SurgiTel®
A Division of General Scientific Corp.

SurgiCam® Pro Digital Camera System

Two Year Limited Warranty

General Scientific Corp. ("GSC") warrants SurgiCam® Pro (Product) against defects in material or workmanship as follows:

ORIGINAL PRODUCT: GSC will repair the product with new or refurbished parts, free of charge, for a period of two (2) years from the date of original purchase in the event of a defect or defects in materials or workmanship.

REPAIRS: GSC will repair or replace defective parts with new or refurbished parts, free of charge. The warranty of repairs is limited for a period equal to the remainder of the original limited warranty period on the original product, or for ninety (90) days after the date of the repair or replacement, whichever is longer.

This warranty is extended only to the original purchaser. A purchase receipt, bill of sale or other proof of date of original purchase will be required before warranty service is rendered. This warranty covers only failures due to defects in materials and workmanship which occur during normal use. The warranty does not cover damages which occurred in shipment, cosmetic damage, damage that is attributable to acts of God, failures which are caused by products not supplied by the warrantor, or failures which result from accident, misuse, abuse, neglect, mishandling, faulty installation, misapplication, improper installation, operation or maintenance, alteration, modification, introduction of sand, humidity or liquids, line power surge, improper voltage supply, lightning damage, or subjecting the product to operating/environmental conditions in excess of the maximum values or below the minimum values set forth in the applicable specifications, or products serviced by anyone other than GSC.

This warranty is invalid if the factory-applied serial number has been altered or removed from the product or if the camera casing has been opened. This warranty does not cover products sold AS IS or WITH ALL FAULTS. This warranty excludes all optical lenses.

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Some states do not allow the exclusion or limitation of incidental or consequential damages, or allow limitations on how long an implied warranty lasts, so the above exclusions or limitations may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state. If a problem with this product develops during or after the warranty period, please contact:

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1. Introduction

Thank you for choosing the SurgiCam® Pro Digital Camera System. Designed from the ground up with ease-of-use in mind, this digital video camera will take you to a level of simplicity and portability never achieved before.

We suggest that you take a few minutes to consult this manual before you begin to use your SurgiCam® Pro Digital Camera System. By doing so, you will reap the full benefits of what your digital camera has to offer.

1.1. *The SurgiCam® Pro Digital Camera System*

The SurgiCam® Pro Digital Camera is a digital video device. Compared to an analog device, the SurgiCam® Pro Digital Camera digitally acquires video data, compresses it and transfers it to your computer in its digital form over the USB standard.

The lenses of your SurgiCam® Pro Digital Camera System have been pre-calibrated in order to obtain the clearest and sharpest picture in operating room light conditions. This eliminates most of the adjustments you would normally have to perform.

Each individual lens is calibrated for use on your own camera at a distance to match your normal working distance. It is possible to operate the camera from a different focal distance; however, some adjustments are required.

Your SurgiCam® Pro Digital Camera System may be used with lenses other than the ones it came with. If you choose to do so, please contact your General Scientific Corp. representative for information about different magnification lenses available.

⚠️ **The digital camera requires good lighting conditions to perform optimal quality video and images. The camera does not perform well in less illuminated conditions. The use of a complementary head light is recommended.**

1.2. *Sterilization*

DO NOT STERILIZE THE CAMERA.

Attempting to sterilize the camera or any other part will most likely damage it.

The SurgiCam® Pro Digital Camera must not be sterilized. It is designed to be used in a non-sterilized zone. It is recommended to perform the adjustments before its use in a surgical environment. When mounted on an operating room tripod, the use of a protective sterile drape is strongly recommended.

1.3. *Interference from Other Equipment*

The SurgiCam® Pro Digital Camera System was designed to minimize electrical interference problems that may result from using high power electrical equipment in the vicinity of the camera. An auto-reset feature has been developed and implemented into the camera that will detect that condition and automatically reset the camera to its initial state. If the Camera hasn't recovered from an interference problem within a short delay, you can manually reset it by unplugging it and plugging it back in.

1.4. Lens Options

Three magnification lens options (2x, 3x and 5x) are available for the SurgiCam® Pro. Some procedures may require wide field-of-view images and others greater details of objects. Lower magnification power lens will allow wider field-of-view and higher magnification power lens show more details of objects.

- **2x lens** offers a wider field-of-view with minimal loss of image detail.

- **3x lens** offers an optimal balance between magnification (or detail) and field-of-view and is suitable for most procedures.

- **5x lens** offers greater image quality with reduced field-of-view.

1.5. Connectivity and Interoperability

Because image frames captured by the SurgiCam® Pro Digital Camera System are natively digital, its video data is easily transferred to another medium, image processing is hassle-free, noise and distortion are a non-issue, and image frames remaining are fully intact.

Furthermore, once your video footage has been recorded, you can easily edit it and save it in your preferred file format.

1.6. *For your Protection*

Your new SurgiCam® Pro Digital Camera is designed to be used conjointly with your personal computer as a USB device. Before using the camera, you must ensure that your computer meets the requirements for this type of environment. For this reason, you should:

⚠	**Never use the camera system as diagnostic equipment.**
⚠	**Ensure that the lens is securely tightened to the camera and that it will not come loose or fall during the intervention. Hand tightening only, using a tool will most likely damage the lens.**
⚠	**Do not operate camera at extreme temperatures. Normal operating temperatures are between 59°F (15°C) and 77°F (25°C).**
⚠	**Do not let the camera or any of its components near a child to avoid any risk of suffocation.**
⚠	**For external use only. Always keep the recommended distance between the camera and the sterilized zone.**
⚠	**Avoid any contact with water. Do not submerge under water.**
⚠	**Do not attach objects that are not designed to be used with the camera.**

2. Hardware Setup

The SurgiCam® Pro Digital Camera System is designed so that it requires very little effort to set up. The digital camera is delivered pre-attached to the accessories you have ordered. Some accessories may need to be setup on per-need basis.

2.1. *Package Content*

The following equipment comes standard with any SurgiCam® Pro Digital Camera System kit:

- One SurgiCam® Pro Digital Camera
- A printed copy of this User's Manual
- An installation CD for the SurgiCam® Pro Software for Windows XP / Vista / 7 in English
- Two hex keys

The following optional accessories may be included:

- Various pre-calibrated camera lenses
- LED Light
- Fiber Optic Light

2.2. _Lens Iris Adjustment_

A variable optical iris enables the control of the amount of light provided to the image sensor. Figure 1 shows how to adjust the iris.

The size of iris will be adjusted by rotating the front ring on the lens. The adjustment of the iris size will change the amount of light to the image sensor. Clockwise will allow more light and counter clockwise will reduce the amount of light, allowing for greater depth of focus. *(Figure 1)*

Close

Open

Figure 1

A fully opened iris provides the maximum amount of light to the image sensor. The main advantage of using an open iris is to better adapt to various lighting conditions of different environments.

Conversely, a closed iris allows the minimum amount of light. The main advantage of using a closed iris is to increase the depth-of-focus, which is of paramount importance when the camera is mounted on your loupes or headlight. Video images may be "noisy" at first when the iris is closed in a poor lighting condition, but the combination with a co-axial headlight illumination eliminates noises on images and greatly improves the depth-of-focus.

Optimizing the iris size with the combination of headlight or other lights, users will capture high quality video or snapshot images and achieve a long depth-of-focus.

2.3. _Working Distance Adjustment_

Lenses are calibrated at your normal working distance. Users proceeding with closer or further distances might experience blurred images as the camera would be out of the focus range.

For the maximum depth-of-focus and the highest image quality you need to adjust the lens iris (aperture) to the optimum/smallest size possible.

1. Hold the camera by aiming it at a target set to your desired working distance. *(Figure 2)*

2. Position the camera lens to the open iris position. (Note: The open iris position depth of focus will be 2 inches. Also a smaller iris will increase the depth of focus.) *(Figure 1, pg. 10)*

3. Adjust the camera (vertical direction and rotationally) so that the target is in the center of your monitor screen. *(Figure 3)*

4. Loosen the set screw on the side of the camera housing using the provided (.035") hex key. *(Figure 4, pg. 13)*

5. Rotate the rear ring of the lens of the camera to achieve the best image (not just the lens). Rotating the lens to the right (clockwise) makes the distance longer, rotating to the left (counter clockwise) makes the distance shorter. *(Figure 5, pg. 13)*

6. When the best focus is found, lock the lens in position by tightening the set screw with your (.035") hex key. *(Figure 4, pg. 13)*

7. Minimize/optimize the size of iris, but the iris should not be closed completely. The minimum/optimum iris size allows for the greatest depth of focus. *(Figure 1, pg. 10)*

| Figure 2 | Figure 3 |

⚠ Any lens used in combination with a headlight should have a closed iris in order to increase the depth of field. It is strongly recommended to combine the use of the camera with a light source because of this benefit.

Any lens used in combination with an Image Stabilizer Arm should have an open iris in order to have the maximal amount of light for the camera.

2.4. Lens Replacement

⚠️ **Before removing the lens, ensure that you are in a dust free environment in order to minimize the risks of dust and grime collecting on the surface of the optical image sensor.**

To replace the lens, unscrew the lens currently attached to the front of the SurgiCam® Pro Digital Camera. Inspect the new lens to ensure it is clean and screw it in place. Never use a tool to remove or tighten the lens as it may damage it.

You may notice spots on the image that never move if there are specks of dust on the image sensor or the lens. Clean the affected area with a lens cloth and isopropyl alcohol. Take care not to use a cloth that will scratch or leave fabric fibers on the optical components after cleaning. Keep unused lenses in a dust free environment.

1. The set screw on the side of the lens holder holds the lens. The set screw can be tightened or loosened with a (.035") hex key. This tool is provided in your accessory kit. *(Figure 4)*

2. Remove the lens (counter clockwise) from the lens holder, by rotating the rear ring on the lens. *(Figure 5)*

3. Attach the new lens and tighten the set screw. *(Figure 5)*

   (Note: Make sure the camera housing and lens are clean before assembling)

4. Adjust the working distance of your camera *(refer to Section 2.3.)*.

Figure 4

Figure 5

2.5. *Connecting to the Computer*

The only connection required by
the SurgiCam® Pro Digital
Camera System is to plug the
camera cable into your
computer's USB port.

**Look for the USB symbol if you have problems
locating a USB port.**

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3. Software Setup

3.1. _System Requirements_

- Intel Pentium 4 or AMS Athlon CPU running at 1.2 GHz or faster
- 512 MB minimum system RAM
- 50 GB minimum hard disk space
- Microsoft Windows XP, Vista or 7 (32 bit or 64 bit) operating system

3.2. _SurgiCam® Pro Setup_

⚠️ **Do not connect the SurgiCam® Pro Digital Camera System to your computer's USB port before you are done with the software installation.**

⚠️ **Verify that you are logged on to your Windows workstation as a user with Administrative privileges; otherwise the software may not work as expected.**

Insert the CD-ROM in your computer's CD drive, and the setup procedure should begin automatically. If it doesn't, manually launch the "Setup.exe" program by browsing the files on your installation CD.

Once the software installation is complete you are ready to connect the SurgiCam® Pro to an available USB port. To launch the software double click the SurgiCam® Pro icon on your desktop or in the start menu.

To insure that your computer will allow video capturing and playback you may want to disable Data Execution Prevention (DEP) for the SurgiCam® Pro software and Windows Explorer. (Control Panel → System → Advanced → Settings → DEP → Turn off DEP for the above applications).

4. Using the Software

4.1. Interface Overview

1. Information panel
2. Camera configuration panel
3. Video control panel
4. Display panel
5. File management panel

4.1.1. Information Panel

The information panel is where you will enter any case specific information.

The Date field is automatically populated with the current date.

The File Name is a required field and this is how the video file will be named.

The Patient Name, Hospital Name, Procedure Name, and Comments field are optional to fill out.

4.1.2. Camera Configuration Panel

The camera configuration panel is used to adjust camera settings. You may use the Slider bars or the Right and Left arrows of the keyboard to change the values of settings.

- Brightness: The luminosity of a visible object.
- Contrast: The degree of difference between light and dark extremes of color on a monitor or on printed output.
- Saturation: Vividness of hue, degree of difference between gray of the same lightness or brightness.
- Sharpness: Clarity of form and detail.
- Default: Returns all the setting to the default value.

Image Resolution:

Video: select this resolution for capturing video images. Image resolution is 640x480 pixels, 30 frames/sec, AVI file format.

Snapshot: select this resolution for capturing still images. Image resolution is 1280x1024 pixels, JPEG file format.

Image orientation tabs: These tabs allow you to rotate or mirror the image.

4.1.3. Video Control Panel

The video control panel can be compared with the control panel of a VCR, most of the functions work exactly the same way.

- Video recording buttons: Audio On/Off, Record (F5), Pause, Stop (F4), Open, Snapshot
- Video playback buttons: Play (F6), Pause (F8), Stop (F4), Open, Snapshot (F7)
- Snapshot recording buttons: Pause, Stop, Open, Snapshot
- Snapshot playback buttons: Open, Live

To record with audio the Audio checkbox needs to be checked prior to starting the recording. You may not check or uncheck this box during recording.

4.1.4. Display Panel

The display panel is where the video preview is displayed. Full screen option can be enabled by using the **F9** key. To return to window mode press Esc.

4.1.5. File Management Panel

This is the list of video and snapshot files you have recorded. To view a file in the display panel click on the file's thumbnail. You may use the arrows on the right and left side of the file management panel to scroll through the recorded Snapshot files.

- Delete: You may select one or more files and delete them by clicking this button.
- Edit: Clicking this button opens up your video or photo editing program.
- Images: Clicking this button opens the folder containing the recorded Snapshots.
- Videos: Clicking this button opens the folder containing the recorded Videos.

4.2. *Operating the SurgiCam® Pro Digital Camera System*

4.2.1. Preview Mode

When you launch the SurgiCam® Pro software with a SurgiCam® Pro Digital Camera plugged in your computer, the software automatically switches to Preview mode. In this mode, the picture captured by the SurgiCam® Pro Digital Camera is shown on screen but nothing is recorded on your computer's hard drive.

Before you start recording video footage, some adjustments should be done to ensure that you will obtain the best possible picture.

1. Center the SurgiCam® Pro Digital Camera on the viewing area (This may not be relevant depending on how you use your SurgiCam® Pro Digital Camera System).

2. Adjust the distance between the SurgiCam® Pro Digital Camera and the viewing area to ensure that the image focus is perfect.

3. If required, fine-tune the picture using the filters available in the Camera Configuration panel (see section 4.1.2).

4.2.2. Recording Video Footage

⚠ **Recording digital videos makes high demand of your computer's resources. For this reason, it is critical that you close all other applications before recording with the SurgiCam® Pro software.**

It is important to disable any screen savers or energy saving feature that may be enabled on your computer. Refer to your operating system documentation for specific instructions on how to disable these features.

Once you are done with the picture adjustment, you are ready to start recording video footage:

1. Click the **Record** button or press the **F5** key to start recording. You will know that the software is recording because of the word "Recording" appearing in the top of the Display panel.

2. If, for some reason, you need to momentarily interrupt the recording, press the **Pause** button. Press it again to resume recording.

3. Once you are done with your case, press the **Stop** button or press the **F4** key to stop recording. The current project will be saved to disk in the SurgiCam® Pro "Record" sub-folder.

4. Fill the Information panel with any information relevant to the case you are recording. This step can be performed at a later time; however, it is recommended that you enter some basic information on-the-fly to be able to identify this case in the future.

   • The recorded video files will be saved in the Video folder under C:\Program Files\SurgiCam Pro\VIDEOS.

You should always make a copy of your original material on a recordable CD or DVD before editing it. It is a good practice to move your material to a recordable media as soon as possible. You can always copy the files back to your computer's hard drive if you need to edit them at a later time.

4.2.3. Video Playback

Once a video project has been captured, you will most likely wish to review it at a later date:

1. If the Video Files panel isn't visible on-screen, click the **File List** button to show the list of your projects.

2. Click on the project that you wish to view. Notice that the Information section is updated with information from the project you just selected.

3. Press the **Play** button or the **F6** key to start playback.

4. You can change the current position within the video by using the slider in the Camera Control panel. Simply click and hold the scroll thumb and drag it to a new location.

⚠️ **You can start instant playback of a project directly from the Video Files panel by double-clicking on one of the projects.**

4.2.4. Capturing Still Images

You can take a snapshot of a single image from what you see in the Display panel at any time by pressing the **Snapshot** button or the **F7** key.

• The recorded snapshot files will be saved in the Snapshot folder under C:\Program Files\SurgiCam Pro\Snapshot.

> ⚠️ **You should rename the snapshot files that you wish to keep and move them to a different location using Windows Explorer as soon as possible.**

5. Technical Support

If you encounter trouble with your SurgiCam® Pro Digital Camera System or its accompanying software, follow the steps below to obtain assistance:

1. Consult this *User's Guide* for information related to the situation.

2. Check the Support section of our web site at **www.surgitel.com.**

3. Contact us via email at: info@surgitel.com. Please include a detailed description of the situation.