increasing along the vertical axis. As an example, the Time History Chart in the previous graphic shows an individual walking at near consistent speed into the area of interest, and is captured entering the door at the front of a building. The front wall is approximately 18 meters from the ASTIR3300 system.

The range limits of what is displayed on the Time History Chart are determined by the user. The vertical axis is the same as that of the Image Window. When the user changes the reconstruction area by either dragging the red rectangle or clicking Zoom in or Zoom Out, the range limits on both the future portion of the Time History Chart as well as the Image Window will update accordingly.

Image Window

The Image Window is a graphical representation of an overhead view of the building or area of interest, showing any walls or individuals within the area and their locations in range as well as cross-range as mapped to the reconstruction area selected by the user. Prominent objects that are not moving, such as background features like walls or metal doors, are displayed in grayscale in the Image Window. Overlaid on top of this grayscale image is a breathing detection image that uses the color intensity scale to show the likelihood of a breathing or moving individual present, as well as their location in range and cross range relative to the ASTIR3300 system. However, keep in mind that larger motions of the individual are most easily seen and tracked using the Time History display.

The figure below uses a possible detection scenario, pictured on left, to demonstrate how to interpret the Image Window, shown in close up on the right. The ASTIR3300 system is placed 15 meters away from the first wall. A second wall is located five meters behind the first wall. These two walls show up in light grey at distances of 15 meters and 20 meters in range, respectively. A breathing simulator is placed 2 meters in front of the second wall, and it shows up in color at 18 meters in range in the Image Window. Since the system was lined up approximately with the center of the breathing machine, the detection shows up around 0 meters in cross range.

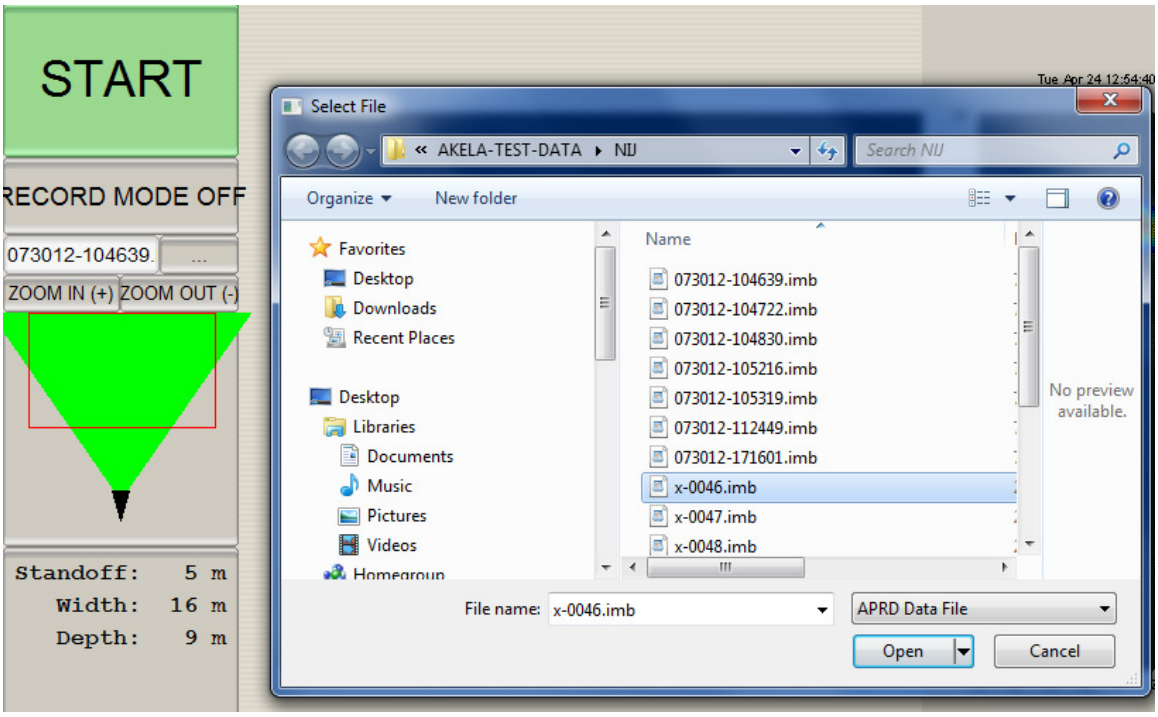


It is important to note that the detection algorithm will also pick up incidental motion including the movement of tree branches in very windy weather, objects such as heavy curtains, and swinging doors. The system is not designed to differentiate or identify various moving targets, only to detect and track their location. The user should be aware of this when using the ASTIR3300 system in such challenging environments.

4.2.5 Data Playback

By default, data files are saved with filenames consisting of (1) the date and (2) the time stamp (marked at the beginning of data acquisition).

To replay a file that was collected earlier, the user can click on the Browse button […] located to the right of the field for filenames. A Windows directory opens, allowing the user to browse the folder where files are currently being saved. Select the desired file and click Open.



Once the file has been opened, make sure that Record Mode remains Off, and press the START button to replay. To rewind the current file before it has finished playing, select Data from the menu, then select Rewind. A file that plays to the end will automatically rewind to the beginning.

4.2.6 Factors affecting detection

Different operating conditions and environmental factors may influence the detection performance of the ASTIR3300 system. Understanding these factors and, where possible, mitigating them will allow the user to fully utilize the capabilities of the ASTIR3300.

Interference

Strong interfering signals present in the frequency band used by the ASTIR3300 may degrade or alter the system's detection performance. This may occur when nearby operators in the 3100-3500 MHz frequency band are transmitting at the same time.

Prior to operating the ASTIR3300, it is recommended that the user survey other frequency licensees within the area to coordinate the frequency plan. The FCC recommends coordination with SBE, WAFC, and AWS licensees.

Operator motion

The antennas used in the ASTIR3300 are directional horn antennas, but it is important to note that these are still susceptible to motions of the user or any other observers standing behind the system. Moving individuals behind the system will show up in the image reconstruction of the area in front of the radar at approximately the same distance from the system, albeit with a reduced signal strength. During operation, it is recommended that operators and other observers behind the system refrain from unnecessary or excessive movements, and to also avoid standing at the same distance away from the system as any targets of interest. (For example, if the system is set up with a stand off distance of 10 meters from an area or building of interest, avoid standing 10 meters behind the system.)

Wall Blockage

Through-the-wall radar technology such as the ASTIR3300 has certain limitations that need to be taken into account to ensure proper usage and performance. The ASTIR3300 cannot see through metal, so operators must take care to avoid aiming the unit directly at metallic doors, significant metallic reinforcements or known blocked walls.

A visual inspection of whether there are large metallic objects within or directly in front of the wall being scanned, in addition to operator's familiarity with the type of building structures predominant in a region or neighborhood, will help the user correctly position the ASTIR3300 system for better performance.

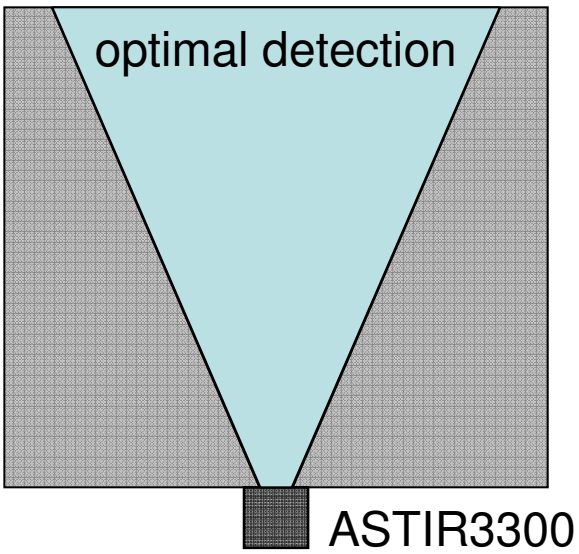
Water and Moisture

Depending on material type, moisture content can profoundly change the attenuating properties of walls. Certain types of porous walls that have been exposed to rainwater, for example, might prove more challenging for see-through-the-wall technology. This is because water is highly absorptive in the 3100-3500 MHz frequency band, such that a significant portion of the radar energy transmitted by the ASTIR3300 system is absorbed by the walls.

The operator should be aware of the relationship between water content and wall attenuation properties, and be advised of possible degraded detection performance when looking into a building or walls with high moisture content.

Region of detection

The ASTIR3300 system provides the optimal detection performance if the area of interest is located within a ±22 degree cone extending from the front of the system. Outside of the conical detection zone, the system's detection performance may be severely restricted. The figure below illustrates the detection region with respect to the position of the ASTIR3300 system.



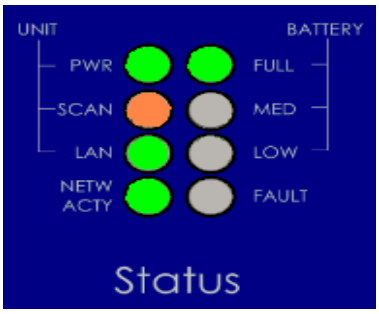
Since the ASTIR3300 supports long standoff distances of up to 30 meters, this will allow the operator to position the system such that most of the building or area of interest falls within the trapezoid of optimal detection, while also allowing law enforcement personnel to remain out of harm's way.

4.2.7 Fault and Status modes

Battery Status

With Option 001, the ASTIR3300 system is capable of operating for up to 2 hours on battery power. For long duration surveillance operations, it can run for extended periods of time when plugged into a power source. While the system is running on battery power, internal circuitry monitors the battery voltage and uses the status indicators to inform the operator when the batteries need to be replaced.

As introduced in Section 4.1 and presented below for clarity, the Battery Level indicators are as follows:



FULL	Battery is full. This indicator should always be on when using AC power.
MED	Battery level is medium.
LOW	Battery level is low.
FAULT	Indicates an internal fault has occurred, e.g. over temperature, over current, under voltage, etc.

It is recommended that the batteries be replaced when the Low battery indicator is illuminated, or to plug the ASTIR3300 in to a power source (e.g. AC source, automobile cigarette lighter receptacle), to ensure uninterrupted operation.

Built-In Test Failures (failure indicator)

The ASTIR3300 system continuously monitors internal parameters critical to proper operation of the radar. When the Fault light is illuminated, this indicates that an internal error as occurred. This may be caused by one of the following events: critical components exceeding a certain temperature, measured current exceeding a set limit, under voltage, etc. While AKELA's radar board has a demonstrated MTBF of 150,000 hours, in the event that an error should occur, the following steps are recommended.

1. Check battery level.
   Check the battery status indicators to see if the error is due to low battery levels. If this appears to be the case, either connect the ASTIR3300 system to a power source for extended operation, or replace the batteries with new ones.

2. Re-start the ASTIR3300 system.
   If the previous step does not resolve the problem, re-start the ASTIR3300 system. This can be done by pressing and holding down the On/Off button until all indicator lights go off. Wait several seconds before pressing the On/Off button once to turn the system back on.

3. If the Fault light continues to be illuminated after the steps above, please contact AKELA for technical support.

5. MAINTENANCE AND SUPPORT

Performing regular inspections of the ASTIR3300 system will help prevent damage to the hardware, as well as reduce the chances of the system failing during operation. Regular inspections also serve to extend the life of the system. The operator is advised to inspect the system both prior to operation and also after operation for maximum effectiveness.

5.1 Pre Operation Inspection

Prior to operating the ASTIR3300, perform the following checks:

1. Inspect the ASTIR3300's housing for signs of visible damage.
2. Inspect that the laptop to be used for the operation is functional and can connect successfully to the ASTIR3300
3. If Option 001 is enabled and the ASTIR3300 is to be operated on battery power, check that the batteries have sufficient charge to cover the duration of the operation.
4. Turn on the ASTIR3300 and verify that the indicator lights are working correctly.
5. Recommended: test the ASTIR3300 with a known target behind a wall at a safe location. Verify that the system hardware and graphics display are all functioning correctly.

5.2 Post Operation Inspection

After an operation has completed, it is recommended that the user follows the following steps to ensure the ASTIR3300 will be ready for the next operation and to detect preventable problems early, thereby extending the life of the system.

1. Inspect the ASTIR3300's housing for signs of visible damage.
2. If the operation took place in an environment that left traces of mud, dirt, or dust on the ASTIR3300, clean the housing with a slightly dampened cloth. Avoid using any harsh chemicals or cleaning agents. Allow the surfaces to air dry before storage.
3. Disconnect all power and Ethernet cables prior to storage. If Option 001 is enabled and the ASTIR3300 was operated on battery power, remove the batteries from the unit prior to storage. Never store the device with batteries still installed.

5.3 Storage

When storing the ASTIR3300 system, avoid placing the unit such that the front panel of the housing, where the buttons and power connectors are located, may accidentally come in contact with other hard surfaces. This may include the interior of a car trunk with other objects present, storage areas with other objects present, etc. Accidentally bumping into a system with batteries installed may turn the device on.

For systems with Option 001, the unit should always be stored with the batteries removed to prevent damage to the device.

6. SERVICE AND SUPPORT

6.1 Service / Warranty

The manufacturer's warranty for the ASTIR3300 covers defects in materials and workmanship for a period of 12 months following purchase. Problems due to misuse or mishandling of the device are not covered by the warranty. Batteries are considered consumables and are not covered by the warranty. Any damage to the unit due to failure to remove batteries prior to storage will also not be covered.

If the ASTIR3300 requires service, please contact an AKELA product support representative to obtain further instructions.

Phone: (805) 683-6414

Email: service@akelainc.com

6.2 Technical Support

To contact an AKELA product support representative with questions concerning the ASTIR3300, use the information below.

Phone: (805) 683-6414

Email: support@akelainc.com