

**The A Team**

**Image Processing Tool for**

**Leidenfrost-Ratchet Systems**

**Test Report Document for Version 2.0 (First/Final Draft)**

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Table of Contents

1. Introduction 2
   1. Scope of Test Report Document 2
2. Overview of Document 2
3. Test Case Results 4-9
4. Bugs Remaining. 9

Document Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Version Number** | **Date** | **Contributor** | **Description** |
| V1.0 | 5/2/2015 | Author: Anne Lam  Reviewers: Rest of  A-Team | First/Only Draft of Test Report |
| V1.1 | 5/7/2015 | Anne Lam | Added fixes to report, bugs remaining |

**1. Introduction**

This document details the results of tests performed from the Test Plan during the testing phase of the software development life cycle.

1.1 Scope of Test Report Document

The scope consists of what we tested, corrected, and what we left 'broken'.

**2. Overview of Document**

In total, this document specifies the results of our tests of the Image Processing Tool Version 2.0 and our history of fixes or lack thereof.

All team members did some sort of testing, both on their own code contributions and on their teammates. Testing was performed on personal laptops/desktops and at various stages of progress on the software which was organized and shared through Github.

**3. Test Case Results**

The test cases for interface, integration, and system testing are listed in the table below with pass/fail results, both before and after fix, if applicable.

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| **Test Cases** | **Test Type** | **Step & Input** | **Expected Results** | **What is Tested** | **Actual Results** | **Pass/ Fail** | **Results after fix** | **Pass/ Fail after fix** |
| **Load Button** |  |  |  |  |  |  |  |  |
| LB 011  Open File Dialog | Interface Test | Click Load Button > Show Open File Dialog | Open File Dialog Should Appear | User Interface | Open File Dialog Appeared | Pass |  |  |
| LB 021 Accept Directory .TIF | Interface Test | Find Image Directory > Open .TIF image folder | Accept .TIF Directory | Open File Dialog | Accepted Directory | Pass |  |  |
| LB 022  Accept Directory .BMP | Interface Test | Find Image Directory > Open .BMP image folder | Accept .BMP Directory | Open File Dialog | Accepted Directory | Pass |  |  |
| LB 023  Reject Single File | Interface Test | Find Image Directory > Select single file | Will not allow selection of single file | Open File Dialog | Did not allow selection of single file | Pass |  |  |
| LB 024  Reject Other Directory Extension | Interface Test | Find Image Directory > Open other folder directory | Will show Error Dialog | Open File Dialog | Showed Error Dialog | Pass |  |  |
| LB 024 Reject Directory with less than 5 images | Interface Test | Find Image Directory > Open Directory with less than 5 images | Will show Error Dialog | User Interface | IndexOutOfRange Exception | Fail | Message box says appropriate folder was not selected | Pass |
| LB 031 Show Image | Interface Test | Find Directory > Click Open | Will show 5th Image in folder processed on UI | User Interface / Open File Dialog | Showed an Image on User Interface | Pass |  |  |
| LB 032  Enable Run Button | Interface Test | Find Directory > Click Open | Run Button Will Enable | User Interface | Run button is enabled | Pass |  |  |
| LB 033  Enable Calibrate Button | Interface Test | Find Directory > Click Open | Calibrate Button Will Enable | User Interface | Calibrate Button Enabled | Pass |  |  |
| **Initial User Interface** |  |  |  |  |  |  |  |  |
| UI 011 Disable Calibrate Button | Interface Test | Click Image Processing Application | Calibrate Buttons disable | User Interface | Calibrate Button Disabled | Pass |  |  |
| UI 012 Disable Run Button | Interface Test | Click Image Processing Application | Run Button is Disable | User Interface | Run Button Disabled | Pass |  |  |
| UI 013  Disable Black/White Calibration Drop down | Interface Test | Click Image Processing Application | Black/White Calibration drop down is disable | User Interface | Black/White Disabled | Pass |  |  |
| UI 014  Enable Load Button | Interface Test | Click Image Processing Application | Enable Load Button | User Interface | Load Button Enabled | Pass |  |  |
| UI 015  Disable Frame Rate Input | Interface Test | Click Image Processing Application | Disable Frame Rate Input | User Interface | Disabled Frame Rate input | Pass |  |  |
| UI 016  Disable Base/Needle Height | Interface Test | Click Image Processing Application | Disable Base/Needle Height | User Interface | Disabled Base/Needle Height | Pass |  |  |
| UI 021  Enable File Menu | Interface Test | Click Image Processing Application | Enable File Menu | User Interface | Enabled File Menu | Pass |  |  |
| UI 022  Enable Image Menu | Interface Test | Click Image Processing Application | Enable Image Menu | User Interface | Enabled Image Menu | Pass |  |  |
| UI 023 Enable About Menu | Interface Test | Click Image Processing Application | Enable About Menu | User Interface | Enabled About Menu | Pass |  |  |
| UI 024  Enable File Menu Load Button | Interface Test | Click Image Processing Application > File | Enable File Menu Load Button | User Interface | Enabled File Load Menu | Pass |  |  |
| UI 025  Enable File Menu Quit Button | Interface Test | Click Image Processing Application > File | Enable File Menu Quit Button | User Interface | Enabled File Quit Menu | Pass |  |  |
| UI 026  Disable Image Menu Run Button | Interface Test | Click Image Processing Application > Image | Disable Image Menu Run | User Interface | Disabled Image Run Menu | Pass |  |  |
| UI 031 Resize Image Processing Form | Interface Test | Click and Drag A corner of the Form and move in and out. | Form Should be fixed | User Interface | Form is not fixed, is maximizable | Fail | Form is fixed and user cannot maximize | Pass |
| **Frame Rate** |  |  |  |  |  |  |  |  |
| FR 011  Enter Frame Rate | Interface Test | Click Up or Down to select frame rate | Let User Choose Correct Frame Rate | User Interface | Let user enter frame rate | Pass |  |  |
| FR 012 Enter Frame Rate | Interface Test | Click Down to select negative number | Should stop at zero | User Interface | User cannot input below zero | Pass |  |  |
| **Base/Needle Height** |  |  |  |  |  |  |  |  |
| BN 011 Enter Base/Needle Height | Interface Test | Enter negative number Base/Needle Height | Should not let user enter negative number | User Interface | Let user enter negative number | Fail | MessageBox alerts user to enter positive number | Pass |
| BN 012 Enter Base/Needle Height | Interface Test | Enter letter for Base/Needle Height | Should not let user enter alphabetic | User Interface | Unhandle Error Exception | Fail | MessageBox alerts user to enter positive numeric value | Pass |
| BN 013 Enter Base/Needle Height | Interface Test | Enter positive Number for Base/Needle Height | Should let user enter positive number | User Interface | Let user enter Positive Number | Pass |  |  |
| BN 014 Enter Base/Needle Height | Interface Test | Enter decimal bumber for Base/Needle Height | Should let user enter decimal number | User Interface | Let user enter decimal number | Pass |  |  |
| **Black/White Calibration** |  |  |  |  |  |  |  |  |
| BW 011 Black/White Calibration | Interface Test | Click Up or Down to select Black/White Calibration | Should let user click up or down | User Interface | Let user click up or down | Pass |  |  |
| BW 012 Black/White Calibration | Interface Test | Click Down to select negtative number for Black/White Calibration | Should stop at zero | User Interface | User cannot enter number below zero | Pass |  |  |
| **Browse Button** |  |  |  |  |  |  |  |  |
| BB 011 | Interface Test | Click Browse Button | Save File Dialog Should Appear | User Interface | Save file dialog appeared | Pass |  |  |
| BB 021 | Interface Test | Click Browse Button > Enter a Name > Click Save | Names an Excel file that will be created after Running, will display file path in 'Save Destination' textbox | User Interface | Name/Path of file is displayed in 'Save Destination' textbox | Pass |  |  |
| **File Menu Strip** |  |  |  |  |  |  |  |  |
| FM 011  File Load Menu | Interface Test | Click File > Load > Show Open File Dialog | Open File Dialog Should Appear | User Interface | Open file dialog appeared | Pass |  |  |
| FM 021 Accept Directory | Interface Test | Find Image Directory > Open .TIF image folder | Accept .TIF Directory | Open File Dialog | Accepted Directory | Pass |  |  |
| FM 022  Accept Directory | Interface Test | Find Image Directory > Open .BMP image folder | Accept .BMP Directory | Open File Dialog | Accepted Directory | Pass |  |  |
| FM 023  Accept Directory | Interface Test | Find Image Directory > Open single file | Will not show single file | Open File Dialog | Did not show single file | Pass |  |  |
| FM 024  Accept Directory | Interface Test | Find Image Directory > Open other folder directory | Will not allow user to select other extension | Open File Dialog | Error Dialog box show not letting user except other extension | Pass |  |  |
| FM 031 Show Image | Interface Test | Find Directory > Click Open | Will show fifth Image processed on UI | User Interface / Open File Dialog | Showed 5th Image processed | Pass |  |  |
| LB 041  Enable Calibrate Button | Interface Test | Find Directory > Click Open | Calibrate Button Will Enable | User Interface | Calibrate Button Enabled | Pass |  |  |
| LB 042  Enable Black/White Input | Interface Test | Find Directory > Click Open | Black/White Input Enable | User Interface | Black/White Input Enabled | Pass |  |  |
| LB 043  Enable Base/Height Needle Input | Interface Test | Find Directory > Click Open | Base/Needle Height Input Enable | User Interface | Base/Needle Height Input Enabled | Pass |  |  |
| **About Menu Strip** |  |  |  |  |  |  |  |  |
| AB 011 Show Information Form | Interface Test | Click About on the Menu Strip | Open an information regarding about the application | User Interface | Showed About Information | Pass |  |  |
| **Image Menu Strip** |  |  |  |  |  |  |  |  |
| IM 011 Image Menu Strip | Interface Test | Click Image > Run on Menu Strip | Should run the Image Processing and open excel with data and graph | User Interface | Run Image Processing and open excel with data and graph | Pass |  |  |

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| **Test Cases** | **Test Type** | **Step & Input** | **Expected Results** | **What is Tested** | **Actual Results** | **Pass or Fail** | **Results after fix** | **Pass/ Fail after fix** |
| **Run Button** |  |  |  |  |  |  |  |  |
| RB 011 Run Button | Integration Test | Click Run Button | Should open Excel software and Generate excel data | User Interface/ Image Processing/ Excel Data | Run open excel software and generate data | Pass |  |  |
| RN 012  Run Button | Integration Test | Run with an Excel application currently open | Open Excel applications will close and then output Excel file will open | User Interface/ Image Processing/ Excel Data | Open Excel applications close and new output Excel file opens | Pass |  |  |
| RN 021 Run Button | Integration Test | Run > Click 'Stop' while Tool is 'Processing Images: ' or 'Calculating Drop Measurements' | Tool should allow the application to stop processing. | User Interface | Tool stopped processing. | Pass |  |  |
| RN 022 Run Button | Integration Test | Run > Click 'Stop' while Tool is 'Generating Spreadsheet/Data Plots' | Tool should complete Excel creation and then stop. | Excel Processing/ IO | Tool does not stop, continues processing and creates the Excel file and saves images. | Fail | Tool does stop at a stoppable point, is able to start over on run | Pass |
| RN 023 Run Button | Integration Test | Run > Click 'Stop' while Tool is 'Saving Processed Images' | Tool should safely stop saving processed images. | User Interface/Excel Processing/IO | Tool does not stop, continues creating and saving images. | Fail | Tool does stop at a stoppable point, is able to start over on run | Pass |
| RN 031 Run Button | Integration Test | Run > Click 'Stop' > Click 'Run' again (at any point during processing) | Tool should just continue to as stoppable point and then restart processing all images. | Excel Processing/IO | Invalid Operation Exception | Fail | Tool does stop at a stoppable point, is able to start over on run | Pass |
| RN 041 Run Button | Integration Test | Run > Click Close/Exit the application while 'Calculating Drop Measurements' | Tool should allow the application to close with no other effects. | User Interface | Tool can close | Pass |  |  |
| RN 042 Run Button | Integration Test | Run > Click Close/Exit the application while 'Generating Spreadsheet/Data Plots' | Tool should not allow the application to close during spreadsheet generation | Excel Processing/IO | Tool can close and IO exception occurs | Fail | Tool can close with no issue | Pass |
| RN 043 Run Button | Integration Test | Run > Click Close/Exit the application while 'Saving Processed Images' | Tool should be able to close and only some processed images will be created and saved | Image Processing/ IO | Tool can close but IO exception may occur are processed(as shown by progress bar and label), otherwise only some processed images are created and saved. INCONSISTENT RESULTS - sometimes breaks | Fail | Tool can close with no issue | pass |

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| --- | --- | --- | --- | --- | --- | --- |
| **Test Cases** | **Test Type** | **Step & Input** | **Expected Results** | **What is Tested** | **Actual Results** | **Pass or Fail** |
| **Black/White Calibration** |  |  |  |  |  |  |
| BW 011 Black/White Calibration Textbox | System Test | Enter Default 32 | Initial processed image will be displayed | Image Processing | Initial processed image is displayed | Pass |
| BW 012 Black/White Calibration Textbox | System Test | Enter Higher than 32 value | More pixels from the original image will be identified as part of the experiment (displayed in black in the PictureBox) than in the Initial processed image | Image Processing | More pixels from the original image are identified as part of the experiment (displayed in black in the PictureBox) than in the Initial processed image | Pass |
| BW 013 Black/White Calibration Textbox | System Test | Enter Lower than 32 value | Less pixels from the original image will be identified as part of the experiment (displayed in black in the PictureBox) than in the Initial processed image | Image Processing | Less pixels from the original image are identified as part of the experiment (displayed in black in the PictureBox) than in the Initial processed image | Pass |
| **Frame Rate** |  |  |  |  |  |  |
| FR 011 Frame Rate Textbox | System Test | Enter Default 250 | The time interval between images will be .004 seconds | Excel Data | The time interval between images is .004 seconds | Pass |
| FR 012 Frame Rate Textbox | System Test | Enter FPS Other than 250 | The time interval between images will be 1/FPS seconds | Excel Data | The time interval between images is 1/FPS seconds | Pass |
| **Base/Needle Height** |  |  |  |  |  |  |
| BN 011 Base/Needle Height | System Test | Leave Blank | Data units will be in pixels (shown in table header) | Excel Data | Data units are in pixels (shown in table header) | Pass |
| BN 012 Base/Needle Height | System Test | Enter a value | Data units will be in centimeters (shown in table header) | Excel Data | Data units are in centimeters (shown in table header) | Pass |

**4. Bugs Remaining**

The only major bug is the tool will stop processing completely should the user interfere with the Excel sheet before it is done loading the data.   
In addition, there is a slight lag and UI bug that occurs when you want to load a data set one after another. Loading takes a bit longer and the status label and progress bar don't update or clear correctly. Processing can still be run successfully though. This test case was thought of late and so was not added in the table above.

Besides that, all issues we ran across in the test report have been tackled and defeated.