17 Virtual Colonoscopy

The Virtual Colonoscopy application enables fast and easy visualization of colon scans, using acquired CT images.

Two workflow stages are provided in Virtual Colonoscopy:

- **Define stage.** When a study is loaded, the application automatically segments the air-filled colon and displays a calculated center line.

- **Navigation stage.** In this stage you can examine the virtual colon to search for suspected colon polyps. Various imaging methods are available for viewing, as well as various display arrangements (layouts), including cine mode. When examining the colon, both manually and automatically, you can mark your "Findings" in a list and send the results as images and text to the Reporting function.

NOTICE

Before continuing, refer to the "Instructions for Use" that came with your scanner.

Other Features

- **Single Image Navigation.** The 3D Single Image Navigation feature improves the perception of navigation performance when operating the Portal in the "lossless" mode. (More information is provided in the section "Navigation Workflow" on page 465 section, later in this chapter).

- **Electronic Cleansing.** The (optional) Cleansing function (fecal tagging) removes oral contrast, if any is present in the bowel. The Cleansing function detects the presence of the contrast in the colon and removes it from images. This reduces artifacts and presents an image with a true anatomic display of all structures, with a smooth, accurate transition at the air-fluid interface. Cleansing can potentially improve polyp detection where lesions are under fluid, or rule out lesions where residual stool could mimic a polyp.

- **Computer Assisted Detection.** The (optional) Computer Assisted Detection function (CAD) can assist your search for polyps.

  There are two CAD algorithms in use. The user interface for the two algorithms is identical. The algorithm used is dependent on geographic location:

  – The CAD algorithm is not available in the United State. See section "Computer Assisted Detection" on page 459.

  – The VeraLook iCAD algorithm is only available in the USA. See section "VeraLook iCAD Algorithm" on page 461.

NOTICE

The CAD Option in both configurations requires an additional license key.

NOTICE

The Electronic Cleansing function is not available in the United States.

The Electronic Cleansing function requires and additional license key.

Load Multiple Studies in Application

To load multiple studies in the application:

1. Use the **Ctrl** key when selecting studies from the Directory list.

2. Select the application from the Applications menu.

3. Confirm the studies are from the same patient.

NOTICE

Depending on your Portal configuration, this application may not be available.

Benefits

If the device is used as specified under the circumstances and conditions as described in the Indications for Use, the Virtual Colonoscopy application can be used to search for suspected colon polyps.

The expected patient benefits are:

- By using 3D virtual dissection, radiologists can interpret CT colonographic data in a time-efficient manner without sacrificing diagnostic performance. Average reading times are routinely less than 10 minutes.

- The Perspective Filet View significantly improves the sensitivity for polyp detection by a novice reader.

- The Electronic Cleansing function displays anatomic structures which may have been hidden behind tagged fluid, with a smooth transition at the air-fluid interface.

- The VC CAD option can be used as a second reader and assist in the search for polyps.
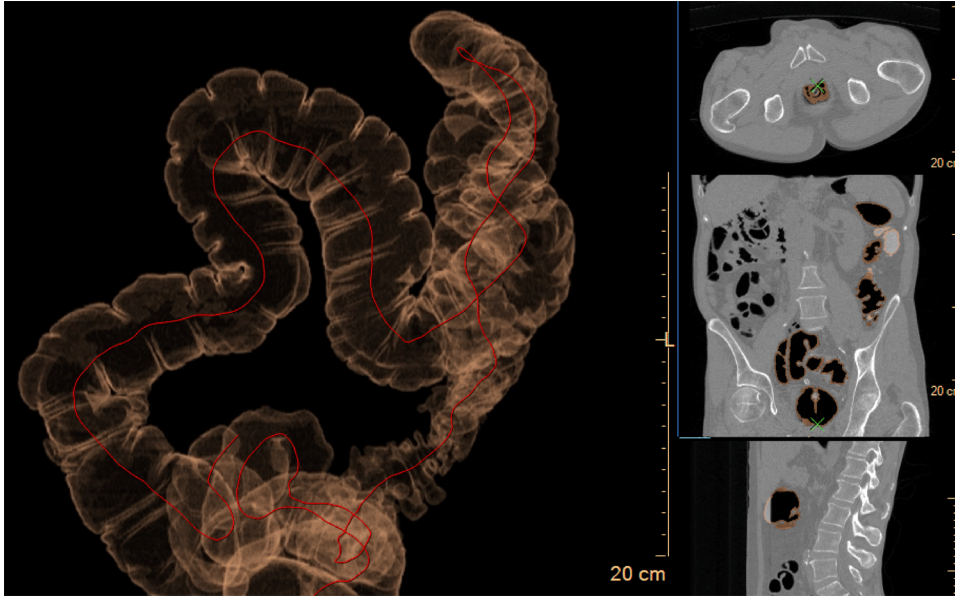
With the resulting radiological conclusion, the referring physician can advise the patient or further investigations.

Indications for Use

CT Virtual Colonoscopy application support visualization and analysis of the Colon from CT Scans and enables 3D visualization of the colon to support examination of virtual colonoscopy on Specifically acquired CT images. Based on the results from radiologists, the referring physician may determine whether a patient needs to be referred to a gastroenterologist.

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Define Work Stage

Click on the Virtual Colonoscopy application icon once you have selected the appropriate colonoscopy studies from the Directory.

There is a delay before you see the opening display (shown above). During colon segmentation, the application is looking for air-filled structures, according to specific Hounsfield Unit values.

Status messages are shown at the bottom of the screen, including "Computing colon segments," "Contrast was removed," and "Verify centerline extraction. If necessary manually correct segmentation . . ."

The application automatically segments the air-filled colon. calculating and displaying a center line, with start and end points labeled.

Structures identified as the colon are colored; other air-filled structures are colored translucent white.

Define Work Stage Warnings

⚠️ **WARNING**

One or more of these image types may appear in this application: curved MPR, straightened MPR, volume images, and thick slab images. Measurements you make on such processed images can sometimes be misleading. When saving such images, make sure they are labeled properly.

Cross sectional images might rotate around the centerline. Please note orientation annotations on images.

In cases where the orientation annotations are not displayed on the image - you must not assume any specific orientation. For correct orientation information - use only the images which display such information. The distance from start of navigation (marked as S) measurement is based on the extracted centerline.

The distance should not be used as a SOLE basis for locating findings in any clinical procedure.

Define Work Stage Tools

See **Report**, **Film**, **CT Common Processes** and **CT Common Tools** for information on using common options, tools, functions, and processes.

Orientation

The three Orientation buttons allow you to select the viewing orientation, Axial, Coronal, and Sagittal, of the active viewport (the viewport with the blue frame).

Flip

Use the Flip button to flip the active volume viewport 180 degrees.

Layout

Use the Layout button to select a different layout or create a custom layout.

Compare

The Compare function allows you to perform a side-by-side review of images from two studies of the same patient, supine and prone.

Relate

The Relate functions allow you to relate a location on one image of the patient to that location as viewed on other image(s) of the patient.

Next or Previous Series

Use this function to move to the next or previous series in the patient study. The button is enabled when more than one series has been loaded to the current application.

Show Transparent

Click Show Transparent to view, in a semi-transparent mode, all bone that was removed during launch.

High Quality

This function adjusts the rendering parameters to display a sharper image to enhance details.

NOTICE

Activating High Quality can slow processing. It is best to complete all image processing before activating it.

Define Work Stage Functions

See **Report**, **Film**, **CT Common Processes** and **CT Common Tools** for information on using common options, tools, functions, and processes.

Key Images

Save groups of images that can be reviewed in any system supporting the defined standard. See **Instructions for Use** > **Directory** > **Key Image Notes** for more information.

Electronic Cleansing

NOTICE

The computer assisted detection (CAD) for polyps and the Electronic Cleansing functions are not available in the United States.

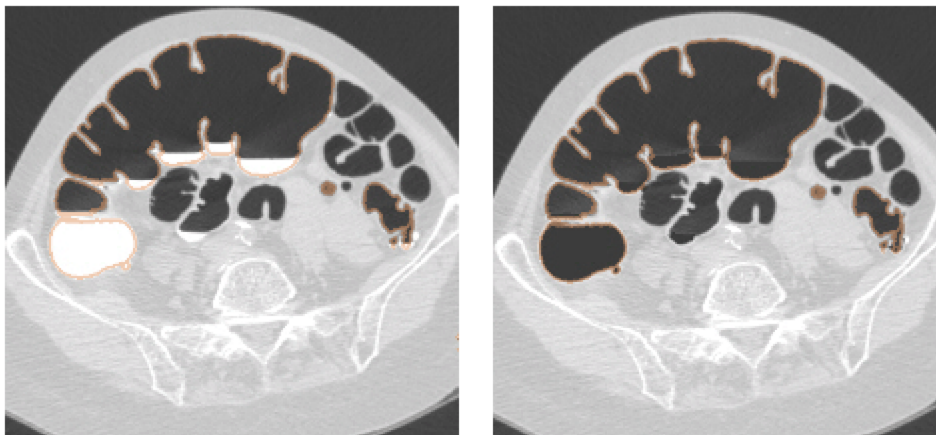The Electronic cleansing option requires an additional license key.

If your Portal system is equipped with electronic Cleansing, the Virtual Colonoscopy application attempts to detect contrast in the bowel during the launch. During launch, the application assesses the amount of contrast and its HU threshold and automatically applies it if cleansing is needed.

NOTICE

You can turn off Cleansing by un-checking the check box.

The Cleansing function is never applied to the Volume viewport.

If no contrast is detected by the application the cleansing function remains inactive as indicated by the grayed-out Apply Cleansing check box.

⚠️ **WARNING**
Verify accuracy of the cleansing operation to avoid misdiagnosis.

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Electronic Cleansing Method

NOTICE

To specify the default method of Cleansing, select a setting in the VC Properties function tab in the Define and Navigation work stage. See section "Navigation Workflow" on page 465.

The IntelliSpace Portal makes available two fecal tagging (electronic cleansing) algorithms:

High-density Contrast

This algorithm is new to the Portal, and is adapted from the Philips ViewForum workstation, where it was clinically validated. It can yield better image quality, especially on high contrasts (>250 HU) in the bowel.

NOTICE

On the first use of the Virtual Colonoscopy application, the High Contrast type is enabled.

In bowels that have low density contrast, it is possible that the High Contrast method may not cleanse all fecal matter.

When comparing images of the same study using the two cleansing methods, you may notice that the cleansing results differ, and the resulting surface rendered images may be different.
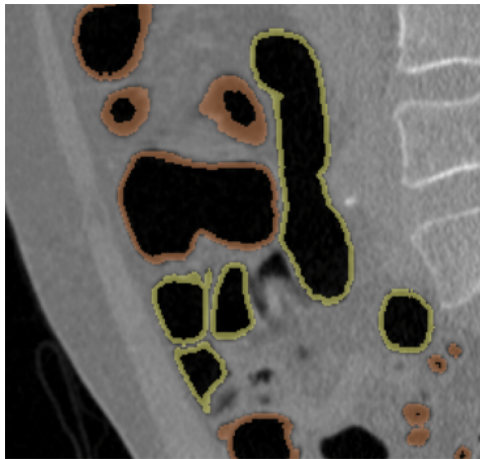
NOTICE

When a study has low density contrast (less than 250 HU), the High Contrast method will not be applied. A warning message appears in the message bar to alert the user.

Show Highlights

Click Show Highlights to display highlights identifying the colon and small intestine. Highlights are shown in the reference viewports.
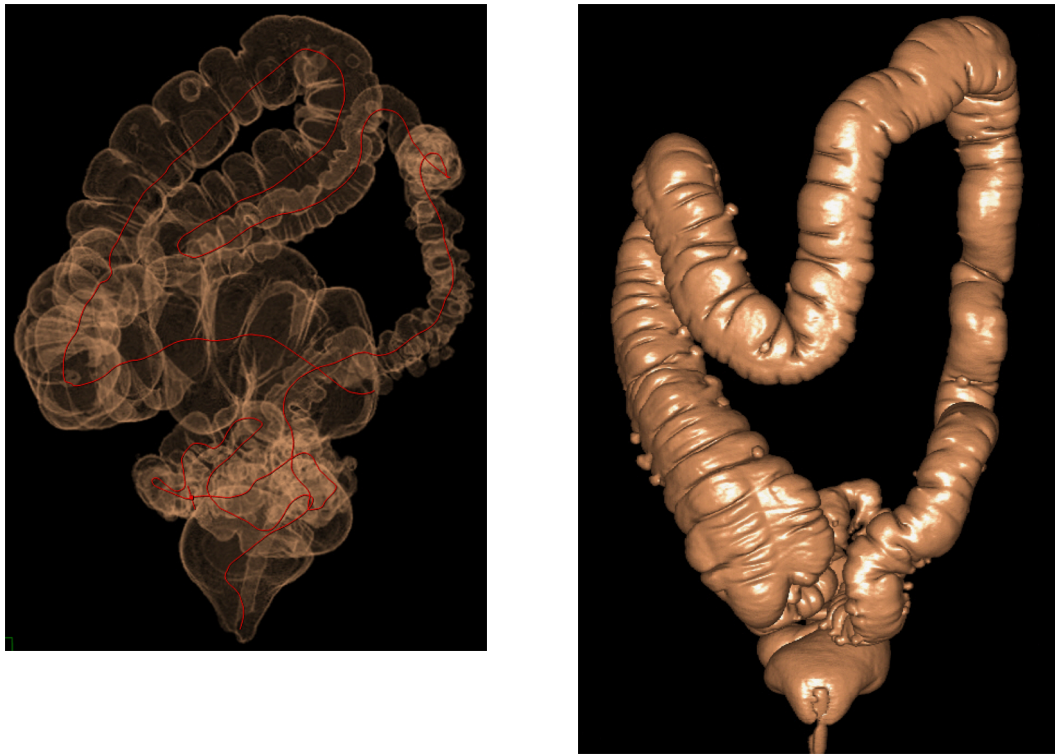
Show Anatomical Segments

Anatomical segments are the boundaries (or interfaces) between the six colon segments, starting with the beginning of the rectum; the second is the beginning of the sigmoid, and so on. Click the Show Anatomical Labels icon to turn the labels on and off.

One or more of the Anatomical Segments boundaries may need manual adjustment. To adjust a boundary (or interface) line, drag it along the centerline to its correct position.

Opaque Colon

In the volume image viewport you can change the default Transparent mode to the Opaque mode. This changes the colon image from transparent (left) to an opaque (right), which may help orient you to the partial views presented in other viewports.

Centerline Editing

In some cases the colon is segmented as a single complete structure. In other cases, the colon is segmented in several parts, depending on the contiguity of the air-filled structures. If the centerline is not correctly placed, use one of the editing tools described below.

⚠️ **WARNING**

Verify center line extraction. If necessary manually correct segmentation with the tools provided in this application.

Scroll Along Centerline

The **Scroll Along Centerline** feature helps to check for the correctness of the centerline.

By default, this feature is enabled in the Define stage. When scrolling the MPR image, the green cross represents the centerline location.

To disable the **Scroll Along Centerline** function, use the Context menu (right mouse button). Unchecking this feature allows scrolling along the Z-position.

 NOTICE

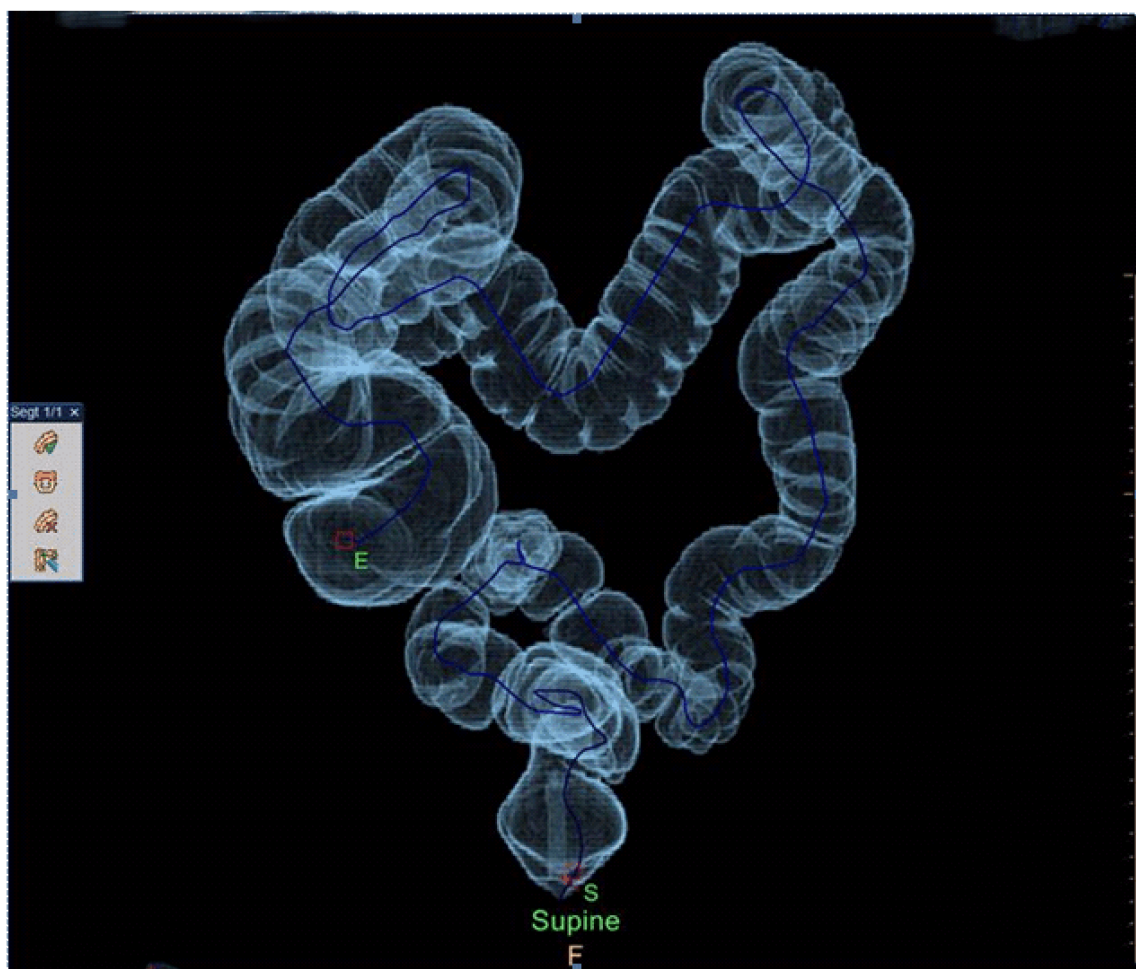 This feature is also available in the Navigation stage.

Editing Per Segment

If the colon is produced with more than one segment, click the **Enable editing** button to activate the editing tools, in order to manually identify the missing parts and connect them.

Enable editing is selected by default. To check the centerline, start by selecting the first segment (i.e. rectum).

The colon turns blue. When you approach the centerline it turns yellow. The segment Edit tools appear as a floating dialog on the 3D volume view.

Editing Tools

A floating dialog appears when a segment is selected. The dialog includes four options, which are described below.

Recalculate & Add Centerline - This button is active when a segment is rejected or it is necessary to recalculate the centerline. Click to add the active segment. The centerline of this segment is now added to the existing centerline.

Flip Start & End Position - Exchanges the start and end points of the centerline per segment. The centerline starts in the rectum and ends in the cecum, by default. The connection of each segment is established in this order.

Remove Centerline & Hide Segment - When selected, simultaneously rejects the segment (centerline) and hides the segment. When clicked, the active segment disappears from the image.

Position Seed Points - Allows the addition of seed points to the centerline. The pencil cursor numbers the seed points as they are placed on the centerline.

Reject All Segments

Clicking this button removes the calculated centerline and allows the user to build the centerline starting at the rectum.

Hide Rejected (white) Segments

Selecting the **Hide rejected (white) Segments** check box hides the white segments without the presence of a centerline on the 3D volume image. Deselect the check box to regain access to the hidden segments.

Editing Entire Centerline

Drawing a New Centerline

When the algorithm fails or the calculated centerline cannot be fixed using the segmentation editing tools, manually draw a new centerline.

1. Select the **Draw new Centerline** icon to remove the current centerline and start drawing the centerline from scratch.

   The mouse pointer turns into a pencil, as an indication for positioning seed points.

2. Place seed points.

3. Once the centerline is completed, either double-click on the last point or press the **Draw new Centerline** icon again.

   - A seed point can be placed in any viewport, including outside of the calculated segments.
   - Users can switch between viewports.
   - While drawing, it is possible to reposition the centerline by pointing at the line and moving the point.
   - When drawing a new centerline, it is possible to select a layout that includes a cMPR.
   - If rotation is required, either press the left and right mouse buttons simultaneously or use the **Roll/Rotate** option (from the Context Menu or Common Tools).
   - If necessary, use the Context Menu to delete a selected point. All seed point numbers are re-ordered by the system.
   - All points are connected consecutively, using a simple spline.
   - When the colon is very curvy, ensure to set enough points.
   - There is no automatic centering. If the manual created centerline is set closely to the colon wall, this might limit the endo view.

Editing an Entire Centerline

Edit Entire Centerline allows manual corrections to complete the centerline. It can be used to make corrections after drawing a new centerline. In addition, it can be used to make corrections of the entire centerline that was calculated per Segment.

NOTICE

When selected, the Per Segment Tools are disabled.

Navigation Work Stage

In this stage you can examine the virtual colon and search for and view suspected colon polyps. Various image types are available for viewing, as well as various display arrangements (layouts), including cine mode.

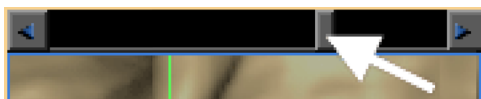The (optional) automatic detecting function (CAD) can assist your search for polyps.

NOTICE

The computer assisted detection (CAD) for polyps and the Electronic Cleansing functions are not available in the United States.

When examining the colon, both manually and automatically, you can mark your "Findings" in a list and send the results as images and text to the Reporting function.

The navigate stage provides a variety of viewing utilities, image types, and display arrangements (layouts). These utilities allow you to search the virtual colon, and identify and examine suspected polyps:

- The scroll bar at the top of the Navigate display lets you quickly view the entire colon along the center line.

- The center line navigation utility lets you to "fly" through the colon in cine fashion, continuously or step-by-step.

- Interactive navigation lets you "fly" through the colon by steering the view, using your mouse on the image.

- The (optional) colon polyp computer aided detection (CAD) helps you detect and analyze intracolonic polyps. Polyp-like tissues are highlighted and displayed as you scroll through the images.

- Compare - for quick correlation, lets you look at two views of the patient at the same time, such as supine, prone and decubitus views.

  To use the Compare function, both cases must be loaded at the same time, when the application is started.

Cursor Display

In this stage, it is possible to switch between three different crosshair states. Select **Show lesions cross-hair** from the **Context** menu (right-click). The following curser display options are available:

- **Show as "Plus" shaped** - This option is the system default.

- **Show as "dot" shaped** - A cursor in the shape of a red dot appears.

- **Do not show** - There is no cursor displayed.

The cursor display setting affects all images at once (including endo, fillet, volume, MPR, CS 4).
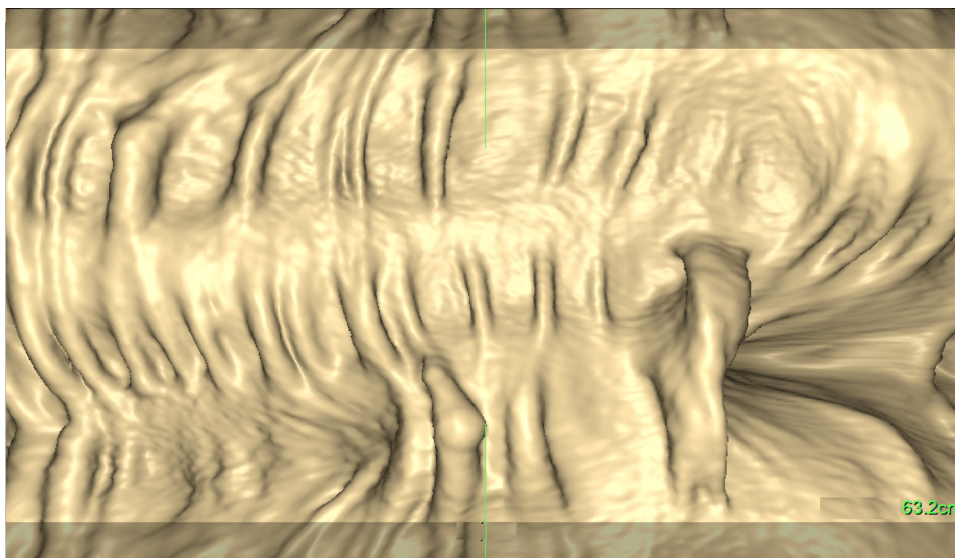
The cursor setting is not saved with Bookmarks.

The system remembers the last setting (per user), which will be either a plus shape or dot. The **Do not show** option is not permitted as a possible default option.

Colonoscopy Images

You can also use any of the view modes, in addition to the orthogonal views, for the colon study.

Filet

A view that cuts a tubular section of the colon longitudinally and stretches it onto a 420-degree image. This view displays the 30-degree overlap on top and bottom of the image. The overlap area is shaded for identification, and allows full viewing coverage. The filet image provides a fast visual examination of the colon, and gives you a broader range of view than either Endo or Split.
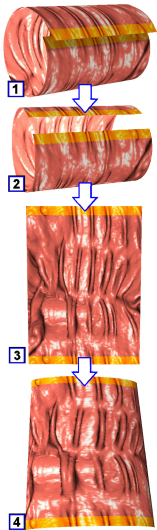

⚠️ **WARNING**

The Filet viewing mode should NOT be used as the SOLE basis for clinical diagnosis.

Orientation of view is with the end of the colon toward the right, toward the cecum. The green vertical lines at the center of the viewport correspond to the center of the yellow highlight in the 3D Colon Map (the location is marked with a blue arrow).

Filet View Measurement

Mixed Layout measures approximately 6 centimeters.

Filet Layout measures approximately 10 centimeters.

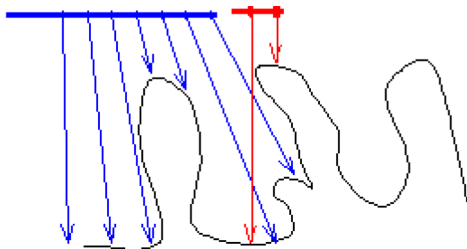420 degree view with a 30 degree overlap.

The Filet image gives a virtual dissection projection that is, in effect, like cutting a section of the colon open longitudinally and spreading it from top to bottom in the viewport, so the entire wall circumference of the colon section can be seen in one view.

The Filet view is formed with an overlap of 30-degrees at the top and bottom, yielding a 420-degree image. (The overlap guarantees full viewing coverage.)

The overlap is marked by shaded portions at the top and bottom of the viewport.

The Filet image is created using a novel visualization technique called the perspective-filet view. This is designed to show as much of the entire colon wall as possible from any point along the centerline. It overcomes the "blind spots" sometimes created when all of the projection rays are perpendicular to the centerline.
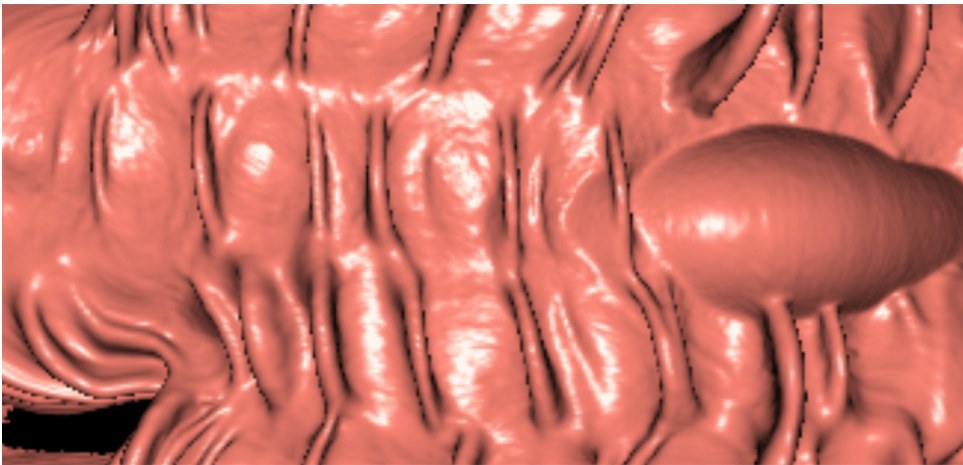
The illustration below is a simple diagram of the perspective technique.

By tilting the projection rays as a function of the distance from the central location, the view adds perspective to the previously flat view. You can now see the antegrade and retrograde sides of the folds without having to manipulate the view at all.

This technique produces some display distortions, both horizontal and vertical. Horizontal distortion is pronounced at the left and right regions of the image, where parts of the colon wall that are not "visible" with the perspective technique are black. (Scrolling and/or navigating reveals these hidden areas at left and right.)

Below is another image that demonstrates distortion in the filet image. What appears to be a domed structure is actually a flat pool of oral contrast (which may be removed with the Cleansing function).
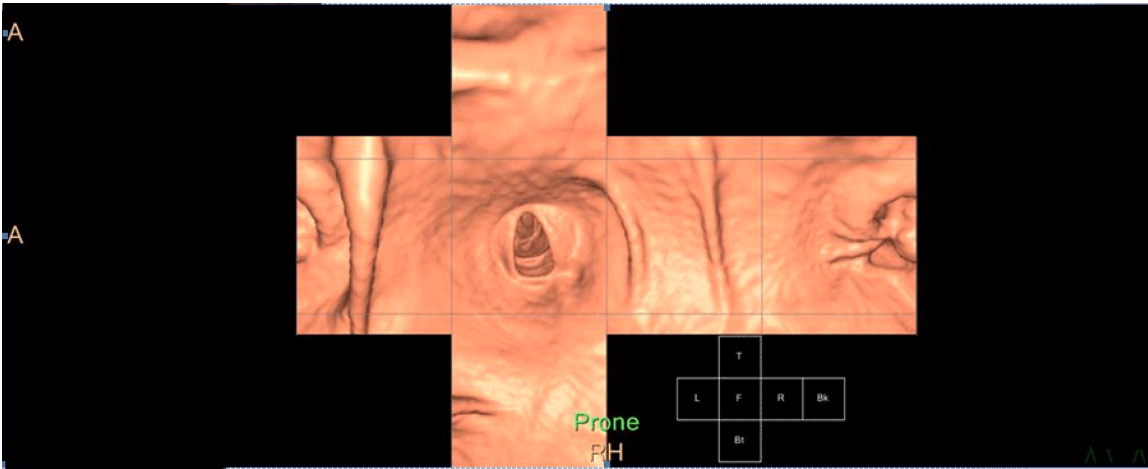
NOTICE

The computer assisted detection (CAD) for polyps and the Electronic Cleansing functions are not available in the United States.

Unfolded

The navigation covers the whole colon in one fly-through (as with filet) by presenting a "flat" image of an unfolded cube, having 6 square surfaces.

	Top		
Left	Forward	Right	Backward
	Bottom		

The surfaces are displayed based as from the center of a cube, viewing along the centerline. The unfolded surfaces are the walls forward, back, left, right, and top and bottom respectively, as shown in the legend which accompanies the layout. (The legend can be shown or hidden: use the Show/hide legend function in the right-click menu of the main viewport.)

On the Unfolded view, there exist "overlapping areas" that correspond to the squares that "touch" each other when the cube is reassembled.

The Unfolded viewport includes the unfolded image and three reference images: 3D colon with centerline path and eye-direction, axial, and cross-section. (In the Compare mode, only two reference images are shown: 3D and axial.)

The functionality and navigation for Unfolded are similar to Endo mode, with the exception of the following:
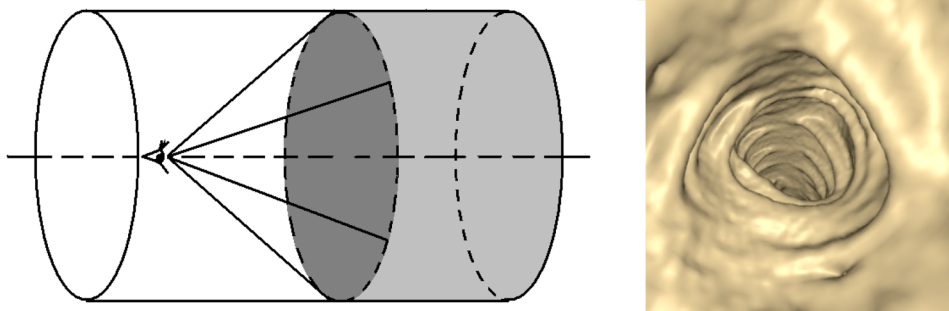
- Zoom, Pan and Swivel cannot be applied to the unfolded view.
- 3D measurements are restricted within one square at the time.
- Findings are displayed directly on the surfaces. The same finding/lesion can be displayed simultaneously in several squares due to the overlapping nature of the view.
- No diameter is displayed for the unfolded view.
- A lesion from the CAD results is displayed on the unfolded view.

NOTICE

The computer assisted detection (CAD) for polyps and the Electronic Cleansing functions are not available in the United States.
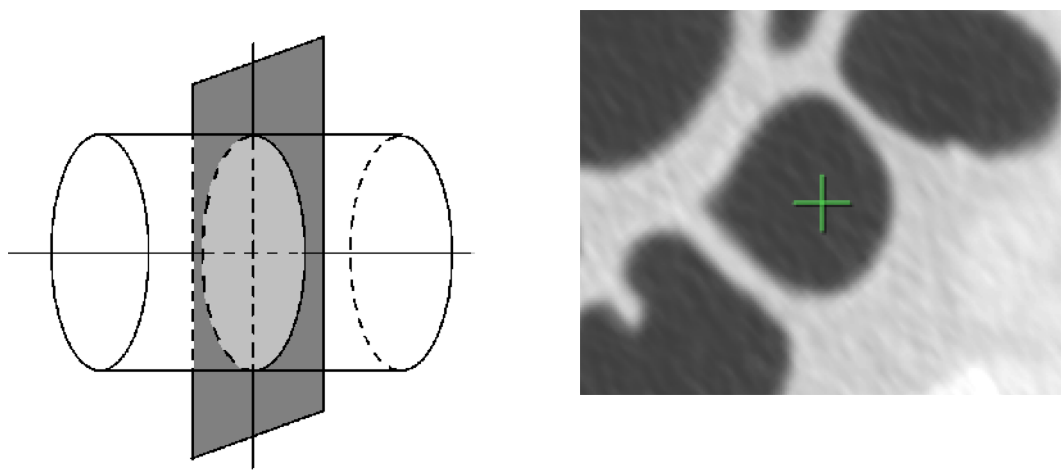
Endo

This is an endoscopic view of the colon. The view direction is toward the end of the colon, the cecum (default). The 3-D endo-luminal view of the colon is displayed when the (virtual) camera is oriented parallel to the centerline passing through the colon.
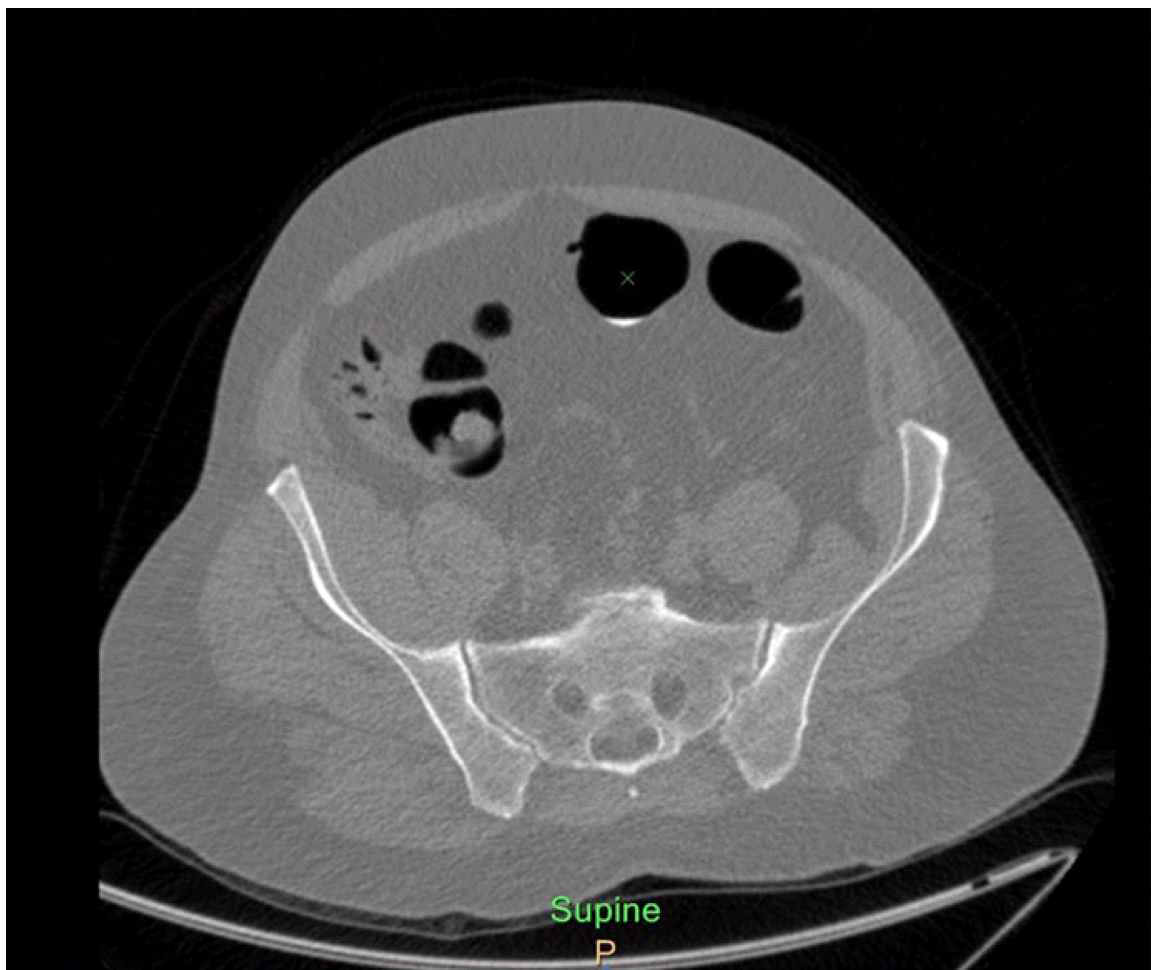

Cross-section

The cross-sectional view is perpendicular to the centerline. The centerline is identified by the green crosshair. The cross-sectional view of the colon is formed by a plane cutting through it at right angle to the centerline.

Axial

Reference Images

The axial image is one of the MPR images that can be used as reference.

There are two ways to scroll through the axial images:

- **Scroll along centerline** - When scrolling the images, the centerline is followed. This may result in jumping from one Z-position to the other. The green cross shows an arrow next to it, showing the direction of the centerline in depth.

- **Scroll in consecutive order of Z-position** - Using the right mouse button, the scroll along centerline function can be disabled to allow to scrolling in consecutive order.
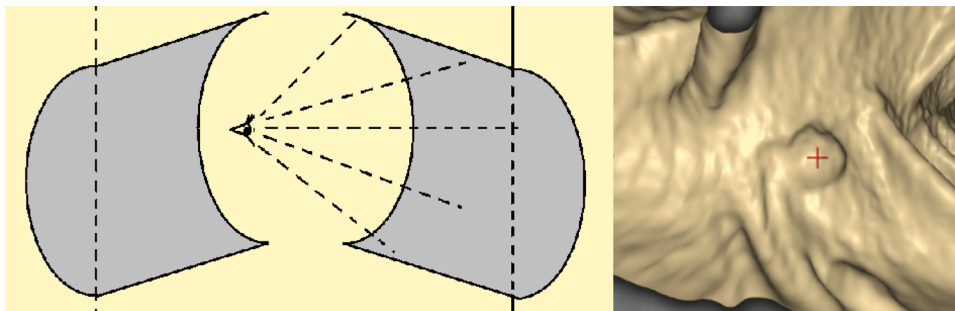
Split Image

NOTICE

This view is only available in the Endo view after a finding is marked with **Mark new finding** feature.

The Split image allows you to views the colon (perpendicular to the center line), splitting the colon in half to show the far wall. It is the 180° view of the colon, displayed when the eye point is at the centerline, oriented towards the colon mucosa.

Layouts

The opening display defaults to the last layout used (user dependant, no default factory or according to the **Save User Settings** feature [see section "Navigation Workflow" on page 465]).

You can Enlarge any of the images in any of the layouts by double clicking in the desired viewport.

Layout selections allow you to choose various viewport arrangements, combining 3D Colon Map, Endo or Split, Filet, and several conventional image formats.

NOTICE

You can adjust display parameters of the Filet, Endo, and Split images with tools in the Image Properties function tab.

Save Layouts

Allows you to keep your layouts: Click the **Save Layout** icon. Type a name for the layout. Click **OK** to save the layout, or **Cancel** to close the dialog box without saving the layout.

Layout Manager

Allows you to manage layouts (viewport display arrangements). It operates the same as described in Common Processes, except that it is more oriented toward the colon. So, you can customize and save your layouts to include Filet, Endo, and Inspect view. (The Inspect image type is accessed from the Image Properties function tab.)

Filet Layout

In the upper half of the image area is the Long Filet view. In the lower half are the 3D Colon Map, the cross section, and Endo images.

⚠ **WARNING**

The Filet viewing mode should NOT be used as the SOLE basis for clinical diagnosis.

Standard Layout

This is the default layout. In the upper half of the image area are the Endo and 3D Colon Map views. In the lower half are the axial, coronal, and sagittal images. There is no filet view.

Filet Endo Layout

The upper half of the image area consists of the Filet and Endo views. In the lower half are the Axial and 3D Colon Map images.

Basic Layout

In the left half of the image area is the Axial view. On the right are the Endo and 3D Colon Map images.

Reference Image

If a layout does not display the desired images, open the Context Menu (right mouse button) .

Select the first option, **Reference Image** and then make a selection from the submenu to replace the active image.

Navigation Tools

Anatomical Segments

Enable to view the different colon segments onto the 3D volume image. See section "Navigation Work Stage" on page 448.

Centerline Navigation

`10 ⬍ ⏮ ◀ ▶ ⏭`

The cine controls allow you to automatically navigate the centerline forward (to C, cecum) or backward (to R, rectum). Set the navigation speed as desired.

There is an "anti-data-skip" function may be automatically applied in the case of network slowness. This function slows down the navigation "play" speed if the slowness might cause the display of some 3D colon data to be dropped.

When using Compare in the Navigation Stage, the speed of the shorter segment decreases to ensure that navigation reaches the next segment at the same time. This is done using the registration process with the user-located anatomical sections.

Flip Endo View

Use the Flip Endo View button to flip the active image during the Navigation stage. The tool will flip volume, Eye direction in 180 deg. (via Endo), and cross-section images prone to supine and vice versa.

NOTICE

The Flip Endo View function is only active when the Endo View image is active. Click the button or activate the desired image and use the **O** key on the keyboard.

Alternate Window

Use the **Alternate window** button to switch between Colon and Abdomen window settings that are preset in **Preferences**. The window settings can also be changed by using the numbers on the keyboard.

Set Exterior Cannula Length

Use the Set Exterior Cannula Length feature to compensate for the length of the inflation cannula length out of the rectum when the centerline is passing through it. To set the length, prone and supine are set independently:

- Using the reference views, navigate along the centerline in the cannula until the start of the rectum.
- Copy the distance into the Exterior Cannula Length setting. This creates a new reference origin for the findings during navigation.
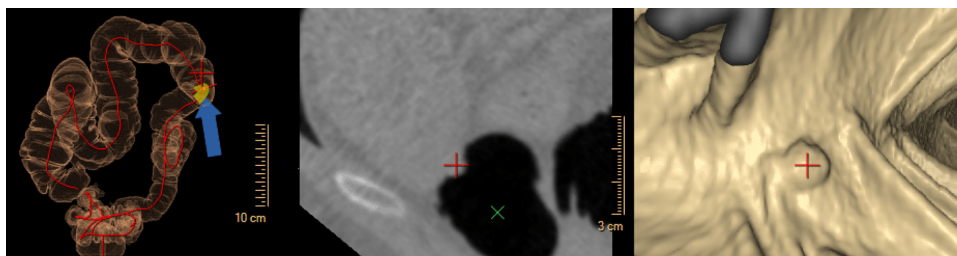
NOTICE

The distance before the new reference origin is annotated as **** cm on the viewports during navigation.
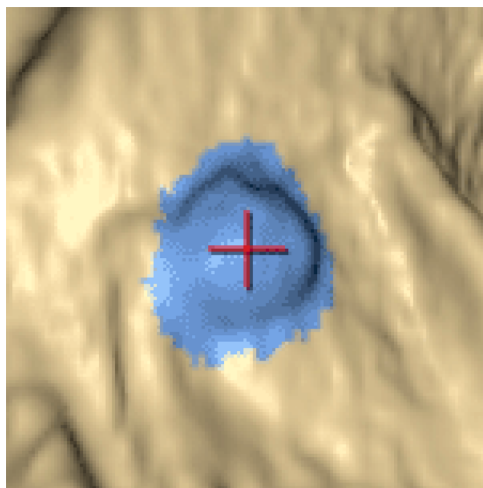
Findings Tab

The Findings functions allow you to search for, display, and mark polyps that may exist in the virtual colon images. Select the Findings tab from the Navigate stage drop-down.

Mark Findings

Click **Mark Findings**. Place the pencil cursor over the area of interest. Left mouse click to mark the area. This area is automatically centered on all images of the same series..

Split appears on the endoscopic view with measures that are adjustable.

NOTICE

Findings may also be marked by using **Alt + F** on the keyboard and then clicking on the appropriate location on an image.

Click **Accept finding**, the finding is displayed with a blue overlay; or click **Reject finding** to continue without listing the finding.

NOTICE

These findings also appear on the 3D Translucent Colon Map.

Working With the Findings List

Accepting/Rejecting Findings

Click the Accept Findings icon to

Rename Finding

Edit your marked findings with the following procedure:

1. Right mouse click on the finding you want to edit.

2. Select **Rename.**

3. Type in a name for the finding.

4. Click **OK** to accept the name. The new name appears in the findings tab.

Editing Measurements

You can edit a Finding's Name, measurements (Length and Width), Shape and Segment on the finding's Measurement Sheet.

1. Right mouse click on the finding name in the Findings tab.

2. Select **Measurement Sheet**. The **Finding's Measurement Sheet** opens.

3. Change the Finding's Name, measurements, Shape or Segment as needed.

4. Click **OK** to accept changes, or Cancel to return without saving any measurement changes.

Computer Assisted Detection

CAD can assist you in polyp detection. CAD is set to detect, optimally, polyps of 6 mm or larger. You may choose whether or not to display the CAD results during the Findings procedure.

⚠️ **WARNING**

CAD must be used only as an adjunct procedure to your primary reading of a study. Final diagnosis and identification of lesions is the responsibility of the radiologist.

⚠️ **WARNING**

The Virtual Colonoscopy CAD option should not be used as the SOLE basis for clinical diagnosis.
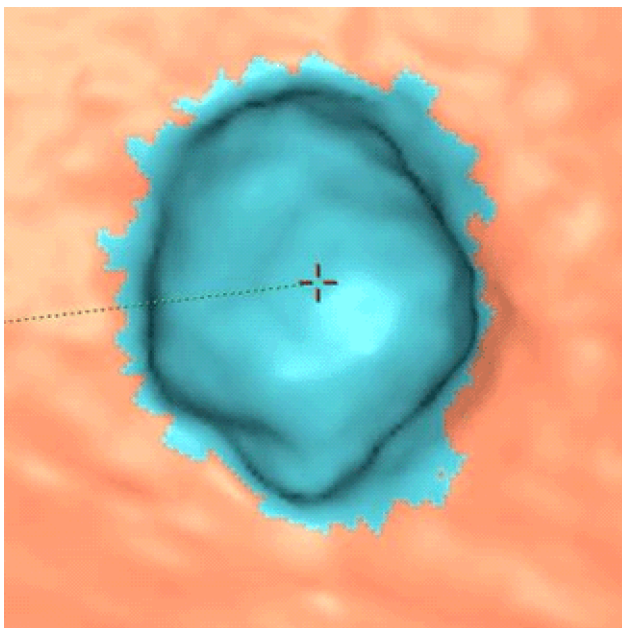
When Show CAD Results is active (checked), all findings found (suggested) by CAD are marked with a cyan blue overlay. The overlay turns purple when you accept the finding.

NOTICE

The computer assisted detection (CAD) for polyps and the Electronic Cleansing functions are not available in the United States.

CAD Procedure

1. Click the **Show CAD Results** check box, which displays CAD Results in the Findings list.
2. CAD displays the number of potential polyps found in the study in the Findings list. The CAD findings are identified with a red dot ⊕ *CAD1* .
3. The 3D images shows the CAD findings in light blue.

4. Click on each CAD finding in the Findings list to view the selected finding on all images.
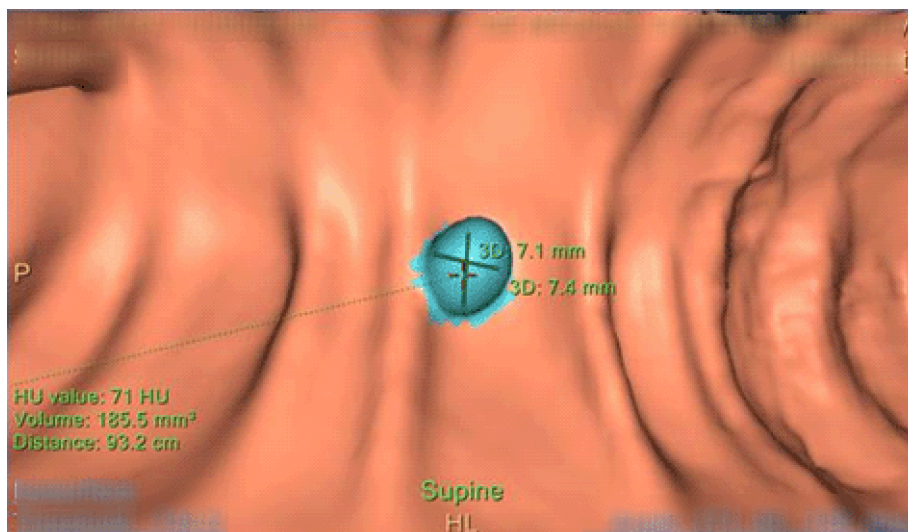
5. Click the [icon] Accept or [icon] Reject icon to accept/reject findings.

6. Once a finding is accepted, the light blue color changes to a dark blue color.

7. To edit an accepted finding, see section "Editing Measurements" on page 459.

NOTICE

Only Accepted CAD Findings can be edited.

Show 3D Diameters

When you activate **Show 3D Diameters**, the system displays the measured diameters of the finding onto the 3D endo image in millimeters (mm).

NOTICE

Applicable for Veralook iCAD Users (available in the USA only): Please note that only one diameter of the finding is displayed (the length diameter of the finding)

VeraLook iCAD Algorithm

The VeraLook, iCAD third party CAD algorithm is integrated into the Virtual Colonoscopy application. This algorithm is available only in the USA and requires an additional license key.

Some information on the company and algorithm:

- VeraLook™ CTC CAD Software is intended to automatically detect potential polyps in CT Colonography exams.

- The VeraLook CAD license is only available for customers in the USA.
- VeraLook is recommended to be used with a slice thickness of ≤ 3 mm and a reconstruction interval of ≤ 2 mm.

VeraLook™ Company Information:

VeraLook© CTC CAD

Software version number – V1.0.11

Software for Computed Tomographic Colonography Computer-Aided Detection

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Create Movie

Only the **All Curve Batch** function is described in this section. Instructions for using other Batch functions are provided in the Common Processes section.
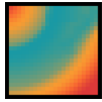
1. After selecting the Batch function tab, click **All Curve**.
2. Set the Batch Parameters (Increments, Number of Images, and Whole Screen) and **Add** features, as desired.
3. Click **Preview**. The Batch Preview window opens and the batch is prepared.
4. If the batch for movie is satisfactory, click the **Save Batch As...** button at the bottom of the Batch Preview window.
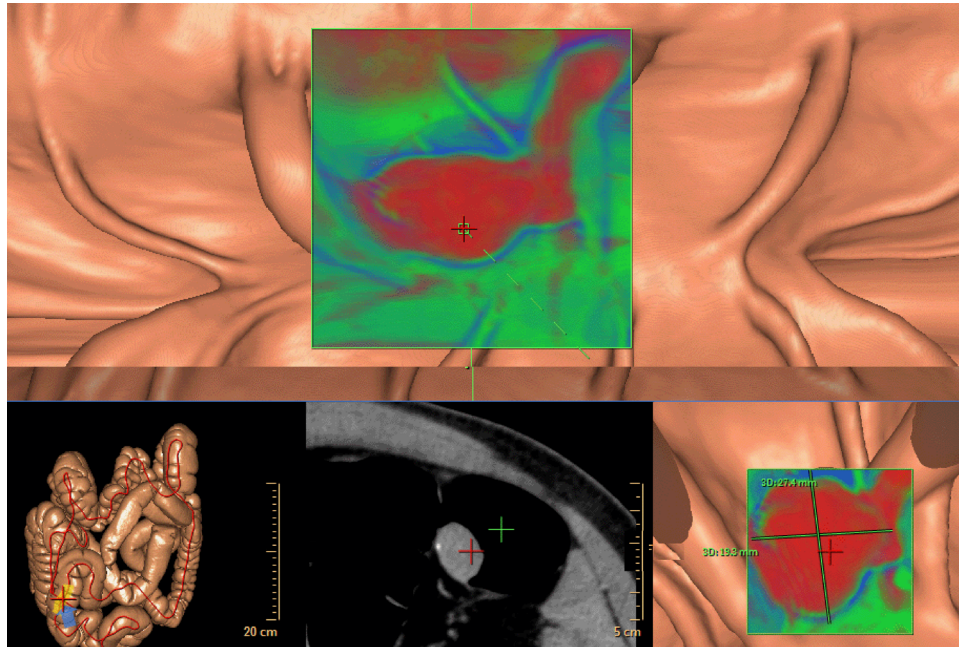
5. Name the batch Description as desired.
6. Select the **Movie** format and set the Quality. The movie is saved as a Windows Media Video (wmv) file. The file size is proportional to the selected quality (higher quality = larger file size).
7. Select the Devices destination.
8. Click

   OK. The Preparing movie window opens, showing the progress of the movie preparation.
9. Locate the newly created movie under the File tab in the Patient Directory.
10. Right-click on the movie file to Copy to CDR, View, Send to Multimedia Viewer, Export, or Delete.
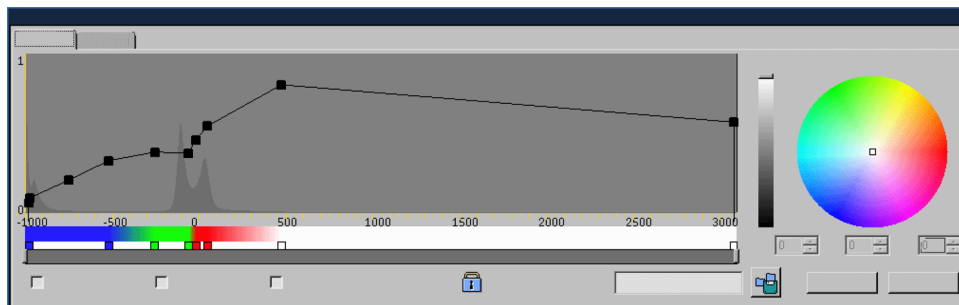
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Color Map

This window is an example of a translucent color map view, which can help distinguish between polyps and stool.

In this view, an attenuation dependent color map is superimposed on the image. The color scale is determined by an opacity curve with colors (shown below).

A detailed description of Volume Rendering, including translucent color mapping and opacity can be found in the Common Processes section.

VC Properties

The VC Properties function tab allows you to set the parameters that control the way various images are shown in the viewports. You can set parameters for the Filet, Endo, Inspect, and Unfolded image types.

In the Inspect image view (which shows a longitudinal cut of the colon), the 2D cutting plane is displayed in grey-white (as an MPR plane) and can be windowed via the reference images (for example, the axial and cross-section views).

Image Type

Use this option to select Image Type. Options include:

- Filet
- Endo
- Inspect
- Unfolded

Projection Radius

Allows the selection of Projection Radius for Filet image type.

Shape

Allows the selection of a shape for Filet image type. Options include:

- Rectangular
- Scaling

Custom Colors

Click the **Custom Colors** icon to open a window that allows the selection of colors to change the color of the 3D Volume rendered images.

Cleansing Method

NOTICE

The computer assisted detection (CAD) for polyps and the Electronic Cleansing functions are not available in the United States.

When the IntelliSpace Portal has the (optional) Apply Cleansing function, it is accessible in both the Define work stage and the Navigation work stage. See section "Electronic Cleansing" on page 441.

In the VC Properties function tab, you can specify the type of cleansing method you want to apply, **Low Density Contrast**, or (the default) **High Density Contrast**.

The most recent setting selected is remembered for the next time the Virtual Cleansing application is opened.

Setting the cleansing method is only available on the Navigation work stage.

When comparing images of the same study using the two cleansing methods, you may notice that the cleansing results differ, and the resulting surface rendered images may be different.

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High Density Contrast is used to filter out high density contrast material.

If the patient preparation consists of less dense contrast, the cleansing may be optimized by using the**Low Density Contrast** cleansing method.

Switching methods updates the cleansing in the current image. However, to update the CAD results based on the new selection, the application must be relaunched.

⚠️ **CAUTION**

Be aware that the High Density method will not be applied to studies having low density (<250 HU). A warning message appears on the bottom tool-bar to alert the user.

Navigation Workflow

Set Current Settings as Default

If the user clicks on **Set current settings as default**, the application "remembers" the following items when relaunching the application.

- Compare status
- Link Status and selected mode
- The selected layout with or without the spread mode
- The "Scroll along centerline" mode for the Navigation stage

NOTICE

If an existing layout was modified, be sure to save this layout first!

Single Image Navigation

Single Image Navigation improves the perception of navigation performance when operating the Portal in the "lossless" mode.

When Single Image Navigation is activated, while you scroll or navigate in an active viewport, non-active viewports are "frozen" (not updated). After you stop or pause the scrolling/navigation activity, all reference viewports are updated to the new position.

VC Compare

If the patient study you loaded includes two series of the patient in different orientations (Supine and Prone, for example), Compare allows you to view the two series in adjacent viewports.

In the display below, the patient's Supine and Decubitus Left series are shown, one above the other.

In general, all the functions available for assessing one Patient Series in Virtual Colonoscopy are available in the Compare mode.

Compare Tools

To perform the Compare function, both studies for the comparison must be loaded at the same time (when the application is launched).

The Compare mode in Virtual Colonoscopy is adapted from the Compare mode available in various other Portal applications. But, instead of comparing images from the same patient series, here you compare images from separately scanned series (of a single patient).

Spread Mode

The Spread mode allows you to display the two compared series on separate display monitors (if your system is so equipped).

Link

The Link function allows you to navigate the colon centerlines simultaneously (in "parallel" views) after linking them at a common location.

Match Findings

The Match Findings function allows you to mark as "matched" the same polyps found in the two patient orientations. (You can also "unmatch".)

Automatic Path Registration

The Automatic Path Registration function ties together the prone/supine centerlines for simultaneous navigation.

NOTICE

Automatic Path Registration is applied by default, but only after clinical validation, and after the Compare and Link buttons are pressed.

The Automatic Path Registration button appears depressed when the function is activated.

Anatomical Registration allows for manual matching via the P/S link (prone/supine) button.

Click the **Anatomical Registration** button to cancel automatic registration and link the prone and supine centerlines manually.