Customer Release Notes for DP-1006 CRN-0151

This document describes the following:

- Changes to ZAP-X® system software since the prior release (DP-1005).

- ZAP-X® system software content that is new with the DP-1006 release.

- Known issues and workarounds.

1. Compatibility

ZAP-X® software is a set of major software components. These release notes are for the following version:

- Treatment Planning Software: v1.8.56.

- Treatment Delivery Software: v1.8.53.

- Treatment Delivery Control Service Software: v1.8.53.

- System Database Software: v1.8.19.

2. Content of DP-1006

The most recent release of ZAP-X® software is the DP-1006 release. It contains the following:

2.1.   DP-1006 Features

Treatment Delivery includes the following features:
- **Simplified Path Diagram**
  - The path diagram shows the nodes where beams will be delivered and gantry travel nodes (in gray). Previously, the nodes available to inverse planning optimization were also displayed. If the gantry does not travel to a node, it is not relevant for delivery and does not need to be displayed.
- **Path detour**
  - The ability of the system to respond when the patient or another object interferes with system movement was enhanced. If a proximity error is encountered, the system will attempt to move forward with reduced buffer size and speed. If this results in a second proximity error, the system will use alternative routes to the

next beam. If no safe routes can be found the system will skip the beam and find a route to the next beam. Skipped beams will automatically be part of a Make-Up fraction. While traveling on the detour the system will move at reduced speed.

- **Matching beam order between planning and delivery**
  - o TDS will deliver beams in the order shown in the Treatment Planning Report.
- **Display secondary dosimeter reading**
  - o In addition to the primary dose (MU) and dose rate (MU/min), the Treatment UI displays the secondary dose and dose rate on the top of the MV image and when hovering over the corresponding fields on the Beam Progress Wheel during delivery.
- **Reject automatic alignment results**
  - o Added ability for the user to reject auto-align results.
- **System Reporting**
  - o Added "System Reporting" that creates reports with details of KV and MV usage between user defined dates. See *Appendix A - System Reporting* for instructions on how to use the tool

Treatment Planning includes the following features:
- **Automatic path optimization improvements**
  - o Reduced automatic path calculation time
  - o Gantry travel nodes, where the gantries will change direction, but no beam will be delivered, were introduced to improve path finding. Travel nodes are displayed in gray in the path progress chart.
  - o Gantry will revisit nodes if this improves the delivery path
  - o More efficient paths are chosen that result in less back-tracking in a single isocenter.
- **Define number of constraint points to use for Inverse Planner**
  - o If the Inverse Planner failed to find a solution for a large problem, user can now break it down to a reasonable size and have the Inverse Planner find a solution for this new size
- **Wheel navigation with keyboard support**
  - o The following keyboard keys result in the following navigation behaviors:
    - Tab: advance to the next icon or field
    - Shift+Tab: go back to previous icon or field
    - Enter: select an icon, enter a drop-down menu
    - Space bar: toggle radio buttons
    - Esc: exit a feature window
    - Ctrl + N (in Optimization window): Add a new constraint
- **Configurable shell sizes in constraint menu**

- By default, 1 mm, 5 mm, 10 mm, and 20 mm shells are provided. Up to four integer-valued custom shell sizes (up to 25 mm) can be defined in the advanced configuration settings.
- **Warning if removal of headrest and table from the CT failed**
  - A warning message will be displayed if a plan is created for which the removal of the headrest and table from the CT had failed.

2.2. DP-1006 bug fixes

DP-1006 contains fixes for the following issues observed in the field:

Title	ID
Gantry node appeared outside of the path control	6508
TreatmentView did not record entire delivered dose from TDCS when beam was aborted	8981
TDS Optimized paths inefficient	9656
Inverse planner fails to find a solution for large problem	10071
MV imager timed out	10284
Inverse planning hangs for plan with complicated critical structures	11663
Proximity error associated with TDS shortcut	11763
Proximity error with no detour	12166
No option to reject auto alignment	12339
Zoom ratio is not the same on all the views and blue lines are not aligned across the views	12348
An unnecessary KV image is taken when there is only one beam node in the path	12480
Noticeable delay (~2min) between end of auto alignment and alignment review	12504
Five second image interval is disabled in Treatment View	12556
TDCS closed unexpectedly during a treatment due bad MV image	12591
TDS should NOT allow user (e.g. therapist) without PlanDesign permission to start the treatment	12604
Partial KV image acquired	12644
Archiving patients does not improve patient loading performance	12663
KV Detector Saturation	12671
Therapist is missing permission to PlanChangeRequest	12676
TDCS gantry initialization fails if GantryOriginSD.xml file is missing	12790
kV technique was set to 75, 100, 100	12793
Gantry velocity reporting errors due to large movements	12797
Transitional Alignment not as expected	12822
Manual Correlate Button Does Not Clear Image History	12873
Inverse Planning Voi Beam Toggle Switch Has Wrong Visual States	12915
Shell (rings at certain distance) constraints within Inverse Planning don't work	12916
Self Check KV image comparison fails with mismatched images	12922
TextBox clear button's icon not showing properly	12926
Inverse Planning - Plan doesn't restore constraints and dose after auto restore	12948

Title	ID
Tracking re-imaged at same node due to lack of rounding	12949
Too long plan name does not prompt with error in TPS	12951
TPS UI froze	12953
Segmentation fails when raw pixel values are large	12993
Missing fraction delivery time information on Delivery Report	13074
Inconsistent behavior when selecting Left mouse button and Drag mouse movement, in text box -Plan Summary	13115
Advanced Correlate Function Does Not Clear Image History	13158
TPS Application interrupts after a read only plan is open from search bar	13174
KV images and DRR do not display during beam delivery	13175
Fusion is timing out with high-resolution t2 MR	13183
LpSolve causes a "CallbackOnCollectedDelegate" exception sometimes	13184
import or export feature in fuse wheel navigates to Main UI	13199
Segmentation instance number is not matching slice location	13221
Image import failure of segmented CT data	13298
Contour outline not visible on non-axial views	13334
Manual subvolume fusion fails	13339
Daily QA - Treatment view shows beam off when beam is on	13425
Initial auto subvolume autofuse result presented for different user-indicated fusion	13442
Number of auto-alignment images was NOT included in report	13522
DVH values not always visible	14102
TPS - error message when selecting MUs	14259
Dose conflict error	14646

2.3.   CRN-0149 bug fixes

CRN-0149 contains fixes for the following issues observed in the field:

Title	ID
Stale delivery instructions saved with plan after optimization parameters changed	15334

2.4.   CRN-0145 bug fixes

CRN-0145 contains fixes for the following issues observed in the field:

Title	ID
Fusion confirm wheel cannot be dragged	13155
The cursor is not populated in the text box after confirming save without entering a plan name.	13171
Deleting a contour from contour list ends up in wrong UI state	13273
Plan summary panel bottom list header checkbox not updating the boxes in the list items	13274
Contour List "delete" header and checkboxes visual state issue	13465

Title	ID
Extract Button Unresponsive after E-Stop	14469
Export fails for plans with a contour set with no defined points	14500
Sphere packing with multiple targets	14532
Daily QA interface does not adequately indicate Collimator move is in progress	14554
Continue to fix TPS memory leaks which could cause TPS UI freeze	14563
Auto path led to unexpected proximity error during treatment	14565
Failed to extract patient with pendant and TreatmentView	14569
Font in kV image is not clearly readable at certain angles	14571
TreatmentView application exited unexpectedly during Steel Ball test	14572
Auto Alignment overlay displayed with older image	14573
Add warning message to user if creating a new plan without a segmentation	14683
Constraint points are not displayed sometimes or are rendered too slowly	15198
Sorting by Max Dose (cGy) does not work correctly	15244
Fraction partially delivered message displayed	15253
Make-up fraction message displayed even though no make-up fraction is available	15296
DoseRateCheck once disabled in DailyQA, was not re-enabled for Treatment	15466
File filter not displayed correctly	15513
TreatmentView UI lagging of dose wheel	15569
Segmented CT for signed DICOM data is not correct	15609

2.5.   CRN-0151 bug fixes

CRN-0151 contains fixes for the following issues observed in the field:

Title	ID
Repeat logging in TreatmentView-Control : UploadSystemDeliverData caught error	16408

3. Known issues and workarounds

- **Failed Self-Check (13326):**
  If self-check fails, follow the steps below:
    o Make sure there is nothing on the table.
    o Make sure HV Enable key is turned to Enable.
    o Make sure the table cushion is correctly positioned.
    o Check for other obstacles in or around the system.
    o Power down the system and power it up again.
  If there is still an issue after following these steps, call Zap service for additional support.

- **MV exit dose conflicts with prediction (5650)**
  Occasionally, the exit beam attenuation is not calculated accurately based on the CT information. This can result in an error when the MV imager provides data that conflicts with the calculated value. Referencing the MV dosimeter graph can confirm if the problem is from a few miscalculated beams or a broader problem

with the dosimetry. To continue with treatment, temporarily turn off the dose check by right clicking on the overlay image in the delivery view and uncheck 'enable' in the context menu.

- **Dosimeter calibration factors in QA page not saved automatically (9657)**
  The dosimeter calibration factors in QA page need to be saved manually to take effect.

- **Door and shell hesitate while opening/closing (12460)**
  When the operator presses the extract button in the Treatment View application, sporadically, the door and shell start opening and then stop several times. The solution is to click the extract button three times or to restart the Pendant application. To restart the Pendant application, swipe right from the left edge of the Pendant screen and click on the X to close the application. After the application is closed, double click on the Pendant application icon.

- **TDCS does not always restart after terminating Treatment View mid-treatment and then restarting (12559)**
  When the Treatment View application is restarted after losing response or being accidentally closed, in rare cases, the Treatment Delivery Control Service is not started automatically. The workaround in the error state is to exit the Treatment View application and restart it.

- **No automatic re-routing for inter-isocenter alignment (13102)**
  The system will not automatically search for a new path if it detects a potential collision zone during inter-isocenter alignment. The workaround is to manually initiate an automatic alignment.

- **kV images not re-submitted if database computer goes offline during delivery (13194)**
  In the unlikely scenario where communication between database and console computer is interrupted during treatment, beam data and delivery times are uploaded to the database when the connection is restored. If this interruption occurs, the kV images are available on the console computer but are not transferred to the database computer. Contact Zap service to retrieve them.

- **Automatic subvolume fusion fails when whole head is not in secondary dataset (13443)**
  For large datasets, automatic subvolume fusion fails when whole head is not in the secondary dataset. The workaround is to perform manual subvolume fusion.

- **Selected a locked plan and received "Object Reference not set on an instance of an object" (13606)**
  The system will report the error "Object Reference not set on an instance of an object" if a locked plan is selected in the treatment plan selection screen. Close the plan on the planning system to unlock and deliver it.

- **CT segmentation fails when multiple series are approved sequentially in a short time (13809)**

If multiple CT series are uploaded to the database computer in a short time, only the first CT will be segmented successfully. To avoid this issue, wait a few minutes between importing CT series.

- **Missing MV images and analysis report on Steel Ball (13852)**
  In rare instances, MV images are not displayed during Steel Ball on the Daily QA screen. Power cycle the ZAP-X system if this issue occurs.

- **Plan load failure (13874)**
  Sporadically, the treatment system reports a plan load failure after powering up. Logout and re-login with the current user to proceed.

- **Gantries move off path during delivery (13387, 13491)**
  Several situations can cause the gantries to depart from the displayed path. After a proximity error, the gantries leave the displayed path when trying to find a detour around the obstacle. When automatic alignment is used the route from the position at the end of automatic alignment to the first beam of the next isocenter may not be shown on the path display.

- **Select Isocenter from List of Isocenters (14109)**
  Use the magnifying glass icon to select an isocenter from the list of isocenters in TPS.

- **Three images are taken during transitional alignment (14210)**
  In rare cases, the system will take three images during transitional alignment, because the first two images are not far enough apart. If this issue occurs, the system will automatically select the appropriate two images for the alignment.

- **DVH plot does not show up on report (15245)**
  If the user clicks on "Generate Plan Report" very quickly after changing plan settings, occasionally, plan report will be missing the DVH plot. This is remedied by closing the report and then redoing the request to "Generate Plan Report".

- **Changing head center with CT setup tool (15610)**
  Any changes to the head center via the CT setup tool will stick only if the user clicks on the CT setup tool icon to exit. If the system does not display a change notification after changing the head center, it has not been changed in the plan.

- **Wheel loses focus during tab navigation (15704)**
  When going from rectangular to circular dialogs, the focus on icons in the wheel may be lost preventing tab navigation. To re-enable tab navigation, use the mouse to click on an icon, then continue tab navigation.

Appendix A - System Reporting

New in DP-1006 CRN-0145 is a system reporting tool that allows the download of KV and MV usage for a user defined time frame. To access this new report, click the Report button on the main dashboard. See Figure 1.1.
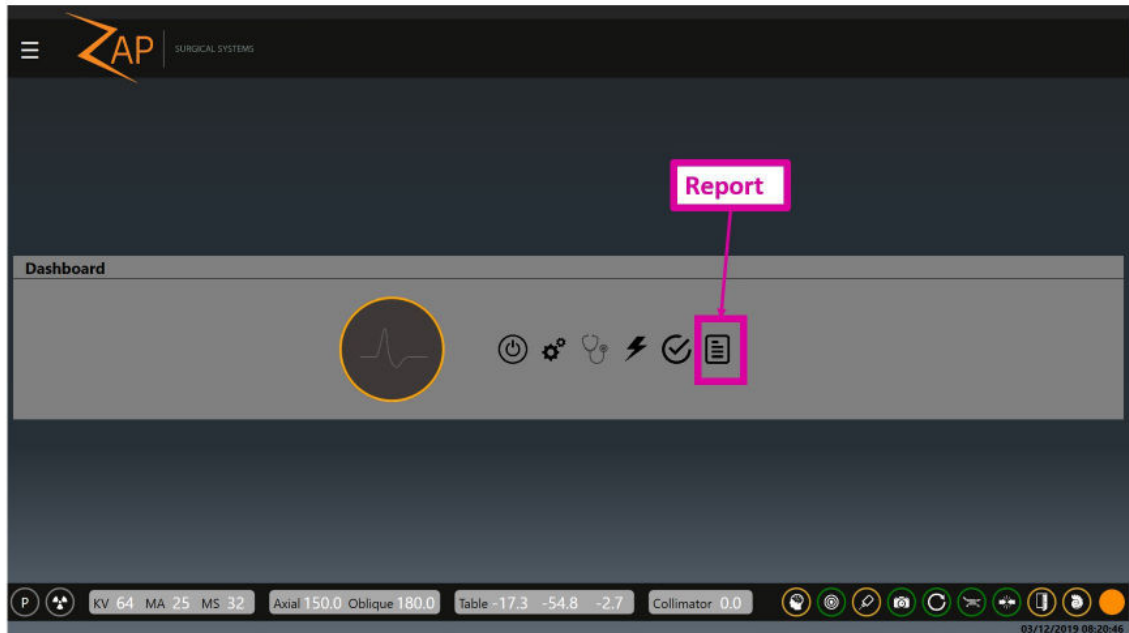

Figure 1.1: The Report Button

Note: there are two report types, the default is the Treatment Report. To select the System Report, click the Load System Report icon on the left. (Figure 1.2)
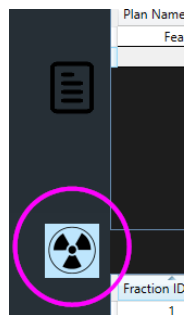

Figure 1.2

The Load System Report icon opens a report to allow query of KV and MV events between selected dates. Select a start date and end date that you want the data collected from – see Figure 1.3.
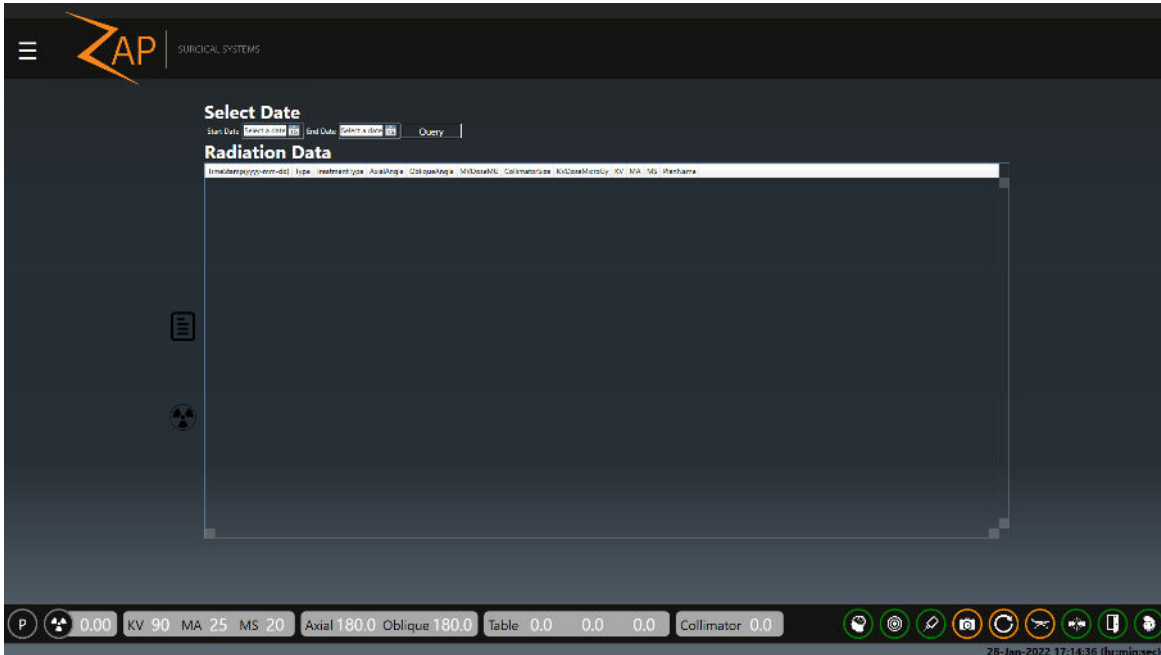

Figure 1.3: System Report Options

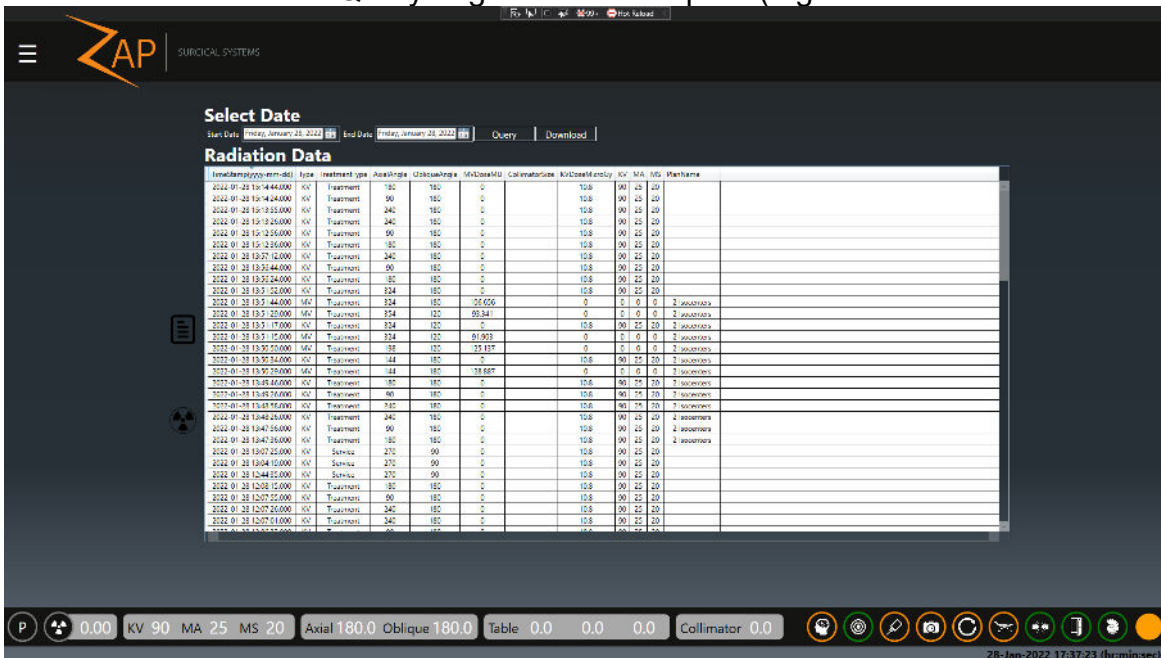Press Query to generate the report. (Figure 1.4

Figure 1.4: Report Review and Download

To save a csv file of the data, click Download.