

exocad

Configuration Guide

exoplan

Configuration Guide by exocad GmbH

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1 Introduction

This document covers the configuration of exoplan and targets resellers who want to customize exoplan.



IMPORTANT

exoplan's certification as a Medical Device is invalidated when the configuration is changed beyond the described configuration options of this guide. Changes within the configuration options of this guide still need to be validated by the reseller. exocad does not take responsibility for any changes made by the reseller.

We assume that readers of this document understand the basic structure of the XML format.

2 Configuration files

These files configure exoplan and are stored in **ImplantPlanning\config**. In this document we distinguish between default configuration files and configuration files for comfortably applying your configuration changes.

2.1 Default configuration files

exocad delivers default configuration files, stored in **ImplantPlanning\config**, whose content may vary across different software versions:

- defaultsettings-implantplanning.xml,
- defaultsettings-implantplanningcad.xml,
- defaultparameters.xml,
- defaultsettings.xml,
- defaultcolors.xml,
- defaultcolors-viewer3d.xml and
- defaultcolors-implantPlanning.xml.

2.2 Configuration files for applying your changes

To simplify the application of your configuration changes to new exoplan versions, we strongly recommend to use the following configuration files:

- settings-implantplanning.xml,
- settings-implantplanningcad.xml and
- colors.xml.

2.2.1 Correlation with default configuration files

The software will check if one or more of your configuration files exist in **ImplantPlanning\config** and will load them in addition to the default configuration files. If the same configuration option is present in a default configuration file and in one of your configuration files, the value defined in your configuration file will override the settings from the default configuration file. This way, you can simply copy your configuration files to a new software version, without having to re-edit the newly delivered default configuration files.

2.2.2 Creating configuration files for applying your changes

These configuration files have to be created by copying the corresponding default configuration files and renaming them:

- defaultsettings-implantplanning.xml → settings-implantplanning.xml
- defaultsettings-implantplanningcad.xml → settings-implantplanningcad.xml
- defaultcolors.xml → colors.xml

Then the content in between the start and end tag has to be deleted, as there the settings you want to change are inserted. The information which configuration file is used for specific changes is given in Chapter 3.

3 Settings

The following attributes are used in this chapter:

Absolute minimum (abs. min.)

The absolute minimum value that can be defined by the reseller. The value cannot be changed if the attribute *hard-coded* is added.

Absolute maximum (abs. max.)

The absolute maximum value that can be defined by the reseller. The value cannot be changed if the attribute *hard-coded* is added.

Default

The default value defined by exocad. It can be changed to a value within the range of the absolute minimum and maximum values.

Unit

The unit of the setting.

Config-file

The setting can only be used in this configuration file.

3.1 General implant planning settings

3.1.1 AllowImportOfDentalCADSceneObjectsOnProjectLoad

If **true**: when *.dentalCAD scene files within the project folder exist, e.g., from a smile-design, the user is asked if a tooth setup from one of these scene files should be imported during project loading. It can be used for backward planning.

Default: true

Config-file: settings-implantplanning.xml

3.1.2 AlsoDrawImplantProstheticConnectionDirectionsInSecondaryViews

If **true**: the prosthetic axis of an angulated superstructure (e.g., a multi-unit abutment) is shown in the secondary views.

Default: false

Config-file: settings-implantplanning.xml

3.1.3 HideUpperImplantAxisPartWhenProstheticAxisDiffers

If **true**: the upper part of the visualized implant axis ends at the top part of the implant if the prosthetic axis differs from the implant axes.

Default: false

Config-file: settings-implantplanning.xml

3.1.4 StartImplantPlanningInInspectionMode

If **true**: projects will be opened in the RAPID PRE-PLANNING mode by default. (Only concerning partners who are not using exoplanDB.)

Default: false

Config-file: settings-implantplanning.xml

3.1.5 InspectionModeStartsWithImplantPlacementByDefault

This only affects the RAPID PRE-PLANNING mode. If **true**: the Wizard workflow will continue to the IMPLANT POSITIONING step after the RAPID PRE-PLANNING mode is initialized. If **false**: the Wizard is closed after the RAPID PRE-PLANNING mode is initialized. The IMPLANT POSITIONING step can then be started by clicking the PLACE IMPLANT button.



Default: false

Config-file: settings-implantplanning.xml

3.1.6 SkipLoadingOfOpticalScansOnDefault

If **true**: the user is asked for optical jaw scans if no one could be loaded automatically during project loading.

Note: Users may define this individually in the settings menu.

Default: false

Config-file: settings-implantplanning.xml

3.1.7 TopDirectionAxisAfterDicomLoad

Defines the default patient up axis after its DICOM data is loaded.

Default: z

Config-file: settings-implantplanning.xml

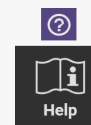
3.1.8 UserManualName

If your own manual shall be loaded when the HELP button or the question mark button is clicked, enter its name prefix here. Leave out the ending of the prefix and the file format. The prefix indicates the language, e.g., `_en` or `_de`. **Example:** `BrandedUserManualForExoplan.3.1`. Your manual has to be a pdf file and must be stored like the exocad manuals, see `...\Implantplanning>manuals`.

Note: exocad does not take responsibility for branded or changed user manuals.

Default: `exoplan.3.1.User Manual`

Config-file: `settings-implantplanningcad.xml`



3.1.9 ViewDirectionAxisAfterDicomLoad

Defines the default patient view axis after its DICOM data is loaded.

Default: `y`

Config-file: `settings-implantplanning.xml`

View settings

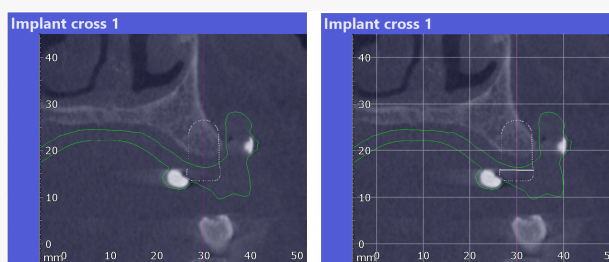
3.1.10 SecondaryViewShowGridDefault

If `true`: a grid will be shown in the secondary views by default.

Note: Users may define this individually in the settings menu.

Default: `false`

Config-file: `settings-implantplanning.xml`

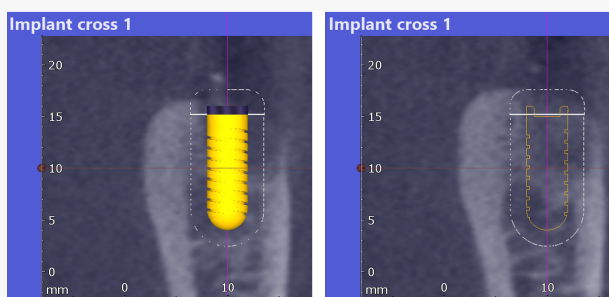


3.1.11 ShowImplantInImplantCrossViewsAs3DSurface

If `true`: the implant is visualized as a 3D surface in the IMPLANT CROSS views. If `false`: the implant is visualized there as an outline.

Default: `false`

Config-file: `settings-implantplanning.xml`



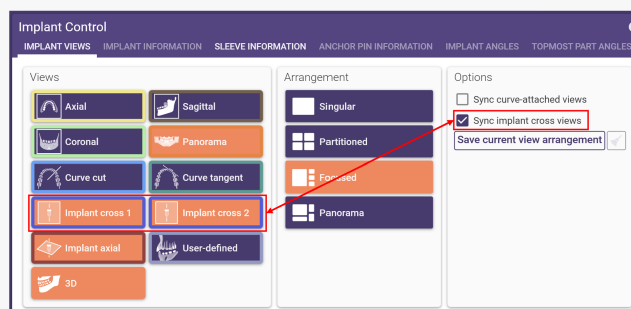
3.1.12 SynchronizeImplantCrossViewsDefault

If **true**: the views IMPLANT CROSS 1 and IMPLANT CROSS 2 are synchronized. If view IMPLANT CROSS 1 is rotated by the user, for example, view IMPLANT CROSS 2 will be rotated simultaneously.

Note: Users may define this individually in the IMPLANT CONTROL menu.

Default: `true`

Config-file: `settings-implantplanning.xml`



Paths

3.1.13 LibDir

Defines the path to an alternative library folder other than the default "library" folder in the software installation. Path can be used for example for a common implant and surgical guide library folder.

Note: If set, all installed exocad products will use this path and the alternative library folder must contain all subfolders with content from the default "library" folder of the software installation.

Default: `empty`

Config-file: `settings-implantplanningcad.xml`

3.1.14 DicomInitialSearchPath

A user-defined path for the DICOM data selection dialog to initially search for DICOM data.

Default: `empty`

Config-file: `settings-implantplanning.xml`

3.1.15 LoadDicom

If set, it indicates a DICOM zip-file or folder for the patient DICOM data. This path is used as default path in the DICOM selection after a project is loaded.

Default: `empty`

Config-file: `settings-implantplanningcad.xml`

3.1.16 LoadDicomProsthesisLowerJaw

If set, it indicates a DICOM zip-file or folder for a prosthesis of the lower jaw, used in the dual scan protocol. This path is used as default path in the DICOM selection dialog for the step LOAD PROTHESIS CT DATA.

Default: *empty*

Config-file: settings-implantplanning.xml

3.1.17 LoadDicomProsthesisUpperJaw

If set, it indicates a DICOM zip-file or folder for a prosthesis of the upper jaw, used in the dual scan protocol. This path is used as default path in the DICOM selection dialog for the step LOAD PROTHESIS CT DATA.

Default: *empty*

Config-file: settings-implantplanning.xml

3.1.18 ImplantPlanningProjectFolderPath

Defines the project folder for the current case where all output data will be saved. (Only concerning partners who are not using exoplanDB.)

Default: *empty*

Config-file: settings-implantplanning.xml

3.2 Tools

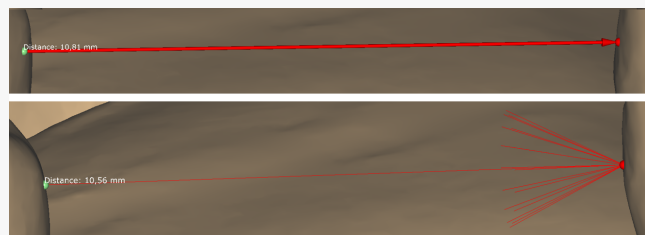
Measurement tool

3.2.1 SpaceRulerArrowDrawStyle

If **true**: the arrows in the measurement tool will be visualized as solid arrows. If **false** the arrows will be visualized with thin lines.

Default: *true*

Config-file: settings-implantplanning.xml

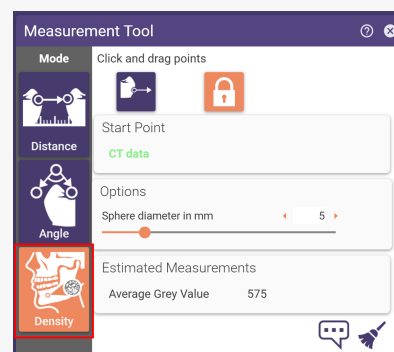


3.2.2 SpaceRulerDensityMeasurementAllowed

If **true**: the mode for measuring bone density is available in the measurement tool.

Default: true

Config-file: settings-implantplanningcad.xml



Screenshot and image editor tool

3.2.3 DefaultPathToImageEditorExecutableForScreenshotImageEditor

Path to the executable of a default installed image editor. This editor is used for the screenshot and image editor tool to edit the screenshot or image.

Default: C:\\WINDOWS\\system32\\mspaint.exe (Windows 10), C:\\Users\\<user_name>\\AppData\\Local\\Microsoft\\WindowsApps\\mspaint.exe (Windows 11)

Config-file: settings-implantplanningcad.xml

3.2.4 SaveSceneScreenshotFormat

Defines the screenshot file extension. Possible values are **png** and **jpg**.

Default: png

Config-file: settings-implantplanningcad.xml

3.2.5 SaveSceneScreenshotToImageFile

Defines if for a saved scene file also a screenshot file of the current scene should be saved in the project folder.

Default: true

Config-file: settings-implantplanningcad.xml

3.3 Implant planning workflow steps

Define density references

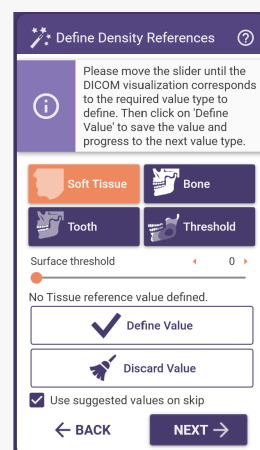
3.3.1 AlwaysPromptForDensityReferenceDefinition

If **true**: the step DEFINE DENSITY REFERENCES will be part of the guided Wizard workflow.

Note: Users may define this individually in the settings menu.

Default: false

Config-file: settings-implantplanning.xml



3.3.2 BoneDensityReferenceDefinitionEndShowOnlyNotification

If **true**: a modal message box informs the user about the saved density values when finishing the DEFINE DENSITY REFERENCES step. If **false**: a notification informs the user.

Default: false

Config-file: settings-implantplanning.xml

3.3.3 DefaultSuggestionDensityTissue

Defines the default density reference value for soft tissue.

Range: abs. min.: minimum density value in DICOM data abs. max.: maximum density value in DICOM data

Default: -120.0

Config-file: settings-implantplanning.xml

3.3.4 DefaultSuggestionDensityBone

Defines the default density reference value for bones.

Range: abs. min.: minimum density value in DICOM data abs. max.: maximum density value in DICOM data

Default: 300.0

Config-file: settings-implantplanning.xml

3.3.5 DefaultSuggestionDensityEnamel

Defines the default density reference value for teeth.

Range: abs. min.: minimum density value in DICOM data abs. max.: maximum density value in DICOM data

Default: 2200.0

Config-file: settings-implantplanning.xml

3.3.6 DefaultSuggestionDensityThreshold

Defines the default threshold value for visually separating hard bone areas from softer areas.

Range: abs. min.: minimum density value in DICOM data abs. max.: maximum density value in DICOM data

Default: 0.0

Config-file: settings-implantplanning.xml

3.3.7 LoadRecentlyUsedDensityValuesAsSuggestedValues

If **true**: recently used values will be used as suggested density reference values. If **false**: the default values will be taken and the step DEFINE DENSITY REFERENCES will appear in the workflow, regardless of the AlwaysPromptForDensityReferenceDefinition setting.

Default: true

Config-file: settings-implantplanning.xml

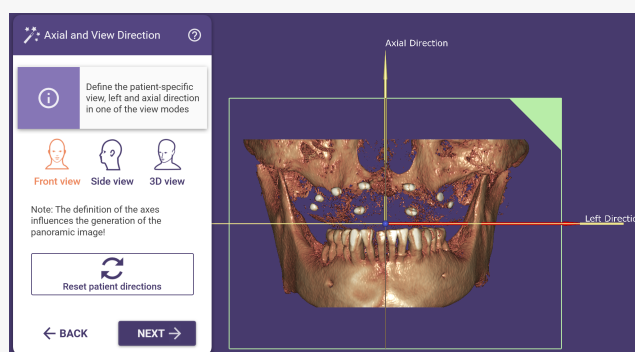
Axial and view direction

3.3.8 DefineJawPlaneManually

If **true**: the step for manually specifying the patient's AXIAL AND VIEW DIRECTION to change the basic orientation of the DICOM series is part of the Wizard workflow. If **false**: this step is only available in the Expert mode.

Default: false

Config-file: settings-implantplanning.xml



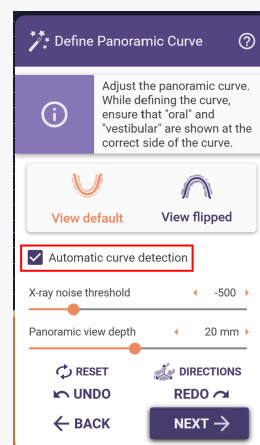
Define panoramic curve

3.3.9 AutomaticPanoramicCurveDetection

If **true**: the option AUTOMATIC CURVE DETECTION is activated in the step DEFINE PANORAMIC CURVE by default.

Default: true

Config-file: settings-implantplanning.xml

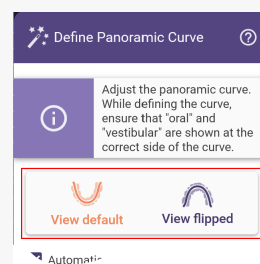


3.3.10 FlipPanoramicCurveDefinitionPerspective

If **true**: the default view direction for defining the panoramic curve is flipped in step DEFINE PANORAMIC CURVE.

Default: false

Config-file: settings-implantplanning.xml



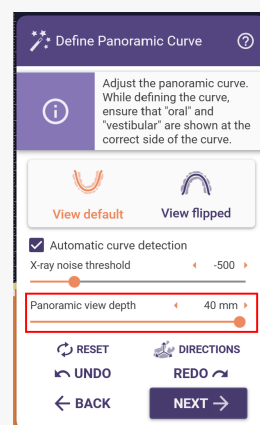
3.3.11 PanoramaCurveThicknessSliderMaxValue

Defines the maximum value for the slider PANORAMIC VIEW DEPTH in step DEFINE PANORAMIC CURVE.

Default: 40

Unit: mm

Config-file: settings-implantplanning.xml



CT Data and CT-to-CT Data Alignment

3.3.12 DefaultDICOMAlignmentWorkflow

Defines the default workflow for CT alignment:

0 = the user will be asked to select the workflow in the Wizard,

1 = CT-to-mesh alignment (e.g., cases with CT data and an optical jaw scan),

2 = CT-to-CT (e.g., dual scan protocol),

3 = skip the CT alignment.

Note: Users may define this individually in the settings menu.

Default: 0

Config-file: settings-implantplanning.xml

3.3.13 BestFitIterations

Defines the default value for the maximum number of iterations for the best fit alignment in the CT DATA ALIGNMENT step.

Note: Users may define this individually in the settings menu.

Range: abs. min.: 100 (*hard-coded*) abs. max.: 200 (*hard-coded*)

Default: 140

Config-file: settings-implantplanning.xml

3.3.14 DisableDistanceVisualizationUpdateDuringManualAlignment

If **true**: on-the-fly update of the distance visualization is deactivated during manual alignment in the CT DATA ALIGNMENT step. This improves interaction performance.

Default: false

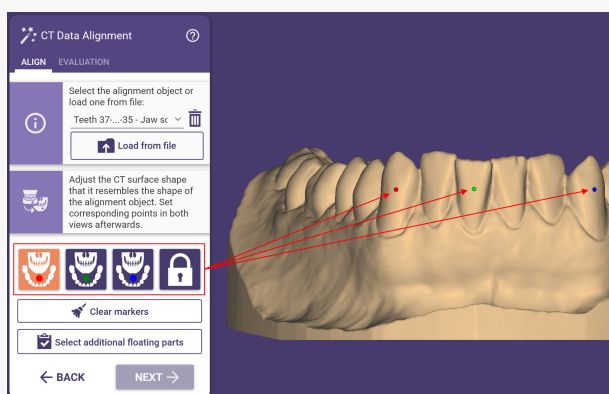
Config-file: settings-implantplanning.xml

3.3.15 RegisterDicomProcessor3PointRegistrationMarkerRadius

Defines the radius of the marker spheres in the 3-point alignment step, relative to the zoom level of the view.

Default: 0.015

Config-file: settings-implantplanning.xml

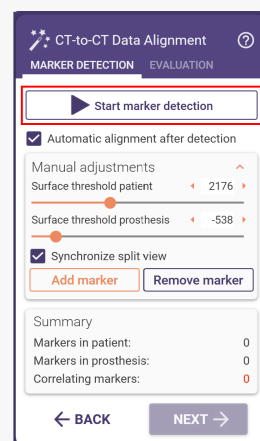


3.3.16 StartMarkerDetectionAutomatically

If **true**: the automatic detection of radio-opaque markers for the CT-to-CT DATA ALIGNMENT step is run automatically. If **false**: the automatic detection has to be started by clicking the START MARKER DETECTION button.

Default: true

Config-file: settings-implantplanning.xml

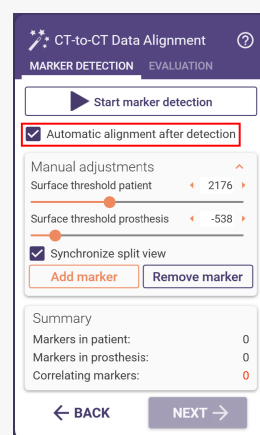


3.3.17 StartAlignmentAfterMarkerDetection

If **true**: the checkbox AUTOMATIC ALIGNMENT AFTER DETECTION in the CT-to-CT DATA ALIGNMENT menu is activated by default.

Default: true

Config-file: settings-implantplanning.xml



Define Mandibular Canal

3.3.18 CurveCutViewDefaultStepSize

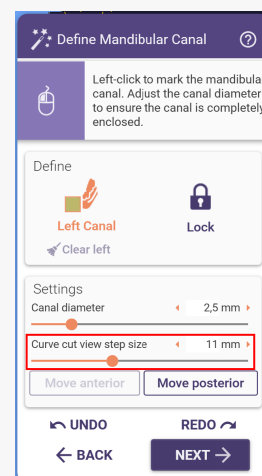
Defines the default step size in the DEFINE MANDIBULAR CANAL menu for moving the curve cut view one step in anterior or posterior direction, related to the currently selected nerve. If 0: the software generates a suitable default step size, according to the length of the defined panoramic curve.

Range: abs. min.: 0 (*hard-coded*) abs. max.: 50 (*hard-coded*)

Default: 0

Unit: mm

Config-file: settings-implantplanning.xml



3.3.19 CurveCutViewMaxStepSize

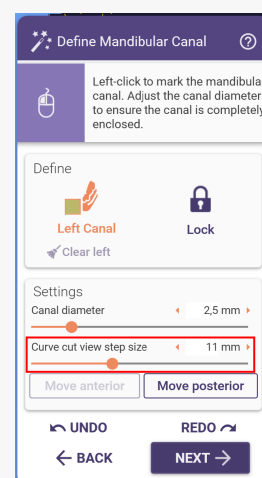
Defines the allowed maximum value for the curve cut view step size in the DEFINE MANDIBULAR CANAL menu.

Range: abs. min.: 0.1 (*hard-coded*) abs. max.: 50.0 (*hard-coded*)

Default: 30

Unit: mm

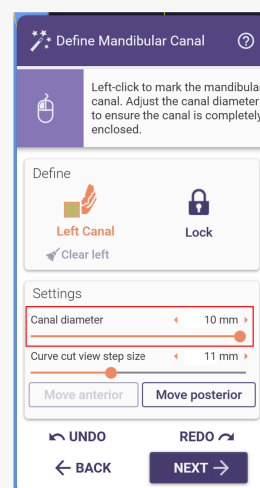
Config-file: settings-implantplanning.xml



3.3.20 MaxNerveDiameter

Defines the allowed maximum value for the nerve diameter in the DEFINE MANDIBULAR CANAL menu.

Range: abs. min.: 1.0 (*hard-coded*) abs. max.: 20.0 (*hard-coded*)
Default: 10.0
Unit: mm
Config-file: settings-implantplanning.xml



Implant positioning

3.3.21 AnchorPinPositioningInitialDepth

Defines the initial depth when positioning an anchor pin.

Note: Users may define this individually in the settings menu.

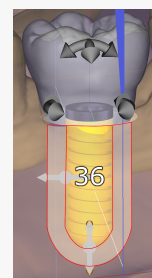
Range: abs. min.: 1.0 (*hard-coded*) abs. max.: 10.0 (*hard-coded*)
Default: 5.0
Unit: mm
Config-file: settings-implantplanning.xml

3.3.22 ImplantPlanningInitialSafetyDistance

Defines the default security distance value between implant and nerve. (If the value entered in the XML file is less than 1, the min. value 1.0 will be used in the software.)

Note: Users may define this individually in the settings menu.

Range: abs. min.: 1.0 (*hard-coded*) abs. max.: 5.0 (*hard-coded*)
Default: 1.5
Unit: mm
Config-file: settings-implantplanning.xml



3.3.23 ImplantPositioningArrowRadiusToLengthRatio

Defines an arrow diameter to length ratio factor for certain 3D arrows in the IMPLANT POSITIONING step.

Range: abs. min.: *not defined, but has to be >0* abs. max.: *not defined*

Default: 0.03

Config-file: settings-implantplanning.xml

3.3.24 ShowSafetyDistancesWhenChangingDistanceValue

If **true**: all safety distance objects are made visible when changing the current safety distance value. If **false**: the current visibility is kept.

Default: true

Config-file: settings-implantplanning.xml

3.3.25 ImplantInsertionChannelDiameter

Set value greater than zero to override diameters from implant configs and use provided value instead.

Range: abs. min.: *not defined, but has to be >0* abs. max.: *not defined*

Default: -1.0

Unit: mm

Config-file: settings-implantplanning.xml

3.3.26 ImplantInsertionChannelLength

Defines the length of the visualized insertion channel direction.

Range: abs. min.: *not defined, but has to be >0* abs. max.: *not defined*

Default: 20.0

Unit: mm

Config-file: settings-implantplanning.xml

Implant planning output generation

3.3.27 AlsoSaveImplantPlanningOutputDataToArchiveFolder

If **true**: a zip archive will be also saved in the archive folder defined in setting **ImplantPlanningArchivePath**.

Default: false

Config-file: settings-implantplanning.xml

3.3.28 ImplantPlanningArchivePath

Defines the path of the archive folder where the zipped implant planning output data are copied when setting `AlsoSaveImplantPlanningOutputDataToArchiveFolder` is set.

Default: C:\ImplantPlanningData\Archive

Config-file: settings-implantplanning.xml

3.3.29 DisplayBoneLevelInReportCrosssectionalImages

If **true**: the implant planning report will display the bone level in the cross-sectional images.

Note: Users may define this individually in the settings menu.

Default: false

Config-file: settings-implantplanning.xml

3.3.30 DisplaySafetyDistanceInReportCrosssectionalImages

If **true**: the implant planning report will display safety distances in the cross-sectional images. This will increase the time for generating the planning report.

Default: false

Config-file: settings-implantplanning.xml

3.3.31 DoNotSaveSceneWhenGeneratingSurgicalGuideOutputFiles

If **true**: a scene will **not** be saved when surgical guide output files are generated.

Default: false

Config-file: settings-implantplanning.xml

3.3.32 GenerateAccumulatedOutputMesh

If **true**: upon generating the planning result files, exoplan creates and saves a combined mesh consisting of the used alignment object and the implant meshes.

Note: Users may define this individually in the settings menu.

Default: false

Config-file: settings-implantplanning.xml

3.3.33 GenerateInsertionChannelMeshes

If **true**: exoplan creates and saves insertion channel meshes upon creating the planning result files.

Note: Users may define this individually in the settings menu.

Default: false

Config-file: settings-implantplanning.xml

3.3.34 GenerateNerveOutputMeshs

If **true**: exoplan creates and saves nerve meshes upon creating the planning result files.

Note: Users may define this individually in the settings menu.

Default: false

Config-file: settings-implantplanning.xml

3.3.35 HideSignatureFieldOnCoverPageOfImplantPlanningReport

If **true**: the signature field will not be placed on the cover page of the planning report.

Default: false

Config-file: settings-implantplanning.xml

3.3.36 StepSizeInReportCrosssectionalImages

Step size of each cross-section image in implant planning report along each cross-section direction.

Default: 0.6

Unit: mm

Config-file: settings-implantplanning.xml

3.4 Surgical guide workflow steps

Note: This workflow is only available with an activated Guide Creator module.

3.4.1

ImportImplantPlanningInformationLoadVirtualToothExtractionMeshInformationDefaultOption

Defines the software behavior for the surgical guide workflow when an additional *.**implantPlanningInfo** file is imported during the project loading. If the file contains information about virtually extracted teeth from the planning, the options control how the import of the modified jaw scan and extracted teeth should be handled. If imported, the original jaw scan in the scene and the extracted teeth will be changed to preop-scan types and the imported (modified) jaw scan becomes the new working jaw scan.

0 = the user will be asked if virtually extracted tooth information should be imported or not,

1 = always import virtually extracted tooth information and the user is not asked,

2 = always skip import of virtually extracted tooth information.

Note: Users may define this individually in the settings menu except of option 2. Allowing the user to always skip the import could potentially cause problems, since the user could not be aware that a virtually extracted tooth is available.

Default: 0

Config-file: settings-implantplanningcad.xml

3.4.2 DefaultFixationGuideWorkflowOption

Defines the default workflow for fixation guides (if a fixation guide can be created):

0 = the user will be asked to select the workflow in the Wizard,

1 = always create a fixation guide,

2 = never create a fixation guide.

Note: Users may define this individually in the settings menu.

Default: 0

Config-file: settings-implantplanning.xml

3.4.3 DualScanDefaultWorkflow

Defines the workflow mode in the step DEFINE GINGIVA CONTACT SURFACE regarding the subsequent surgical guide design for an edentulous case:

0 = the user will be asked to select the workflow in the Wizard,

1 = design the guide by designing the bottom and top part individually,

2 = use the shape of the prosthesis mesh as base design for the guide.

Note: Users may define this individually in the settings menu.

Default: 0

Config-file: settings-implantplanning.xml

Attachments Surgical Guide

3.4.4 SurgicalGuideAddRemoveStructureManualRotationValue

Defines the step size rotation value when an attachment is rotated via corresponding hotkeys.

Default: 15.0

Unit: ° (degree)

Config-file: settings-implantplanning.xml

Surgical guide output generation

3.4.5 HideSignatureFieldOnCoverPageOfSurgicalGuideReport

If **true**: the signature field will not be placed on the cover page of the surgical guide report.

Default: false

Config-file: settings-implantplanning.xml

3.4.6 SurgicalProtocolGenerateFullDrillSequencePagesIfPossible

If **true**: when using a drill protocol library for a tooth, a corresponding page with the drill sequence for that tooth will be generated in the surgical guide report.

Default: true

Config-file: settings-implantplanning.xml

4 Colors and Render Effects

The colors and render effects should only be changed with the constraint that the changes compared to the original version do not negatively affect the readability, recognizeability and distinguishability of the user interface elements.

5 Support

We provide third-level support to our partners in case of technical questions/issues related to our products, usage of the software, exoportal, etc. You can contact our support team to request quick online demonstrations of new features demonstrated by application specialists.

As a certified company (ISO 13485), we document support issues and the given solutions or results. To contact our support team, please send a request to your region's respective email address. Your email will automatically create a ticket in our support system. You will receive a ticket number along with the automatic response email. Our support team will contact you by email or by phone.

To follow up, please keep your ticket number ready. A convenient way to follow up is to reply to our ticket response email. Without a ticket number, we cannot handle your request. Thank you for your understanding.



IMPORTANT

To resolve your issue quickly and smoothly:

- Send a separate email for each issue. Please do not introduce new topics to an existing email conversation!
- Do not modify the subject line of the support reply email!
- Provide all necessary data (project file, scan data, construction files, DICOM data) and additional information (software build number, OS, engine build number of used exoplan version, etc). Without this data, we cannot reproduce a problem (technical or usage) and therefore, we cannot handle it!

To view the support contact details of your support region, visit [exocad.com/secure-area/technical-and-software-support](https://www.exocad.com/secure-area/technical-and-software-support).