Business Unit MR

CS PDT Voxel

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# Introduction

## Purpose

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| INFO 96480  Rev: 1  **✓** | Purpose  Model: [] FS: [] GS: [] Options: [] Quality Attributes: [] Type of Test: []  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:19:47 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:29:54 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 15:28:36 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]  This document describes the requirements of 'PDT' component. |

## Scope

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| INFO 96481  Rev: 1  **✓** | Scope  Model: [] FS: [] GS: [] Options: [] Quality Attributes: [] Type of Test: []  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:19:50 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:29:59 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 15:28:38 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]  The scope of this document is limited to the PDT component responsible for drawing intersection graphics overlays between the viewport image geometry and the scan planning geometries |

## References

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| INFO 96482  Rev: 1  **✓** | References  Model: [] FS: [] GS: [] Options: [] Quality Attributes: [] Type of Test: []  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:19:52 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:30:05 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 15:28:41 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]   |  |  |  |  | | --- | --- | --- | --- | | **Reference** | **Title of document** | **ID** | **Revision** | | [1] | sSRQ - UserWorkflow | D002015285 | A | |

## Terms, Definitins and Abbreviations

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| INFO 96483  Rev: 1  **✓** | Terms, Definitions and Abbreviations  Model: [] FS: [] GS: [] Options: [] Quality Attributes: [] Type of Test: []  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:19:55 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:30:09 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 15:28:46 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]   |  |  | | --- | --- | | **Terminology & Abbreviations** | **Description/Definition** | | PDT | Plan drawing tool | | AIF | Arterial Input Function | | FOV | Field Of View | | FOS | Fold Over Suppression | |

# Component Overview

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| INFO 96488  Rev: 1  **✓** | Component Overview  Model: [] FS: [] GS: [] Options: [] Quality Attributes: [] Type of Test: []  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:19:59 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:30:14 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 15:29:58 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]  This software component is designed to manage the calculation, drawing and interaction with the intersections between a geometry elements(stack, volume, AIF)and a reference image. Its primary function is to aid in graphical planning and review by providing a visual representation of how these elements intersect with the images.    **Key Responsibilities:**    Intersection Calculation:  This involves computing the precise points or areas where the geometry element intersects with the reference image.    Drawing:  The component is responsible for calculating shapes and breaking them into smaller graphical elements like point, lines text that needs to be drawn for the intersections. PDT is reposnible for defining the points for drawing the points. Users of PDT are responsible to draw the shapes.    User Interaction:  Enables users interaction for all graphical elements. |

# Component Specifications

## Functional Specifications

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| --- | --- |
| SPEC 96249  Rev: 1  **✓** | SWCMP.UW.PDT.Graphics.GeometryElement  Model: [All] FS: [All] GS: [All] Options: [] Quality Attributes: [N.A.] Type of Test: [Development Test]  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:20:02 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:30:18 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 16:55:14 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]  PDT shall support graphical display of following geometry elements.   * Stacks (radial and parallel stacks) * REST slabs * Shim volumes * FOS oversampling area * FOS direction * Navigator beams * Spectro Volumes * Labels * AIF * Three PPS points   Background:  NA |
| SPEC 98347  Rev: 1  **✓** | SWCMP.UW.PDT.Graphics.Intersection  Model: [All] FS: [All] GS: [All] Options: [] Quality Attributes: [N.A.] Type of Test: [Development Test]  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:20:04 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:30:20 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 16:55:15 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]  The PDT shall provide intersection graphics between the image and the planning geometries, only if the image frame of reference matches with that of the planning geometries.  Background:  NA |
| SPEC 96248  Rev: 1  **✓** | SWCMP.UW.PDT.Graphics.GeometryElement.Style  Model: [All] FS: [All] GS: [All] Options: [] Quality Attributes: [N.A.] Type of Test: [Development Test]  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:20:06 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:30:22 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 16:55:17 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]  PDT shall draw different geometry elements with the color code and styles associated with that element as described in the below table:     |  |  |  |  | | --- | --- | --- | --- | | **Geometry** | **Color(Color Code)** | **Graphics(When selected)** | **Graphics(When not selected)** | | Stacks | GROUPBLUE35(439AC1) |  |  | | FOS direction | GROUPBLUE35(439AC1) |  |  | | REST slabs | GREEN50(3E8A29) |  |  | | Shim volumes | ORANGE25(F2C544) |  |  | | FOS area | ORANGE45(FF830F) |  |  | | Navigator beams | PINK30(EC8BA1) |  |  | | Spectro Volumes | GROUPBLUE35(439AC1) |  |  | | AIF | PURPLE30(C48CD4) |  |  | | Labels | WHITE(FFFFFF) |  |  |      In multi station planning, the active planned geometry appears in color, while non-selected geometry appears in gray (#F5F5F5).    Background:  NA |
| SPEC 96256  Rev: 1  **✓** | SWCMP.UW.PDT.Graphics.GeometryElement.DisplayMode  Model: [All] FS: [All] GS: [All] Options: [] Quality Attributes: [N.A.] Type of Test: [Development Test]  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:20:07 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:30:25 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 16:55:19 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]  PDT shall provide various display modes to control how the PDT geometry elements are displayed, including   * Slice mode * Box mode * 3D Perspective Mode     PDT shall provide control to show or hide   * Mid-Plane display * Stacks, AIF * Slabs * Volumes     Background:  NA |
| SPEC 96250  Rev: 1  **✓** | SWCMP.UW.PDT.Graphics.GeometryElement.Interaction.Cursors  Model: [All] FS: [All] GS: [All] Options: [] Quality Attributes: [N.A.] Type of Test: [Development Test]  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:20:09 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:30:27 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 16:55:20 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]  PDT shall provide continuous cursor feedback reflecting the interaction with graphical planning elements such as positioning, rotation, and field of view (FOV).     |  |  |  | | --- | --- | --- | | **Un-Selected cursors** | **Selected Cursors** | **Functions** | |  |  | Resize FOV | |  |  | Move | |  |  | Rotate | |  |  | Change Slice gap | |  |  | Change number of slices |     Background:  NA |
| SPEC 96471  Rev: 1  **✓** | SWCMP.UW.PDT.Graphics.GeometryElement.Interaction  Model: [All] FS: [All] GS: [All] Options: [] Quality Attributes: [N.A.] Type of Test: [Development Test]  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:20:11 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:30:31 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 16:55:22 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]  PDT shall allow only one geometry element to be actively modifiable at a time based on the selected geometry. All allowed interactions are based on the modifiability set on the geometry.  The interaction regions for the graphics shown below:  **Stacks/AIF**  PDT enables change to FOV, slice thickness, number of slices and slice-gap, based on the modifiability set on the stack/aif.   |  |  | | --- | --- | | **Type** | **Interaction region** | | Parallel |  | | Radial |  |   **FOS area**  PDT shall allow interaction with FOS to modify area associated with a stack using edges of the FOS graphics.  Note: Only for motion enabled planning, FOS interaction is allowed from both the edges.    PDT FOS shall follow the associated stack position, rotation and change in FOV.  Note: Planning FOS scan geometry is filled using FOS’s FOV, off-center and angulation is filled using associated stack.    **Shim**  PDT shall allow interaction with shim to modify off-center, angulation and FOV (Field of View).    **Rest Slabs**  PDT shall allow interaction with parallel and perpendicular slabs to modify the field of view (FOV) and free slabs to adjust off-center, angulation, and FOV. Circular slabs shall not be allowed to interact.       |  |  | | --- | --- | | **Type** | **Interaction Region** | | Parallel |  | | Free |  | | Circular |  | | Perpendicular |  |     **Navigator**  PDT shall allow interaction with navigator to modify off-center, angulation and FOV (Field of View).    **Spectro VOI**  PDT shall allow interaction with spectro VOI to modify off-center, angulation and FOV (Field of View).    **Labels**  PDT shall allow interaction with parallel labels to modify the FOV (Field of View) and free and pencil beam labels to adjust off-center, angulation, and FOV.       |  |  | | --- | --- | | **Type** | **Interaction** | | Parallel |  | | Free |  | | Pencil Beam |  |         Background:  NA |
| SPEC 96255  Rev: 1  **✓** | SWCMP.UW.PDT.Graphics.GeometryElement.Zoom.Recalculate  Model: [All] FS: [All] GS: [All] Options: [] Quality Attributes: [N.A.] Type of Test: [Development Test]  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:20:13 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:30:34 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 16:55:24 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]  PDT shall recalculate the geometry with zoom factor of the image on which graphic is drawn.  Background:  NA |
| SPEC 97921  Rev: 1  **✓** | SWCMP.UW.PDT.Graphics.ThreePPS  Model: [All] FS: [All] GS: [All] Options: [] Quality Attributes: [N.A.] Type of Test: [Development Test]  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:20:14 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:30:36 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 16:55:25 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]  PDT shall allow computation of slice plane for the selected stack or AIF based on three points placed on the reference images.  Background:  NA |
| SPEC 97922  Rev: 1  **✓** | SWCMP.UW.PDT.Graphics.ThreePPS.Enabled  Model: [All] FS: [All] GS: [All] Options: [] Quality Attributes: [N.A.] Type of Test: [Development Test]  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:20:16 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:30:38 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 16:55:26 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]  PDT shall not draw any other graphics other than Point 1, Point 2, Point 3 associated with three pps when ThreePps mode is enabled.  Background:  NA |
| SPEC 98055  Rev: 1  **✓** | SWCMP.UW.PDT.Graphics.ModifierKeys  Model: [All] FS: [All] GS: [All] Options: [] Quality Attributes: [N.A.] Type of Test: [Development Test]  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-10 06:20:17 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-09 14:30:40 Meaning: SME Approved - (Technical)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-06 16:55:28 Meaning: SME Approved - (Business)::Bulk Transitions  Approval Status: [Approved]  PDT shall allow interactions based on modifier keys. Following are the interactions based on modifier keys:   1. **Ctrl => symmetric**           While dragging a border or slice gap handle of a selected element: change between asymmetric (not pressed) and symmetric resize (Ctrl pressed). The cursor does         not reflect this change. Once the mouse is pressed and the drag operation starts, the mode stays until the mouse is released.   1. **Alt => do not snap**           Only for a stack in FOV (phase or frequency) direction, changes between snapping to rounded values (default, not pressed) and not snapping to rounded values (Alt         pressed). The mode change applies while dragging.   1. **Alt + Ctrl => symmetric + do not snap** 2. **Shift => slice angle**           Only for radial planning, to change resize mode between number of slices (not pressed) and slice angle (Shift pressed). The cursor changes directly to reflect the         mode. Once the mouse is pressed and the drag operation starts, the mode stays until the mouse is released.   1. **Alt + Shift**           Select the element behind the element that is in the front  Background:  NA |

## Non-Functional Specifications

## Compliance Specifications

# Component Traceability

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| INFO 96489  Rev: 1  **✓** | Component Traceability\_V1\_R13.0.0  Model: [] FS: [] GS: [] Options: [] Quality Attributes: [] Type of Test: []  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-11 12:36:28 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-10 09:52:10 Meaning: SME Approved - (Business) Signed by: Gujjala, Bala Shabarish (320252679) on 2025-06-10 09:01:59 Meaning: SME Approved - (Technical)  Approval Status: [Approved]  Please refer the attachments. |

**Attachment:**

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| --- |
| RTM CS PDT.xlsm |

# Document History

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| INFO 96490  Rev: 1  **✓** | Document History R13.0.0  Model: [] FS: [] GS: [] Options: [] Quality Attributes: [] Type of Test: []  Signatures: Signed by: P S, Guruprasad (320209039) on 2025-06-18 13:23:46 Meaning: QA Approved - (QA)::Bulk Transitions Signed by: Shivarudrappa, Pavithra (320092086) on 2025-06-18 12:34:35 Meaning: SME Approved - (Technical) Signed by: Channakeshava, Chandralatha (ing09855) on 2025-06-16 15:17:49 Meaning: SME Approved - (Business)  Approval Status: [Approved]   |  |  |  |  | | --- | --- | --- | --- | | **Revision** | **Date** | **Author** | **Description of change** | | A | 10-Jun-2025 | Anoop D V | Initial version for R13 |       The Date and Author Name in the document history (below table) is the last date of change and person who made the change in ALM. This may/may not be same as the in CS Title Page (which is the date and person to initiate Agile/WindChill routing). |

