

# A Graphical User Interface of Pylinac Library

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## INTRODUCTION

Despite the wide availability of technology throughout the world, in developing countries it is hard to access to integral QA systems. The community of open source code, and linacs integrating image system, lead to a group of developers to create the Pylinac Library [1].

## AIM

This work aims to present a graphical user interface (GUI) as a QA tool based on linac images

## METHOD

A Python GUI [2, 3] (figure 1) was developed to perform quick and easy QA of linacs. Pylinac Library includes Calibration, Starshot, VMAT, Catphan, Log-analyzer, Picket-Fence, Winston-Lutz, Planar imaging, and Flatness/Symmetry QA modules. In this first version we implemented VMAT, Catphan, Picket-Fence, Winston-Lutz, and Planar imaging modules. We checked the result against PIPSPRO (Standard Imaging), Portal Dosimetry and spreadsheets (VARIAN). We evaluated each module with a set of five images each.

## RESULTS

CatPhan showed mean difference of Uniformity of 2.4 HU (-2.3,17.6), HU constancy, -6.5 HU (-45.3,2.3), geometric node spacing -0.05 mm (-0.18,0.25) and slice thickness 0.01 mm (-0.07,0.07). See figure 2

VMAT Test2 showed mean maximum deviation of 1.3% 2.3% and mean average deviation of 0.5% and 1.1% for Pylinac and Varian spreadsheets respectively.

VMAT Test3 showed mean maximum deviation of 0.5% and 0.9%, mean average deviation of 0.4% 1.4% for Pylinac and Varian spreadsheet respectively.

For Winston-Lutz, mean lateral displacement was -0.07mm (-0.05, -0.10), -0.10mm (-0.30,0.20) mean in-out displacement 0.10mm (0.04,0.23), -0.40mm (-0.20,-0.70) a mean up-down displacement of -0.20mm(-0.01,-0.34), 0.13mm (0.00,0.30), system 3D deviation 0.15mm (0.06,0.41) 0.30mm (0.28,0.82), mean maximum distance of 0.94mm (0.71,1.18) 0.73mm (0.6,0.9) for Pylinac and PIPSPRO respectively.

Others parameters were evaluated, wich showed differences in absolute value due to differences in formulae or ROIs selected but the results were consistent

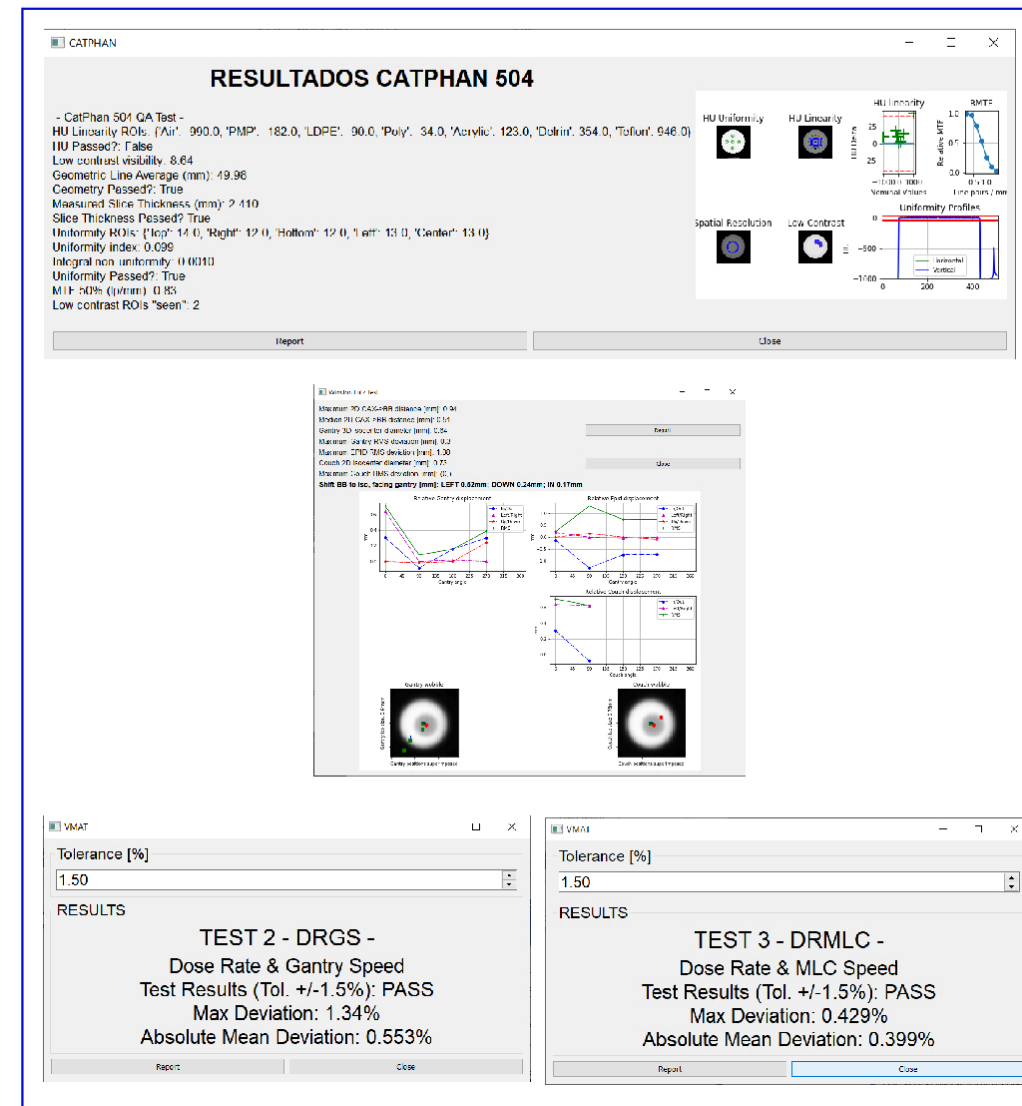


Figure 2 : Windows results

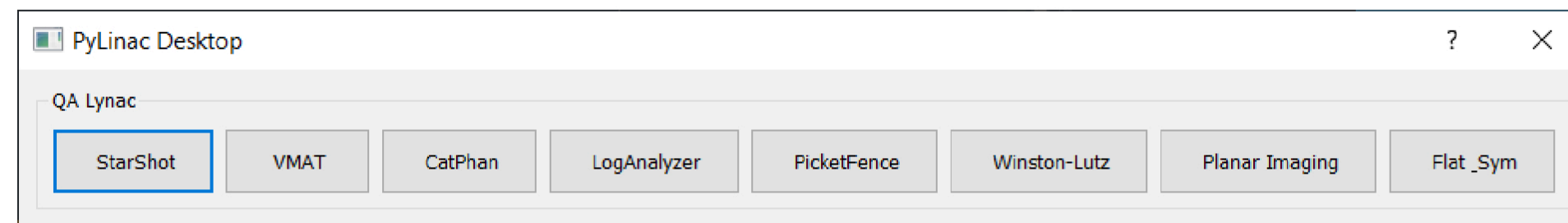


Figure 1 : Pylinac Desktop GUI

## CONCLUSIONS

A Graphical User Interface from Pylinac Library was developed and evaluated, showing a good performance when contrasted against available commercial softwares

## REFERENCES

- [1] <https://pylinac.readthedocs.io/en/stable/>
- [2] <https://www.anaconda.com/products/individual>
- [3] <https://www.python.org/>

## CONTACT INFORMATION

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