New Features - MapCHECK Software

Version 5.0 (Released October 1, 2009)

SunMETRIC™ Feature

The SunMETRIC™ feature provides a unique method to change the criteria for comparing dose maps. Rather than compare points based on a "Pass-Fail" method, the user can alter the comparison criteria to fit the specific needs of a clinic or patient.

Open TIFF Film Scan

Film scans that were saved as a TIFF (.tif) image can be processed within the MapCHECK software, provided that they were saved in 48-bit color.

Multi-Leaf Collimator (MLC) QA Feature

The MLC QA feature is now available for MapCHECK 2. MLC QA is performed using a series of "picket fence" measurements, similar to film measurements. This method consists of a step-and-shoot delivery of an open flat field composed of segmented adjacent fields formed by the MLC.

MotionSim XY/4D™

An optional MotionSim XY/4D table can now be used with MapCHECK 2 to simulate tumor motion and simultaneously trigger a gating surrogate. Refer to the MotionSim XY/4D *Reference Guide* or Online Help for details.

File Manager (Patient Plan) Enhancements

- Batch analysis can now be performed from the File Manager dialog box immediately after creating a new patient plan. With earlier software versions, the user had to create the patient plan, close the File Manager dialog box, and then re-open the File Manager dialog box again to perform batch analysis.
- A 'New Patient Plan button has been added to the File Manager dialog box so that the user can create a new patient plan without having to return to the main screen.

ArcCHECK™ Support

MapCHECK software version 5.0 supports three devices, MapCHECK™, MapCHECK 2™, and ArcCHECK™. The software recognizes which device is connected and automatically configures the screen options and display to match the connected device. See the ArcCHECK *Reference Guide* or Online Help for details.

Movie File

When saving MapCHECK 2 measured data, the user can select an option to save the file in both.txt format and .mcm (MapCHECK movie mode) format. Movie files capture data in 50 ms updates. MapCHECK 2 movie files cannot be viewed within MapCHECK software, but they can be opened in other programs, such as MS Excel.

MapCALC™ Enhancement

When initiating MapCALC 2D calculations, the software will now display all of the fields from the RTP/RTPlan file so that the user can select the field(s) to calculate. This is useful in the event that the RTP/RTPlan file has extra fields that the user does not want to calculate. Refer to the MapCALC *Reference Guide* or Online Help for details.

Raw/Corrected Numbers

When viewing non dose plan files, such as EPID images, Pinnacle, CMS, etc., the tabular view now includes the option to display raw/corrected values.

Measured File Format

- Background Threshold Count—A background threshold count is now stored in the header of each MapCHECK or MapCHECK 2 measured file. This allows the user to verify the threshold rate that was used for the measurement.
- Software Version—the full four-decimal software version is now stored in the header of the MapCHECK or MapCHECK 2 measured file.

Saving to TIFF Format

MapCHECK 2 measured files are now saved correctly as a TIFF (.tif) image. Previously, the two markers highlighted for registration in the TomoTherapy software were not visible. If a MapCHECK 2 file is saved to TIFF, the software will now change the marker position automatically.

Scanned Film Orientation

When manually registering a scanned film file, the image can be rotated (flatbed scanners only) or flipped along the X or Y axis (both flatbed and Vidar scanners).

DICOM Files

DICOM files are no longer required to have a .dcm file extension to open them in MapCHECK software.

Dose Rate Error

An error message is now displayed if MapCHECK 2 receives a higher dose rate than the instrument can support.

Version 4.1 (Released April 3, 2009)

File Manager Batch Mode

A batch comparison mode has been added to The File Manager. This lets you compare a batch of file pairs at once instead of comparing one pair at a time.

Support for Siemens EPIDs in EPIDose

Siemens EPIDS are now supported in the optional EPIDose software. The software supports both Varian and Siemens EPIDS. Refer the EPIDose Online Help (see Modules on the MapCHECK help menu) or the EPIDose *Reference Guide*.

MU Calculation for IMRT Fields in MapCALC

The optional MapCALC software now performs MU calculation in the IMRT field. Refer the MapCalc Online Help (see Modules on the MapCHECK help menu) or the MapCALC *Reference Guide*.

Automatic Background Measurement (MapCHECK 2 Only)

MapCHECK 2 automatically measures and records background throughout the day. Background is measured every 15 minutes, but only while the instrument is not in use. If the instrument detects radiation, automatic background measurement is cancelled. The software will attempt the background measurement again in 15 minutes. For most applications, it is unnecessary to take manual background measurements.

Version 4.0 (Released Dec. 3, 2008)

TPS CAX Shift

A new option in the 'Other' tab of the Program Preferences window allows the software to remember the TPS CAX Shift. The 'Auto Remember CAX Shift' check box is selected by default. Uncheck the box to turn off the feature. The software will remember the user's preferences when the software is launched.

Calc Shift

For the “Calc Shift” function, gradient is now defined as High if it is 3% per mm, whereas before it was defined as High if it was 5% per mm. With this change the software will, in some cases, be able to locate a better shift option, when "Calc Shift" is selected.

MapPHAN Correction Factor Algorithm

For optimal MapCHECK™ with MapPHAN™ results in rotational delivery QA, a 2D MapPHAN/Arc calibration matrix can be applied to the measurement. Refer to the following bulletins for additional information:

Bulletin 4-08, MapPHAN/Arc Calibration Matrix (P/N 1082016, Rev B)

Bulletin 6-08, Use of MapPHAN during Rotational Treatment QA (P/N 1082017, Rev A)

File Manager Default Directory Path

A new option in the ‘File’ tab of the Program Preferences window allows the user to select a directory path for Patient Plans. The default path is C:\SNC\Patient Plans. The software will remember the user’s preferences when software is launched.

Sagittal Slices Now Supported

The Import DLL now supports sagittal slices.

MapCHECK 2

MapCHECK software now supports the MapCHECK 2 instrument.

Version 3.5 (Released Aug. 1, 2008)

MAPcalc Option (License Required)

The MAPcalc option lets you perform independent, 2D dose calculations within the MapCHECK software and immediately compare the resulting dose maps to the fields of an imported treatment plan. Using advanced modeling of each individual accelerator, the MAPcalc algorithm calculates a predicted dose map for all treatment fields in seconds. Then you can compare them immediately to the treatment plan fields and display the comparison in MapCHECK.

File Manager

File manager is an innovative tool to organize and manage the many files needed for MapCHECK QA functions. Types of files managed include: DICOM RT Plan, DICOM RT STRUCTURES, RTP Link, MLC FILES, DICOM RT IMAGES (EPID), MapCHECK measured, EPIDose calculated, FILM, TPS dose maps, and MapCALC files.

Files are quickly copied, renamed, and arranged in standard subdirectories by patient. You can tell exactly what each file is by the name. Your original data is untouched. Only copies are used.

File manager is integrated with MapCHECK, EPIDose, and MapCALC. When a patient file set is selected, the correct subdirectory is automatically selected so you can immediately find the files you need.

Film Analysis Enhancements

You can now perform a scanner calibration with the MapCHECK software. Consequently you do not have to obtain your scanner from Sun Nuclear Corporation.

Since the sensor of each scanner is unique and contains small errors, each scanner requires calibration to remove the errors. Previously a file to do this was created by Sun Nuclear Corporation and shipped to you along with the scanner. Now you can obtain your scanner (of the supported models) from any source and calibrate it yourself.

EPSON 10000 XL scanner now supported.

Beam QA Supports EPIDose Files

The Beam QA tool now supports EPIDose files, and all other non-MapCHECK array files.

Version 3.4 (Released Sept. 5, 2007)

Smoothing

MapCHECK now has the ability to provide smoothing of the data collected for QA profiles. Six different smoothing algorithms are provided.

Merging Non-measured Files

Some treatment planning software, such as ADAC Pinnacle, generates two separate files when it needs to split fields. You can merge MapCHECK measurements but until now, you could not merge the plan files. Now MapCHECK offers a new option that allows you to merge supported plan files as well as EPID files so that the merged file can be compared directly with the merged MapCHECK file over the entire field.

Beam QA Values Panel

Profile flatness and symmetry for Beam QA is now automatically calculated and displayed in a panel below the profile when you select a new profile, replacing the Dose Values. You can switch between Beam QA (BQA) and Dose values.

Patient Information

You can set up default values for the Patient Information dialog box so that these values appear in the dialog box for each measurement. This saves time in having to enter repetitive information. Default values for date (auto-date), hospital or institution name, SDD, SSD, depth, energy, and gantry angle can be preset. You also have the ability to pull patient information from plan fields. These values can be edited before saving.

XY/4D Option with "Gating Surrogate"

The XY/4D option has been upgraded to add a powered "gating surrogate" motion to the XY/4D table. The gating surrogate structure accepts Varian RPM blocks as well as Siemens and Elekta belts.

EPIDose Option (License Required)

The EPIDose option lets you use the EPID (Electronic Portal Imaging Device) furnished with many new accelerators as an independent QA device. Although EPIDs produce an image, they do not produce a dose map. EPIDose converts an EPID image to a dose map that can be analyzed in the MapCHECK software.

By using MapCHECK measurements to correct the output of an EPID, you can measure images directly on an EPID at the standard 140-145 cm SSD, import the image, convert it to dose, and compare it to the planned dose. EPIDose converts EPID images to 2D dose maps that can be compared to the plan or to a measured MapCHECK dose.

Histogram Bin Size

Histogram bin size can be adjusted in five steps for half a bin resolution. This provides a better analysis of failed detectors or more detail of passing detectors.

Gamma Graph

You can now display a 1D gamma distribution plot on the Profile graph. This additional graph is activated by a right-click (context menu).

Clear Panels Individually

You can now clear each of the three panels, Set 1, Set 2, Set 3 (compare), individually as well as clearing them all at once. You can clear them individually from the file menu or from the context menu for each panel.

User Interface Enhancements

Several user interface enhancements have been made to make on-screen navigation more user friendly.

MLC QA Histogram

The MLC QA Histogram graph now centers around the average area. This will provide a more detailed view of the errors.

Settings Remembered

The software now remembers the graph settings from the previous instance. The software opens with the settings set the same way they were the last time you used the program.

Region of Interest

The user now has an option to disable the analysis of points inside the "region of interest" but which are outside the 10% threshold line.

Find Device

The Find Device feature now searches all available COM ports and runs automatically at program launch. The user can turn off the automatic search from the program preferences.

MapCHECK Measured Data Shift

MapCHECK measured data can now be shifted in 1 mm increments. This can be helpful for people who are trying not to model leaf edge effects.

Version 3.3 (Released April 9, 2007)

EPID File Import

Users can now import EPID image files in the DICOM RT IMAGE format (only tested with Varian EPID). Two types of files can be imported, raw EPID files and EPID dose image files. MapCHECK imports these files using the TPS Import Utility. Varian PortalVision software can convert a raw EPID image to dose image files and a treatment planning system can export a predicted EPID dose image file. When these EPID dose image files are imported, the measured and predicted dose files can be compared, analyzed, and displayed just like any other MapCHECK file.

Improved MLC QA

Multi-Leaf Collimator QA has a new user interface and simpler Wizard. Plus, the software now supports the following MLCs: Varian—80 and120 leaves, Siemens—58 and 82 leaves, Elekta—80 leaves.

Gamma Analysis using Van Dyk % Difference

When selecting Van Dyk % difference, the software now calculates gamma analysis as well as DTA analysis.

Enhanced DICOM Structures Import

The DICOM structures import was redesigned to make it more intuitive and easier to use.

Expanded Film Scanner Support

Film scanning now supports Epson V700/V750 scanners.

Support for Optional MotionSim XY/4D™ table

MapCHECK now supports the optional MotionSim XY/4D™ positioning table suitable for automatic positioning and repetitive motion.

Version 3.2 (Approximate Release Date - Sept. 1, 2006)

DICOM Radiotherapy Structures

A DICOM radiotherapy structure set can be imported and displayed to show critical anatomical structures, such as heart, lung, spine, etc. The structures appear on-screen and can be individually selected. Each structure outline acts as a filter to select only the points within the boundary. The Compare panel shows the pass/fail points within the structure. A point editor lets you create custom structures by drawing a boundary around a region of the dose map. For bifurcated fields, you can draw boundaries around two separate regions. In addition, individual points can be selected for inclusion in the comparison.

GAFCHROMIC Film Analysis

The software now operates with Epson Model 1680 flatbed scanner to scan GAFCHROMIC self-developing film.

Measured to Measured Comparison

You can now compare two measured MapCHECK files for constancy checks. This comparison is based strictly on percent difference and does not include any DTA (Distance To Agreement) or Gamma.

MLC Quality Assurance

A new method of QA checks of multi-leaf collimators (MLCs) provides a rapid way to check the adjustment of MLC leaves. Leaf edges are positioned directly over detectors and exposed to radiation in a series of adjacent exposures strips. MapCHECK software combines detector readings and calculates average error and standard deviation. The method is very sensitive to small errors in MLC leaf position.

Van Dyk % Difference

The software offers a choice between the standard MapCHECK % difference and a "Van Dyk" % difference.

Calibration Dose Gauge

A new gauge on the array calibration dialog box shows the percent of real-time dose delivered. This may be useful if there are any problems with the setup.

Array Calibration Graphics

Array calibration dialog box now includes more graphics to help you place MapCHECK in the correct position and orientation for each array calibration step. Laser lines can be turned on and off, and a close-up view or 3D view can be seen for each step.

DTA Display on Profile Graph

DTA (Distance To Agreement) values are now displayed along with % difference when you click the profile graph.

Rotation of Composite and Merged Files

Composite and merged files can now be rotated in increments of 90 degrees just like regular files.

Beam QA Display

Beam QA is now accessed from the Tools menu and a graphic has been added to show the X and Y profiles.

Corresponding Plan/Measured Points

You can find corresponding measured, plan, and compared points by right-clicking on the Data grids.

Histogram Bins

You can now select a range of bins on the histogram display and show the statistics related to the range of bins.

GreyScale Display Option

A display option that shows the files as a "film" style GreyScale has been added as an option.

Version 3.1 (Approximate Release Date - March 6, 2006)

Histogram

- A gamma function histogram is now available in addition to the DTA histogram.
- The histogram pop-up includes the percentage of total points.

Ruler Tool

A new ruler tool lets you measure the distance between any two points on a dose map.

Calculated Alignment

A special function (Calc Shift) calculates and determines if a shift in the plan position will improve the QA results. Improved results indicates a possible misalignment between the MapCHECK and the beam.

Printing Features

- Print Preview—A Print Preview appears when you send a print to the printer. You can examine the print preview before printing.
- Print to PDF—you can print a report to Adobe PDF format and save it or send it electronically.
- Beam QA summary—A print button on the beam QA summary lets you print a report.

Beam QA

- Printing—you can print a report directly from the beam QA dialog.
- Profiles and Area—shows values for area flatness and symmetry as well as flatness and symmetry for four profiles.
- Moveable display box—You can drag the Beam QA box out of the Set 1 area to avoid obscuring the dose map.

Dissimilar Data Warning

A warning appears if you load a measured file and a plan file that are very dissimilar. This helps to prevent accidentally loading non-matching files.

Show all Detectors

You can show all detectors in any view panel, Set 1, Set 2, or Compare, in any view mode.

Mark Selected Detectors

It is possible to mark detectors as bad or unusable. Data at these points are interpolated from neighboring points.

Clear all Option

You can now clear all loaded file data and calculations from the program with a single click.

Treatment Plan Rotation

You can rotate a treatment plan dose map to any angle to match your MapCHECK file.

Uncertainty Calculation for Each Detector

An uncertainty factor is now calculated individually and applied to each detector, replacing the adjustable uncertainty factor previously used.

Contour Settings

Contour colors, spacing, line width, etc., can now be altered from a single dialog box. Sets 1 and 2 can be locked. You can save sets of contour settings and quickly and easily switch between them.

Expanded Copy Functions

Copy functions have been expanded to include

- Copying the X, Y, diagonal axis or selected axes to the clipboard
- Copying the profile chart or histogram to the clipboard.

Film Features

- Response curves—You can create your own film response curves to account for differences in film type, film batch, or processing.
- Manual film alignment—If the software does not automatically find the alignment pin pricks, you can select them manually.

Version 3.0 (Approximate Release Date - Sept. 30, 2005)

Graphic Display Modes

Graphic display modes are enhanced to provide more information:

- Colored isodose lines (same as before).
- Layered solid colors
- Blended solid colors
- Layered gray-scale (replaces previous smooth gray-scale)
- Colored isodose lines plus layered gray-scale

Graph Zooming

Set 1, Set 2, and Compare graphs can be zoomed to yield more detail in specific areas. A zoom control panel is available as a docking window.

Toolbars Rearranged

Some controls are moved to the left side of the panels to provide additional controls and maximum graph space. The controls are very similar to previous software versions.

Histograms

DTA and percent difference histograms are available in a separate docking panel.

Beam QA: Flatness and Symmetry

You can view Area Flatness and Symmetry as well as Profile Flatness and Symmetry for files open in Set 1.

Absolute Dose Measurement Graphing

- You can now show graphs of absolute dose values (if available in the file) as well as relative dose values.

Failed Point Display

The 3D graph displays now show failed points (red, blue) as well as the selected normalization point.

Profiles

- You can select diagonal profiles (45 degree angle)
- You can drag profiles across an image
- Percent difference graph added to profile display
- Information popup added to profile display panel

Preferences

- Treatment plan axis inversion is added to preferences dialog. This feature lets you set up plan importing so that one or both axes are always inverted when the plan is imported.
- Import filters can be limited to the one or more that you use every day.

Version 2.1 (Approximate Release Date - March 19, 2005)

File Merging and Reorientation

Multiple files can be spliced together to make a mosaic of a larger area or combined to make a composite plan or increase detector density. You can also rotate a file in 90 degree increments.

Auto Normalization

Software either automatically picks a default normalization point or displays a list of five best normalization points plus CAX and Max so you can manually choose the one you want.

Gamma Analysis

Software automatically calculates a "gamma index" value to further evaluate points that do not meet %difference or distance to agreement (DTA) criteria.

Version 2.0 (Approximate Release Date - Sept. 1, 2004)

Film Analysis

A film analysis module was added to the software that allows MapCHECK to:

- Connect to a Vidar film scanner.
- Import film scanner files.
- Calibrate films that are exposed simultaneously with MapCHECK.
- Compare, analyze, and display film files.
- Print reports of film analysis.

A fixture aligns the film with the MapCHECK detectors for simultaneous exposure. MapCHECK detectors are used to calibrate the film.

Absolute Dose DTA Comparison

New functionality was introduced to allow Distance-To-Agreement (DTA) comparison between files containing absolute dose values.

Off-axis Alignment of Plan Files

Imported plan files can be moved in the X and Y axes to align the CAX of the plan file to the CAX of the measured file.

This page is intentionally left blank.