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Xaver™ 100

User Manual

NOTE: System color and specifications are subject to change without notice.

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1 Introduction

This section provides an introduction to the Xaver™ 100, a handheld Sense Through The Wall (STTW) micro-power radar system.

2 System Overview

The Xaver™ 100 is a compact, lightweight and durable device designed for through wall presence of life detection. The Xaver™ 100 provides critical real-time information on presence of life behind a wall or barrier. Simple to operate, the Xaver™ 100 provides immediate mission-critical information wherever needed.

The Xaver™ 100 utilizes technology similar to that of the pioneering Xaver™ 800 and Xaver™ 400 systems, but in a smaller handheld system. The result is a significantly compact form factor optimized for use by tactical teams combining a performance level that suits the requirements of tactical operations.

***NOTE**: The Xaver™ 100 is user-safe. There is no radiation hazard.*

2.1 System Capabilities, Purpose & Use

The capabilities, purpose and use of the Xaver™ 100 system are as follows:

Rapid determination of presence and distance of live objects behind walls - The system provides the ability to determine people and their distance from the system.

Ability to operate with diverse structural materials – The Xaver™ 100 provides the capability to sense through many types of walls. These include all standard types of non-metal walls such as cement block, dry wall, brick, adobe, stucco, plaster and reinforced concrete. The system cannot penetrate solid metal, however, the system can sense through walls containing some forms of non-continuous metal structure.

Ease of use in the field – The Xaver™ 100's compact design is optimized for tactical operations. The system provides real-time information within seconds of powering on. Its small size and light weight enable it to be handheld. The intuitive user interface allows for quick and easy interpretation.

2.2 Technical Specifications

Specification	Description
Device type	Handheld through-wall radar
Penetrable wall materials	Most commonly used building materials; Cement, plaster, brick, concrete, cement blocks, reinforced concrete, adobe, stucco and drywall (the system cannot penetrate solid metal)
Detection range	4m, 8m, 20m
Field of view	120° in both Azimuth and Elevation
Dimensions	L:21.8cm, W:9.7cm, H:6.4cm
Weight	660g, with 4 CR123A Batteries
Power supply	4 batteries, type CR123A Or 2 AA batteries (see section 4 for approved battery types)
Battery operation time (at 25°C)	3.5 hours with 4 CR123A Batteries
	1 hour with 2 AA batteries
Operating Temperature	-20°C to +55°C
Storage Temperature	-40°C to +70°C
Environmental Conditions	MIL-STD 810F

Table 2-1: Technical specifications of the Xaver™ 100

3 Controls & Connectors

This section describes the Xaver™ 100 controls, indicators and connectors from the front, back, and bottom views.

3.1 Front View

The following figure details the Xaver™ 100 from the front view:

Figure 3-1: Xaver™ 100 Front View

No.	Label	Description	Functionality
1	Display	2.4" LCD display	LCD is protected by an anti-glare, anti-fingerprint coating, and suitable for outdoor operation.
2	On/Off Button	Turns the system On and Off	Used for powering on and off the system.
3	Mode button	Changes the display mode	Toggles between the Standard user interface and the Expert view mode.
4	Range button	Change the maximum viewing range of the system	Toggles between 4m, 8m and 20m viewing ranges.
5	Handle	Deployable handle	Handle can be opened for easy use of the system.

Table 3-1: Controls and connectors in the front view of the Xaver™ 100

3.2 Bottom View

The following figure details the Xaver™ 100 from the bottom view.

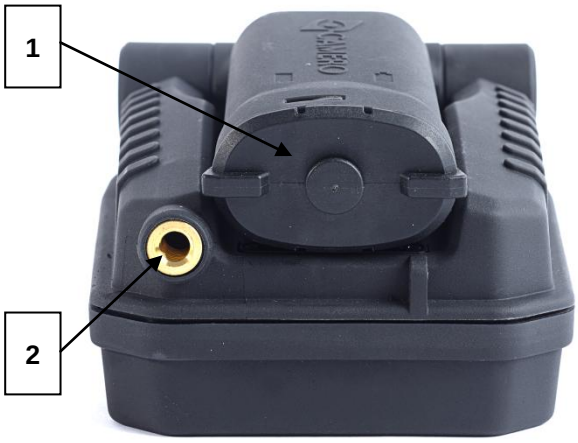


Figure 3-2: Xaver™ 100 Bottom View

No.	Label	Description	Functionality
1	Battery cover	A rotating (water-proof) cover for the battery housing	Rotates (counter clockwise) for the removal and (clockwise) for closing.
2	Tripod Threads	NC4 Female internal screw thread	Enables the system to be attached to a tripod or other mechanical device

Table 3-2: Details of the Xaver™ 100 Bottom View

3.3 Back View

The following figure details the Xaver™ 100 from the back view.

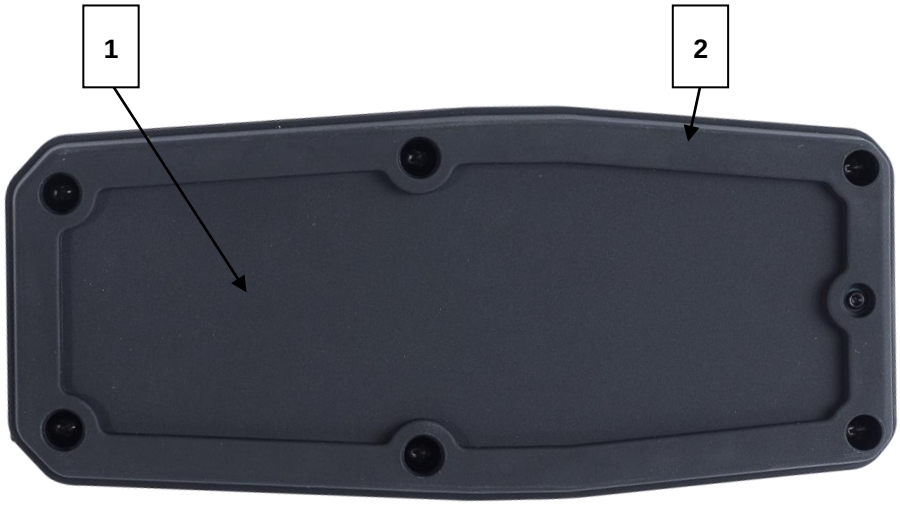


Figure 3-3: Xaver™ 100 Back View

4 Battery Setup

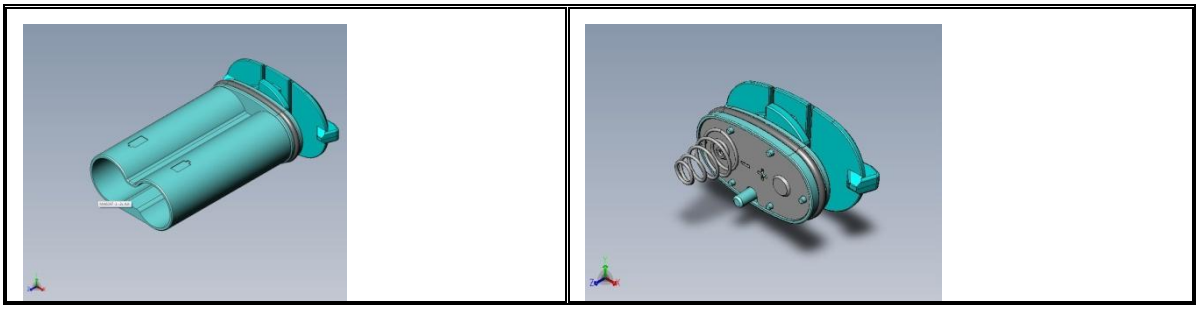
No.	Label	Description	Functionality
1	Radome	External casing for front of system	Protects the internal components of the system.
2	Spacer	A rubber like material found around the perimeter of the Radome	Provides “Soft Touch” to wall for quiet and stable wall deployment.

The Xaver™ 100 system operates on 4 CR123A battery units or 2 AA battery units.

Battery Size	Type	Approved	Approved Part	Operation time
CR123A	Pr Lithium			
AA	Primary	Energizer	L91BP-2	1 hour

Table 3-3: Description Table of Back View of the Xaver™ 100

Battery cover for AA (Use with 2 AA units)	Battery cover for CR123A (Use with 4 CR123A units)



The batteries are installed into the handle of the system as marked on the handle, and as shown in figure 4 below.

The battery cap is removed by a half turn in the counterclockwise direction. When closing the battery cover the spring section should be on the right, push down the battery cover till it is flat against the handle, only then turn the battery cover clockwise until it locks into place.

Figure 4: Xaver™ 100 Handle & Battery Cover with CR123A Batteries

NOTE: It is important to follow the above directions to preserve the integrity of the waterproof enclosure.

5 Basic System Operation

The system operation is very simple:

Power on the system by a single push of the on/off button until the system turns on.

When the system is turned on, a set of icons indicating the situation behind the wall will be displayed, as described in section 6.

Power off the system by holding the on/off button until the system turns off.

In order to sense through the wall, it is recommended to attach the system to the wall and hold it steady. If there is some living object behind the wall (within the

system detection coverage zone), an appropriate indication will be displayed on the screen, otherwise after 8 seconds (of searching) "no object detection" indication will be given.

5.1 Proper Operation of the System

There are few tips to aide in maximizing the results of the system:

- The system will not penetrate any continuous metal object.
- Whenever possible, attach the system to the wall. If not possible, the system can operate in stand-off mode at a distance from the wall. When operating in stand-off mode make sure to limit any movement near the system (see comment in the following).
- Properly locate the system on the wall where a good signal level  reading can be identified.
- Systematically relocate the system to get multiple readings from behind the wall.
- Limit all movement on the same side of the system. Movement by the user or any other people and objects on the same side of the system may cause a false reading of presence in the room due to reflections from the wall. This is especially important for walls with air cavities (such as hollow concrete blocks).

6 Screen Interface

This section describes the screen interface, i.e. the different screen indications and their meaning.

6.1 Standard Display Mode

The following screen shot describes typical indication when an object is detected behind the wall:

Figure 6-1: Xaver™ 100 Standard Display

The human icon at the top left of the display indicates the successful detection of a moving object, in the top middle a measurement of distance is displayed representing the estimated distance of the first object (closest to the system) moving in reference to the location of the system. In addition, a human icon is displayed on the range scale, indicating their location and their movement state. The movement state is indicated as the following:

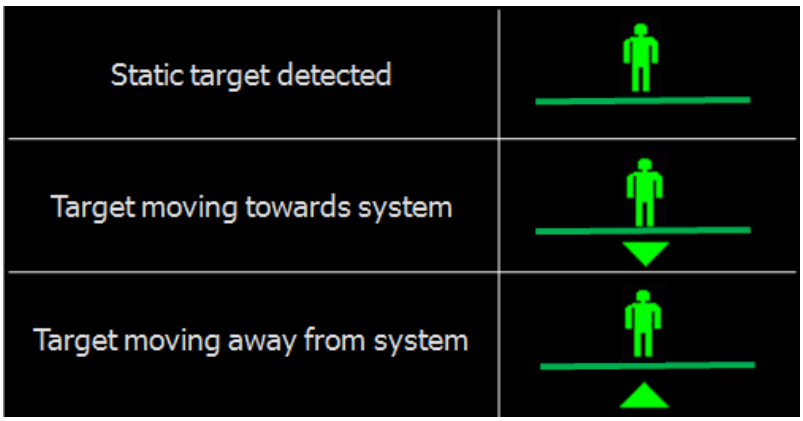


Figure 6-2: Xaver™ 100 Motion Icons

The received signal level icon , indicating the systems penetrability of the wall, is displayed in the lower right corner of the screen, by means of a 5 levels level bar.

The battery level is displayed at the lower left corner of the screen. When the icon is full , the battery level status is OK, while when it is red the remaining operation time of the system (depending on temperature and type of batteries used) is approximately 30 minutes.

6.1.1 Empty Room Indication

After approximately 8 seconds of the system searching, the following screen indication should appear when no moving object is detected behind the wall.

Figure 6-3: Xaver™ 100 Empty Room Indication

Both the text message of “No Object Detected” will be displayed in the center of the screen, and a icon will be displayed on the top left.

6.1.2 System Unstable

In order to enable proper system operation, it is preferred to attach the system to the wall and hold it steady. The system is equipped with accelerometers, enabling it to detect its movements and notify the user accordingly. When the system is not sufficiently stabilized, the following screen indication appears on the top right of the screen:

In addition, the “Unstable” warning will also appear in a text format in the top center of the screen.

6.1.3 System Acquisition Search

During the 8 seconds after the system is stably placed on the wall, there is a period at which the system tries to detect targets (living objects) behind the wall. During this period, the following rotating dial appears on the screen  .

At the same time a “Searching” message appears in the top center area of the display. If after the 8 second searching period, no moving object is detected, the “No Object Detected” indication will appear as described in section 6.1.1. For the other cases, when moving objects are successfully detected, the standard display appears, as described in section 6.1).

6.1.4 System Sensitivity

For the Standard Display Mode, the sensitivity settings can be adjusted. There are three sensitivity options; High, Normal and Low, that can be selected in the menu option as described in section 7 below. When in High Sensitivity mode, the indicator “HS” will appear at the bottom of the screen. When in Low Sensitivity mode, the indicator “LS” will appear at the bottom of the screen.

6.1.5 Wireless Display/Control*

The Xaver™ 100 can be supplied with an optional wireless remote viewing and control option. Systems that support this wireless option will have an external wireless antenna on the top side of the device as can be seen in the following image:

This Equipment uses the following Antenna and may not be used with other antenna types of higher gain:

Mfg.: SAMWOO electronics P/N SMAP-900-1

Type: a ¼ wavelength monopole helical antenna with 0 dB gain

Gain: 0 dBi

This Antenna is permanently attached with glue by Camero-Tech Ltd. before being shipped to customers.

The Xaver™ 100 with the wireless remote viewing option has an On-Screen wireless indication icon:  , when the wireless option is enabled (see section 7 for further details). The same wireless icon will generate a blue background as follows:  **,** once successful wireless communication has been established.

The wireless channel can be selected from a set of channels as can be seen on section 7 table 7-1 under “wireless channel” option and will be stated as numbers such as “1” or “10” etc.

Note: The Normal frequencies on the wireless remote viewing for the US Market will be between 906MHz - 920MHz.

*This feature is optional, and is not supplied with all models.

6.2 Expert Display Mode

The expert display can be accessed by holding down the “Mode” button (button number “3”).

The Expert Display Mode provides detailed information on the movement of objects on a rolling time axis. This view provides history of the objects movement and can be used for more detailed analysis, and rapid interpretation of the situation behind the wall. The display provides information during of the last 30 seconds (indicated with the time marks at the bottom of the screen. The range of the object is indicated by the range marks at the left side of the screen. Color coding is used to indicate the target significance where the brighter colors represent better detection of the object.

The figure below shows an example of the expert display in which a person is in motion and static (standing/sitting) states:

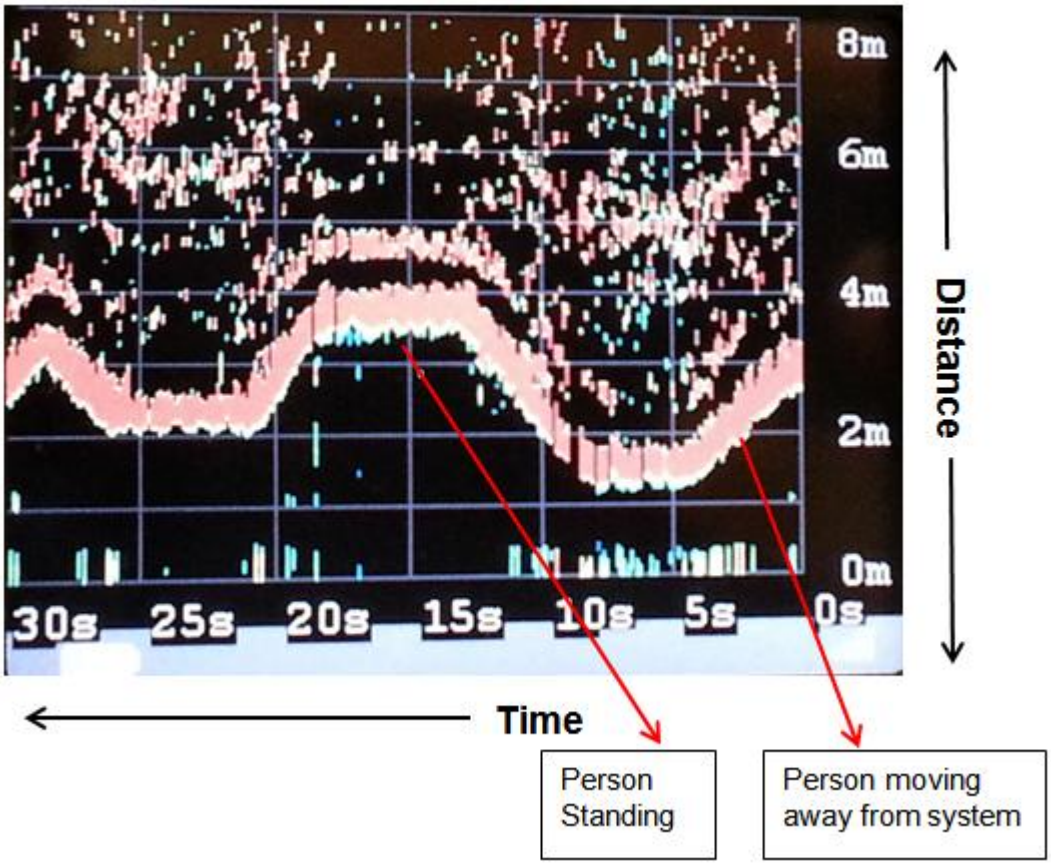


Figure 6-4: Xaver™ 100 Expert Display

6.3 System Viewing Ranges

The system has three set viewing ranges – 4m, 8m and 20m. These ranges can be selected by holding down the range button (No.4, as described in section 3.1). These range options can be applied to both the Standard Display Mode as well as the Expert Display Mode.

Reducing the viewing range will increase the probability of detection. Therefore, it is recommended to toggle through the ranges and use the shortest range option that is appropriate for the structure that is being examined.

7 System Menu

The Xaver™ 100 has a detailed system menu for changing various parameters, and understanding system information.

The system menu can be accessed by simultaneously pressing both the Mode and Range button (button 3 + button 4).

To scroll through the menu options, use the mode button (button “3”). To change a parameter use the Range button (button “4”).

The selections made will be applied automatically during the same use session; i.e., they will be lost at system power down. However, to save the selected options for use after turning the system off, the options must be saved. To save the selected options, scroll down to the “Save” parameter and selecting it with the use of the Range button (button “4”).

The menu with the description of each option is explained below:

Menu Option	Parameter	Description
		Parent group for up to 4 systems in close proximity (i.e. A1-A4 for first group and second group B1-B4).
		Channel for parent group of systems in close proximity.
		Turn on/off wireless communication for remote device. This menu item is available only on systems supporting wireless control.
		Wireless channel selection. In order to properly communicate with the remote display/control unit, the selected channel of the system must be the same as the selected channel in the remote display/control unit. This menu item is available only on systems supporting wireless control.
		Reduce or Increase the sensitivity of the system. HIGH Sensitivity mode may increase chance of user reflection.
		Select this option in order to save the current system configuration (after changing menu parameters).
		Restore will return the system to the last committed settings.
		Displays system information.
		isplay mode.

Table 7-1: Xaver™ 100 Menu Description

8 Troubleshooting

This section provides a list of possible system problems that you may encounter while operating the Xaver™ 100 and the suggested solutions.

8.1 Operational Troubleshooting

The following table describes the problems and solutions.

Problem	Cause	Solution
Screen does not turn on	**Batteries are empty**	**Replace batteries (see section 4).**
System shuts itself down	**Low battery capacity**	**Try turning on the system again. If this does not work, replace batteries (see section 4).**

8.2 Detection Troubleshooting

The following table describes the problems and solutions related to the detection performance of the system.

Problem	Cause	Solution
No targets are shown by the system	Objects are in "Dead Zones"	Relocate system position to cover "Dead Zones"
	Objects are not reflecting back to the system or shadowed by another static object	Relocate the system position on the wall
	Room may be empty	Relocate system position to verify
	Signal is too low (check Signal Level)	The wall is too tough to penetrate, try locating the system at a different position on the wall
	Live object may be very static	Increase the Sensitivity of the system in the menu settings
False target is shown on the system	The system is showing false targets due to user or other reflections from the same side as the system	Limit all movement of the user or anyone else on the same side of the system
		Decrease the sensitivity of the system

FCC Notice

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS.

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

This Equipment uses the following Antenna and may not be used with other antenna types of higher gain:

Mfg.: SAMWOO electronics P/N SMAP-900-1

Type: a ¼ wavelength monopole helical antenna with 0 dB gain

Gain: 0 dBi

This Antenna is permanently attached with glue by Camero-Tech Ltd. before being shipped to customers.

Operating Restrictions:

Operation of this device is limited to purposes associated with law enforcement, fire fighting, emergency rescue, and necessary training operations. Parties operating this equipment must hold a license issued by the Federal Communications Commission to operate a transmitter in the Public Safety Radio Pool under part 90 of this chapter. The license may be held by the organization for which the UWB operator works on a paid or volunteer basis." under the provisions of Code of Federal Regulations: CFR 47 Part 15 Subpart F. Operation by any other party is a violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties.

IMPORTANT NOTE:

The Camero Xaver100 is considered UWB imaging device and is subject to FCC Coordination requirements under the CFR Tile 47 Chapter I, Sub chapter A, Part 15, Subpart F , Section 15.525. As such it is the responsibility of the users of these systems to submit the following information to the FCC prior to use of these systems.

The users of UWB imaging devices shall supply operational areas to the FCC Office of Engineering and Technology, which shall coordinate this information with the Federal Government through the National Telecommunications and Information Administration. The information provided by the UWB operator shall include the name, address and other pertinent contact information of the user, the desired geographical area(s) of operation, and the FCC ID number and other nomenclature of the UWB device. If the imaging device is intended to be used for mobile applications, the geographical area(s) of operation may be the state(s) or county(ies) in which the equipment will be operated. The operator of an imaging system used for fixed operation shall supply a specific geographical location or the address at which the equipment will be operated.

This material shall be submitted to Frequency Coordination Branch, OET, Federal Communications Commission, 445 12th Street, SW, Washington, D.C. 20554, Attn: UWB Coordination.

The operator shall comply with any constraints on equipment usage resulting from this coordination.