SICATAIR

SICAT AIR *VERSION 1.0*

Instructions for use | English

TABLE OF CONTENTS

1 INTENDED USE

SICAT Air is a software application for the visualization and segmentation of imaging information of the ear-nose-throat region. The imaging data originates from medical scanners such as CT or CBCT scanners. It is also used as a software system to aid qualified medical professionals with the evaluation and comparison of treatment options. The medical professionals' planning data may be exported from SICAT Air and used as input data for CAD or Rapid Prototyping Systems.

2 USED ICONS AND HIGHLIGHTING

ICONS

These instructions for use uses the following icons:

- The hint icon indicates additional information, for example alternative approaches.

- The SICAT Suite icon indicates information that applies only to the standalone version of SICAT Suite.

- The icon for integrated versions indicates information that applies to all integrated versions of SICAT Suite.

- The Sirona SIDEXIS XG icon indicates information that applies only to SICAT Suite as a SIDEXIS XG plug-in.

If you use an integrated version of SICAT Suite, please read both the information for all integrated versions and the information for your specific version.

HIGHLIGHTING

Texts and names of elements that SICAT Suite shows are highlighted by **bold** fonts. This includes the following objects in the user interface:

- Names of areas
- Names of buttons
- Names of icons
- Texts from hints and on-screen messages

INSTRUCTIONS

Instructions are written as ordered lists:

☑ Prerequisites are marked with this symbol.

1. Steps are marked with numbers.

   ▶ Interim results are marked with this symbol and are indented.

2. Interim results are followed by additional steps.

▶ Final results are marked with this symbol.

- However, if an instruction consists of only one step, the step is marked with this symbol.

3 SAFETY INFORMATION

It is mandatory that you read the following security relevant chapters:

- *Identification of danger levels [▶ Page 8]*
- *Qualification of operating personnel [▶ Page 9]*

3.1 IDENTIFICATION OF DANGER LEVELS

These instructions for use uses the following warning signs to avoid injuries of operating personnel or patients and material damage:

⚠️ **CAUTION**	Indicates a hazardous situation that, if not avoided, *could* result in minor injury.

NOTICE	Indicates information considered important but not hazard-related.

3.2 QUALIFICATION OF OPERATING PERSONNEL

⚠️ **CAUTION**	**Use of software by unqualified personnel could result in incorrect diagnosis and treatment.** ▪ The use of the software is restricted to qualified professionals.

Only skilled or properly trained personnel are allowed to use the software.

If you are undergoing education or training, or you are using the software as part of your general training, you may only operate the software under the constant supervision of a qualified person.

You have to fulfill the following prerequisites to be allowed to use the software:

- You have read the instructions for use.
- You are familiar with the fundamental structure and the functions of the software.
- You are able to recognize irregularities in the functioning of the software and implement the appropriate measures where necessary.

CAUTION! Federal Law (USA) restricts use of this device to or on the order of a physician, dentist or licensed practitioner.

4 SYSTEM REQUIREMENTS

⚠️ **CAUTION**	**If your system does not meet the system requirements, the software might not start or work as intended.** ▪ Prior to installing the software, check your system for compliance with the minimum software and hardware requirements.

MINIMUM

Processor	Dual Core 2 GHz
RAM	4 GB
Video card	Dedicated* DirectX 10 or higher 512 MB video memory Shader Model 3 "INTZ"-Surfaces Current driver
Screen	At least 1280x1024 pixel**
Free space on HDD	5 GB
Input devices	Keyboard, mouse
Network	Ethernet, 100 Mbit/s
Printer for patient consultation	At least 300 dpi Paper sizes DIN A4 or US Letter
Operating system	Windows 7 (32 bit or 64 bit) Windows 8 (64 bit) Windows 8.1 (64 bit)
Web browser	Microsoft Internet Explorer 9 or higher Mozilla Firefox 10 or higher Google Chrome 10 or higher Apple Safari 5 or higher JavaScript has to be activated.
PDF viewer	With support for PDF standard 1.7, for example Adobe Reader 8 or higher

RECOMMENDED

Processor	Quad Core 2.3 GHz
RAM	8 GB
Video card	1024 MB video memory
Screen	At least 1920x1080 pixel**
Network	Ethernet, 1000 Mbit/s

> *SICAT Suite only supports dedicated video cards (NVIDIA GeForce 670 and ATI Radeon HD 4xxx or newer). Integrated video cards are not supported.
>
> **The resolution must not be higher than 2560x1600 pixel. The screen has to be set up to show the SMPTE test picture correctly. For information about this, see Monitor calibration with the SMPTE test pattern.

5 THE SICAT AIR WORKFLOW

A typical workflow with SICAT Air is as follows:

1. Open a 3D X-ray scan in SICAT Air. For information about this, see the SICAT Suite instructions for use and *SICAT Air studies in SICAT Suite [▶ Page 15]*.

2. Adjust the 3D X-ray scan corresponding to your requirements, for example to the Frankfurt plane. For information about this, see *Adjusting the volume orientation [▶ Page 60]*.

3. Evaluate the 3D X-ray scan and get a first overview regarding the upper airways.

4. If indications of obstructive sleep apnea (OSA) exist, segment the airway. For information about this, see *Segmentation of the airway [▶ Page 74]*.

5. Review the airway in the **Airway** workspace. For information about this, see *Airway analysis [▶ Page 84]*.

6. Perform a patient consultation and create a handout based on it. Give the handout to the patient to take home. For information about this, see *Patient consultation [▶ Page 90]*.

7. The final OSA diagnosis is performed by a qualified physician.

8. Perform a conventional therapy planning.

9. Create a 3D X-ray scan of the patient with the jaw in therapy position. Import the scan into SICAT Suite and open it in SICAT Air.

10. Check the effects of the therapeutic appliance. Especially consider changes of the airway and effects on the mandibular joint.

11. Order a patient individual therapeutic appliance. For information about this, see *Ordering process [▶ Page 98]*.

6 INSTALLING SICAT AIR

⚠️ **CAUTION**	**The absence of a backup mechanism for the patient record depots could result in patient data being irreversibly lost.** ▪ Make sure that a regular data backup is created of all patient record depots.

⚠️ **CAUTION**	**Saving SICAT application data in an unreliable or incompatible network file system could result in data loss.** ▪ Together with your network administrator, assure that SICAT application data can be safely stored in the desired network file system.

⚠️ **CAUTION**	**Using SICAT Suite and the contained SICAT applications together with other devices within a computer network or storage network could result in previously unknown risks for patients, users and other persons.** ▪ Make sure policies are established within your organization to determine, analyze, assess and control risks that are related to your network.

⚠️ **CAUTION**	**Changes to your network environment could result in new risks. Examples are changes to your network configuration, connection of additional devices or components to your network, disconnection of devices or components from the network and update or upgrade of network devices or components.** ▪ Perform a new network risk analysis after any network changes.

The SICAT Suite installer installs SICAT Air as a part of SICAT Suite. For information about installing SICAT Suite, see the instructions for use of SICAT Suite.

7 OPENING THE ONLINE HELP

The instructions for use of SICAT Suite and SICAT applications are integrated in the **Support** window in form of an online help.

You can open the **Support** window by clicking the **Support** icon in the **Navigation bar** or by pressing the F1 key.

The SICAT Suite instructions for use are divided into multiple sections:

- General functions like data management that all SICAT applications use are described in the SICAT Suite instructions for use.
- Functions that are available in SICAT applications are described in the additional instructions for use of each SICAT application.

8 SICAT AIR STUDIES IN SICAT SUITE

⚠️ **CAUTION**	**X-ray devices without DICOM conformity could result in incorrect diagnosis and treatment.** ▪ Only use 3D volume data from x-ray devices with DICOM conformity declared.

⚠️ **CAUTION**	**Inappropriate X-ray devices could result in incorrect diagnosis and treatment.** ▪ Only use 3D data from X-ray devices cleared as medical devices.

⚠️ **CAUTION**	**Inappropriate 3D data could result in incorrect diagnosis and treatment.** ▪ Always verify the quality, integrity, and correct orientation of the displayed 3D data.

⚠️ **CAUTION**	**Insufficient visualization quality could result in incorrect diagnosis and treatment.** ▪ Prior to using a SICAT application check for sufficient visualization quality, for example by using the SMPTE test pattern.

⚠️ **CAUTION**	**Insufficient environmental visualization conditions could result in incorrect diagnosis and treatment.** 1. Only perform planning if the environmental conditions allow for sufficient visualization quality. For example, check for appropriate lighting. 2. Check for sufficient visualization quality using the SMPTE test pattern.

If SICAT Suite runs as a standalone version, managing patient data takes place in SICAT Suite.

The **Patient record browser** shows information for SICAT Air studies if the following prerequisites are fulfilled:

- You use the standalone version of SICAT Suite.
- You have selected a SICAT Air study in the **3D Scans and Planning Projects** area.

| 1 | Selected SICAT Air study | 3 | **Details** area |
| 2 | **Preview** area | | |

If you already have segmented the airway, the **Preview** area shows the following elements:

- Visualization of the segmented airway with highlighting of the minimal cross section
- Contour with the slice of the minimal cross section

The **Details** area shows the following information:

- Availability of optical impressions
- Availability of an airway segmentation with creation date
- Availability of an order with status and date

If you have already segmented the airway, the **Patient record browser** additionally shows the following information:

- **Total volume**
- **Minimum slice area**

Furthermore, the **Patient record browser** shows handouts in the **3D Scans and Planning Projects** area that you have created with SICAT Air. You can open handouts in the standard PDF viewer by double-clicking on them.

If SICAT Suite runs as integrated version, managing patient data takes place in the main application.

9 OVERVIEW OF THE USER INTERFACE

The user interface of SICAT Air consists of the following parts:
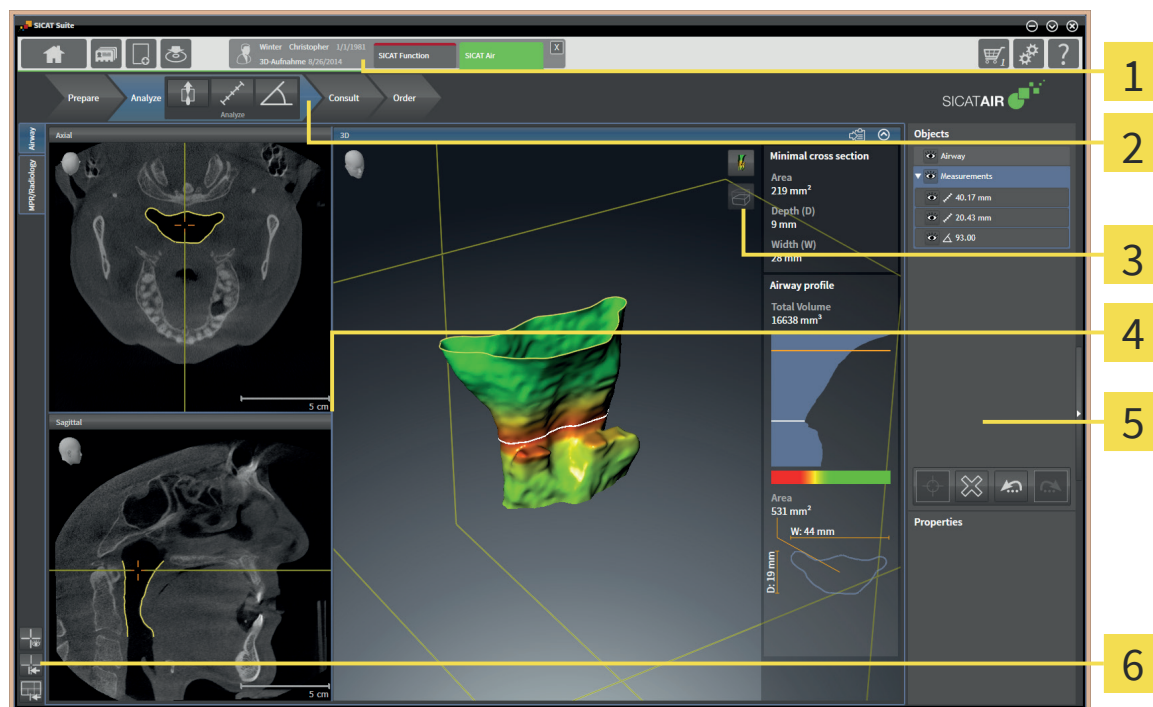
1	**Active patient record** tab	**4**	**Object bar**
2	**Workflow toolbar**	**5**	**Workspace toolbar**
3	**View toolbar**		

- The **Active patient record** tab shows attributes of the active patient record. For details, see the SICAT Suite instructions for use.

- The **Workflow toolbar** consists of different workflow steps that contain the main tools of the application workflow. This includes tools with that you can add and import diagnosis objects and planning objects. For information about this, see *Workflow toolbar [▶ Page 19]*.

- The **Workspace area** is the part of the user interface below the **Workflow toolbar**. It shows the active workspace of SICAT Air. Each workspace contains a specific set of views. For information about this, see *Workspaces [▶ Page 27]*.

- Only the active view shows the **View toolbar**. It contains tools for adapting the visualization of the corresponding view. For information about this, see *Adaptation of views [▶ Page 33]* and *Adaptation of the 3D View [▶ Page 44]*.

- The **Object bar** contains tools for managing diagnosis objects and planning objects. For information about this, see *Object bar [▶ Page 21]* and *SICAT Air objects [▶ Page 24]*.

- The **Workspace toolbar** contains tools for changing general settings of workspaces and all contained views. For information about this, see *Moving, hiding, and showing crosshairs and frames [▶ Page 41]*, *Resetting views [▶ Page 42]*, and *Adapting and resetting the layout of workspaces [▶ Page 31]*.

9.1 WORKFLOW TOOLBAR

In SICAT Air, the **Workflow toolbar** consists of four workflow steps: **Prepare**, **Analyze**, **Consult**, and **Order**.

PREPARE WORKFLOW STEP
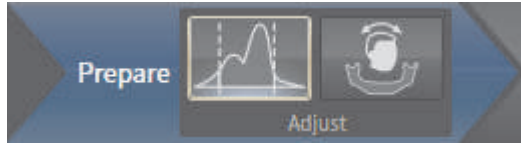
In the **Prepare** workflow step, the following tools are available:

- **Adjust Gray Values** - for information about this, see *Adjusting gray values [▶ Page 56]*. This tool is only available for volumes from non-Sirona devices.

- **Adjust volume orientation and panoramic region** - for information about this, see *Adjusting the volume orientation [▶ Page 60]* and *Adjusting the panoramic region [▶ Page 65]*.

ANALYZE WORKFLOW STEP
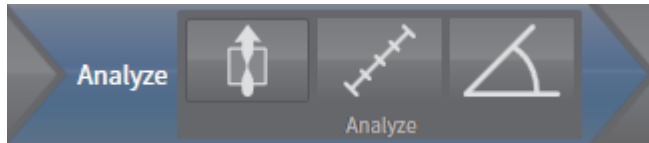
In the **Analyze** workflow step, the following tools are available:

- **Segment the airway** - for information about this, see *Determining the airway region [▶ Page 75]*.

- **Add distance measurement (D)** - for information about this, see *Adding distance measurements [▶ Page 69]*.

- **Add angle measurement (A)** - for information about this, see *Adding angle measurements [▶ Page 70]*.

CONSULT WORKFLOW STEP
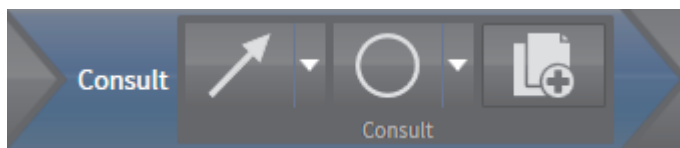
In the **Consult** workflow step, the following tools are available:

- **Draw Arrow** - for information about this, see *Creating images and screenshots [▶ Page 91]*.

- **Draw Circle** - for information about this, see *Creating images and screenshots [▶ Page 91]*.

- **Generate handout** - for information about this, see *Preparing handouts [▶ Page 94]*.

ORDER WORKFLOW STEP
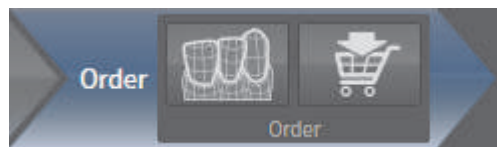
In the **Order** workflow step, the following tools are available:

- **Import and register optical impressions** - for information about this, see *Importing and registering optical impressions [▶ Page 103]*.

- **Order oral appliance** - for information about this, see *Adding therapeutic oral appliances to the shopping cart [▶ Page 99]*.

EXPANDING AND COLLAPSING WORKFLOW STEPS

You can expand and collapse workflow steps by clicking on them.

9.2 OBJECT BAR
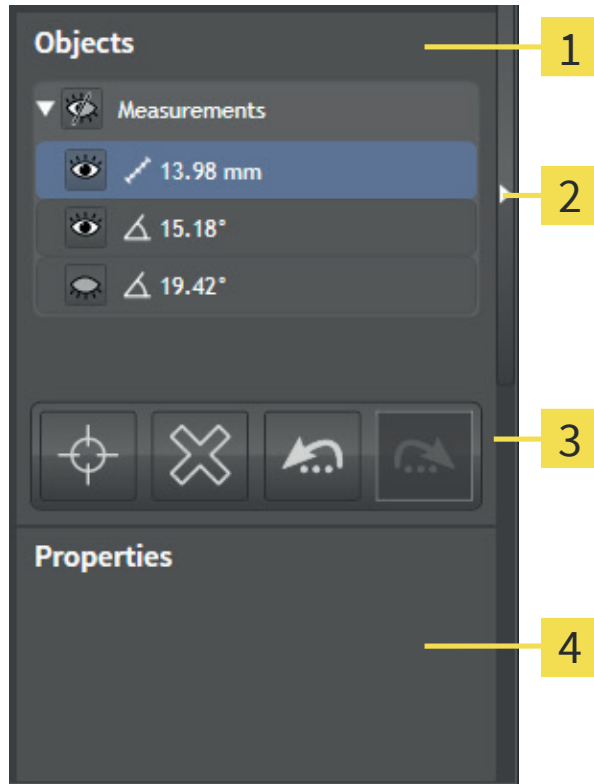
1	**Object browser**
2	**Hide object bar** button or **Show object bar** button
3	**Object toolbar**
4	**Properties** area

The **Object bar** contains the following elements:

- The **Object browser** shows a categorized list of all diagnosis objects and planning objects that you added or imported to the current study. The **Object browser** groups objects automatically. For example, the **Measurements** group contains all measurements. You can collapse and expand object groups, activate objects and object groups, and hide and show objects and object groups. For information about this, see *Managing objects with the Object browser [▶ Page 22]*.

- The **Object toolbar** contains tools to focus on objects, remove objects or object groups, and undo or redo object actions or object group actions. For information about this, see *Managing objects with the Object toolbar [▶ Page 23]*.

- The **Properties** area shows details of the active object.

You can hide and show the **Object bar** by clicking the **Hide object bar** button or the **Show object bar** button at the right-hand side of the **Object bar**.

9.3 MANAGING OBJECTS WITH THE OBJECT BROWSER

> **i** The following functions are only available for specific object types.

COLLAPSING AND EXPANDING OBJECT GROUPS

To collapse and expand an object group, proceed as follows:
☑ The desired object group is currently expanded.

1. Next to the object group, click the **Collapse** icon.
   ► The desired object group collapses.

2. Next to the object group, click the **Expand** icon.

► The desired object group expands.

ACTIVATING OBJECTS AND OBJECT GROUPS

Some tools are only available for active objects or object groups.

To activate an object or an object group, proceed as follows:
☑ The desired object or object group is currently deactivated.

▪ Click on the desired object or object group.
   ► SICAT Air deactivates a previously activated object or object group.
   ► SICAT Air activates the desired object or object group.
   ► SICAT Air highlights the object or object group in the **Object browser** and in the views.

> **i** In the 2D views, you can also activate specific objects by clicking on the objects.

HIDING AND SHOWING OBJECTS AND OBJECT GROUPS

To hide and show an object or an object group, proceed as follows:
☑ The desired object or object group is currently shown.

1. Next to the desired object or object group, click the **Shown** icon or the **Some Shown** icon.
   ► SICAT Air hides the object or object group.
   ► Next to the object or object group, SICAT Air displays the **Hidden** icon.

2. Next to the desired object or object group, click the **Hidden** icon.

► SICAT Air shows the object or object group.

► Next to the object or object group, SICAT Air displays the **Shown** icon.

9.4 MANAGING OBJECTS WITH THE OBJECT TOOLBAR

> ℹ️ The following functions are only available for specific object types.

FOCUSING ON OBJECTS

Use this function to find objects in the views.

To focus on an object, proceed as follows:

☑ The desired object is already active. For information about this, see *Managing objects with the Object browser [▶ Page 22]*.

▪ Click the **Focus active object (Ctrl+F)** icon.

▶ SICAT Air moves the focus point of the views to the active object.

▶ SICAT Air visualizes the active object in the views.

> ℹ️ You can also focus on objects by double-clicking on them in the **Object browser** or in a view except for the **3D** view.

REMOVING OBJECTS AND OBJECT GROUPS

To remove an object or an object group, proceed as follows:

☑ The desired object or object group is already active. For information about this, see *Managing objects with the Object browser [▶ Page 22]*.

▪ Click the **Remove active object/group (Del)** icon.

▶ SICAT Air removes the object or object group.

UNDOING AND REDOING OBJECT ACTIONS

To undo and redo the last object action or object group action, proceed as follows:

1. Click the **Undo last object/group action (Ctrl+Z)** icon.

   ▶ SICAT Air undoes the last object action or object group action.

2. Click the **Redo object/group action (Ctrl+Y)** icon.

▶ SICAT Air redoes the last undone object action or object group action.

> ℹ️ Undo and redo are available as long as a study is opened in a SICAT application. Undo and redo are not available for all objects.

9.5 SICAT AIR OBJECTS

In the **Object browser**, SICAT Air groups application specific objects as follows:

- **Optical Impressions**
- **Airway**
- **Handout**
  - – **Image**
  - – **Screenshot**

OPTICAL IMPRESSIONS OBJECT

An **Optical Impressions** object contains the following sub-objects:

- **Maxilla**
- **Mandible**

If you focus on one of the sub-objects, SICAT Air focuses all 2D views onto the selected object.

If you remove a **Maxilla** or a **Mandible** object, SICAT Air deletes all optical impressions from the study.

AIRWAY OBJECT
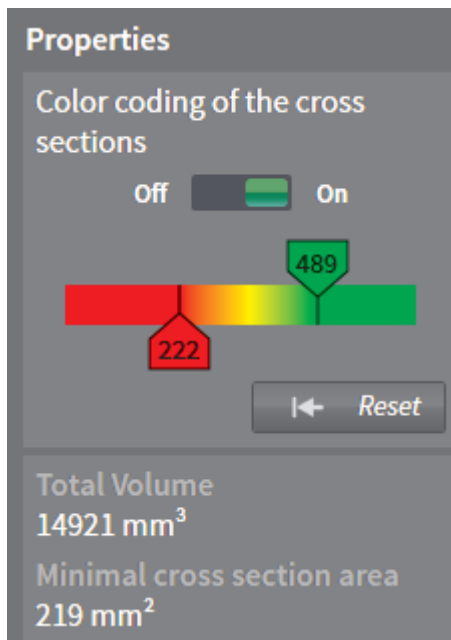
After you segmented the airway, SICAT Air shows the **Airway** object in the **Object browser**. The **Object bar** shows the following items for this object in the **Properties** area:

- A switch for turning color coding on and off.
- The **Colorcoding of the cross sections** with sliders for setting the minimal and the maximal value of the cross section in mm² for the color gradient.
- The **Reset** button for resetting the values for color coding to the values from the SICAT Air settings. For how to set the default values in the SICAT Air settings, see *Changing SICAT Air Options [▶ Page 119]*.
- The **Total Volume** of the segmented airway region
- The **Minimal cross section area** of the segmented airway region

SICAT Air applies changes to the settings on the airway in the **3D** view immediately.

If you focus on the **Airway** object, SICAT Air adapts the workspace area as follows:

- If not already active, SICAT Air activates the **Airway** workspace.
- SICAT Air focuses all views on the middle of the minimum cross section.

If you hide the **Airway** object, SICAT Air also hides the airway analysis area.

IMAGE OBJECTS
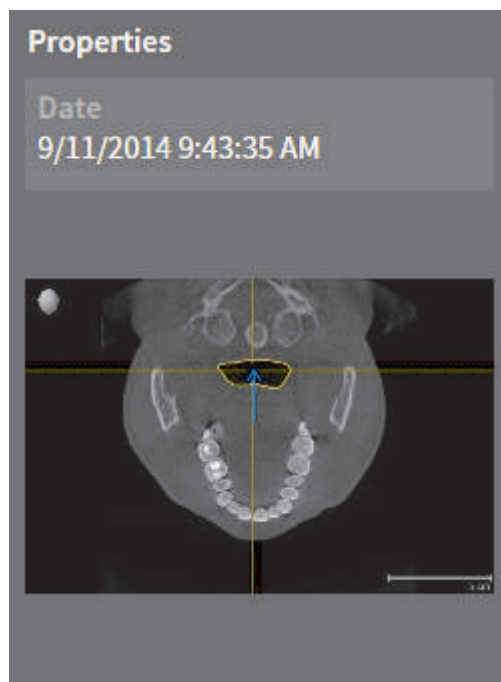
For **Image** objects, the following applies:

- In every workspace per 2D view, SICAT Air combines all drawing objects of a slice and creates an **Image** object of these.
- SICAT Air combines all drawing objects of a specific viewing direction and a specific zoom factor in a workspace for the **3D** view and creates an **Image** object of these.
- You can use the **Undo last object/group action (Ctrl+Z)** and **Redo object/group action (Ctrl+Y)** functions for single arrows and circles.
- You can use the **Remove active object/group (Del)** function to remove an **Image** object and thus all contained arrows and circles at a time.
- If you focus on an **Image** object, SICAT Air restores the corresponding view at the time when you created the last contained arrow or circle.

SCREENSHOT OBJECTS
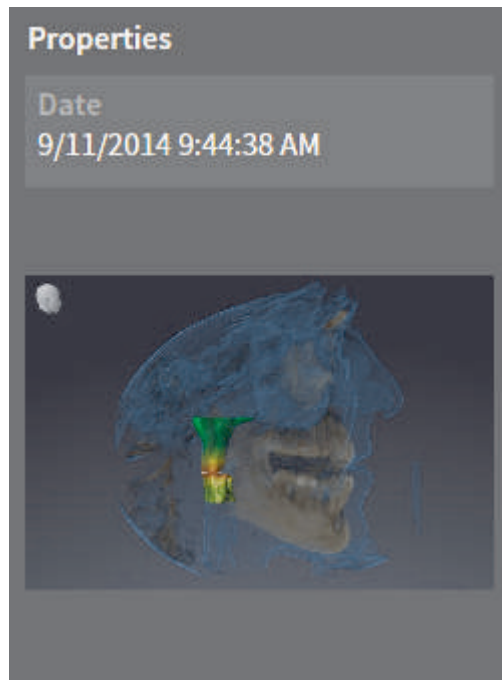
For **Screenshot** objects, the following applies:

- SICAT Air creates one **Screenshot** object per screenshot.
- If you focus on a **Screenshot** object, SICAT Air restores the corresponding view at the time when you created the object.
- The functions for showing and hiding are not available.

CREATION DATE AND PREVIEW

After you have created and activated an **Image** object or a **Screenshot** object, the **Object browser** shows the following in the **Properties** area:

- Creation date of the object
- Preview of the object

10 WORKSPACES

SICAT applications visualize studies in different views and arrange collections of views in workspaces.

In SICAT Air, there are two different workspaces:

- **Airway** workspace - for information about this, see *Overview of the Airway workspace [*▶*Page 28]*.
- **MPR/Radiology** workspace - for information about this, see *Overview of the MPR/Radiology workspace [*▶*Page 29]*.

For a description of the different views, see *Views [*▶*Page 32]*.

i	If you close SICAT Air, the software saves the layout of the workspaces and the settings of the views.

The following actions are available for workspaces and the contained views:

- *Switching the active workspace [*▶*Page 30]*.
- *Adapting and resetting the layout of workspaces [*▶*Page 31]*.
- *Adaptation of views [*▶*Page 33]*.
- There are additional ways to adapt the **3D** view. For information about this, see *Adaptation of the 3D View [*▶*Page 44]*.

10.1 OVERVIEW OF THE AIRWAY WORKSPACE
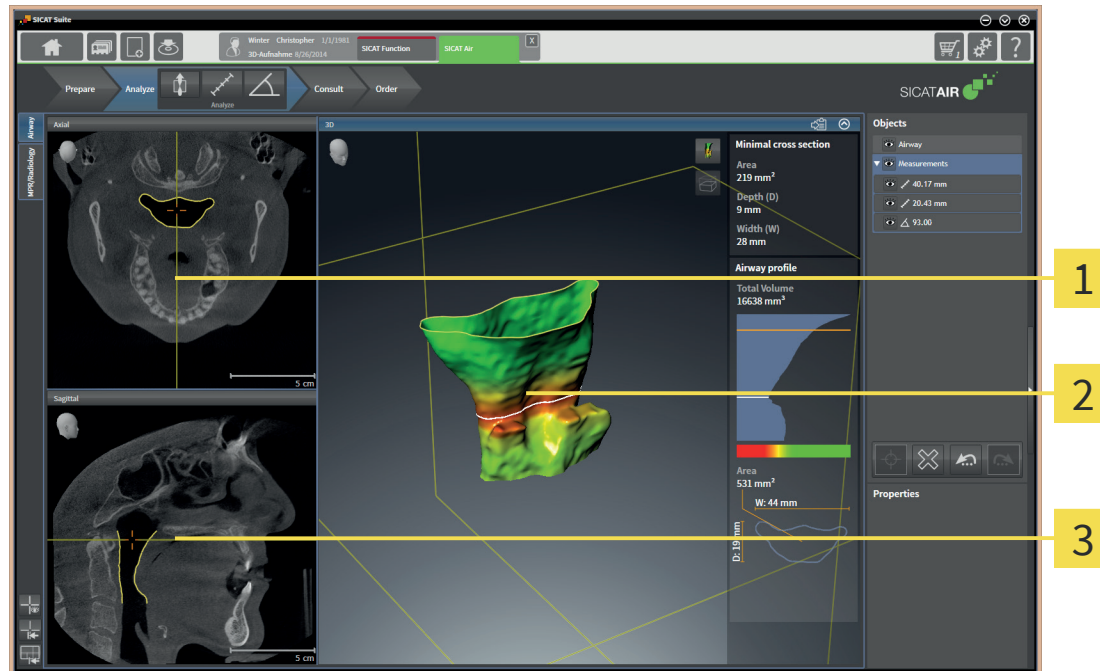
1 **Axial** view

2 **3D** view

3 **Sagittal** view

The **Airway** workspace consists of the following views:

- **Axial** view
- **3D** view
- **Sagittal** view

For a description of the different views, see *Views [▶ Page 32]*.

If you have created an **Airway** object by segmenting the airway, the airway analysis area is available in the **3D** view. For information about this, see *SICAT Air objects [▶ Page 24]*, *Segmentation of the airway [▶ Page 74]*, and *Interacting with the airway profile [▶ Page 87]*.

10.2 OVERVIEW OF THE MPR/RADIOLOGY WORKSPACE
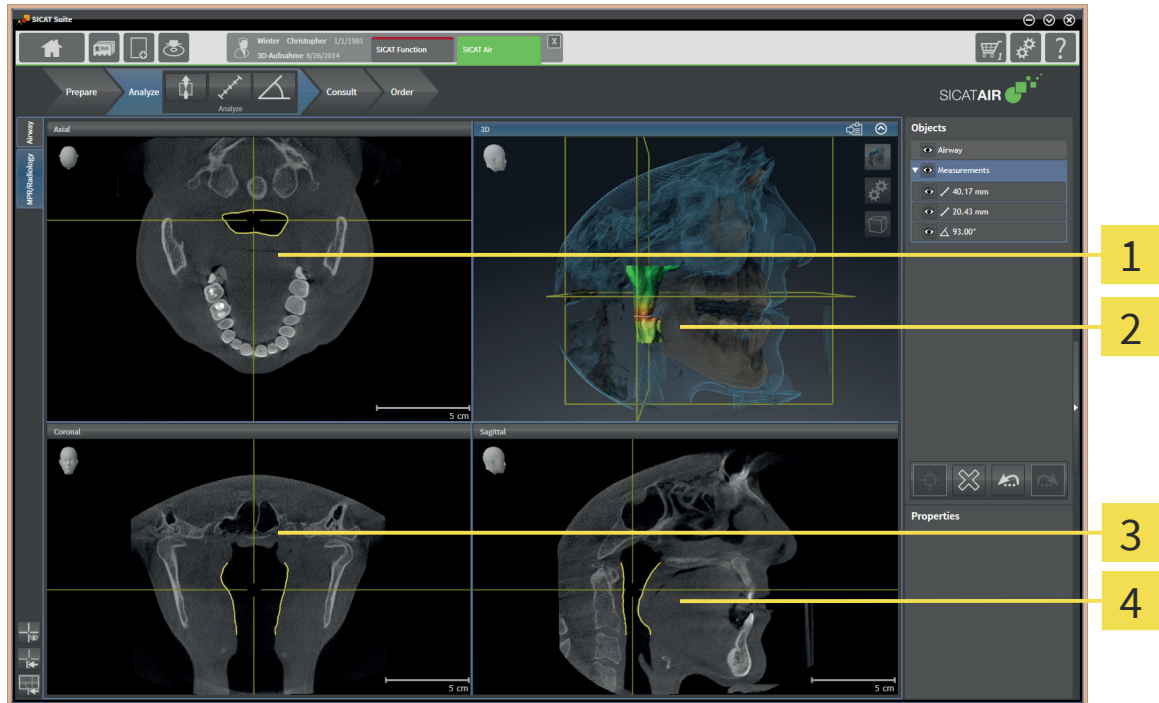
1	**Axial** view	**3**	**Coronal** view
2	**3D** view	**4**	**Sagittal** view

The **MPR/Radiology** workspace consists of the following views:

- **Axial** view
- **3D** view
- **Coronal** view
- **Sagittal** view

For a description of the different views, see *Views [▶ Page 32]*.

10.3 SWITCHING THE ACTIVE WORKSPACE

To switch the active workspace, proceed as follows:

▪ In the upper left corner of the workspace area, click the tab of the desired workspace.

▶ The selected workspace opens.

10.4 ADAPTING AND RESETTING THE LAYOUT OF WORKSPACES

ADAPTING THE LAYOUT OF THE ACTIVE WORKSPACE

To adapt the layout of the active workspace, proceed as follows:

1. Move the mouse pointer over the border between two or more views.
   - ► The mouse pointer changes to a two-directional arrow or a cross.

2. Click and hold the left mouse button.

3. Move the mouse.
   - ► The position of the border changes.
   - ► The sizes of the views on all sides of the border change.

4. Release the left mouse button.

► SICAT Air maintains the position of the border and the current sizes of the views on all sides of the border.

RESETTING THE LAYOUT OF THE ACTIVE WORKSPACE

To reset the layout of the active workspace, proceed as follows:

- ▪ In the **Workspace toolbar**, click the **Reset layout of active workspace** icon.

► SICAT Air resets the active workspace to the default layout. This means that the software displays all views in their default sizes.

11 VIEWS

Views are contained in workspaces. For a description of the different workspaces, see *Workspaces [▶ Page 27]*.

Each SICAT application visualizes studies in views that are arranged in workspaces. A workspace contains a specific set of the following views:

Per default, the **Axial** view shows slices from the top. You can switch the viewing direction of the **Axial** view. For information about this, see *Changing visualization settings [▶ Page 117]*.

The **Coronal** view shows slices from the front.

Per default, the **Sagittal** view shows slices from the right. You can switch the viewing direction of the **Sagittal** view. For information about this, see *Changing visualization settings [▶ Page 117]*.

The **Panorama** view corresponds to a virtual orthopantomogram (OPG). It shows an orthogonal projection to the panoramic curve with a specific thickness. You can adjust the panoramic curve and the thickness to both jaws. For information about this, see *Adjusting the panoramic region [▶ Page 65]*.

i	In SICAT Air, the **Panorama** view is only available for the registration of optical impressions.

The **3D** view shows a 3D visualization of the opened study.

i	If you close SICAT Air, the software saves the layout of the workspaces and the settings of the views.

You can adapt the views. For information about this, see *Adaptation of views [▶ Page 33]* and *Adaptation of the 3D View [▶ Page 44]*.

11.1 ADAPTATION OF VIEWS

Some tools for adapting views are only available with the active view. For activating a view, see *Switching the active view [▶ Page 35]*.

An active view contains the following elements:
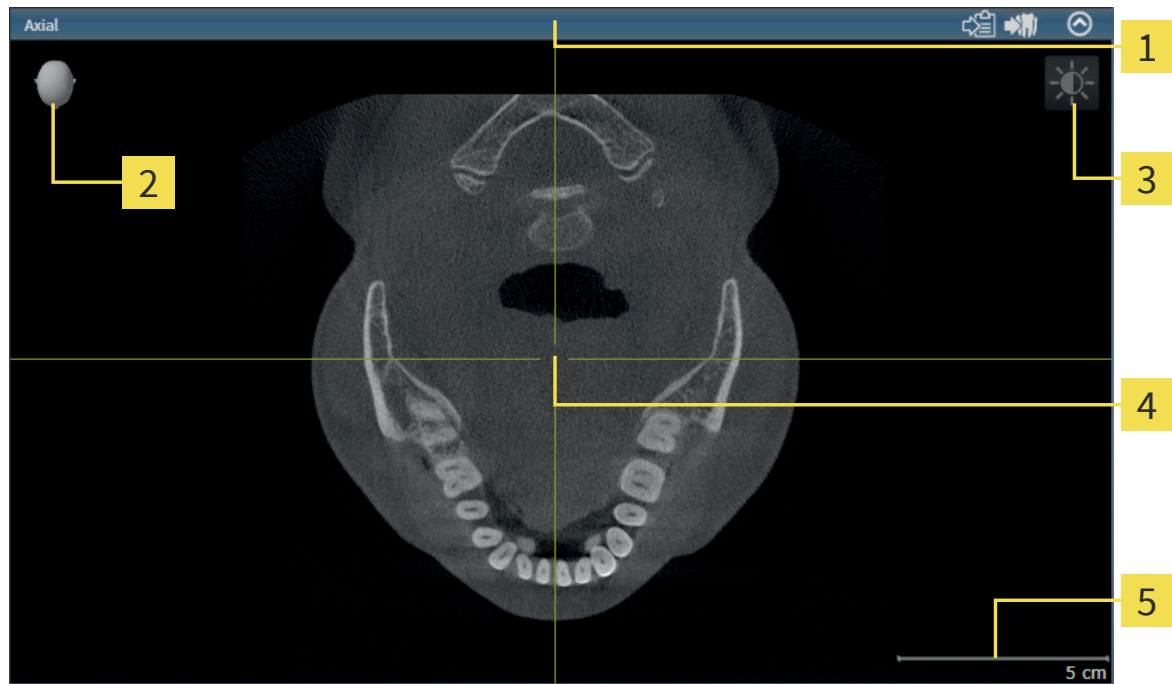
1	Title bar
2	Orientation head
3	View toolbar
4	Crosshair
5	Ruler

2D slice views show crosshairs. Crosshairs are cutlines with other slice views. SICAT Air synchronizes all slice views with each other. That means all crosshairs focus on the same position in the 3D X-ray data. This allows you to associate anatomical structures across views.

The **3D** view shows frames that represent the current positions of the 2D slice views.

2D slice views contain a ruler.

To adapt the views, the following actions are available:

- *Maximizing and restoring views [▶ Page 36]*
- *Adjusting and resetting the brightness and the contrast of 2D views [▶ Page 37]*
- *Zooming and panning views [▶ Page 39]*
- *Scrolling through slices in 2D slice views [▶ Page 40]*
- *Moving, hiding, and showing crosshairs and frames [▶ Page 41]*
- Moving, hiding, and showing the Inspection Window
- *Resetting views [▶ Page 42]*

There are additional ways to adapt the **3D** view. For information about this, see *Adaptation of the 3D View [▶ Page 44]*.

You can document the content of an active view. For information about this, see *Documentation [▶ Page 43]*.

11.2 SWITCHING THE ACTIVE VIEW

Only the active view shows the **View toolbar** and the tools in the title bar.

To activate a view, proceed as follows:
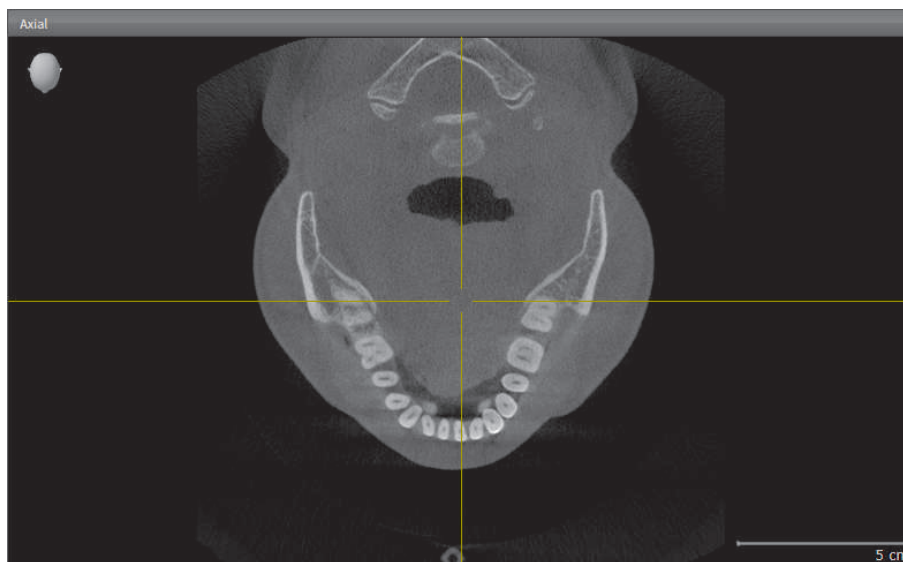
- Click inside the desired view.

▶ SICAT Air activates the view:
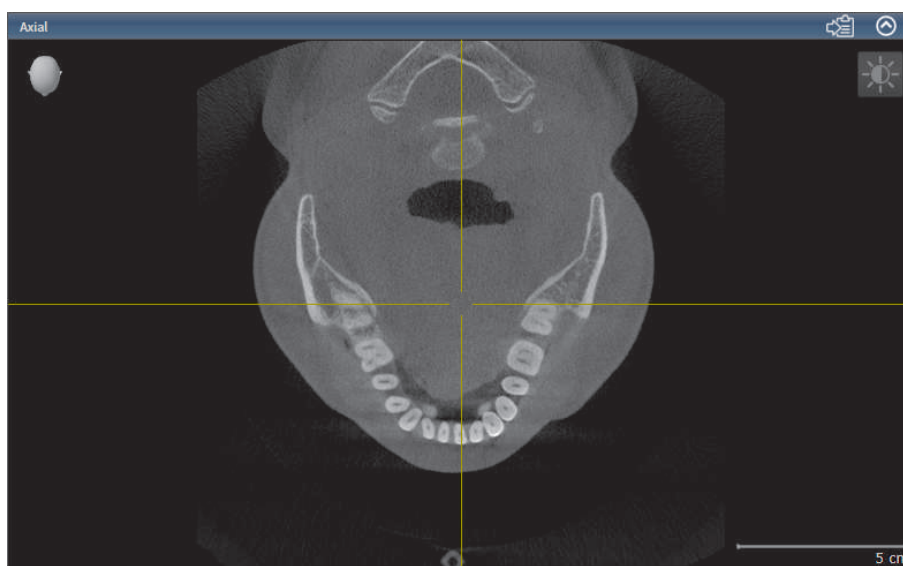
11.3 MAXIMIZING AND RESTORING VIEWS

To maximize a view and restore the previous size a view, proceed as follows:

☑ The desired view is already active. For information about this, see *Switching the active view [▶ Page 35]*.

☑ The desired view is not maximized.

1. In the title bar of the desired view, click the **Maximize** icon.
   ▶ SICAT Air maximizes the view.

2. In the title bar of the maximized view, click the **Restore** icon.
   ▶ SICAT Air restores the previous size of the view.

> To maximize views and restore their previous size, the following alternatives are available:
> - To maximize a view, you can also double-click on the title bar of the desired view.
> - To restore the previous size of a view, you can also double-click on the title bar of the maximized view.

11.4 ADJUSTING AND RESETTING THE BRIGHTNESS AND THE CONTRAST OF 2D VIEWS

To adjust the brightness and the contrast of a 2D view, proceed as follows:

☑ The desired 2D view is already active. For information about this, see *Switching the active view* [▶ Page 35].

1. In the **View toolbar** of the 2D view, move the mouse pointer over the **Adjust brightness and con-trast** icon.

   ► The **Adjust brightness and contrast** overlay opens:
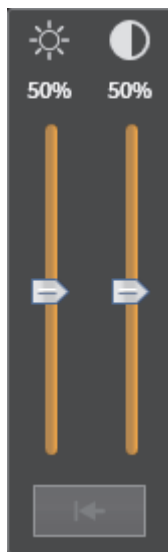
2. Move the mouse pointer over the **Brightness** slider.

3. Click and hold the left mouse button and move the mouse pointer up or down.

   ► SICAT Air adjusts the brightness of the 2D view corresponding to the position of the **Brightness** slider.

4. Release the left mouse button.

   ► SICAT Air maintains the current brightness of the 2D view.

5. Move the mouse pointer over the **Contrast** slider.

6. Click and hold the left mouse button and move the mouse pointer up or down.

   ► SICAT Air adjusts the contrast of the 2D view corresponding to the position of the **Contrast** slider.

7. Release the left mouse button.

   ► SICAT Air maintains the current contrast of the 2D view.

8. Move the mouse pointer out of the **Adjust brightness and contrast** overlay.

► The **Adjust brightness and contrast** overlay closes.

To reset the brightness and the contrast of the 2D view to their default values, you can click the **Reset brightness and contrast** icon.

> ℹ️ The brightness and the contrast of all 2D slice views are linked with each other.

11.5 ZOOMING AND PANNING VIEWS

ZOOMING A VIEW

Zooming enlarges or reduces the content of a view.

To zoom a view, proceed as follows:

1. Move the mouse pointer over the desired view.

2. Rotate the mouse wheel forward.

   ▶ The view zooms in.

3. Rotate the mouse wheel backward.

▶ The view zooms out.

	You can also click and hold the mouse wheel and move the mouse up or down to zoom in or out.

PANNING A VIEW

To pan a view, proceed as follows:

1. Move the mouse pointer over the desired view.

2. Click and hold the right mouse button.

   ▶ The mouse pointer changes to a four-directional arrow.

3. Move the mouse.

   ▶ The view pans corresponding to the movement of the mouse pointer.

4. Release the right mouse button.

▶ SICAT Air maintains the current detail of the view.

11.6 SCROLLING THROUGH SLICES IN 2D SLICE VIEWS

To scroll through slices in a 2D slice view, proceed as follows:

1. Move the mouse pointer over the desired 2D slice view.

2. Click and hold the left mouse button.
   - ▶ The mouse pointer changes to a two-directional arrow.

3. Move the mouse up or down.
   - ▶ Slices except for the **Cross-Sectional** slice move parallel.
   - ▶ The **Cross-Sectional** slice moves along the panorama curve.
   - ▶ SICAT Air adapts the slices and the crosshairs of other views according to the current focus point.
   - ▶ SICAT Air adapts the frames in the **3D** view corresponding to the current focus point.

4. Release the left mouse button.

▶ SICAT Air maintains the current slice.

11.7 MOVING, HIDING, AND SHOWING CROSSHAIRS AND FRAMES

MOVING A CROSSHAIR

To move the crosshair in a 2D view, proceed as follows:

☑ All crosshairs and frames are currently shown.

1. In the desired view, move the mouse pointer over the middle of the crosshair.
   ▶ The mouse pointer changes to a crosshair.

2. Click and hold the left mouse button.

3. Move the mouse.
   ▶ The crosshair of the view follows the movement of the mouse.
   ▶ SICAT Air adapts the slices and the crosshairs of other views according to the current focus point.
   ▶ SICAT Air adapts the frames in the **3D** view corresponding to the current focus point.

4. Release the left mouse button.

▶ SICAT Air maintains the current crosshair position.

	To move the crosshair to the position of the mouse pointer immediately, you can also double-click inside a 2D view.

HIDING AND SHOWING CROSSHAIRS AND FRAMES

To hide and show all crosshairs and frames, proceed as follows:

☑ All crosshairs and frames are currently shown.

1. In the **Workspace toolbar**, click the **Hide crosshairs and frames** icon.
   ▶ SICAT Air hides the crosshairs in all views.
   ▶ SICAT Air hides the frames in the **3D** view.

2. Click the **Show crosshairs and frames** icon.
   ▶ SICAT Air shows the crosshairs in all views.
   ▶ SICAT Air shows the frames in the **3D** view.

11.8 RESETTING VIEWS

To reset all views, proceed as follows:

- In the **Workspace toolbar**, click the **Reset views** icon.

▶ SICAT Air resets all views to the default values for zoom, movement of the details, scrolling, and movement of the crosshairs.

▶ SICAT Air resets the viewing direction of the **3D** view to the default value.

11.9 DOCUMENTATION

For documentation purposes, you can copy the content of a view into the Windows clipboard. If you started SICAT Suite from Sirona SIDEXIS, you can also copy the content of a view to the current SIDEXIS exam.

COPYING THE CONTENT OF A VIEW INTO THE WINDOWS CLIPBOARD

To copy the content of a view into the Windows clipboard, proceed as follows:

☑ The desired view is already active. For information about this, see *Switching the active view [▶ Page 35]*.

▪ In the title bar of the view, click the **Copy to clipboard (Ctrl+C)** icon.

▶ SICAT Air copies the content of the view to the Windows clipboard.

COPYING THE CONTENT OF A VIEW INTO SIDEXIS

To copy the content of a view into the current exam of SIDEXIS, proceed as follows:

☑ You have started SICAT Suite from SIDEXIS.

☑ The desired view is already active. For information about this, see *Switching the active view [▶ Page 35]*.

▪ In the title bar of the view, click the **Export to current exam** icon.

▶ SICAT Air copies the content of the view to the current SIDEXIS exam.

12 ADAPTATION OF THE 3D VIEW

You can always change the viewing direction of the **3D** view. For information about this, see *Changing the viewing direction of the 3D view [▶ Page 45]*.

To configure the **3D** view, the following actions are available:

- *Switching the display mode of the 3D view [▶ Page 47]*
- *Configuring the active display mode of the 3D view [▶ Page 48]*
- *Switching the clipping mode of the 3D view [▶ Page 53]*

ℹ	If you close SICAT Air, the software saves the layout of the workspaces and the settings of the views.

12.1 CHANGING THE VIEWING DIRECTION OF THE 3D VIEW

There are two ways to change the viewing direction of the **3D** view:

- Interactively
- Selecting a default viewing direction

INTERACTIVELY CHANGING THE VIEWING DIRECTION OF THE 3D VIEW

To change the viewing direction of the **3D** view interactively, proceed as follows:

1. Move the mouse pointer over the **3D** view.

2. Click and hold the left mouse button.
   - ▶ The mouse pointer changes to a hand.

3. Move the mouse.
   - ▶ The viewing direction changes according to the movement of the mouse.

4. Release the left mouse button.

▶ SICAT Air maintains the current viewing direction of the **3D** view.

SELECTING A DEFAULT VIEWING DIRECTION

To select a default viewing direction in the **3D** view, proceed as follows:

1. In the upper left corner of the **3D** view, move the mouse pointer over the Orientation head icon.
   - ▶ The **Viewing direction** overlay opens:

   - ▶ In the middle of the **Viewing direction** overlay, the highlighted Orientation head shows the current viewing direction.

2. Click the Orientation head icon that shows the desired default viewing direction.
   - ▶ The viewing direction of the **3D** view changes corresponding to your selection.

3. Move the mouse pointer out of the **Viewing direction** overlay.

▶ The **Viewing direction** overlay closes.

12.2 VISUALIZATION MODES OF THE 3D VIEW

For general information about the **3D** view, see *Adaptation of the 3D View [▶ Page 44]*.

SICAT Air provides different display modes for the **3D** view in the **MPR/Radiology** workspace and in the **Airway** workspace:

- The **Volumetric view with soft tissue** only shows soft tissue.

- The **Surface view** shows a non-transparent cut through the volume. For information about this, see *Clipping modes of the 3D view [▶ Page 50]*.

- The **Volumetric view with bones and soft tissue** combines the **Volumetric view with soft tissue** and the **Volumetric view with bones**.

- The **Volumetric view with bones** only shows bones.

- The **Opaque view of the airway** only shows the segmented airway. Settings of the **Airway** object affect the **Opaque view of the airway**. For information about this, see *SICAT Air objects [▶ Page 24]*.

For how to activate a display mode of the **3D** view, see *Switching the display mode of the 3D view [▶ Page 47]*.

For how to configure a display mode, see *Configuring the active display mode of the 3D view [▶ Page 48]*.

12.3   SWITCHING THE DISPLAY MODE OF THE 3D VIEW

All display modes are available in all workspaces.

To switch the display mode of the **3D** view, proceed as follows:

☑   The **3D** view is already active. See *Switching the active view [▶ Page 35]*.

1.   In the **View toolbar** of the **3D** view, move the mouse pointer over the **Switch display mode** icon.

   ▶   The **Switch display mode** overlay opens.

2.   Click the icon of the desired display mode.

   ▶   SICAT Air activates the desired display mode.

3.   Move the mouse pointer out of the **Switch display mode** overlay.

▶   The **Switch display mode** overlay closes.

12.4 CONFIGURING THE ACTIVE DISPLAY MODE OF THE 3D VIEW

> **(i)** Only configurable display modes show the **Configure active display mode** icon. The **Configure active display mode** overlay only shows settings that are relevant for the active display mode.

To configure the display mode of the **3D** view, proceed as follows:

☑ The **3D** view is already active. For information about this, see *Switching the active view [▶ Page 35]*.

☑ The desired display mode is already active.

☑ The active display mode is configurable.

1. In the **View toolbar** of the **3D** view, move the mouse pointer over the **Configure active display mode** icon.
   ▶ The **Configure active display mode** overlay opens:
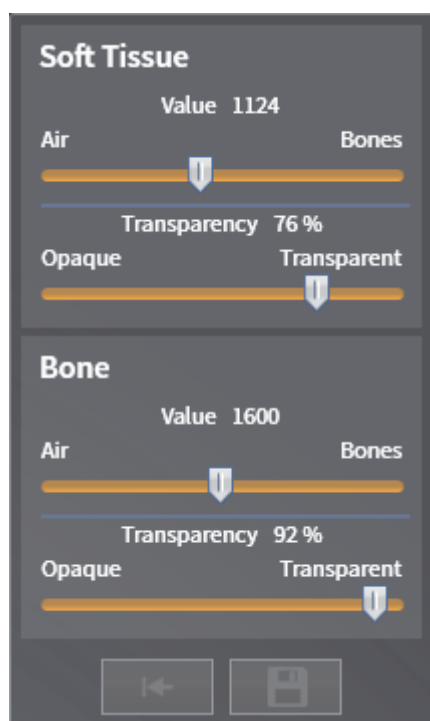
2. Move the desired sliders.
   ▶ SICAT Air adjusts the **3D** view corresponding to the position of the sliders.

3. If available, click the arrow icon next to **Show advanced options**.
   ▶ The **Show advanced options** area expands.

4. Activate or deactivate the available check boxes.
   ▶ SICAT Air adjusts the **3D** view corresponding to the state of the check boxes.

5. Move the desired sliders.
   ▶ SICAT Air adjusts the **3D** view corresponding to the position of the sliders.

6. Move the mouse pointer out of the **Configure active display mode** overlay.

▶ The **Configure active display mode** overlay closes.

You can reset the settings to the default values by clicking the **Reset configuration of active display mode to default values** button.

You can save the current settings as default values by clicking the **Save configuration of active display mode as default values** button.

12.5 CLIPPING MODES OF THE 3D VIEW

For general information about the **3D** view, see *Adaptation of the 3D View [▶ Page 44]*.

With the clipping modes, you can hide parts of the volume in the **3D** view.

Depending on the display mode, SICAT Air provides different clipping modes in the **3D** view:

- **Clipping: None** - SICAT Air shows all parts of the volume that are contained in the active viewing mode.
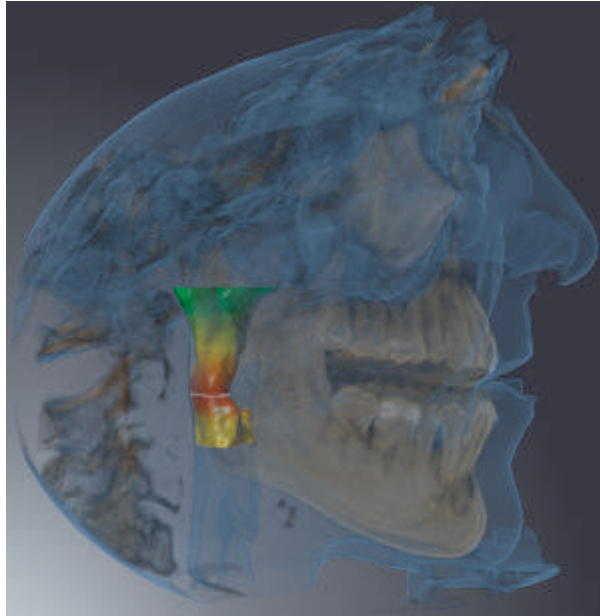
- **Clipping: Airway Slab** - SICAT Air hides all parts of the volume that are located lateral of the airway region. For how to define an airway region, see *Determining the airway region [▶ Page 75]*. If you did not define an airway region, SICAT Air uses default values.
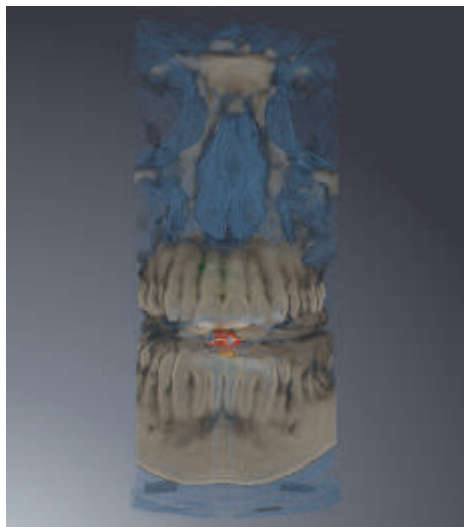
- **Clipping: Active Slice** - SICAT Air hides all parts of the volume that are located beyond a determined slice. Depending on the clipping mode, you can determine the slice in the **Axial** slice view, **Coronal** slice view, or **Sagittal** slice view. For information about this, see *Scrolling through slices in 2D slice views [▶ Page 40]*. A workspace only provides the slice clipping modes corresponding to the con-

tained slice views. In the **Airway** workspace, you can also determine the axial slice in the airway pro-file. For information about this, see *Interacting with the airway profile [▶ Page 87]*.
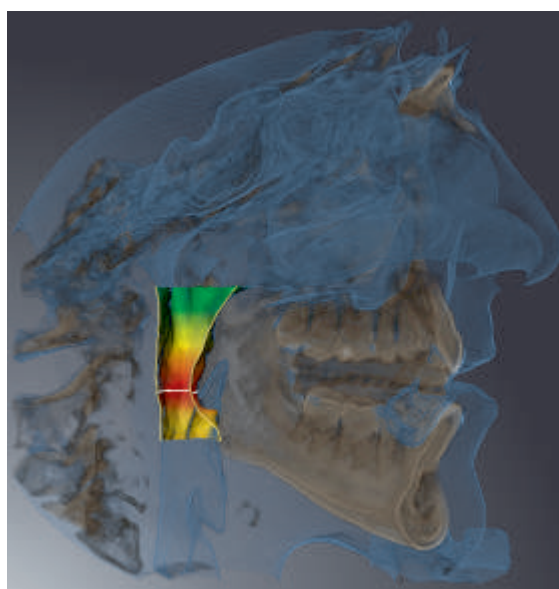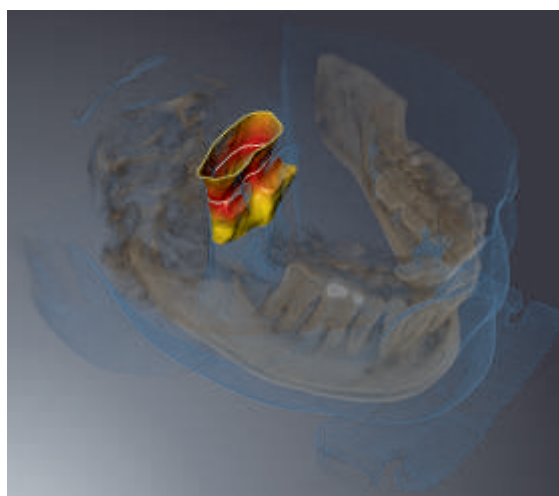
CLIPPING MODES IN SPECIFIC VIEWING MODES

The following table shows which clipping modes are available in the display modes:

	Clipping: None	Clipping: Airway Slab	Clipping: Active Slice
Volumetric view with soft tissue	Yes	Yes*	Yes
Surface view	No	No	Yes, sagittal*
Volumetric view with bones and soft tissue	Yes*	Yes	Yes
Volumetric view with bones	Yes*	No	Yes
Opaque view of the air-way	Yes*	No	Yes

*Default

For how to activate a clipping mode of the **3D** view, see *Switching the clipping mode of the 3D view [▶ Page 53]*.

12.6 SWITCHING THE CLIPPING MODE OF THE 3D VIEW

To switch the clipping mode of the **3D** view, proceed as follows:

☑ The **3D** view is already active. See *Switching the active view [▶ Page 35]*.

1. In the **View toolbar** of the **3D** view, move the mouse pointer over the **Switch clipping mode** icon.

   ▶ The **Switch clipping mode** overlay opens.

2. Click the icon of the desired clipping mode.

   ▶ SICAT Air activates the desired clipping mode.

3. Move the mouse pointer out of the **Switch clipping mode** overlay.

▶ The **Switch clipping mode** overlay closes.

13 GRAY VALUES

> ℹ️ You can only adjust the gray values of volumes generated by non-Sirona 3D scanners.

If the visualization of the volume is insufficient, you can adjust the gray values of the volume in the **Adjust Gray Values** window:
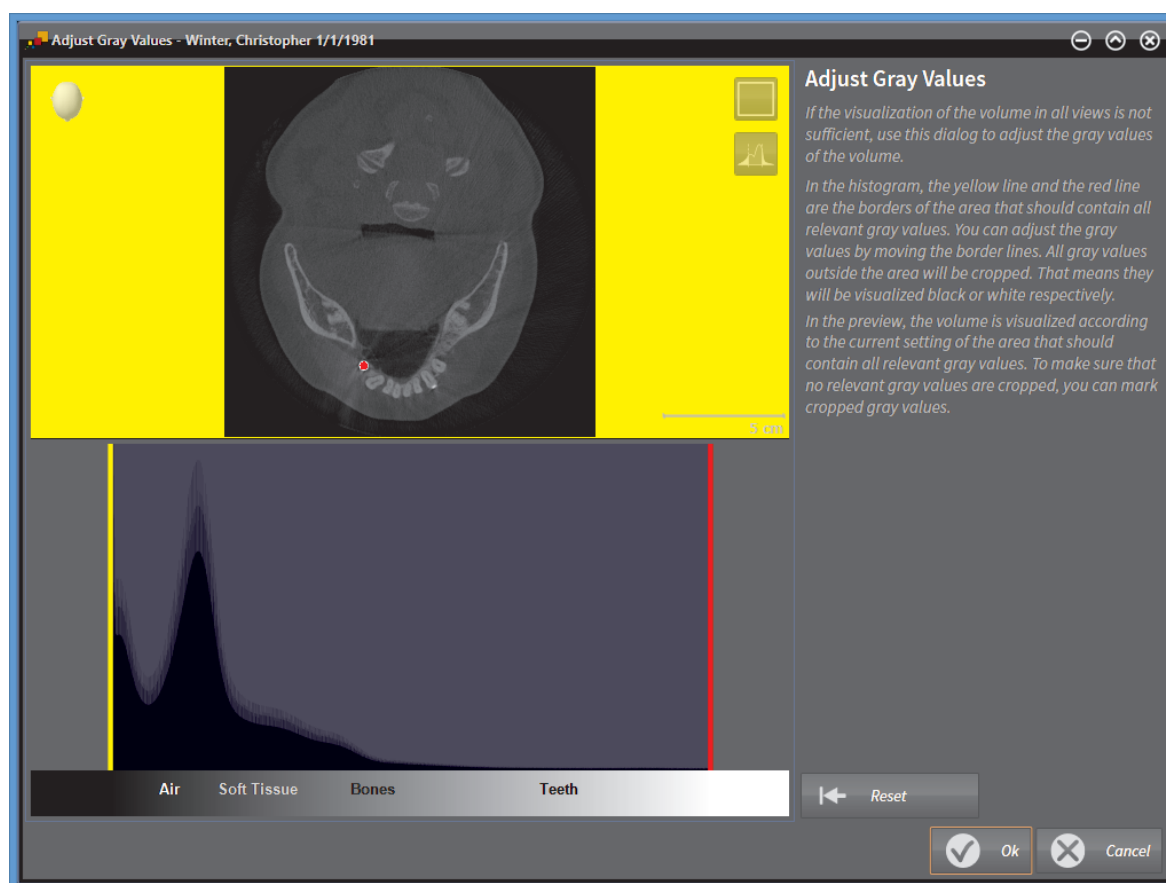
The **Adjust Gray Values** window consists of two parts:

- The upper part shows an **Axial** slice view or a **Coronal** projection view.
- The lower part shows a histogram with the frequency distribution of gray values.

In the histogram, the yellow line and the red line represent the borders of the area that should contain all relevant gray values. You can adjust the gray values by moving the lines. SICAT Air crops all gray values outside the area. That means that the software visualizes them black or white respectively.

SICAT Air visualizes the volume in the **Axial** slice view or in the **Coronal** projection view corresponding to the area that should contain all relevant gray values. To make sure that SICAT Air hides no relevant image information, the software can mark cropped gray values.

In the **Axial** slice view, you can scroll through the slices and check them for cropped gray values individually.

In the **Coronal** projection view, you can check all slices for cropped gray values at a time.

Adjust the gray values only if the visualization of the volume is insufficient in all views. For information about this, see *Adjusting gray values [▶ Page 56]*.

You can adjust the brightness and the contrast of the 2D views. For information about this, see *Adjusting and resetting the brightness and the contrast of 2D views [*▶ *Page 37].*

You can adapt the display mode of the **3D** view. For information about this, see *Switching the display mode of the 3D view [*▶ *Page 47], Configuring the active display mode of the 3D view [*▶ *Page 48],* and *Switching the clipping mode of the 3D view [*▶ *Page 53].*

13.1 ADJUSTING GRAY VALUES

For general information about gray values, see *Gray values [▶ Page 54]*.

To adjust the gray values of the volume, proceed as follows:

☑ The **Prepare** workflow step is already expanded.

1. Click the **Adjust gray values** icon.
   ▶ The **Adjust Gray Values** window opens:
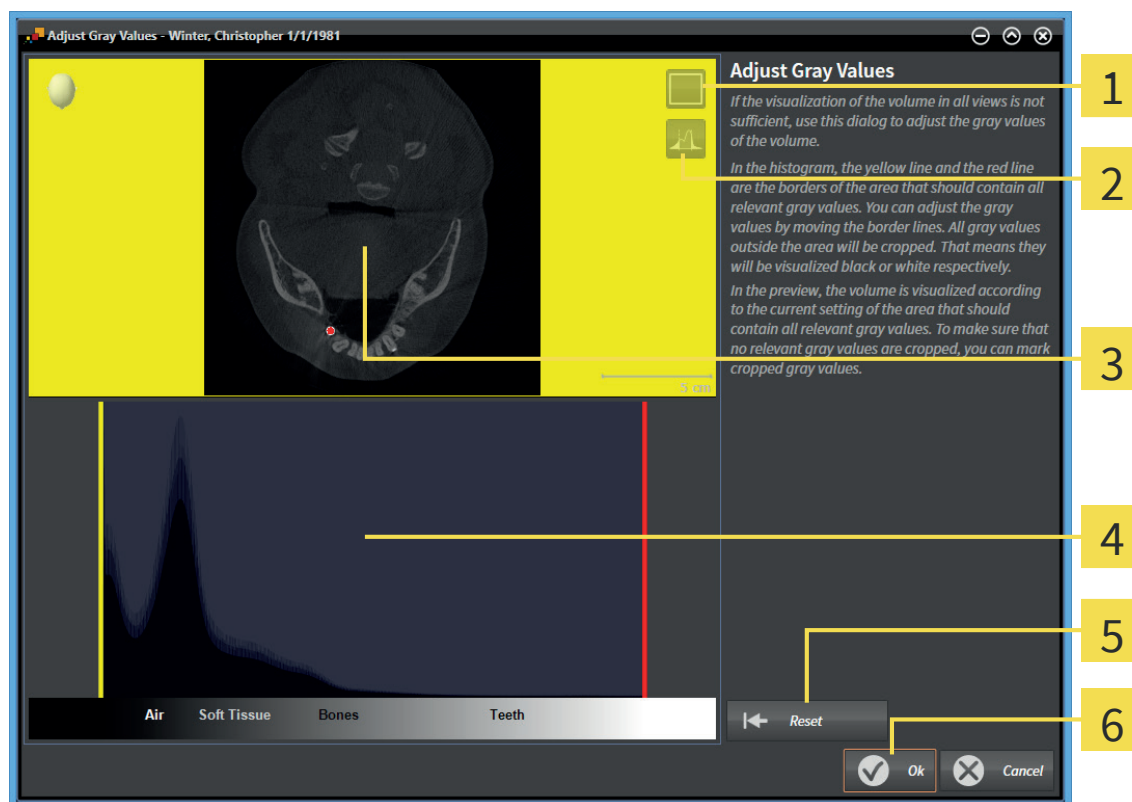
1	**Enable coronal projection mode** icon or **Enable axial slices mode** icon
2	**Unmark cropped gray values** icon or **Mark cropped gray values** icon
3	**Axial** slice view or **Coronal** projection view
4	Histogram
5	**Reset** button
6	**OK** button

2. Make sure that the slices mode is active. If required, click the **Enable axial slices mode** icon.

3. To adjust the lower border of the area that should contain all relevant gray values, move the yellow line.
   ▶ SICAT Air adjusts all gray values in the **Axial** slice view correspondingly.
   ▶ SICAT Air marks gray values below the lowest relevant gray value in yellow.

4. Scroll through the axial slices. Make sure that all relevant gray values are not marked in yellow. If required, move the yellow line again.

5. To adjust the upper border of the area that should contain all relevant gray values, move the red line.

    ► SICAT Air adjusts all gray values in the **Axial** slice view correspondingly.

    ► SICAT Air marks gray values above the highest relevant gray value in red.

6. Scroll through the axial slices. Make sure that all relevant gray values are not marked in red. If required, move the red line again.

7. Click **OK**.

► The **Adjust Gray Values** window closes and SICAT Air visualizes the volume in all views corresponding to the adjusted gray values.

> In addition to the described procedure, the following actions are available in the **Adjust Gray Values** window:
>
> ▪ To evaluate all slices at a time, you can click the **Enable coronal projection mode** icon. By clicking the **Enable axial slices mode** icon, you can switch to the **Axial** slice view again.
>
> ▪ To move both borders at once, you can click and move the area that should contain all relevant gray values.
>
> ▪ To reset the area that should contain all relevant gray values to the default settings, you can click the **Reset** button.
>
> ▪ If you do not want to mark the cropped gray values, you can click the **Unmark cropped gray values** icon.
>
> ▪ If you do not want to save your changes, you can click **Cancel**.

14 VOLUME ORIENTATION AND PANORAMIC REGION

> ℹ️ If an adjustment of the volume orientation is required, perform it at the beginning of your work with the 3D X-ray scan. If you adjust the volume orientation later, you may have to repeat parts of your diagnosis or planning.

VOLUME ORIENTATION

You can adjust the volume orientation for all views by rotating the volume around the three principal axes. This can be required in the following cases:

- Less-than-ideal positioning of the patient during the 3D scan
- Alignment by application, for example alignment of the axial slices parallel to the Frankfurt plane or parallel to the occlusal plane
- Optimizing the panorama view

If you adjust the volume orientation in SICAT Air, all other SICAT applications take over your adaptations.

You can adjust the volume orientation. For information about this, see *Adjusting the volume orientation* [▶ *Page 60*].

PANORAMIC REGION

SICAT Air calculates the **Panorama** view based on the volume and the panoramic region. To optimize the **Panorama** view, you should adjust the panoramic region to both jaws of the patient. This is mandatory for an effective and efficient diagnosis and treatment planning.
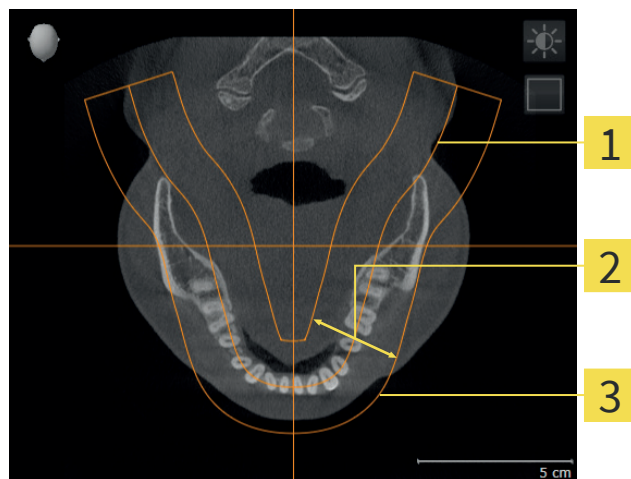
1	Panoramic curve
2	Thickness
3	Panoramic region

The panoramic region is defined by the following two components:

- Panoramic curve
- Thickness

For an optimal adjustment of the panoramic region, the following two conditions have to be met simultaneously:

- The panoramic region has to contain all teeth and both jaws completely.
- The panoramic region should be as thin as possible.

If you adjust the panoramic region in SICAT Air, all other SICAT applications take over your adaptations.

You can adapt the panoramic region. For information about this, see *Adjusting the panoramic region* [▶ *Page 65*].

14.1 ADJUSTING THE VOLUME ORIENTATION

For general information about the volume orientation, see *Volume orientation and panoramic region*
[▶ *Page 58*].

Adjusting the volume orientation consists of the following steps:

- Opening the **Adjust Volume Orientation and Panoramic Region** window
- Rotating the volume in the **Sagittal** view
- Rotating the volume in the **Coronal** view
- Rotating the volume in the **Axial** view

OPENING THE "ADJUST VOLUME ORIENTATION AND PANORAMIC REGION" WINDOW

☑ The **Prepare** workflow step is already expanded.

- Click the **Adjust volume orientation and panoramic region** icon.

▶ The **Adjust Volume Orientation and Panoramic Region** window opens:
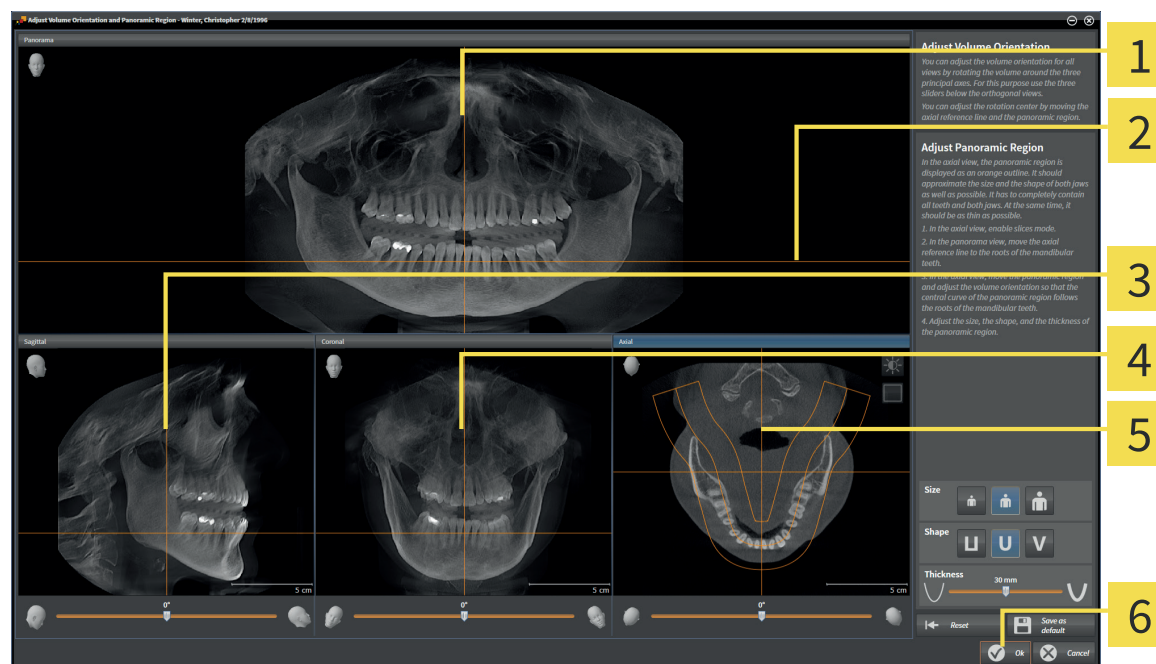
1	**Panorama** view	**4**	**Coronal** view with **Rotation** slider
2	Axial reference line	**5**	**Axial** view with **Rotation** slider
3	**Sagittal** view with **Rotation** slider	**6**	**OK** button

ROTATING THE VOLUME IN THE SAGITTAL VIEW

1. Activate the **Sagittal** view:
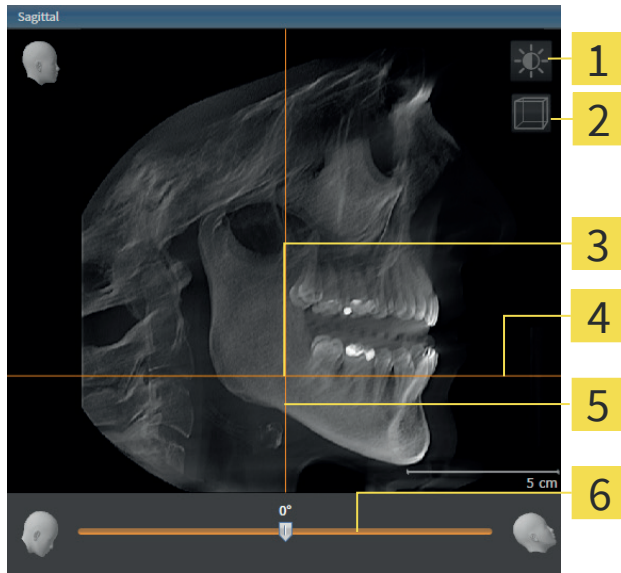
1	**Adjust brightness and contrast** icon	**4**	Axial reference line
2	**Enable slices mode** icon or **Enable projection mode** icon	**5**	Coronal reference line
3	Rotation center	**6**	**Rotation** slider

2. Make sure that the projection mode is active. If required, click the **Enable projection mode** icon.

3. If required, move the axial reference line by clicking on the axial reference line with the left mouse button and moving the mouse up and down while holding the left mouse button.

4. Move the mouse pointer over the **Rotation** slider.

5. Click and hold the left mouse button.

6. Move the mouse to the left or to the right.

   ► SICAT Air rotates the volume in the **Sagittal** view circularly around the rotation center and in the other views correspondingly.

7. When you have set up the desired rotation of the volume, release the left mouse button. Orientate yourself towards the axial reference line and the coronal reference line.

ROTATING THE VOLUME IN THE CORONAL VIEW

1. Activate the **Coronal** view:
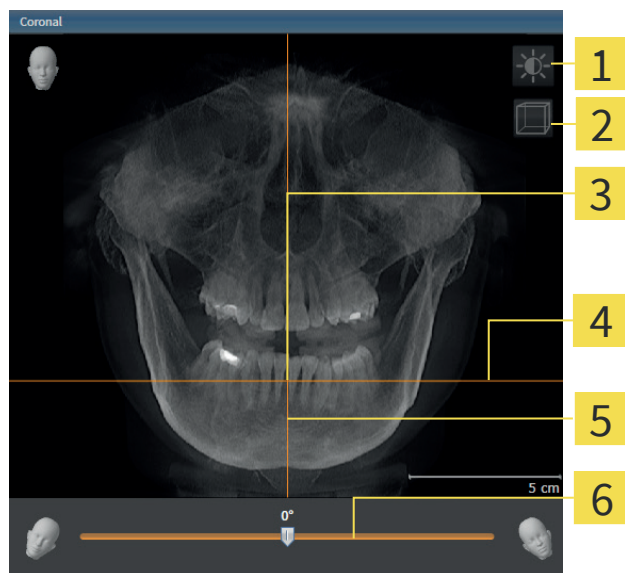
1	**Adjust brightness and contrast** icon	**4**	Axial reference line
2	**Enable slices mode** icon or **Enable projection mode** icon	**5**	Sagittal reference line
3	Rotation center	**6**	**Rotation** slider

2. Make sure that the projection mode is active. If required, click the **Enable projection mode** icon.

3. If required, move the axial reference line by clicking on the axial reference line with the left mouse button and moving the mouse up and down while holding the left mouse button.

4. Move the mouse pointer over the **Rotation** slider.

5. Click and hold the left mouse button.

6. Move the mouse to the left or to the right.

   ▶ SICAT Air rotates the volume in the **Coronal** view circularly around the rotation center and in the other views correspondingly.

7. When you have set up the desired rotation of the volume, release the left mouse button. Orientate yourself towards the axial reference line and the sagittal reference line.

ROTATING THE VOLUME IN THE AXIAL VIEW
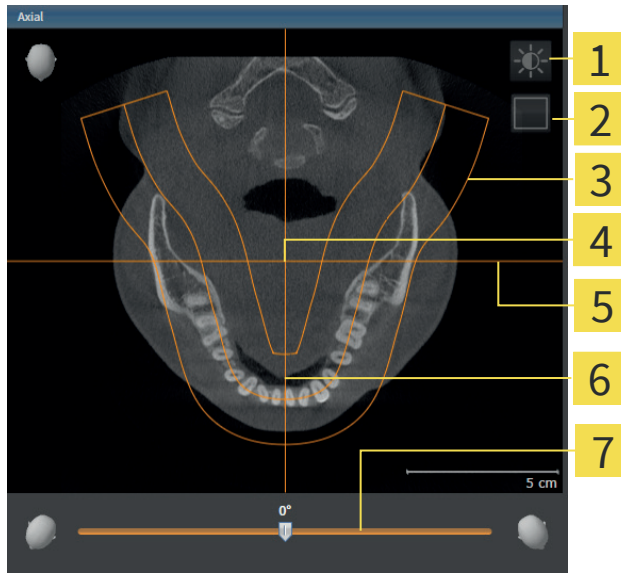
1. Activate the **Axial** view:

1	**Adjust brightness and contrast** icon	**5**	Coronal reference line
2	**Enable projection mode** icon or **Enable slices mode** icon	**6**	Sagittal reference line
3	Panoramic region	**7**	**Rotation** slider
4	Rotation center		

2. Make sure that the slice mode is active. If required, click the **Enable slices mode** icon.

3. Scroll to a slice that shows the roots of the mandibular teeth, for example by clicking on the axial reference line in the panorama view with the left mouse button and moving the mouse up or down while holding the left mouse button.

4. If required, move the panoramic region in the **Axial** view by clicking on the panoramic region with the left mouse button and moving the mouse while holding the left mouse button. SICAT Air moves the coronal reference line and the sagittal reference line correspondingly.

5. Move the mouse pointer over the **Rotation** slider.

6. Click and hold the left mouse button.

7. Move the mouse to the left or to the right.

   ▶ SICAT Air rotates the volume in the **Axial** view circularly around the rotation center and in the other views correspondingly.

8. When you have set up the desired rotation of the volume, release the left mouse button. Orientate yourself towards the panoramic region, the coronal reference line and the sagittal reference line.

9. To save your adjustments, click **OK**.

▶ SICAT Air saves the adjusted volume orientation and shows the volume in all views orientated correspondingly.

In addition to the described procedure, the following actions are available in the **Adjust Volume Orientation and Panoramic Region** window:

- You can adjust the brightness and the contrast of a 2D view by activating the desired view and clicking on the **Adjust brightness and contrast** icon. For information about this, see *Adjusting and resetting the brightness and the contrast of 2D views [▶ Page 37]*.
- To reset the volume orientation and the panoramic region, you can click the **Reset** button.
- To save the current volume orientation and the current panoramic region as default, you can click the **Save as default** button.
- If you do not want to save your adjustments, you can click **Cancel**.

14.2 ADJUSTING THE PANORAMIC REGION

For general information about the panoramic region, see *Volume orientation and panoramic region* [▶ Page 58].

Adjusting the panoramic region consists of the following steps:

- Opening the **Adjust Volume Orientation and Panoramic Region** window
- Adjusting the slice position of the **Axial** view
- Moving the panoramic region
- Rotating the volume in the **Axial** view
- Adjusting **Size**, **Shape**, and **Thickness** of the panoramic region

OPENING THE "ADJUST VOLUME ORIENTATION AND PANORAMIC REGION" WINDOW

☑ The **Prepare** workflow step is already expanded.

- Click the **Adjust volume orientation and panoramic region** icon.

▶ The **Adjust Volume Orientation and Panoramic Region** window opens:
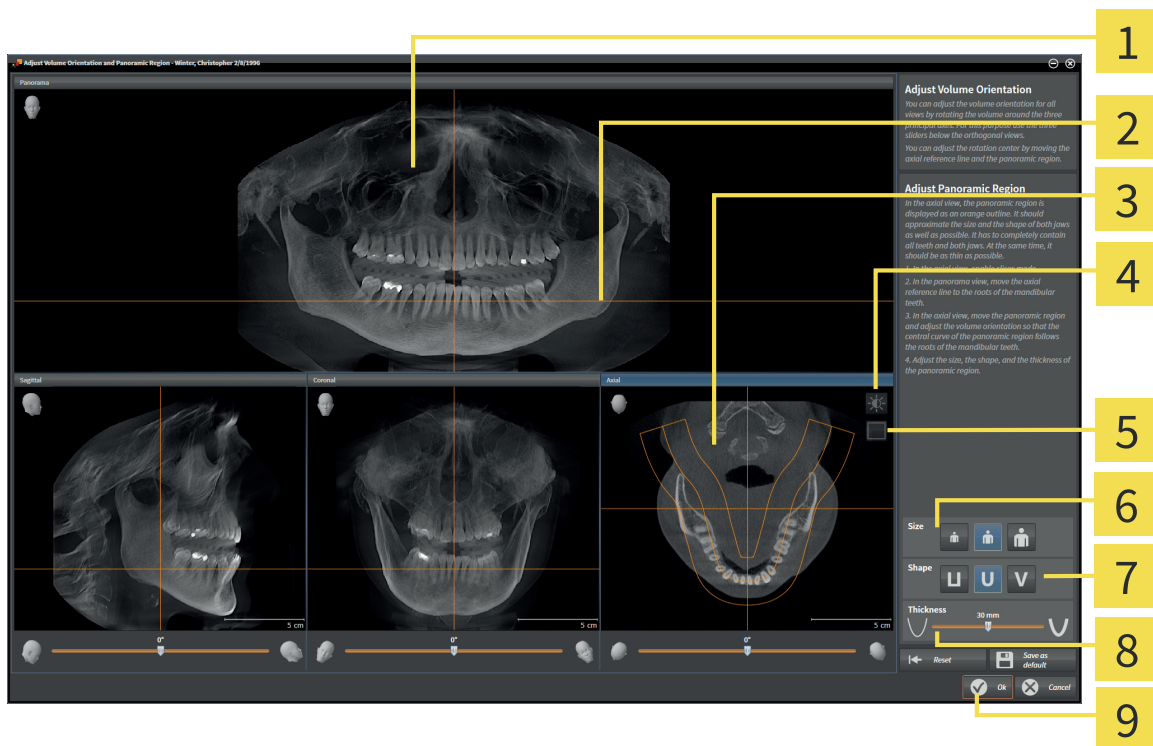
1	**Panorama** view	**6**	**Size** buttons
2	Axial reference line	**7**	**Shape** buttons
3	**Axial** view with **Rotation** slider	**8**	**Thickness** slider
4	**Adjust brightness and contrast** icon	**9**	**OK** button
5	**Enable projection mode** icon or **Enable slices mode** icon		

ADJUSTING THE SLICE POSITION OF THE AXIAL VIEW

1. In the **Axial** view, make sure that the slices mode is enabled. If required, click the **Enable slices mode** icon.

2. In the **Panorama** view, move the mouse pointer over the axial reference line. The axial reference line shows the current slice position of the **Axial** view.

3. Click and hold the left mouse button.

4. Move the mouse up or down.
   ▶ The slice of the **Axial** view adapts to the position of the axial reference line in the **Panorama** view.

5. When the axial reference line is located on the roots of the mandibular teeth, release the left mouse button.
   ▶ The **Axial** view maintains the current slice.

MOVING THE PANORAMIC REGION

1. In the **Axial** view, move the mouse pointer over the panoramic region.

2. Click and hold the left mouse button.

3. Move the mouse.
   ▶ SICAT Air moves the panoramic region corresponding to the position of the mouse pointer.

4. When the central curve of the panoramic region follows the roots of the mandibular teeth, release the left mouse button.
   ▶ The panoramic region maintains its current position.

ROTATING THE VOLUME IN THE AXIAL VIEW

1. In the **Axial** view, move the mouse pointer over the **Rotation** slider.

2. Click and hold the left mouse button.

3. Move the mouse to the left or to the right.
   ▶ SICAT Air rotates the volume in the **Axial** view circularly around the rotation center and in the other views correspondingly.

4. When the roots of the mandibular teeth follow the central curve of the panoramic region, release the left mouse button.

ADJUSTING SIZE, SHAPE, AND THICKNESS OF THE PANORAMIC REGION

1. Select the **Size** of the panoramic region that matches best to the mandible of the patient by clicking on the corresponding **Size** button.

2. Select the **Shape** of the panoramic region that matches best to the mandible of the patient by clicking on the corresponding **Shape** button.

3. In the **Axial** view, make sure that the projection mode is enabled. If required, click the **Enable projection mode** icon.

4. Select the **Thickness** of the panoramic region by adjusting the **Thickness** slider. Make sure that the panoramic region contains all teeth and both jaws completely. Keep the thickness as thin as possible.

5. To save your adjustments, click **OK**.

▶ SICAT Air saves the adjusted volume orientation and the adjusted panoramic region and visualizes the **Panorama** view correspondingly.

> In addition to the described procedure, the following actions are available in the **Adjust Volume Orientation and Panoramic Region** window:
>
> - You can adjust the brightness and the contrast of a 2D view by activating the desired view and clicking on the **Adjust brightness and contrast** icon. For information about this, see *Adjusting and resetting the brightness and the contrast of 2D views [*▶ *Page 37]*.
>
> - To reset the volume orientation and the panoramic region, you can click the **Reset** button.
>
> - To save the current volume orientation and the current panoramic region as default, you can click the **Save as default** button.
>
> - If you do not want to save your adjustments, you can click **Cancel**.

15 DISTANCE AND ANGLE MEASUREMENTS

There are two different types of measurements in SICAT Air:

- Distance measurements
- Angle measurements

The tools for adding measurements are located in the **Diagnose** step of the **Workflow toolbar**. You can add measurements in all 2D slice views except for the **Inspection Window**. Every time you add a measurement, SICAT Air also adds it to the **Measurements** group in the **Object browser**.

The following actions for measurements are available:

- *Adding distance measurements [▶ Page 69]*
- *Adding angle measurements [▶ Page 70]*
- *Moving measurements, single measurement points, and measurement values [▶ Page 72]*
- Activating, hiding, and showing measurements - for information about this, see *Managing objects with the Object browser [▶ Page 22]*.
- Focusing on measurements, removing measurements, and undoing and redoing measurement actions - for information about this, see *Managing objects with the Object toolbar [▶ Page 23]*.

15.1 ADDING DISTANCE MEASUREMENTS
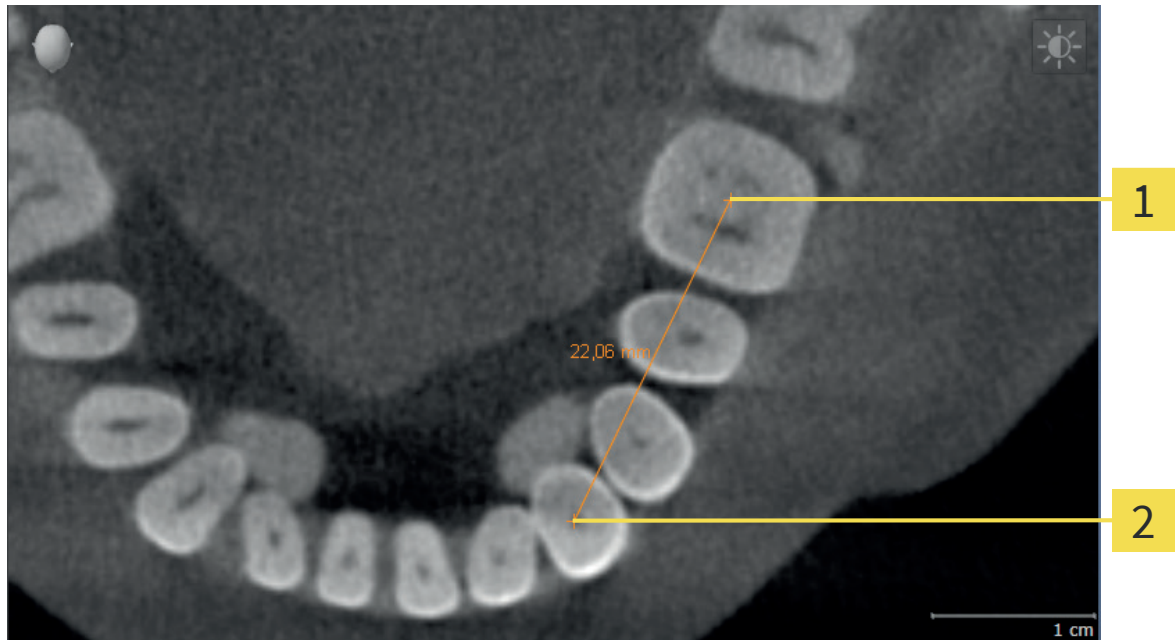
1 Starting point

2 Ending point

To add a distance measurement, proceed as follows:

☑ The **Diagnose** workflow step is already expanded.

1. In the **Diagnose** workflow step, click the **Add distance measurement (D)** icon.
   ► SICAT Air adds a new distance measurement to the **Object browser**.

2. Move the mouse pointer over the desired 2D slice view.
   ► The mouse pointer changes to a cross.

3. Click on the starting point of the distance measurement.
   ► SICAT Air shows the starting point by a small cross.
   ► SICAT Air shows a distance line from the starting point to the mouse pointer.
   ► SICAT Air shows the current distance between the starting point and the mouse pointer at the middle of the distance line and in the **Object browser**.

4. Move the mouse pointer to the ending point of the distance measurement and click the left mouse button.

► SICAT Air shows the ending point by a small cross.

> You can always cancel adding measurements by pressing **ESC**.

15.2 ADDING ANGLE MEASUREMENTS

1 Starting point

2 Ending point

3 Apex

To add an angle measurement, proceed as follows:
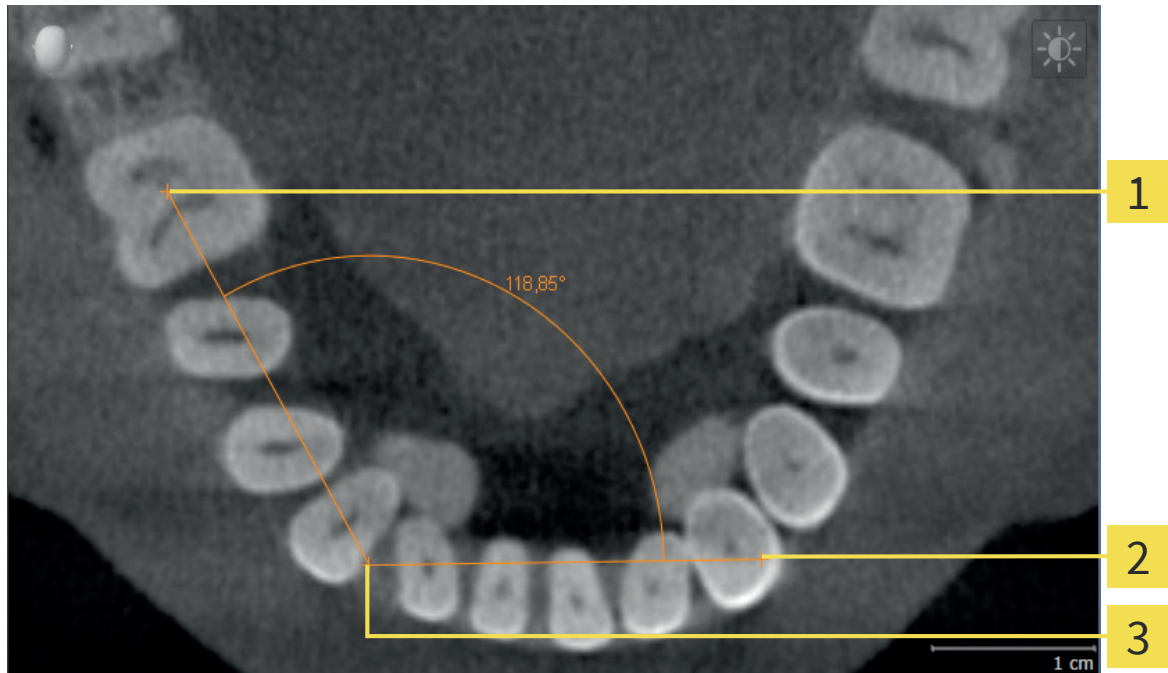
☑ The **Diagnose** workflow step is already expanded.

1. In the **Diagnose** workflow step, click the **Add angle measurement (A)** icon.
   ► SICAT Air adds a new angle measurement to the **Object browser**.

2. Move the mouse pointer over the desired 2D slice view.
   ► The mouse pointer changes to a cross.

3. Click on the starting point of the angle measurement.
   ► SICAT Air shows the starting point by a small cross.
   ► SICAT Air shows the first arm of the angle measurement by a line from the starting point to the mouse pointer.

4. Move the mouse pointer to the apex of the angle measurement and click the left mouse button.
   ► SICAT Air shows the apex by a small cross.
   ► SICAT Air shows the second arm of the angle measurement by a line from the apex to the mouse pointer.
   ► SICAT Air shows the current angle between the two arms of the angle measurement and in the **Object browser**.

5. Move the mouse pointer to the ending point of the second arm and click the left mouse button.

► SICAT Air shows the ending point by a small cross.

> You can always cancel adding measurements by pressing **ESC**.

15.3 MOVING MEASUREMENTS, SINGLE MEASUREMENT POINTS, AND MEASUREMENT VALUES

MOVING MEASUREMENTS

To move a measurement, proceed as follows:

☑ SICAT Air already visualizes the desired measurement in a 2D slice view. For information about this, see *Managing objects with the Object browser [▶ Page 22]* and *Managing objects with the Object toolbar [▶ Page 23]*.

1. Move the mouse pointer over a line of the measurement.

   ▶ The mouse pointer changes to a cross.

2. Click and hold the left mouse button.

3. Move the mouse pointer to the new position of the measurement.

   ▶ The measurement follows the movement of the mouse pointer.

4. Release the left mouse button.

▶ SICAT Air maintains the current position of the measurement.

MOVING SINGLE MEASUREMENT POINTS

To move a single measurement point, proceed as follows:

☑ SICAT Air already visualizes the desired measurement in a 2D slice view. For information about this, see *Managing objects with the Object browser [▶ Page 22]* and *Managing objects with the Object toolbar [▶ Page 23]*.

1. Move the mouse pointer over the desired measurement point.

   ▶ The mouse pointer changes to a cross.

2. Click and hold the left mouse button.

3. Move the mouse pointer to the new position of the measurement point.

   ▶ The measurement point follows the movement of the mouse pointer.

   ▶ The measurement value changes while you move the mouse.

4. Release the left mouse button.

▶ SICAT Air maintains the current position of the measurement point.

MOVING MEASUREMENT VALUES

To move a measurement value, proceed as follows:

☑ SICAT Air already visualizes the desired measurement in a 2D slice view. For information about this, see *Managing objects with the Object browser [▶ Page 22]* and *Managing objects with the Object toolbar [▶ Page 23]*.

1. Move the mouse pointer over the measurement value.

   ▶ The mouse pointer changes to a cross.

2. Click and hold the left mouse button.

3. Move the mouse pointer to the new position of the measurement value.

    ► The measurement value follows the movement of the mouse pointer.

    ► SICAT Air shows a dotted line between the measurement value and the corresponding measurement.

4. Release the left mouse button.

► SICAT Air maintains the current position of the measurement value.

> **i** After moving the value of a measurement, SICAT Air fixes the value at an absolute position. To make the position of the value relative to the measurement again, you can double-click the value.

16 SEGMENTATION OF THE AIRWAY

NOTICE	Before segmenting the airway, it can be useful to align the volume to the Frankfurt plane. For information about this, see *Adjusting the volume orientation [▶ Page 60]*. If you adjust the volume after performing the segmentation of the airway, SICAT Air removes the Airway object and you have to perform the segmentation again.

In SICAT Air, you need an **Airway** object for the airway analysis. The **Airway** object visualizes the airway separately, shows essential information and provides additional interaction options. You create an **Airway** object by segmenting the airway.

For the segmentation of the airway, SICAT Air requires an airway region. You determine the airway region by two anatomical reference points in the **Segmenting the airway** window. Afterwards, SICAT Air creates an airway region in the shape of a cuboid. The software defines the airway region by the reference points and a configurable lateral width. In the airway region, SICAT Air finally performs the automatic segmentation of the airway. You can move the landmarks and change the lateral width afterwards, causing the software to perform the automatic segmentation of the airway again.

SICAT Air colors areas in red in the **3D** view that are possibly not part of the airway. If SICAT Air has assigned parts of the volume wrong, correction tools are available.

The segmentation of the airway consists of the following steps:

- *Determining the airway region [▶ Page 75]*

The following steps are optional:

- *Correcting the airway segmentation [▶ Page 79]*
- *Removing areas that are not required from the airway [▶ Page 81]*

If the automatic segmentation of the airway is insufficient even after using the correction tools, you can perform the segmentation of the airway manually. For information about this, see *Segmenting the airway manually [▶ Page 82]*.

16.1 DETERMINING THE AIRWAY REGION

| ⚠️ **CAUTION**	**Insufficient quality of 3D X-ray data could cause an insufficient quality of the segmented airway and the airway profile.**
	▪ Only use 3D X-ray data of sufficient quality to get a segmented airway and an airway profile of sufficient quality and resolution.

For general information about segmenting the airway, see *Segmentation of the airway [▶ Page 74]*.

OPENING THE "SEGMENTING THE AIRWAY" WINDOW

☑ You have already adjusted the volume corresponding to your requirements, for example to the Frankfurt plane. For information about this, see *Adjusting the volume orientation [▶ Page 60]*.

☑ The **Analyze** workflow step is already expanded. For information about this, see *Workflow toolbar [▶ Page 19]*.

▪ Click the **Segment the airway** icon.

▶ The **Segmenting the airway** window opens:
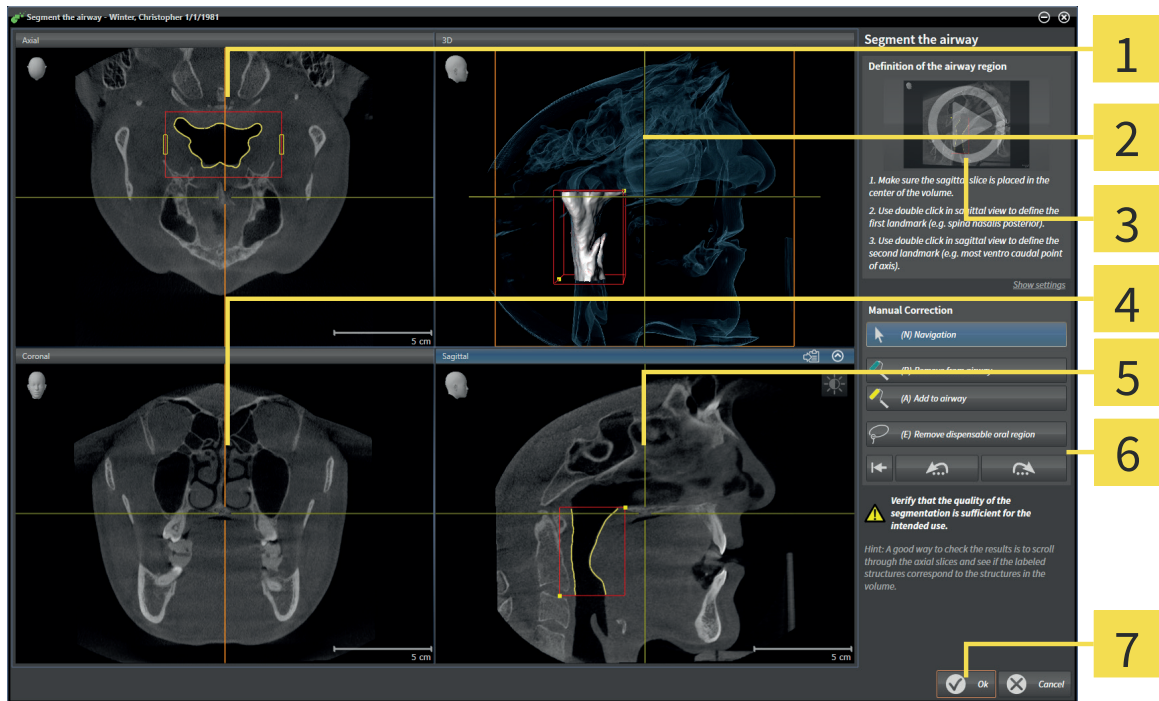
| **1**	**Axial** view	**5**	**Sagittal** view
2	**3D** view	**6**	Tools area
3	Example video	**7**	**OK** button
4	**Coronal** view		

DETERMINING LANDMARKS FOR THE DEFINITION OF THE AIRWAY REGION

1. Make sure that the **Sagittal** view shows the desired position of the upper reference point in the airway. If required, scroll through the slices in the **Sagittal** view.

2. In the **Sagittal** view, double-click on the position for the upper reference point of the airway region:

- ► SICAT Air marks the upper reference point with a yellow rectangle.
- ► From now on, the lower reference point corresponds to the position of the mouse pointer.
- ► SICAT Air marks the airway region with a red frame.

3. Make sure that the **Sagittal** view shows the desired position of the lower reference point in the airway. If required, scroll through the slices in the **Sagittal** view.

4. In the **Sagittal** view, double-click on the position for the lower reference point of the airway region.
   - ► SICAT Air marks the lower reference point with a yellow rectangle.

► SICAT Air determines the airway region corresponding to the position of the reference points.

► SICAT Air segments the airway based on the airway region.

► In the **3D** view, SICAT Air colors areas in red that are possibly not part of the airway:
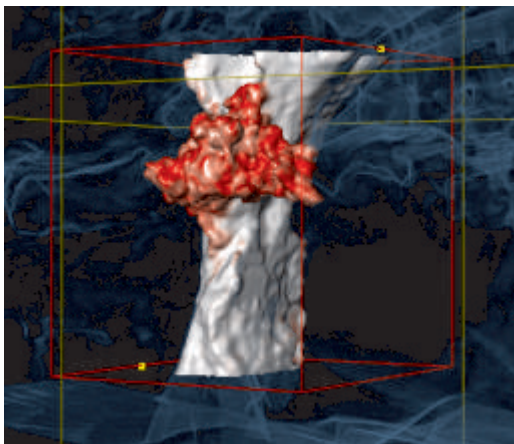
MOVING REFERENCE POINTS OF THE AIRWAY REGION

You can move the landmarks in all 2D views.

1. Make sure that the navigation mode is active. If required, click the **Navigation** button.

2. Make sure that the desired 2D view shows the desired reference point. If required, scroll through the slices.

3. Move the mouse pointer over a reference point.
   ► The mouse pointer changes to a crosshair.

4. Click and hold the left mouse button.

5. Move the mouse pointer to the new position of the reference point.
   ► The reference point follows the movement of the mouse pointer.
   ► SICAT Air adapts the airway region corresponding to the position of the reference point.

6. Release the left mouse button.

► SICAT Air maintains the new position of the reference point.

► SICAT Air automatically segments the airway again based on the new airway region.

► In the **3D** view, SICAT Air colors areas in red that are possibly not part of the airway.

CHANGING THE LATERAL SIZE OF THE AIRWAY REGION

The lateral size is 60 mm per default.

1. Make sure that the navigation mode is active. If required, click the **Navigation** button.

2. Make sure that the **Axial** view shows the marks for the lateral size. If required, scroll through the slices in the **Axial** view:
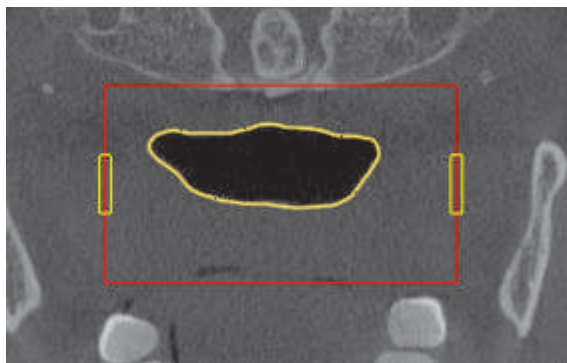
3. Move the mouse pointer over a mark of the lateral size.
   ► The mouse pointer changes to a two-directional arrow.

4. Click and hold the left mouse button.

5. Move the mouse pointer to the desired position of the mark.
   ► The mark follows the movement of the mouse pointer.
   ► SICAT Air adapts the airway region corresponding to the new lateral size.

6. Release the left mouse button.

► SICAT Air maintains the new position of the mark.

► SICAT Air automatically segments the airway again based on the new airway region.

► In the **3D** view, SICAT Air colors areas in red that are possibly not part of the airway.

When the segmentation of the airway corresponds to the anatomical conditions, proceed with *Finishing the segmentation of the airway [►Page 83]*.

When the segmentation of the airway does not correspond to the anatomical conditions, proceed with *Correcting the airway segmentation [►Page 79]* or *Removing areas that are not required from the airway [►Page 81]*.

> In addition to the described procedure, the following actions are available in the **Segmenting the airway** wizard:
> - You can adjust the brightness and the contrast of a 2D view by clicking the **Adjust brightness and contrast** icon. For information about this, see *Adjusting and resetting the brightness and the contrast of 2D views [►Page 37]*.
> - You can copy screenshots of a view into the Windows clipboard and into the handout by clicking the **Copy to clipboard (Ctrl+C)** icon. For information about this, see *Documentation [►Page 43]*.
> - If you want to undo the last work step, you can click the **Undo** button.
> - If you want to repeat the last work step, you can click the **Redo** button.
> - If you want do undo all work steps, you can click the **Remove airway segmentation and reset all changes** button and confirm this by clicking **OK** in the message window.
> - If you want to abort segmenting the airway, you can click **Cancel**.
>
> The **Undo** and **Redo** functions are only available as long as the **Segmenting the airway** window is opened.

16.2 CORRECTING THE AIRWAY SEGMENTATION

> ℹ️ The segmentation of SICAT Air works with areas instead of anatomical contours. Therefore, it is rarely required that you trace anatomical contours exactly.

For general information about segmenting the airway, see *Segmentation of the airway [▶ Page 74]*.

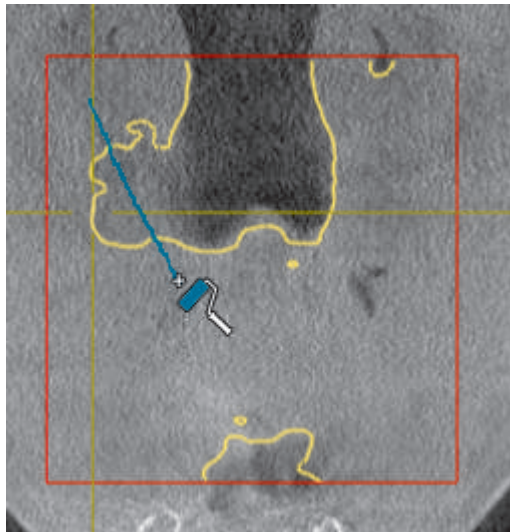### REMOVING WRONG RECOGNIZED AREAS FROM THE AIRWAY

You can remove areas from the airway in all 2D views.

During your corrections, especially consider the areas colored in red in the **3D** view. However, these areas may not be the only areas that SICAT Air may have marked wrongly as airway.

☑ You have already defined an airway region. For information about this, see *Determining the airway region [▶ Page 75]*.

1. In the **Segmenting the airway** window, click the **Remove from airway** button.
   ▶ The mouse pointer changes to a blue paint roller.

2. In a 2D view within the airway region, mark additional areas that SICAT Air has wrongly recognized as airway:

▶ SICAT Air removes the marked area from the airway:

ADDING WRONG RECOGNIZED AREAS TO THE AIRWAY

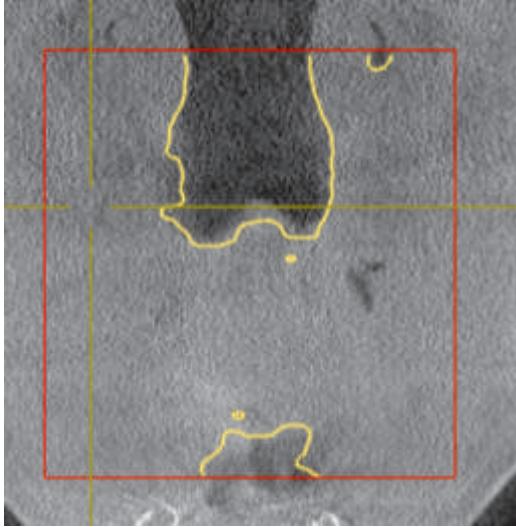You can mark additional areas as airway in all 2D views.

☑ You have already defined an airway region. For information about this, see *Determining the airway region [*▶ *Page 75]*.

1. In the **Segmenting the airway** window, click the **Add to airway** button.
   ▶ The mouse pointer changes to a yellow paint roller.

2. In a 2D view within the airway region, mark additional areas as airway.
   ▶ SICAT Air recognizes the marked area as airway.

When the segmentation of the airway corresponds to the anatomical conditions, proceed with *Finishing the segmentation of the airway [*▶ *Page 83]*.

If the automatic segmentation of the airway does not correspond to the anatomical conditions even after using the correction tools, you can perform the segmentation of the airway manually. For information about this, see *Segmenting the airway manually [*▶ *Page 82]*.

## 16.3 REMOVING AREAS THAT ARE NOT REQUIRED FROM THE AIRWAY

For general information about segmenting the airway, see *Segmentation of the airway [▶ Page 74]*.

Use the **Remove dispensable oral region** tool in air leading areas that do not belong to the relevant airway. Examples are the oral cavity and eversions.

☑ You have already defined an airway region. For information about this, see *Determining the airway region [▶ Page 75]*.

1. In the **Segmenting the airway** window, click the **Remove dispensable oral region** button.
    ▶ The mouse pointer changes to a lasso.

2. In the **3D** view, frame areas that you want to remove from the recognition completely. It is not relevant whether it is the airway or an area outside the airway:
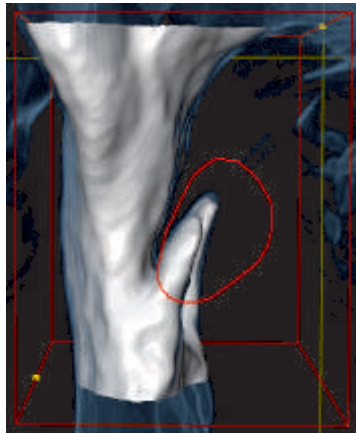
▶ SICAT Air removes the complete area behind the marking from the volume. This means that SICAT Air cannot recognize this area as airway or areas outside the airway anymore:
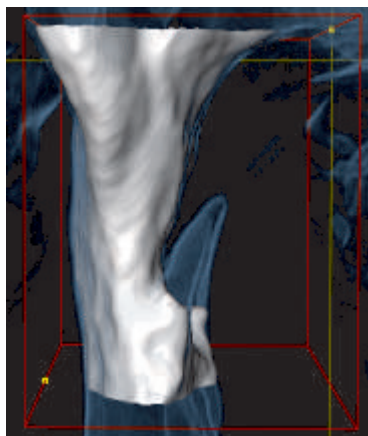
You can also use the **Remove dispensable oral region** function in the 2D views. In this case, SICAT Air performs changes only in the current slice.

When the segmentation of the airway corresponds to the anatomical conditions, proceed with *Finishing the segmentation of the airway [▶ Page 83]*.

If the automatic segmentation of the airway does not correspond to the anatomical conditions even after using the correction tools, you can perform the segmentation of the airway manually. For information about this, see *Segmenting the airway manually [▶ Page 82]*.

16.4 SEGMENTING THE AIRWAY MANUALLY

ℹ	The segmentation of SICAT Air works with areas instead of anatomical contours. Therefore, it is rarely required that you trace anatomical contours exactly.

For general information about segmenting the airway, see *Segmentation of the airway [*▶ *Page 74]*.

Even if you use the correction tools, SICAT Air may not be able to perform a suitable segmentation of the airway with certain 3D X-ray scans. In this case, perform the segmentation of the airway manually:

☑ You have already defined an airway region. For information about this, see *Determining the airway region [*▶ *Page 75]*.

1. In the **Segmenting the airway** window, click the **Show settings** button.
   ▶ The **Show settings** area expands.

2. Select the **Segment the airway manually** check box.
   ▶ If available, SICAT Air removes the automatic segmentation of the airway and corresponding corrections.

3. To mark areas as airway, use the **Add to airway** drawing tool within the airway region.

4. To mark areas outside the airway, use the **Remove from airway** drawing tool within the airway region.

▶ SICAT Air segments the airway based on your marks.

▶ In the **3D** view, SICAT Air colors areas in red that are possibly not part of the airway.

ℹ	If you segment the airway manually, you have to mark both the airway and areas outside the airway. Afterwards, SICAT Air performs the segmentation.

ℹ	The tools for correcting the automatic segmentation of the airway are also available for the manual segmentation of the airway.

When the segmentation of the airway corresponds to the anatomical conditions, proceed with *Finishing the segmentation of the airway [*▶ *Page 83]*.

16.5 FINISHING THE SEGMENTATION OF THE AIRWAY

For general information about segmenting the airway, see *Segmentation of the airway [*▶ *Page 74]*.

☑ In the **Segmenting the airway** window, you have already defined an airway region. For information about this, see *Determining the airway region [*▶ *Page 75]*.

▪ If the segmentation corresponds to the anatomical conditions, you can click the **OK** button.

▶ SICAT Air takes over the segmented airway.

▶ SICAT Air closes the **Segmenting the airway** window.

▶ If not already active, SICAT Air activates the **Airway** workspace.

▶ In the **3D** view, SICAT Air activates the **Opaque view of the airway** display mode.

▶ In the **Object bar**, SICAT Air creates an **Airway** object.

17 AIRWAY ANALYSIS

Before you can start with the airway analysis, you have to segment the airway. For information about this, see *Segmentation of the airway [*▶ *Page 74]*.

SICAT Air provides the following options for the airway analysis:

- Airway analysis area
- Visualization modes
- Clipping modes
- Color coding
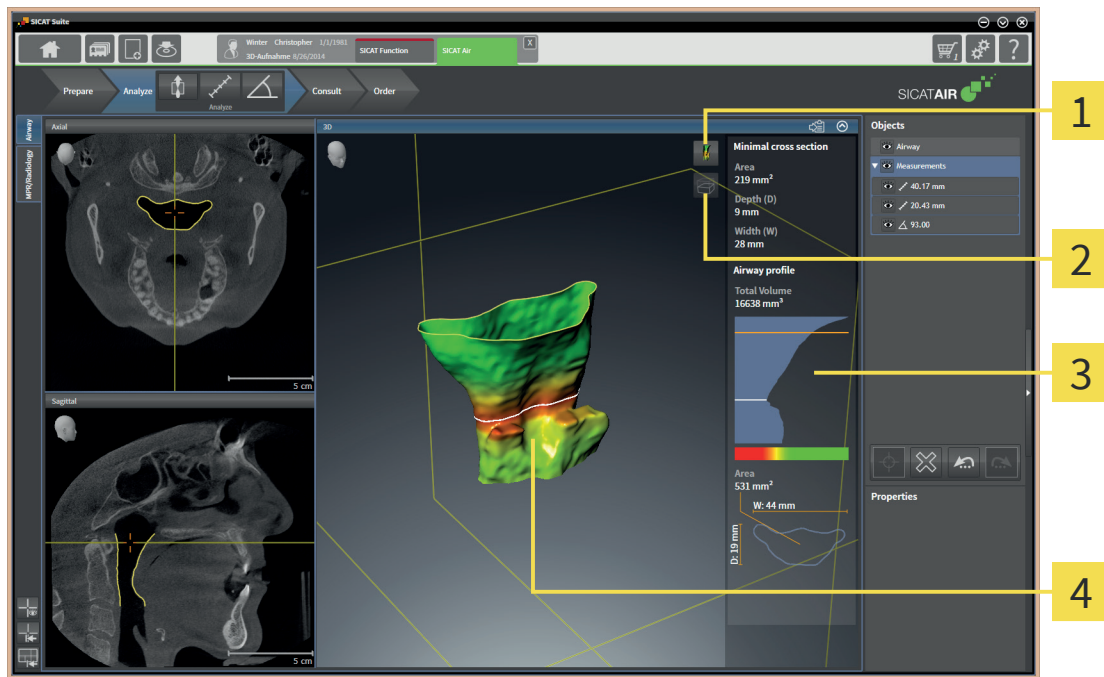
1	**Switch display mode** icon	**3**	Airway analysis area
2	**Switch clipping mode** icon	**4**	Segmented **Airway** object with color coding

AIRWAY ANALYSIS AREA

After you have segmented the airway, SICAT Air shows the airway analysis area in the **Airway** workspace.

The upper part of the airway analysis area looks as follows:
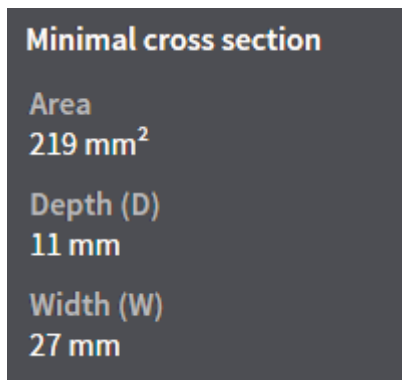
You can see the following information for the segmented airway:

- **Minimal cross section area**
- **Depth (D)**
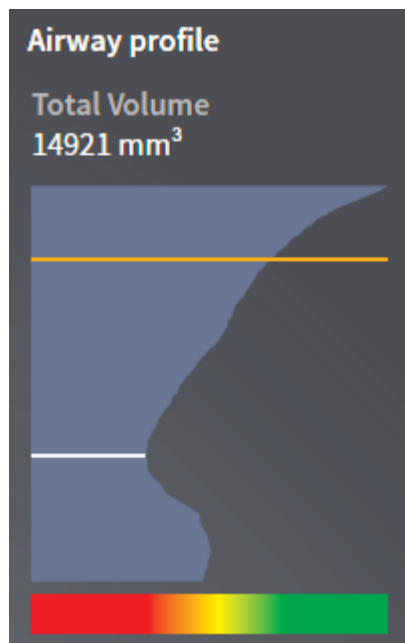- **Width (W)**

The middle part of the airway analysis area shows the airway profile. The airway profile shows the cross sectional areas of the axial slices along the airway:

Above the airway profile, SICAT Air visualizes the total volume of the **Airway** object in mm².

The airway profile contains two lines that have the following meaning:

- The white line represents the slice with the smallest cross section.
- The orange line represents the selected slice.

The selected slice determines the position of the clipping in the **3D** view and information in the lower part of the airway analysis area.

For how to select a slice in the airway profile, see *Interacting with the airway profile [▶ Page 87]*.

The color gradient below the airway profile establishes a connection between the color coding and the cross sections.

The lower part of the airway analysis area looks as follows:
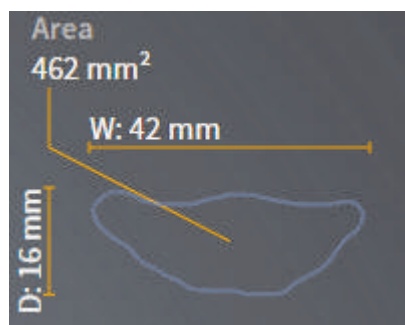
You can see the following information for the selected slice:

- Visualization of the cross section

- Cross sectional area

- Width

- Depth

VISUALIZATION MODES

In the **3D** view, SICAT Air can highlight certain aspects of the volume by different viewing modes. For information about this, see *Visualization modes of the 3D view [▶ Page 46]*.

CLIPPING MODES

In the **3D** view, SICAT Air can highlight certain aspects of the volume by different viewing modes. For information about this, see *Clipping modes of the 3D view [▶ Page 50]*.

COLOR CODING

SICAT Air provides the segmented airway with a color coding. The color coding corresponds to the cross sectional areas of the airway profile. With the color coding, you can highlight bottlenecks of the airway object in the **3D** view.

You can configure the color coding. For information about this, see *SICAT Air objects [▶ Page 24]*. You should select the upper threshold so that you can consider all areas above as healthy. You should select the lower threshold so that you can consider all areas above as pathologic. SICAT Air visualizes the area in between as a color gradient:
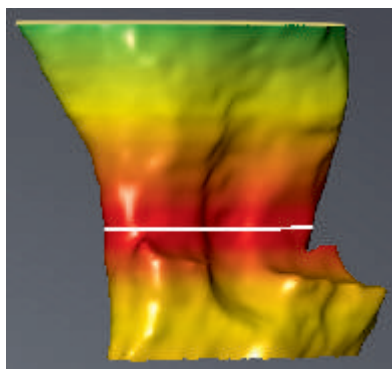
In the SICAT Air options, you can select default values for the color coding. For information about this, see *Changing SICAT Air Options [▶ Page 119]*.

17.1 INTERACTING WITH THE AIRWAY PROFILE

For general information about airway analysis, see *Airway analysis [*▶ *Page 84]*.

To interact with the airway profile, proceed as follows:

☑ The **Airway** workspace is already opened. For information about this, see *Switching the active workspace [*▶ *Page 30]*.

☑ You have already segmented the airway. For information about this, see *Determining the airway region [*▶ *Page 75]*.

▪ In the airway profile, click on the desired slice.

▶ An orange line in the airway profile shows the selected slice:
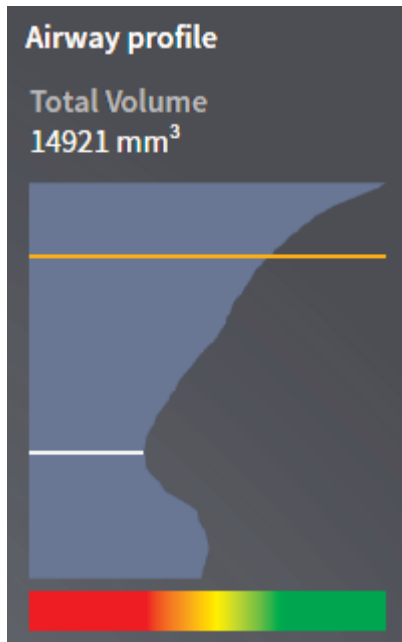
▶ SICAT Air shows information for the selected slice:
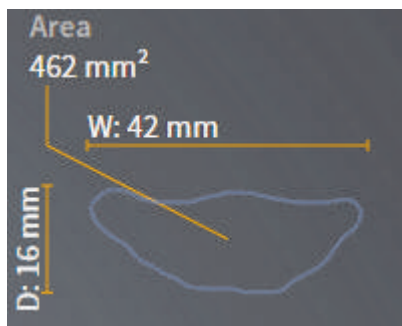
▶ In the **3D** view, SICAT Air activates the **Clipping: Designated Slice (select in sliceview)** clipping mode.

▶ The **3D** view hides the area above the selected slice:

▶ In the 2D views, SICAT Air focuses the crosshair on the center of the airway.

18 PATIENT CONSULTATION

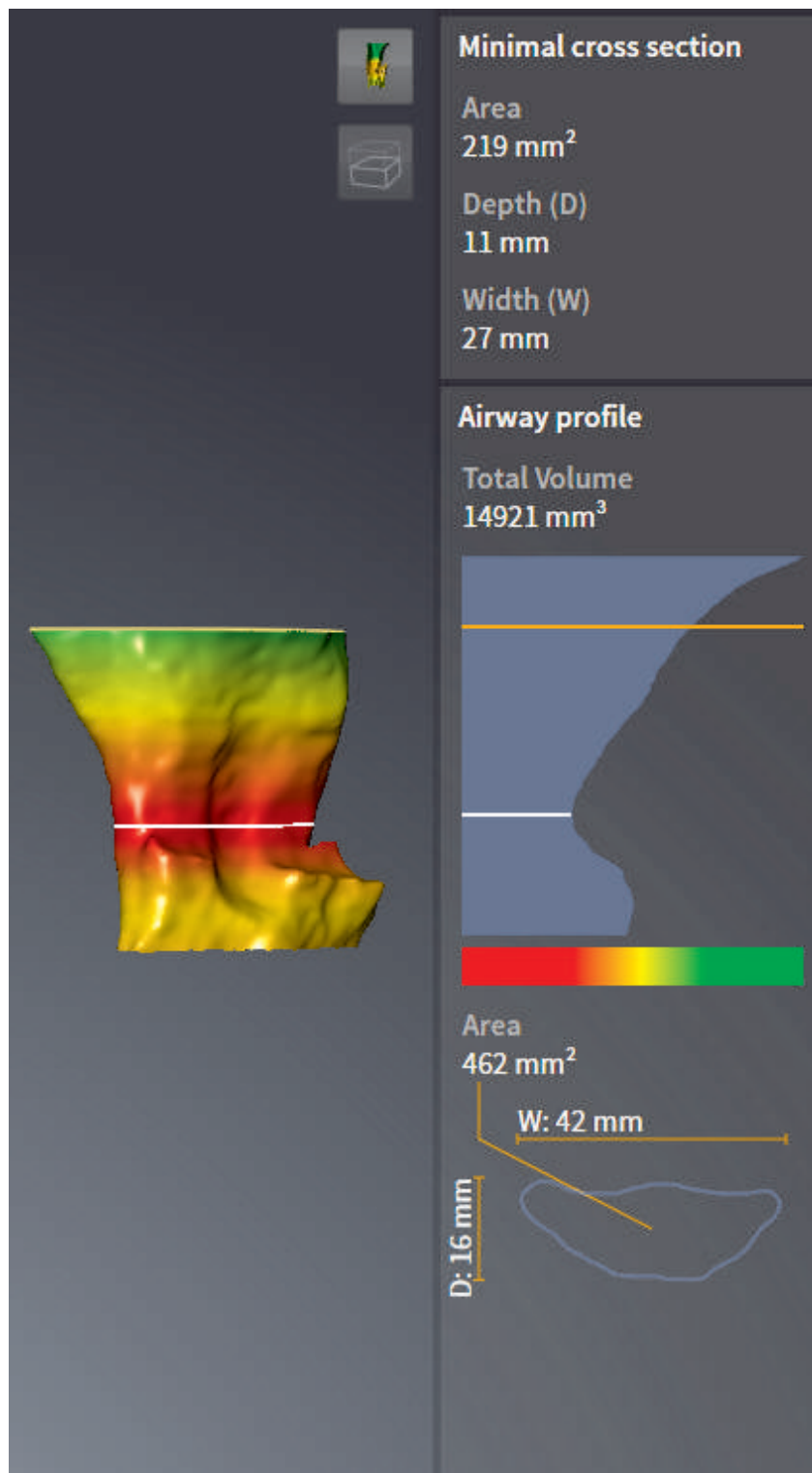| ⚠️ **CAUTION**	**Usage of the handout for diagnostic purposes could result in incorrect diagnosis and treatment.** ▪ Only use the software for diagnosis of medical images, diagnosis and treatment planning.

With patient-individual images, you can inform the patient about the suspicion of obstructive sleep apnea and clarify the corresponding symptoms. In SICAT Air, patient consultation is performed in two steps:

1. Informing the patient in your practice
2. Informing the patient via handout

You can create handouts for your patients. You can create the contents for the handouts during your explanations on the screen. The sources are images that are based on drawing objects and screenshots. This eases the patients to understand your results at home.

Creating the handout consists of the following steps:

▪ *Creating images and screenshots [▶ Page 91]*

▪ *Preparing handouts [▶ Page 94]*

▪ *Producing handouts [▶ Page 97]*

You can print handouts or save them as PDF files. You can open the PDF files in PDF viewers that SICAT Air supports. For information about this, see *System requirements [▶ Page 10]*.

18.1 CREATING IMAGES AND SCREENSHOTS

NOTICE	**Before creating images and screenshots, it can be useful to align the volume to the Frankfurt plane. For information about this, see *Adjusting the volume orientation [▶ Page 60]*. If you adjust the volume orientation after creating images and screenshots, SICAT Air removes the drawing objects and you have to perform the segmentation again.**

For general information about patient consultation, see *Patient consultation [▶ Page 90]*.

For general information about managing images and screenshots, see *SICAT Air objects [▶ Page 24]*.

There are two drawing tools:
- Drawing arrows
- Drawing circles

DRAWING ARROWS

To draw an arrow, proceed as follows:

☑ You have already adjusted the volume corresponding to your requirements, for example to the Frankfurt plane. For information about this, see *Adjusting the volume orientation [▶ Page 60]*.

☑ The **Consult** workflow step is already expanded. For information about this, see *Workflow toolbar [▶ Page 19]*.

1. In the **Consult** workflow step, click the **Draw Arrow** icon.

2. Move the mouse pointer over the desired view.
   ▶ The mouse pointer changes to a pencil.

3. Click on the desired position for the arrow head and hold the left mouse button.
   ▶ In the view, SICAT Air shows an arrow.
   ▶ From now on, the end of the arrow corresponds to the position of the mouse pointer.

4. Move the mouse pointer to the desired position for the end of the arrow and release the left mouse button.
   ▶ In the view, SICAT Air shows the finished arrow.
   ▶ If not already available, SICAT Air creates the required structures for the **Image** object in the **Object browser**.
   ▶ The image is available in the **Generate handout** window.

5. Click the **Draw Arrow** icon.

▶ SICAT Air closes the mode for drawing arrows.

DRAWING CIRCLES

To draw a circle, proceed as follows:

☑ You have already adjusted the volume corresponding to your requirements, for example to the Frankfurt plane. For information about this, see *Adjusting the volume orientation [▶ Page 60]*.

☑ The **Consult** workflow step is already expanded. For information about this, see *Workflow toolbar* [▶ *Page 19*].

1. In the **Consult** workflow step, click the **Draw Circle** icon.

2. Move the mouse pointer over the desired view.
   ▶ The mouse pointer changes to a pencil.

3. Click on the desired position for the center of the circle and hold the left mouse button.
   ▶ In the view, SICAT Air shows a circle.
   ▶ From now on, the radius of the circle corresponds to the distance between the center and the position of the mouse pointer.

4. Move the mouse pointer until the desired radius has been reached and release the left mouse button.
   ▶ In the view, SICAT Air shows the finished circle.
   ▶ If not already available, SICAT Air creates the required structures for the **Image** object in the **Object browser**.
   ▶ The image is available in the **Generate handout** window.

5. Click the **Draw Circle** icon.

▶ SICAT Air closes the mode for drawing circles.

> ℹ️ As long as the **Draw Circle** drawing tool or the **Draw Arrow** drawing tool are active, you can add multiple drawing objects consecutively. You can cancel using a drawing tool by clicking on a position outside the desired view or pressing the ESC key.

CONFIGURING DRAWING TOOLS

You can configure the **Draw Arrow** drawing tool or the **Draw Circle** drawing tool independently. Changes to the settings are only applied on drawing objects that are created afterwards.
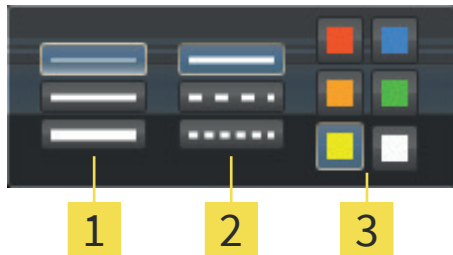
To configure a drawing tool, proceed as follows:

☑ The **Consult** workflow step is already expanded. For information about this, see *Workflow toolbar* [▶ *Page 19*].

1. In the **Consult** workflow step, next to the **Draw Arrow** icon or the **Draw Circle** icon, click the corresponding **Configure drawing tool** icon.

▶ The **Configure drawing tool** overlay opens:

1 Icons for the **Line thickness**

2 Icons for the **Line type**

3 Icons for the **Line color**

2. Click on the desired symbols to configure the **Line thickness**, the **Line type**, and the **Line color** of the drawing tool.

3. Click on an arbitrary spot outside the **Configure drawing tool** overlay.

▶ SICAT Air closes the **Configure drawing tool** window.

▶ SICAT Air saves the settings in your user profile.

▶ SICAT Air applies the new settings to all drawing objects that are created afterwards.

ADDING SCREENSHOTS TO THE "GENERATE HANDOUT" WINDOW

You can create screenshots of every view in every workspace and in every window as long as it contains the **Copy to clipboard (Ctrl+C)** icon.

To add screenshots to the handout, proceed as follows:

▪ In the **View toolbar** of the desired view, click the **Copy to clipboard (Ctrl+C)** icon.

▶ SICAT Air creates the required structures for the **Screenshot** object in the **Object browser** and activates it.

▶ The screenshot is available in the **Generate handout** window.

▶ SICAT Air copies a screenshot of the selected view into the clipboard.

Proceed with *Preparing handouts [*▶ *Page 94]*.

18.2 PREPARING HANDOUTS

For general information about patient consultation, see *Patient consultation [*▶ *Page 90]*.

The following actions are available for preparing handouts:

- Opening the **Generate handout** window
- Preparing screenshots
- Changing handout settings

OPENING THE "GENERATE HANDOUT" WINDOW

☑ You have at least created one **Image** object or one **Screenshot** object.

☑ The **Consult** workflow step is already expanded. For information about this, see *Workflow toolbar [*▶ *Page 19]*.

- Click the **Generate handout** icon.

▶ The **Generate handout** window opens:
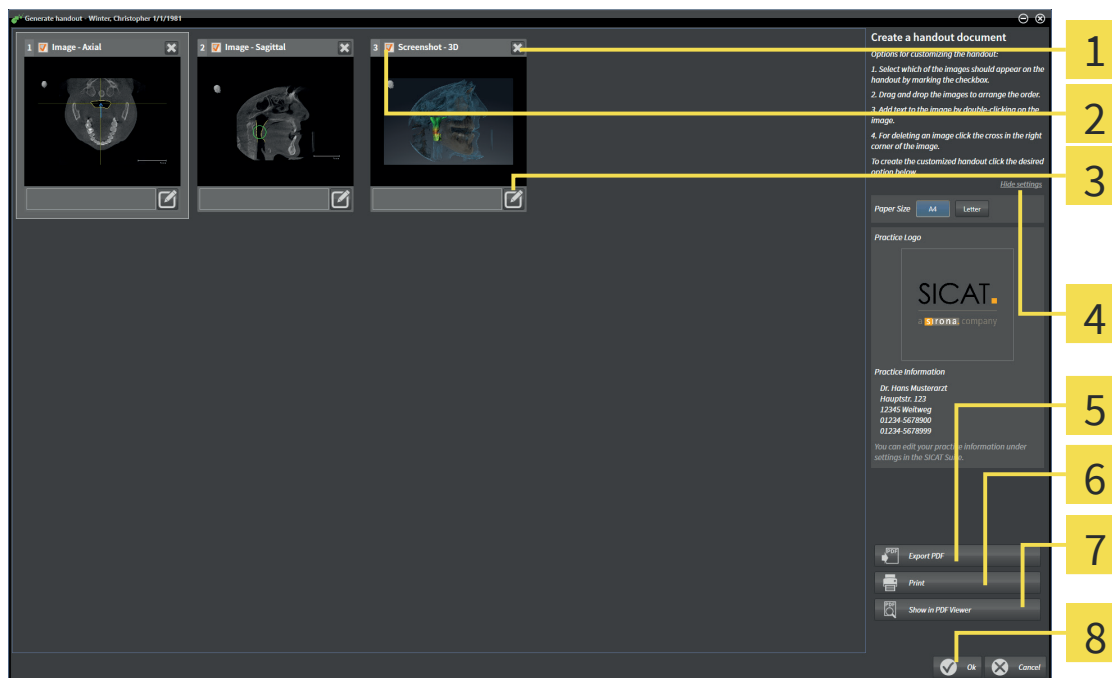
1	**Delete this image** icon	**5**	**Export PDF** button
2	Check boxes to activate and deactivate screenshots	**6**	**Print** button
3	**Edit image description** icon	**7**	**Show in PDF Viewer** button
4	**Settings**	**8**	**OK** button

PREPARING SCREENSHOTS

The **Generate handout** window shows screenshots from **Image** objects and **Screenshot** objects. For information about this, see *Creating images and screenshots [*▶ *Page 91]*.

☑ The **Generate handout** window is already opened.

1. If you want to delete a screenshot from the handout and from the **Object browser**, click the **Delete this image** icon of the screenshot.

   ► SICAT Air removes the screenshot from the handout.

   ► SICAT Air removes the screenshot from the **Object browser**.

2. If you want to hide a screenshot in the handout, deactivate the check box of the screenshot.

   ► SICAT Air hides the screenshot in the handout.

   ► SICAT Air maintains the screenshot in the **Object browser**.

3. If you want to add a description to a screenshot, click the **Edit image description** icon of the screenshot.

   ► SICAT Air shows an enlarged version of the screenshot and a text field:
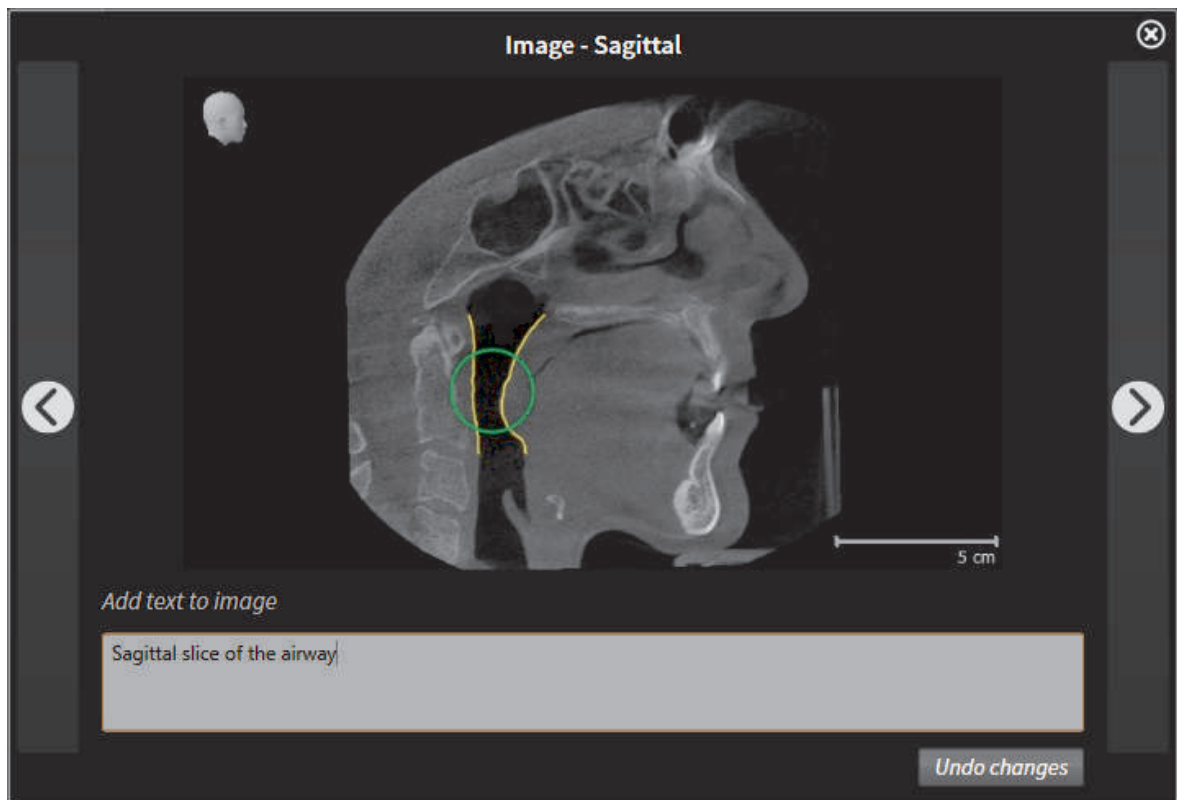
4. Type a description into the text field.

5. In the upper right corner of the window that shows the enlarged versions of the screenshot, click the **Close** button.

   ► SICAT Air saves the description of the screenshot.

6. If you want to change the order of the screenshots in the handout, adapt it using drag&drop.

> In the window that shows the enlarged versions of the screenshots, you can switch between the screenshots by clicking the **Next screenshot** button and the **Previous screenshot** button.

CHANGING HANDOUT SETTINGS

☑ The **Generate handout** window is already opened.

1.   Click **Show settings**.

2.   The **Settings** area expands:

3.   In the **Paper Size** area, select the desired paper size.

4.   Click **Hide settings**.

► The **Settings** area collapses.

► SICAT Air saves your changes.

Proceed with *Producing handouts [▶ Page 97]*.

	SICAT Air takes over practice logo und practice information text from the general settings. For details, see the SICAT Suite instructions for use.

18.3 PRODUCING HANDOUTS

The following actions are available for creating a handout:

- Saving handouts as PDF files
- Printing a handout
- Showing a handout in a PDF viewer

SAVING HANDOUTS AS PDF FILES

☑ The **Generate handout** window is already opened.

1. Click the **Export PDF** button.
   - ▶ A Windows File Explorer window opens.

2. Browse to the directory where you want to save the handout.

3. In the **Filename** field, enter a file name and click **Save**.

▶ The Windows File Explorer window closes.

▶ SICAT Air saves the handout as a PDF file.

▶ If you are using the standalone version of SICAT Suite, SICAT Air also saves the PDF file in the patient record.

PRINTING A HANDOUT

> ℹ Handouts with a suitable quality require a printer that fulfills specific require-
> ments. For information about this, see *System requirements [▶ Page 10]*.

☑ The **Generate handout** window is already opened.

1. Click the **Print** button.
   - ▶ The **Print** window opens.

2. Select the desired printer and adapt the settings if required.

3. Click **Print**.

▶ SICAT Air sends the handout to the printer.

SHOWING A HANDOUT IN A PDF VIEWER

☑ The **Generate handout** window is already opened.

- Click the **Show in PDF Viewer** button.

▶ If available, the default PDF viewer of your computers opens the handout.

See also

▶ System requirements [▶ 10]

19 ORDERING PROCESS

To order therapeutic appliances, proceed as follows:

▪ In SICAT Air, add the desired planning data for therapeutic oral appliances to the shopping cart. For information about this, see *Adding therapeutic oral appliances to the shopping cart [*▶ *Page 99]*.

▪ Check the shopping cart in SICAT Suite and start the order. For information about this, see *Checking the shopping cart and finalizing an order [*▶ *Page 110]*.

▪ Finalize the order directly on the computer that runs SICAT Suite or on another computer with an active Internet connection. For information about this, see *Finalizing orders with an active Internet connection [*▶ *Page 111]* or *Finalizing orders without an active Internet connection [*▶ *Page 112]*.

▪ The SICAT Portal allows you to submit your order via your web browser to qualified vendors and shows you the prices of the products. For a description of the ordering steps that take place in SICAT Portal, see *Performing ordering steps in the SICAT Portal [*▶ *Page 115]*.

If you have completed the order, SICAT WebConnector or your web browser transfers the order data using an encrypted Internet connection.

If you have started SICAT Suite as standalone version, you can add multiple therapeutic appliances to the shopping cart per order that are based on different patients and 3D scans. The contents of the shopping cart are saved when closing SICAT Suite.

If you have started SICAT Suite from SIDEXIS, you can only add orders to the shopping cart that are based on the same 3D scan. You have to perform the ordering process afterwards completely, because the contents of the shopping cart are deleted on closing SICAT Suite.

> If the computer that runs SICAT Suite has an active Internet connection, SICAT Suite WebConnetor automatically transfers the encrypted order data to the SICAT server. In this case, multiple therapeutic appliances per order are possible. If the computer that runs SICAT Suite does not have an active Internet connection, the transmission is performed via an XML file and a zip archive that you can upload onto another computer with an active Internet connection. In this case, SICAT Suite exports all therapeutic appliances in the shopping cart at once and creates a separate folder per patient. In SICAT Portal, you can upload one therapeutic appliance per patient afterwards.

19.1 ADDING THERAPEUTIC ORAL APPLIANCES TO THE SHOPPING CART

⚠️ **CAUTION**	**Wrong data in an order could result in a wrong order.** ▪ If you perform an order, make sure that you select and transmit the correct data for the order.

For general information about the ordering process, see *Ordering process [▶ Page 98]*.

In SICAT Air, the first part of the ordering process for a therapeutic oral appliance consists of the following steps:

IF YOU DID NOT ADD OPTICAL IMPRESSIONS

☑ The 3D X-ray scan has been acquired in the treatment position.

☑ The **Order** workflow step is already expanded. For information about this, see *Workflow toolbar [▶ Page 19]*.

1. Click the **Order oral appliance** icon.
   ▶ The **Order incomplete** window opens:
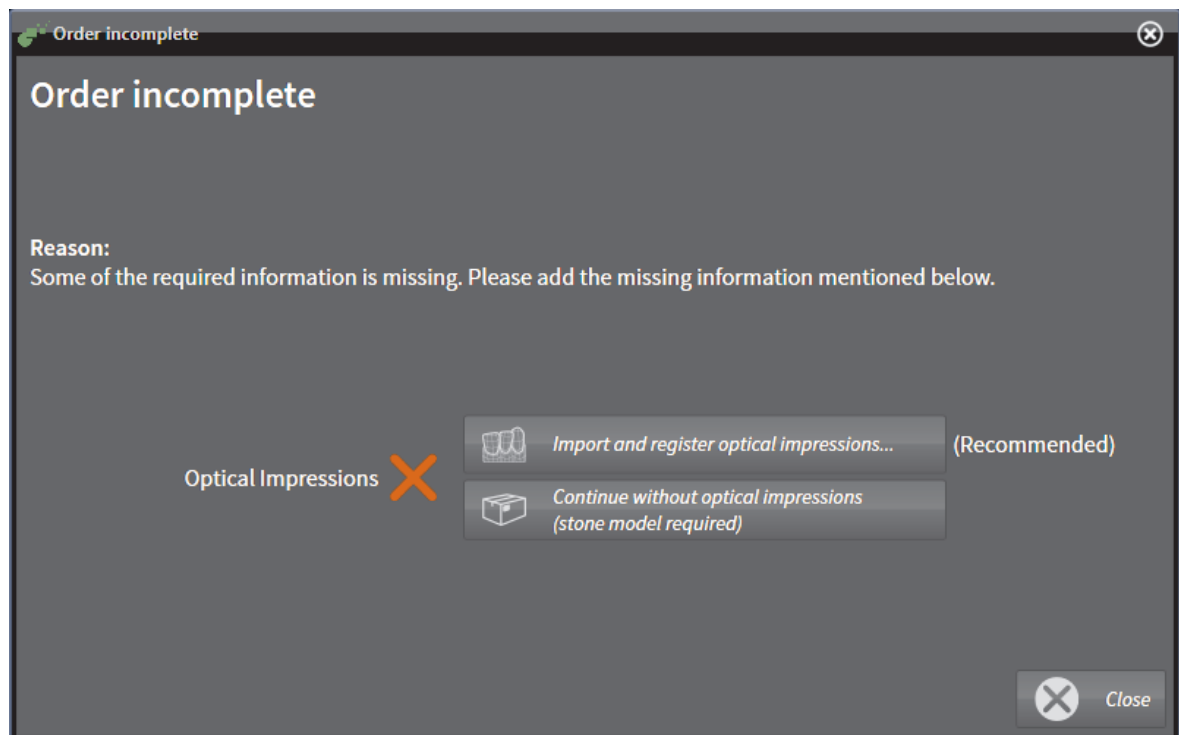
2. Click the **Import and Register Optical Impressions** button and import optical impressions corresponding to the 3D X-ray scan. For information about this, see *Importing and registering optical impressions [▶ Page 103]*.

   ▶ The **Order oral appliance** window opens.

> **i** Under certain circumstances, you have to adapt the volume orientation and the panoramic curve before importing optical impressions. You can open the **Adjust Volume Orientation and Panoramic Region** window directly from the **Import and Register Optical Impressions** window by clicking the **Adjust panoramic region** button. For information about this, see *Adjusting the panoramic region* [▶ Page 65].

> **i** If you want to send stone models instead of optical impressions to SICAT, you can add therapeutic oral appliances to the shopping cart without optical impressions by clicking the **Continue without optical impressions (stone model required)** button in the **Order incomplete** window. Afterwards, the **Order oral appliance** step shows the information **This order will be placed without optical impression data. The stone model must be sent to the SICAT Lab**.

IF YOU HAVE ALREADY ADDED OPTICAL IMPRESSIONS

☑ You have already imported optical impressions.

☑ The **Order** workflow step is already expanded. For information about this, see *Workflow toolbar* [▶ Page 19].

▪ Click the **Order oral appliance** icon.

  ▶ The **Order oral appliance** window opens.

CHECK YOUR ORDER IN THE "ORDER ORAL APPLIANCE" WINDOW

☑ The **Order oral appliance** window is already opened:

1. In the **Patient** area and in the **Order Details** area, check that the patient information and the scan information are correct.

2. In the 2D view, check that the scan has been acquired in the treatment position.

3. If desired, type additional information for SICAT into the **Additional information** field.

4. Click the **Add to shopping cart** button.

▶ The **Order oral appliance** window closes.

▶ The desired planning data for therapeutic oral appliances is located inside the shopping cart.

> As long as an order is located inside the shopping cart, you cannot overwrite optical impressions of a planning anymore. This is possible again when you have finished or deleted the order. If you overwrite or delete optical impressions of a planning, you cannot order the same therapeutic oral appliance again.

Proceed with *Checking the shopping cart and finalizing an order [*▶ *Page 110]*.

19.2 OPTICAL IMPRESSIONS

> **i** You can only import and register optical impressions to X-ray data generated by Sirona 3D scanners.

SICAT Air can simultaneously visualize X-ray data and optical impressions of the same patient. The combined visualization provides additional information for analysis and diagnosis. Furthermore, the therapy realization is based on optical impressions.

The following actions are required to use optical impression data in SICAT Air:

- Import of an optical impression file that contains optical impression data from an optical impression system, for example CEREC
- Registration of optical impressions with 3D X-ray data

SICAT Air supports the following optical impression file formats:

- SIXD files that contain one optical impression of the maxilla and one optical impression of the mandible
- SSI files that contain one optical impression of the maxilla and one optical impression of the mandible
- STL files that contain one optical impression of the mandible

The tool for importing and registering optical impressions is located in the **Order** step of the **Workflow toolbar**. When you import and register optical impressions, SICAT Air adds the optical impressions to the **Optical Impressions** group in the **Object browser**.

After you have imported and registered optical impressions in another SICAT application, you can reuse them for the same 3D scan in SICAT Air.

The following tools for optical impressions are available:

- *Importing and registering optical impressions [▶ Page 103]*
- *Reusing optical impressions from other SICAT applications [▶ Page 108]*
- Activating, hiding, and showing optical impressions - for information about this, see *Managing objects with the Object browser [▶ Page 22]*.
- Focusing on optical impressions and removing optical impressions - for information about this, see *Managing objects with the Object toolbar [▶ Page 23]*.

> **i** SICAT Air only supports STL files with an additional license.

19.3 IMPORTING AND REGISTERING OPTICAL IMPRESSIONS

⚠️ **CAUTION**	**Use of other data than 3D X-ray data as the only source of information could result in incorrect diagnosis and treatment.** 1. Use 3D X-ray data as the ultimate source of information for diagnosis and planning. 2. Use other data, for example optical impression data, only as an auxiliary source of information.
⚠️ **CAUTION**	**Inappropriate optical impression devices could result in incorrect diagnosis and treatment.** ▪ Only use optical impression data from devices cleared as medical devices.
⚠️ **CAUTION**	**Optical impression data that does not match patient and date of 3D X-ray data could result in incorrect diagnosis and treatment.** ▪ Assure patient and date of the imported optical impression data match patient and date of the visualized 3D X-ray data.
⚠️ **CAUTION**	**Insufficient integrity or quality of optical impression data could result in incorrect diagnosis and treatment.** ▪ Verify the integrity and quality of the imported optical impression data.
⚠️ **CAUTION**	**Insufficient quality and precision of optical impression data could result in incorrect diagnosis and treatment.** ▪ Only use optical impression data with sufficient quality and precision that allow for intended diagnosis and therapy.
⚠️ **CAUTION**	**Excessive artifacts, insufficient resolution, or absence of registration landmarks could result in a failure of the registration process of optical impressions. Examples of excessive artifacts in 3D X-ray data are motion or metal artifacts.** ▪ Only use optical impression data and 3D X-ray data that allow for an adequate registration.
⚠️ **CAUTION**	**Selecting markers in the registration process of optical impressions that do not correspond to each other could result in an incorrect diagnosis and treatment.** ▪ When you register optical impressions, choose corresponding markers in the 3D X-ray data and in the optical impressions.
⚠️ **CAUTION**	**Wrong alignment of optical impression data and 3D X-ray data after registration could result in an incorrect diagnosis and treatment.** ▪ Verify that the registered optical impression data is correctly aligned with the 3D X-ray data.

> ℹ️ You can use the **Inspection Window** for checking if an optical impression is precisely aligned to the X-ray data. You can move the **Inspection Window** and scroll through the slices in the **Inspection Window**.
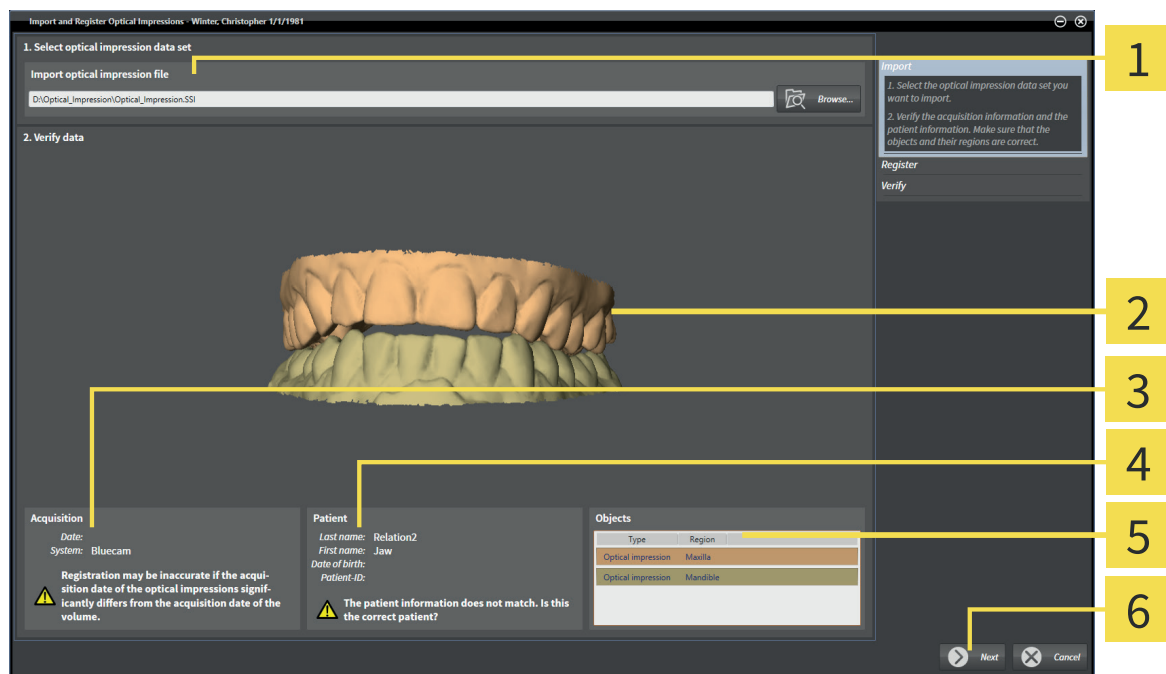
For general information about optical impressions, see *Optical impressions [*▶ *Page 102]*.

To import and register optical impressions, proceed as follows:

☑ The **Order** workflow step is already expanded.

1. Click the **Import and Register Optical Impressions** icon.
    ► The **Import and Register Optical Impressions** wizard with the **Import** step opens.

2. Click the **Browse** button.
    ► The **Open Optical Impression File** window opens.

3. In the **Open Optical Impression File** window, browse to the desired optical impression file, select the file and click **Open**.
    ► The **Open Optical Impression File** window closes.
    ► SICAT Air imports the selected optical impression file:

1	**Import optical impression file** area	**4**	Patient information
2	**3D** view	**5**	List of objects
3	Acquisition information	**6**	**Next** button

4. Verify the acquisition information and the patient information. Make sure that the objects and their regions are correct. The background color in the list of objects corresponds to the color of objects in the **3D** view.

5. Click **Next**.

► The **Register** step opens for the first optical impression:
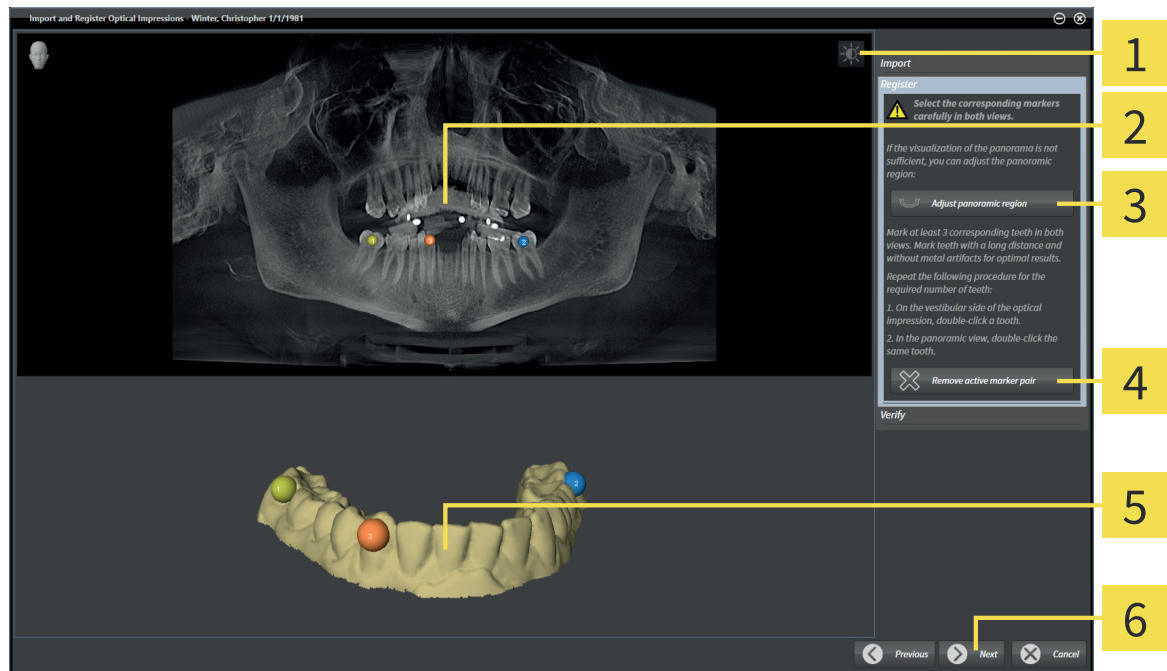
1	**Adjust brightness and contrast** icon	**4**	**Remove active marker pair** button
2	**Panorama** view	**5**	**3D** view that shows the first optical impression
3	**Adjust panoramic region** button	**6**	**Next** button

6. For the first optical impression, double-click on the same tooth both in the **Panorama** view and on the vestibular side of the optical impression in the **3D** view. Mark teeth with a long distance and without metal artifacts. Repeat this step until you marked at least three corresponding teeth in both views.

   ► In both views, markers with different colors and numbers show the assigned teeth of the first optical impression.

7. Click **Next**.

   ► SICAT Air calculates the registration of the first optical impression with the X-ray data.

▶ The **Verify** step opens for the first optical impression:
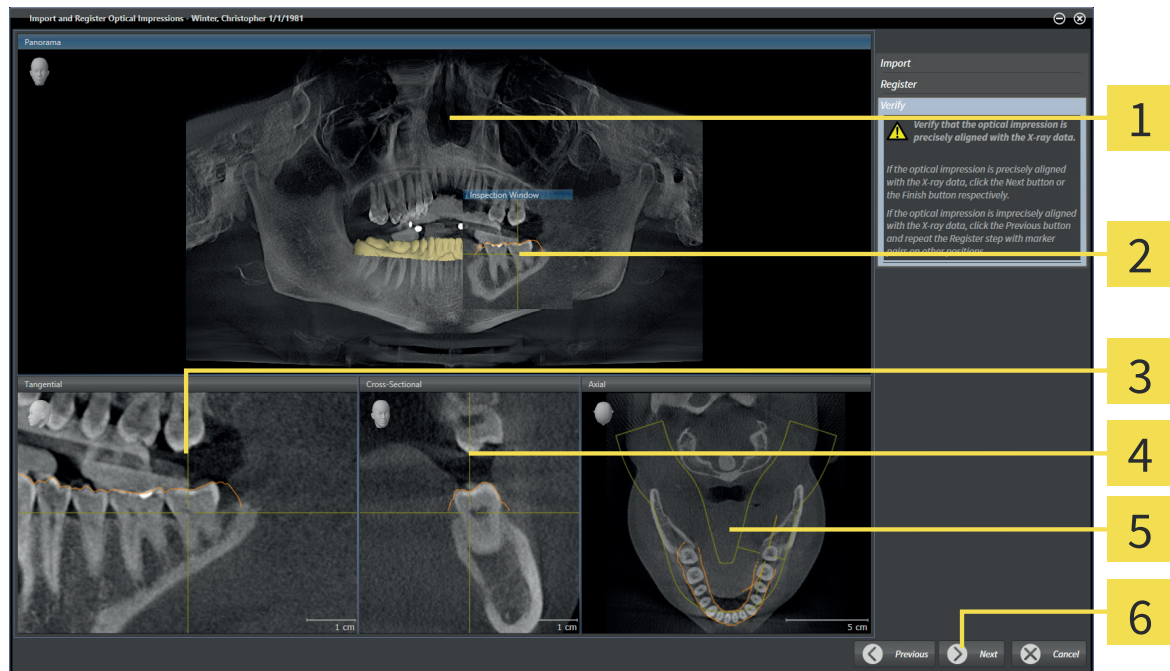
1	**Panorama** view	**4**	**Cross-Sectional** view
2	**Inspection Window**	**5**	**Axial** view
3	**Tangential** view	**6**	**Next** button

8. In the 2D slice views, verify that the optical impression is precisely aligned with the X-ray data. Scroll through the slices and check the visualized contours.

9. If the optical impression is imprecisely aligned with the X-ray data, click the **Previous** button and repeat the **Register** step with marker pairs at different positions.

10. If the first optical impression is precisely aligned with the X-ray data, click the **Next** button.

   ▶ The **Register** step opens for the second optical impression.

11. For the second optical impression, double-click on the same tooth both in the **Panorama** view and on the vestibular side of the optical impression in the **3D** view. Mark teeth with a long distance and without metal artifacts. Repeat this step until you marked at least three corresponding teeth in both views.

   ▶ In both views, markers with different colors and numbers show the assigned teeth of the second optical impression.

12. Click **Next**.

   ▶ SICAT Air calculates the registration of the second optical impression with the X-ray data.

   ▶ The **Verify** step opens for the second optical impression.

13. In the 2D slice views, verify that the optical impression is precisely aligned with the X-ray data. Scroll through the slices and check the visualized contours.

14. If the optical impression is imprecisely aligned with the X-ray data, click the **Previous** button and repeat the **Register** step with marker pairs at different positions.

15. If the second optical impression is precisely aligned with the X-ray data, click the **Finish** button.

► The **Import and Register Optical Impressions** wizard closes.

► SICAT Air adds the selected optical impressions to the **Object browser**.

► SICAT Air visualizes the registered optical impressions.

In addition to the described procedure, the following actions are available in the **Import and Register Optical Impressions** wizard:

- You can adjust the brightness and the contrast of a 2D view by clicking the **Adjust brightness and contrast** icon. For information about this, see *Adjusting and resetting the brightness and the contrast of 2D views [▶ Page 37]*.

- You can adjust the panoramic region by clicking the **Adjust panoramic region** icon. For information about this, see *Adjusting the panoramic region [▶ Page 65]*.

- If you want to remove a specific marker pair in the **Register** step, you can select a marker of the pair and click the **Remove active marker pair** button.

- If you want to abort importing and registering optical impressions, you can click **Cancel**.

19.4 REUSING OPTICAL IMPRESSIONS FROM OTHER SICAT APPLICATIONS

⚠️ **CAUTION**	**Use of other data than 3D X-ray data as the only source of information could result in incorrect diagnosis and treatment.** 1. Use 3D X-ray data as the ultimate source of information for diagnosis and planning. 2. Use other data, for example optical impression data, only as an auxiliary source of information.

⚠️ **CAUTION**	**Inappropriate optical impression devices could result in incorrect diagnosis and treatment.** ▪ Only use optical impression data from devices cleared as medical devices.

⚠️ **CAUTION**	**Optical impression data that does not match patient and date of 3D X-ray data could result in incorrect diagnosis and treatment.** ▪ Assure patient and date of the imported optical impression data match patient and date of the visualized 3D X-ray data.

⚠️ **CAUTION**	**Insufficient integrity or quality of optical impression data could result in incorrect diagnosis and treatment.** ▪ Verify the integrity and quality of the imported optical impression data.

⚠️ **CAUTION**	**Insufficient quality and precision of optical impression data could result in incorrect diagnosis and treatment.** ▪ Only use optical impression data with sufficient quality and precision that allow for intended diagnosis and therapy.

⚠️ **CAUTION**	**Wrong alignment of optical impression data and 3D X-ray data after registration could result in an incorrect diagnosis and treatment.** ▪ Verify that the registered optical impression data is correctly aligned with the 3D X-ray data.

For general information about optical impressions, see *Optical impressions [*▶ *Page 102]*.

To reuse optical impressions from another SICAT application, proceed as follows:

☑ The **Order** workflow step is already expanded.

☑ You have already imported optical impressions for the opened study in another SICAT application that you do not reuse in SICAT Air yet.

1. Click the **Import and Register Optical Impressions** icon.
   ▶ The **Import and Register Optical Impressions** wizard with the **Import** step opens.

2. In the **Reusing optical impressions from other SICAT applications** area, click on the row that contains the desired optical impressions.

3. SICAT Air visualizes the selected optical impressions:
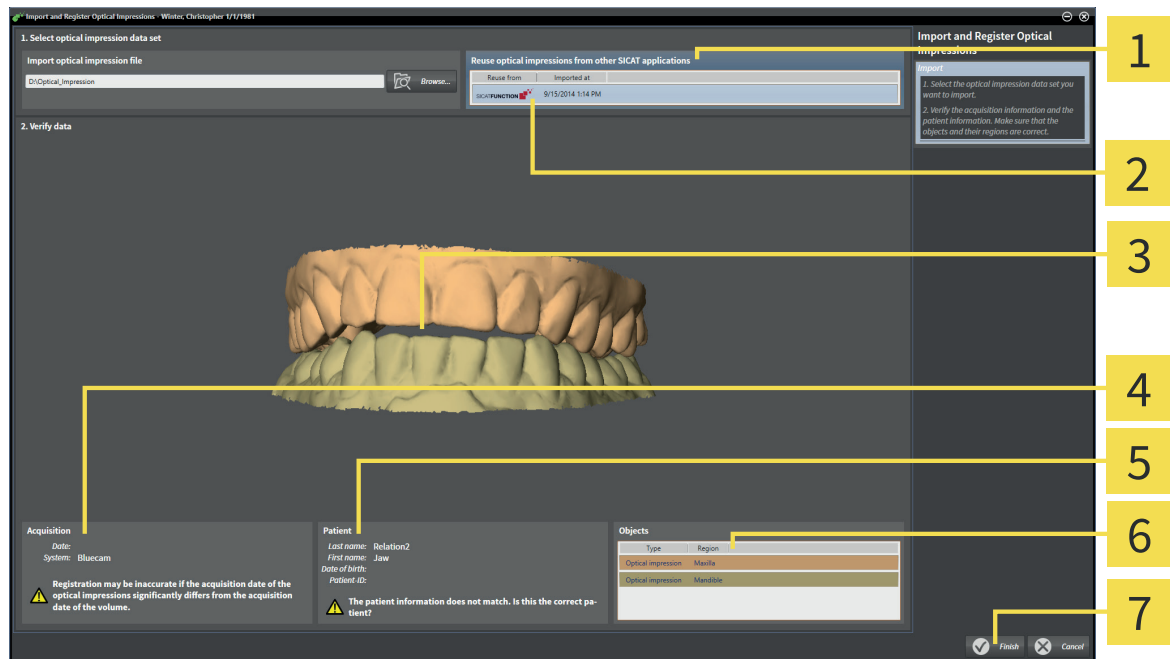
1	**Reusing optical impressions from other SICAT applications** area	5	Patient information
2	List with optical impressions from other SICAT applications	6	List of objects
3	**3D** view	7	**Finish** button
4	Acquisition information		

4. Verify the acquisition information and the patient information. Make sure that the objects and their regions are correct. The background color in the list of objects corresponds to the color of objects in the **3D** view.

5. Click the **Finish** button.

► The **Import and Register Optical Impressions** wizard closes.

► SICAT Air adds the selected optical impressions to the **Object browser**.

► SICAT Air visualizes the selected optical impressions.

If you want to abort importing optical impressions from another SICAT application, you can click **Cancel**.

19.5 CHECKING THE SHOPPING CART AND FINALIZING AN ORDER

☑ The shopping cart contains at least one therapeutic appliance.

1. If the shopping cart is not already opened, in the **Navigation bar**, click the **Shopping cart** button.
   ▶ The **Shopping cart** window opens and shows all therapeutic appliances grouped by patients that are currently included in the shopping cart.
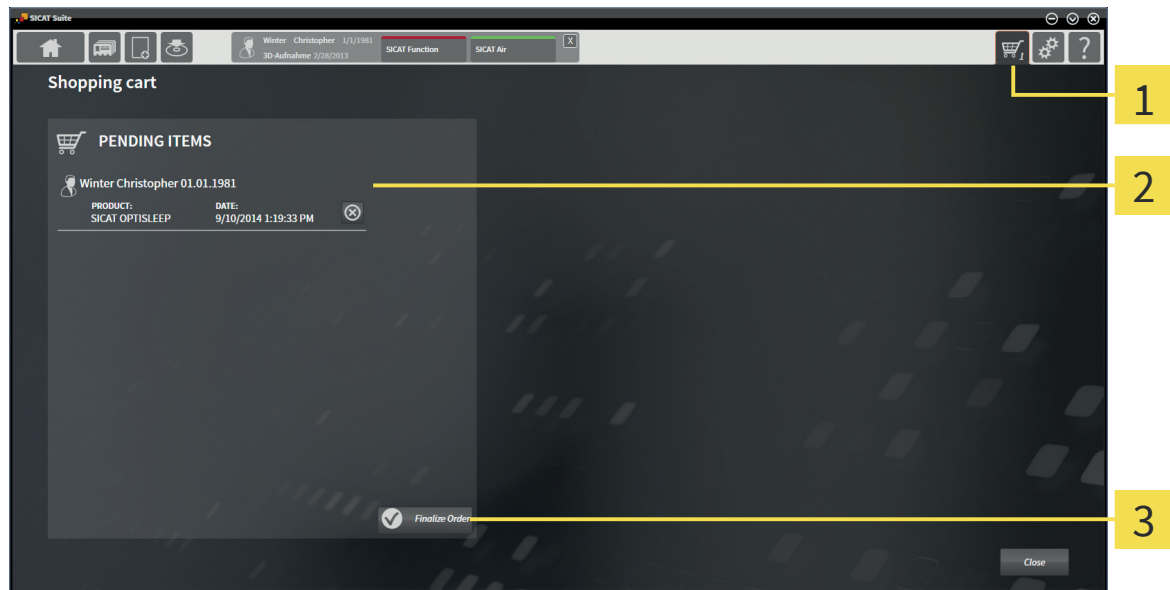
1   **Shopping cart** tab

2   **PENDING ITEMS** list

3   **Finalize Order** button

2. In the **Shopping cart** window, check if the desired therapeutic appliances are included.

3. Click the **Finalize Order** button.

▶ SICAT Suite changes the status of the order to **Preparing** and establishes a connection to the SICAT server.

▶ In the case of orders with an active Internet connection, changes on the order are only possible in SICAT Portal.

> ℹ️ You can click the **Delete** icon to remove therapeutic appliances from the shopping cart.

Proceed with one of the following actions:
- *Finalizing orders with an active Internet connection [▶ Page 111]*
- *Finalizing orders without an active Internet connection [▶ Page 112]*

## 19.6 FINALIZING ORDERS WITH AN ACTIVE INTERNET CONNECTION

☑ The computer that runs SICAT Suite has an active internet connection.

☑ SICAT Portal has been automatically opened in your web browser.

1. If not already done, log on to SICAT Portal with your SICAT ID and your password.

   ▶ The order overview opens and shows the contained therapeutic appliances and the corresponding prices grouped by patients.

2. Follow the orders under *Performing ordering steps in the SICAT Portal [*▶ *Page 115]*.

▶ SICAT Suite prepares the order data for the upload.

▶ When the preparation has been completed, SICAT WebConnector transmits the order data using an encrypted connection to the SICAT server.

▶ The status of the order in the shopping cart changes to **Uploading**.

You can remove patients and the corresponding therapeutic appliances from the SICAT Portal by selecting a patient and clicking on the button for removing patients. Afterwards, you have full access to the compilation of therapeutic appliances in the shopping cart of SICAT Suite again.

	If you log off from Windows during the upload, SICAT WebConnector pauses the process. The software continues with the upload process automatically after logging on again.

19.7 FINALIZING ORDERS WITHOUT AN ACTIVE INTERNET CONNECTION

☑ The computer that runs SICAT Suite does not have an active internet connection.

☑ The window shows the following message: **Unable to connect to the SICAT server**
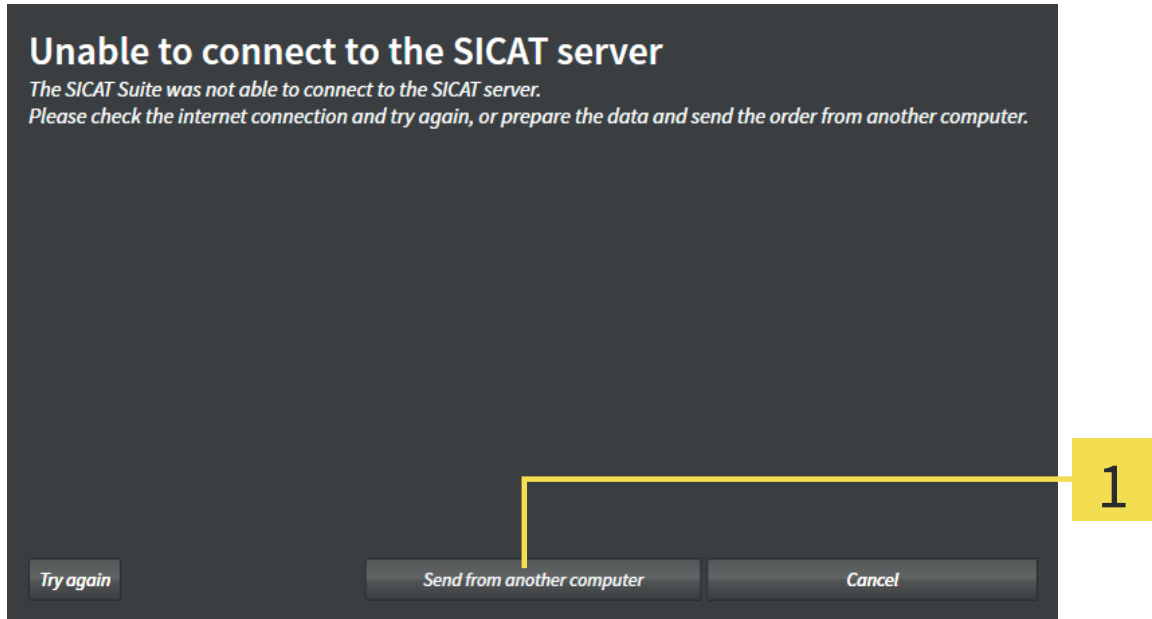
1 | **Send from another computer** button

1. Click the **Send from another computer** button.
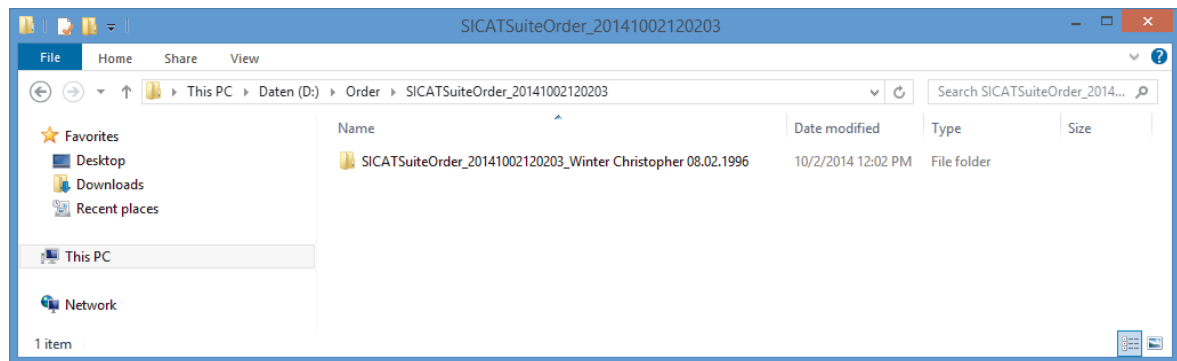   ▶ The **Sending the order from another computer** window opens:
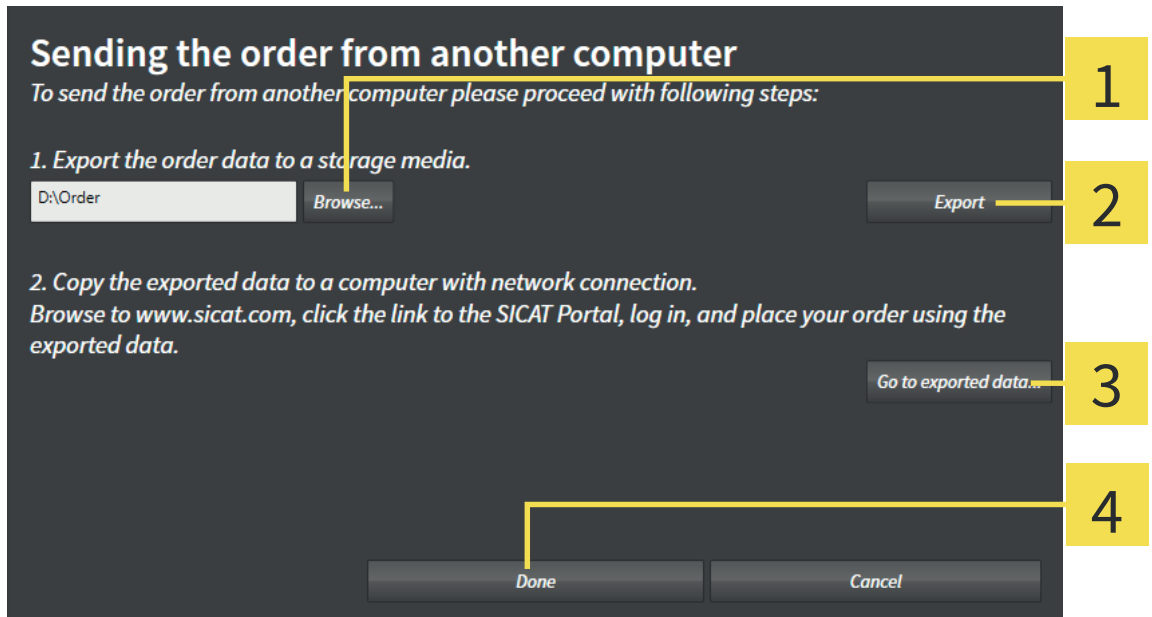
1 | **Browse** button   **3** | **Go to exported data** button

2 | **Export** button   **4** | **Done** button

2. Click the **Browse** button.

   ▶ A Windows File Explorer window opens.

3. Choose an existing folder or create a new folder and click **OK**.

4. Click the **Export** button.

   ▶ SICAT Suite exports all data into the selected folder that is required for ordering the content of the shopping cart. SICAT Suite creates a sub folder for each patient.

5. Click the **Go to exported data** button.

   ▶ A Windows File Explorer window opens and shows the directory with the exported data:

6. Copy the folder that contains the data of the desired therapeutic appliance to a computer with an active Internet connection, for example with the help of a USB flash drive.

7. In the **Sending the order from another computer** window, click **Done**.

   ▶ SICAT Suite closes the **Sending the order from another computer** window.

   ▶ SICAT Suite removes all therapeutic appliances that are included in the order from the shopping cart.

8. On the computer with an active Internet connection, open a web browser and open the http://www.sicat.com web page.

9. Click on the link to the SICAT Portal.

   ▶ The SICAT Portal opens.

10. If not already done, log on to SICAT Portal with your SICAT ID and your password.

11. Click on the button for uploading the order.

12. Choose the desired order on the computer with an active Internet connection. It is the XML file that has a file name starting with **SICATSuiteOrder**.

   ▶ The order overview opens and shows the contained patient, the corresponding therapeutic appliance and the price.

13. Follow the orders under *Performing ordering steps in the SICAT Portal [▶ Page 115]*.

14. Click on the button for uploading the therapeutic appliance data.

15. Choose the corresponding therapeutic appliance data on the computer with an active Internet connection. It is the zip archive that is contained in the same folder as the previously uploaded XML file and has a file name starting with **SICATSuiteExport**.

▶ If you have performed the order, your web browser transfers the archive with the therapeutic appliance data using an encrypted connection to the SICAT server.

> SICAT Suite does not delete exported data automatically. If an ordering process is completed, you should delete exported data manually for security reasons.

19.8 PERFORMING ORDERING STEPS IN THE SICAT PORTAL

1. Check if the desired therapeutic appliances are included.

2. If required, remove the patients and thus all corresponding therapeutic appliances from the order overview.

3. Check if the billing address and the delivery address are correct. If required, make changes.

4. Select the desired shipping method.

5. Accept the general terms and conditions and submit the order.

20 SETTINGS

Common SICAT Suite settings are described in the instructions for use of SICAT Suite. These instructions for use describe settings for SICAT Air.

To change general visualization settings, see *Changing visualization settings [▶ Page 117]*.

For how to change SICAT Air options, see *Changing SICAT Air Options [▶ Page 119]*.

20.1 CHANGING VISUALIZATION SETTINGS

⚠️ **CAUTION**	**Insufficient visualization quality could result in incorrect diagnosis and treatment.** ▪ Prior to using a SICAT application check for sufficient visualization quality, for example by using the SMPTE test pattern.

⚠️ **CAUTION**	**Insufficient environmental visualization conditions could result in incorrect diagnosis and treatment.** 1. Only perform planning if the environmental conditions allow for sufficient visualization quality. For example, check for appropriate lighting. 2. Check for sufficient visualization quality using the SMPTE test pattern.

Visualization settings determine the visualization of the volume, the diagnosis objects, and the planning objects in all SICAT applications.

To change the visualization settings, proceed as follows:

1. Click the **Settings** icon.
   ▶ The **Settings** window opens.

2. Click the **Visualization** tab.
   ▶ The **Visualization** window opens:

1	**Visualization** tab	**4**	**RENDERING OPTIMIZATION** area
2	**IMAGE QUALITY** area	**5**	**LINE THICKNESS** area
3	**UPDATE OF OTHER VIEWS** area	**6**	**VIEWING DIRECTION** area

3. Select the desired visualization settings.

▶ Changes on visualization settings take effect immediately.

The options are:

- **IMAGE QUALITY** - Improves the image quality of slices by averaging nearby slices. Enable this setting only on powerful computers.

- **UPDATE OF OTHER VIEWS** - Delayed update improves interactivity of the view you are working with at the cost of delayed update of other views. Enable delayed update only if you encounter interactivity problems on your computer.

- **RENDERING OPTIMIZATION** - Disables the rendering optimization. Disable this setting only if you encounter stability problems on your computer.

- **LINE THICKNESS** - Changes the thickness of lines. Thicker lines are useful for presentations on video projectors.

- **VIEWING DIRECTION** - Switches the viewing direction of the **Axial** slice view and the **Sagittal** slice view.

20.2 CHANGING SICAT AIR OPTIONS

SICAT Air settings determine the gradient of the **Airway** object in SICAT Air.

To change the SICAT Air settings, proceed as follows:

1. Click the **Settings** icon.
   - ► The **Settings** window opens.

2. Click the **SICAT Air** tab.
   - ► The **SICAT Air** window opens:
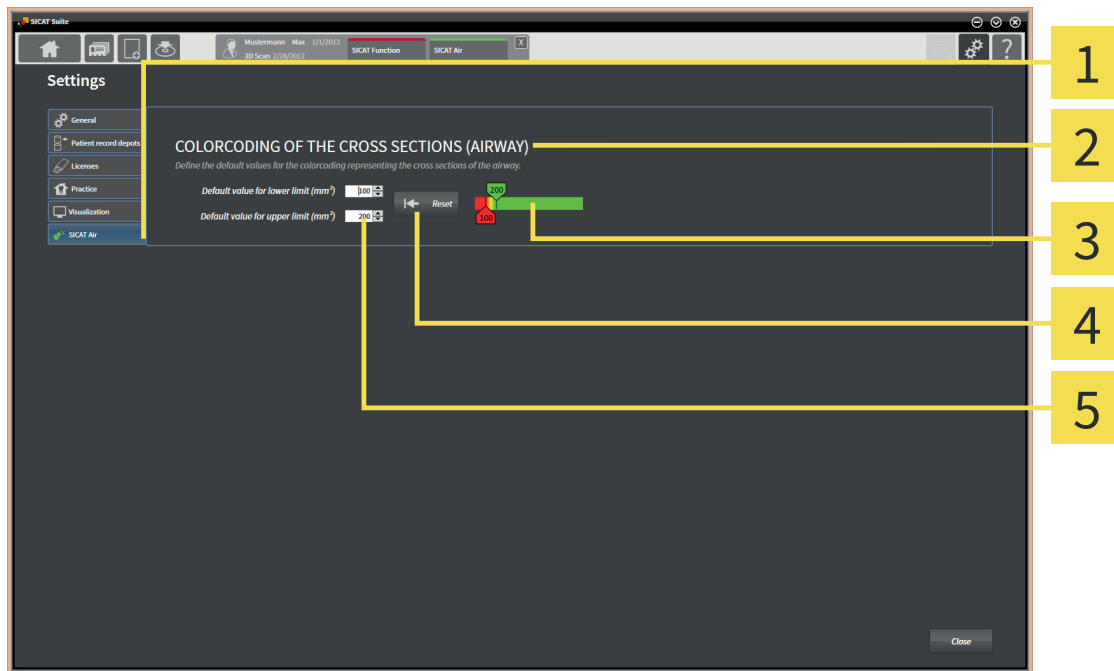
1	**SICAT Air** tab	**4**	**Reset** button
2	**COLORCODING OF THE CROSS SECTIONS (AIRWAY)** area	**5**	**Default value for lower limit (mm²)** field and **Default value for upper limit (mm²)** field
3	**Color coding** with sliders		

3. Select the default values for the color coding.

► SICAT Air saves the default values in your user profile.

► SICAT Air uses the changed default values when you open a 3D X-ray scan for the first time and segment the airway.

► SICAT Air uses the changed default values when you reset the values of an **Airway** object.

The options are:

- **Default value for lower limit (mm²)** - determines the lower value of the cross sectional area in mm where the **Color coding** begins in full red.
- **Default value for upper limit (mm²)** - determines the upper value of the cross sectional area in mm where the **Color coding** ends in full green.

If you change the values in the **Default value for lower limit (mm²)** and **Default value for upper limit (mm²)** fields, the sliders show the effect on the **Color coding**. If you move the sliders in the **Color coding**, the values in the fields adapt correspondingly.

You can click the **Reset** button to reset the settings for **Default value for lower limit (mm²)** and **Default value for upper limit (mm²)** to the default values of SICAT Air.

21 CLOSING SICAT AIR

To close SICAT Air, proceed as follows:
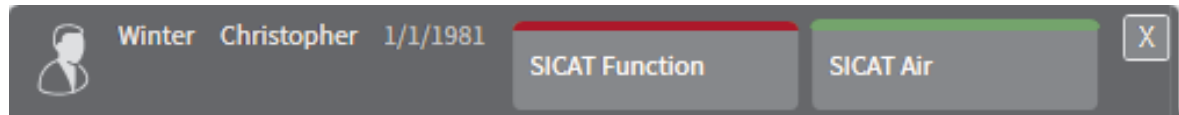
- ▪ In the active patient record area, click the **Close** button.

▶ SICAT Air saves the active patient record.

▶ SICAT Air closes.

▶ SICAT Suite closes the active patient record.

22 KEYBOARD SHORTCUTS

The following keyboard shortcuts are available in all SICAT applications:

KEYBOARD SHORTCUTS	DESCRIPTION
A	Add angle measurement
D	Add distance measurement
Ctrl + C	Copy content of active view to clipboard
Ctrl + F	Focus on active object
Ctrl + Z	Undo last object action
Ctrl + Y	Redo last undone object action
Del	Remove active object or object group
ESC	Cancel current action (for example, adding a measurement)
F1	Opening the **Support** window

The following keyboard shortcuts are available in the **Segmenting the airway** window of SICAT Air:

KEYBOARD SHORTCUTS	DESCRIPTION
N	Navigation
B	Remove from airway
A	Add to airway
E	Remove dispensable oral region

23 ACCURACY

The following table shows the accuracy values in all SICAT applications:

Measurement accuracy for distance measurements	< 100 μm
Measurement accuracy for angle measurements	< 1 degree
Visualization accuracy	< 20 μm

24 SAFETY INSTRUCTIONS

3D X-RAY DATA

⚠️ **CAUTION**	**X-ray devices without DICOM conformity could result in incorrect diagnosis and treatment.** ▪ Only use 3D volume data from x-ray devices with DICOM conformity declared.

⚠️ **CAUTION**	**Inappropriate X-ray devices could result in incorrect diagnosis and treatment.** ▪ Only use 3D data from X-ray devices cleared as medical devices.

⚠️ **CAUTION**	**Inappropriate 3D data could result in incorrect diagnosis and treatment.** ▪ Always verify the quality, integrity, and correct orientation of the displayed 3D data.

DATA MANAGEMENT

⚠️ **CAUTION**	**The absence of a backup mechanism for the patient record depots could result in patient data being irreversibly lost.** ▪ Make sure that a regular data backup is created of all patient record depots.

NETWORK

⚠️ **CAUTION**	**Saving SICAT application data in an unreliable or incompatible network file system could result in data loss.** ▪ Together with your network administrator, assure that SICAT application data can be safely stored in the desired network file system.

⚠️ **CAUTION**	**Using SICAT Suite and the contained SICAT applications together with other devices within a computer network or storage network could result in previously unknown risks for patients, users and other persons.** ▪ Make sure policies are established within your organization to determine, analyze, assess and control risks that are related to your network.

⚠️ **CAUTION**	**Changes to your network environment could result in new risks. Examples are changes to your network configuration, connection of additional devices or components to your network, disconnection of devices or components from the network and update or upgrade of network devices or components.** ▪ Perform a new network risk analysis after any network changes.

SAFETY

⚠ CAUTION	**Security leaks in your information system environment could result in unauthorized access to your patient data and put the privacy or integrity of your patient data at risk.** 1. Make sure policies are established within your organization to prevent security threats to your information system environment. 2. Install and run an up-to-date virus scanner. 3. Make sure the pattern files of the virus scanner are updated on a regular basis.

⚠ CAUTION	**Unauthorized access to your workstation could result in risks to the privacy and integrity of your patient data.** ▪ Limit the access to your workstation to authorized individuals only.

⚠ CAUTION	**Cyber security problems could result in access to your patient data and impose risks to the privacy and integrity of your patient data.** ▪ If you suspect cyber security related problems with your system, contact SICAT GmbH & Co. KG immediately.

SEGMENTATION

⚠ CAUTION	**Excessive artifacts or insufficient resolution of 3D X-ray data could result in a failure of the segmentation process or inadequate results. Examples of excessive artifacts in 3D X-ray data can be motion artifacts or metal artifacts.** ▪ Only use 3D X-ray data that allows for a sufficient quality of the segmentation of the relevant anatomical structures.

⚠ CAUTION	**Insufficient quality of segmentation could result in incorrect diagnosis and treatment.** ▪ Verify that the quality of segmentation is sufficient for the intended use.

⚠ CAUTION	**Insufficient quality of 3D X-ray data could cause an insufficient quality of the segmented airway and the airway profile.** ▪ Only use 3D X-ray data of sufficient quality to get a segmented airway and an airway profile of sufficient quality and resolution.

PATIENT CONSULTATION

⚠ CAUTION	**Usage of the handout for diagnostic purposes could result in incorrect diagnosis and treatment.** ▪ Only use the software for diagnosis of medical images, diagnosis and treatment planning.

OPTICAL IMPRESSIONS

⚠️

CAUTION

Use of other data than 3D X-ray data as the only source of information could result in incorrect diagnosis and treatment.

1. Use 3D X-ray data as the ultimate source of information for diagnosis and planning.
2. Use other data, for example optical impression data, only as an auxiliary source of information.

⚠️

CAUTION

Inappropriate optical impression devices could result in incorrect diagnosis and treatment.

- Only use optical impression data from devices cleared as medical devices.

⚠️

CAUTION

Optical impression data that does not match patient and date of 3D X-ray data could result in incorrect diagnosis and treatment.

- Assure patient and date of the imported optical impression data match patient and date of the visualized 3D X-ray data.

⚠️

CAUTION

Insufficient integrity or quality of optical impression data could result in incorrect diagnosis and treatment.

- Verify the integrity and quality of the imported optical impression data.

⚠️

CAUTION

Insufficient quality and precision of optical impression data could result in incorrect diagnosis and treatment.

- Only use optical impression data with sufficient quality and precision that allow for intended diagnosis and therapy.

⚠️

CAUTION

Excessive artifacts, insufficient resolution, or absence of registration landmarks could result in a failure of the registration process of optical impressions. Examples of excessive artifacts in 3D X-ray data are motion or metal artifacts.

- Only use optical impression data and 3D X-ray data that allow for an adequate registration.

⚠️

CAUTION

Selecting markers in the registration process of optical impressions that do not correspond to each other could result in an incorrect diagnosis and treatment.

- When you register optical impressions, choose corresponding markers in the 3D X-ray data and in the optical impressions.

⚠️

CAUTION

Wrong alignment of optical impression data and 3D X-ray data after registration could result in an incorrect diagnosis and treatment.

- Verify that the registered optical impression data is correctly aligned with the 3D X-ray data.

ORDERS

⚠️ **CAUTION**	**Wrong data in an order could result in a wrong order.** ▪ If you perform an order, make sure that you select and transmit the correct data for the order.

QUALIFICATION OF OPERATING PERSONNEL

⚠️ **CAUTION**	**Use of software by unqualified personnel could result in incorrect diagnosis and treatment.** ▪ The use of the software is restricted to qualified professionals.

VISUALIZATION CONDITIONS

⚠️ **CAUTION**	**Insufficient visualization quality could result in incorrect diagnosis and treatment.** ▪ Prior to using a SICAT application check for sufficient visualization quality, for example by using the SMPTE test pattern.

⚠️ **CAUTION**	**Insufficient environmental visualization conditions could result in incorrect diagnosis and treatment.** 1. Only perform planning if the environmental conditions allow for sufficient visualization quality. For example, check for appropriate lighting. 2. Check for sufficient visualization quality using the SMPTE test pattern.

GLOSSARY

Airway
The term airway names the object that SICAT Air creates during the segmentation. It is the upper part of the airways that is relevant in SICAT Air.

Airway analysis area
The term airway analysis area describes the bar in the Airway workspace that contains the relevant measurement values and the airway profile.

Airway profile
Names the 2D diagram that visualizes the cross sectional areas along the segmented airway.

Airway region
The airway region is the region of interest that you determine in the segmentation window by the anatomical reference points and the lateral size.

Color coding
Color coding highlights the size of the cross sections of the airway by differences in color.

Crosshairs
Crosshairs are cutlines with other slice views.

Frames
In the 3D view, frames show the position of 2D slice views.

Minimal cross section
The minimal cross section is the position of the airway with the minimal cross sectional area.

Optical impressions
An optical impression is the result of a 3D surface scan of teeth, impression materials, or stone models.

Registration
Spatial alignment

Segmentation
Segmentation is the process where the software separates specific parts of the volume.

SICAT ID
A SICAT ID is a user name for SICAT Portal.

SICAT Portal
SICAT Portal is a web page, where you can order therapeutic appliances from SICAT among other things.

SIXD
Data format for exchanging optical impressions.

SSI
Data format for exchanging optical impressions.

STL
Surface Tessellation Language, standard file format for exchanging mesh data that can, for example contain optical impressions.

Study
A study consists of a 3D scan and the corresponding planning projects.

INDEX

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