

## Purpose

QATrack+ is a free and open-source online form-based data-entry and database application that can be used to collect data from medical physics surveys and store the information in the cloud or on a dedicated server, in house. Current physics survey reports in many departments are saved as Excel and pdf files. Large amounts of time and effort are required to extract the information from years of Excel data to perform desired data analysis such as image quality and dose trends to improve patient care. Incorporating the available integrated scheduling system may reduce unintended missed surveys and the multiplatform (computer/tablet/smartphone) functionality will be useful providing access to and comparing to prior year's results. Native reports generated from QATrack+ may not be adequate to file as final reviewable/distributable medical physics survey reports (for diagnostic work); however, data can be extracted and Excel-type spreadsheets or pdf reports can be automatically generated using python scripting and packages.

## Method

Implementation of a working server system is explored, by adding applicable tests for diagnostic annual and acceptance surveys. Useful data extraction is investigated utilizing the QATrack+ API (Application Programming Interface). QATrack+, Python coding and LibreOffice were combined together to automate the interface interrogation for the server and provide appropriate data constructs to produce professional level reporting and final documentation.

## QATrack+

QATrack+ is utilized for server based data storage and analysis. Diagnostic imaging report structures were developed within QATrack+ for each modality (ie. Portable x-ray, c-arm, CT, mammography, etc).

Figure 1. Available surveys and their due dates. Surveys overdue will highlight in red, surveys not due will highlight in green and surveys due will highlight in yellow.

Figure 2. Tests created for a portable x-ray. Tolerance can be set for each test and tests will be automatically evaluated. Highlight in red indicates a test is failed.

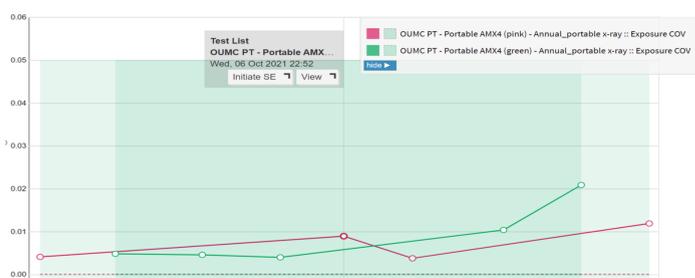


Figure 3. Trend analysis. Built in trend analysis can be used to compare system performance between and within units.

## MPR+

Medical Physics Reports+ (MPR+) is a python-based GUI program and is used to create bridge from QATrack+ server to current standard reports (Excel/PDF).

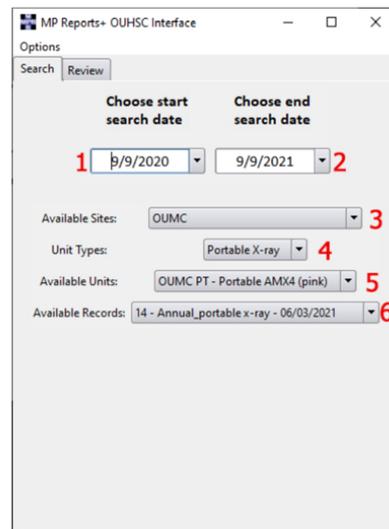


Figure 4. MPR+ Interface. (1) and (2) allow user to select start and end date for finding the available records within the range. (3) is a dropdown list of available sites. (4), (5) and (6) are used to narrow down the selections to the desired unit and date.

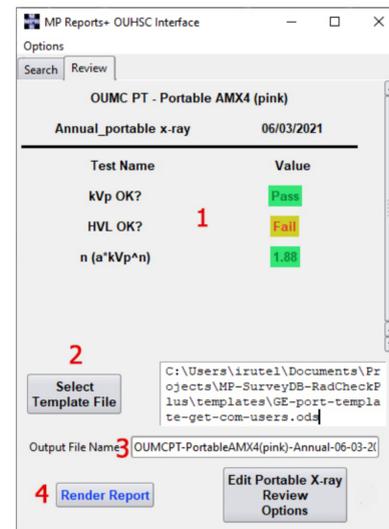


Figure 5. Review Pane. (1) is where a review of user selected test results and comparison with QATrack+/user implemented tolerances will be shown. (2) select a specific template. (3) set user defined name for rendered report. (4) convert QATrack+ data to a final report using selected template.

## LibreOffice Calc

LibreOffice is a excel-like spreadsheet program. Data from QATrack+ server are placed into LibreOffice Calc templates through the QATrack+ API and appy.pod package functionality.

Figure 6. LibreOffice Template for a portable x-ray unit.

## Results

Investigation of the online system provides a customizable selection for testing requirements. Many individual tests can be re-used or modified for multiple modalities or survey types. Surveys are reviewed and approved by appropriate groups on the server/database, and the QATrack+ JSON API is used to access or export data. Python code was created to selectively extract data from the server and provide information in a usable format for report generation. The data was organized and placed in LibreOffice Calc utilizing an appropriate template (an Excel-type spreadsheet, with variable placeholders). The automatically generated spreadsheet survey report results in a final report nearly identical to current practice forms (Excel spreadsheets) and can be accessed using LibreOffice or Excel.

Figure 7. Final converted excel report. The final report is nearly identical to current practice forms (Excel sheets). Report can be easily converted to PDF for distribution.

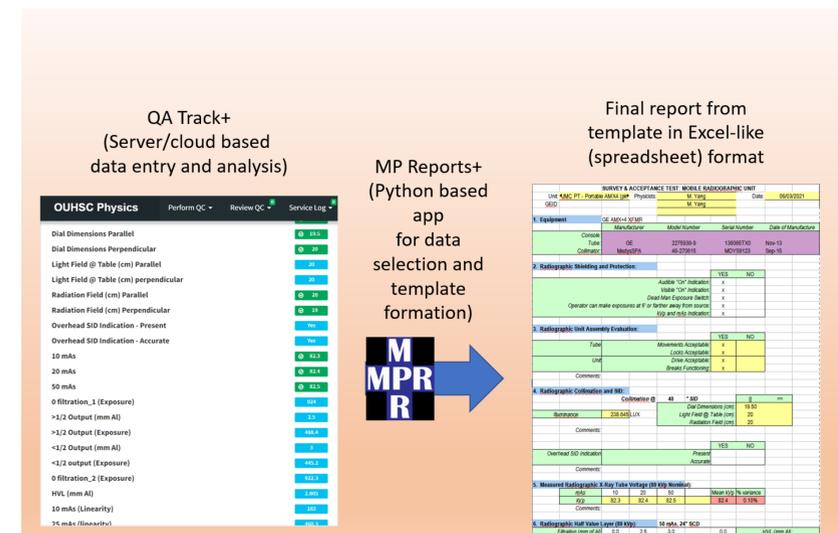


Figure 8. Workflow sample.

## Conclusion

Overall, the marriage of these technologies provides an achievable full diagnostic survey handling system. Having an online multiplatform database helps to access the data at anytime from anywhere. The added ability to extract the data and automate the report generation process may improve efficiency of the medical physicists' workflow. We maintain the current standard for final report formatting, so no change in reporting documentation is required. Using QATrack+ as a data entry and storage system and Python/LibreOffice as data formatting and report generation provides a new opportunity for future data analysis tasks on image quality, dose or other relevant parameters. Implementation may lead to a better understanding of machine parameter performance trends and ultimately improve patient care.