UI Specification

for

Rapid LDraw Parts Definition

Version 2.0

Prepared by

PSU, Fall Capstone 2018
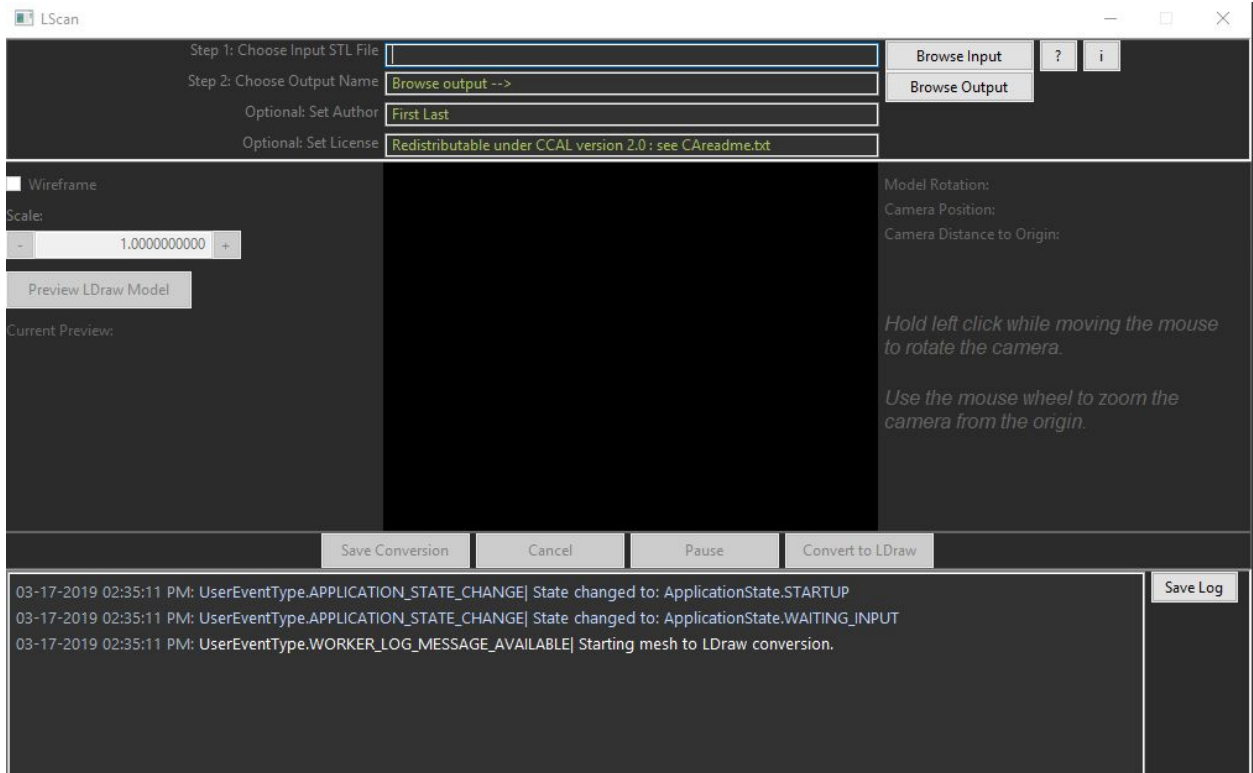
Version 1: 11-22-2018
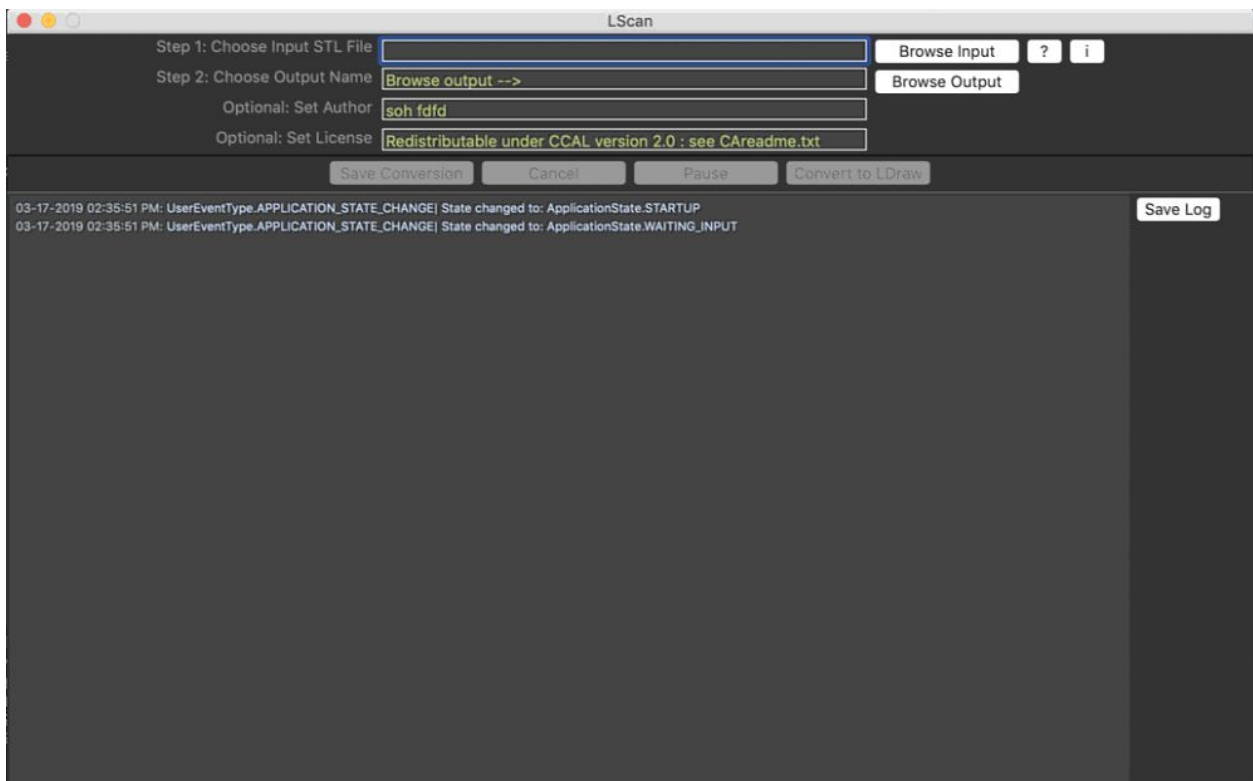**Version 2: 3-17-2019**

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1. UI Overview

Windows:

Windows version (top window):

LScan

Step 1: Choose Input STL File | | Browse Input | ? | i
Step 2: Choose Output Name | Browse output --> | Browse Output
Optional: Set Author | First Last
Optional: Set License | Redistributable under CCAL version 2.0 : see CAreadme.txt

Wireframe

Scale:

1.0000000000

Preview LDraw Model

Current Preview:

Model Rotation:
Camera Position:
Camera Distance to Origin:

Hold left click while moving the mouse to rotate the camera.

Use the mouse wheel to zoom the camera from the origin.

Save Conversion | Cancel | Pause | Convert to LDraw

03-17-2019 02:35:11 PM: UserEventType.APPLICATION_STATE_CHANGE| State changed to: ApplicationState.STARTUP
03-17-2019 02:35:11 PM: UserEventType.APPLICATION_STATE_CHANGE| State changed to: ApplicationState.WAITING_INPUT
03-17-2019 02:35:11 PM: UserEventType.WORKER_LOG_MESSAGE_AVAILABLE| Starting mesh to LDraw conversion.

Save Log

Mac OS:

LScan

Step 1: Choose Input STL File | | Browse Input | ? | i
Step 2: Choose Output Name | Browse output --> | Browse Output
Optional: Set Author | soh fdfd
Optional: Set License | Redistributable under CCAL version 2.0 : see CAreadme.txt

Save Conversion | Cancel | Pause | Convert to LDraw

03-17-2019 02:35:51 PM: UserEventType.APPLICATION_STATE_CHANGE| State changed to: ApplicationState.STARTUP
03-17-2019 02:35:51 PM: UserEventType.APPLICATION_STATE_CHANGE| State changed to: ApplicationState.WAITING_INPUT

Save Log

2. General Specifications

1. The primary user interface will be a GUI (Graphical User Interface)

2. The GUI will use standard mouse and keyboard input.

3. The GUI will use the following concepts:

   a. Labels: Uneditable, static text.

   b. Textboxes: Uneditable, variable text as output.

   c. Entry box: Display and enter text. Where applicable, a default value will pre-populate the field.

   d. Buttons: Mechanism for user invocation of an action. Buttons will support enabled, disabled and selected states. Buttons will be enable when the program state is such that the associated action is valid. Buttons will be disabled when the program state is such that the associated action is invalid.

   e. Icons Buttons: Buttons represented by symbols rather than text.

   f. Language: The GUI will be in en-US.

3. Input File Selection

The primary input to the Rapid LDraw Parts Definition program is an STL file representing a LEGO part.

1. It is required that the primary input file have the .stl extension.
2. The file selection feature will filter available files for selection by extension.
3. The user will have the ability to cancel the file selection.
4. The initial (or default) directory will be the normal directory associated with data for the platform.
5. If the user changes the directory during the file selection process, the selected directory will be remembered and the subsequent file selection process will start from that directory.

4. Output File Selection

The primary output of the Rapid LDraw Parts Definition program is a DAT file representing a LEGO part conformant to the LDraw Parts Specification.

1. The output file will have the .dat extension by default.

2. The default file name will be "untitled.dat".
3. The user will have the ability to change the file name, including the extension.
   a. The edited file name must follow the required OS file system rules.
4. The user will have the ability to cancel the output file selection
5. If the output file name conflicts with an already existing file, the user will be warned of the conflict.
   a. If a conflict exists, the user can cancel the operation returning to the file selection feature (not back to the main screen).
   b. If a conflict exists, the user may continue which will result in overwriting the existing file.
6. The selected output file name will be added to the output file data as a comment consistent with the LDraw Parts specification. For example, if the selected file name is 'my3003.dat', the following line will appear in the output file:

   0 Name: my3003.dat

7. The initial (or default) directory will be the normal directory associated with data for the platform.
8. If the user changes the directory during the file selection process, the selected directory will be remembered and the subsequent file selection process will start from that directory.

5. Termination

The Rapid LDraw Parts Definition program will support termination.

1. Termination will be enabled in all program states
2. Termination will have a close icon at the top of the window.
3. Termination will execute within 1-5 second.
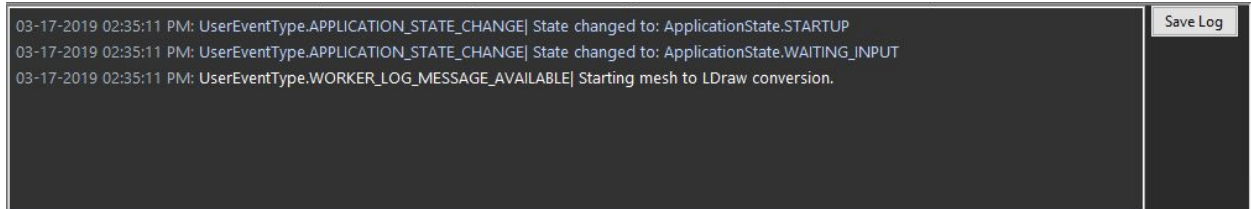4. This termination will be non-destructive of the STL input file.

6. Feedback Status Log

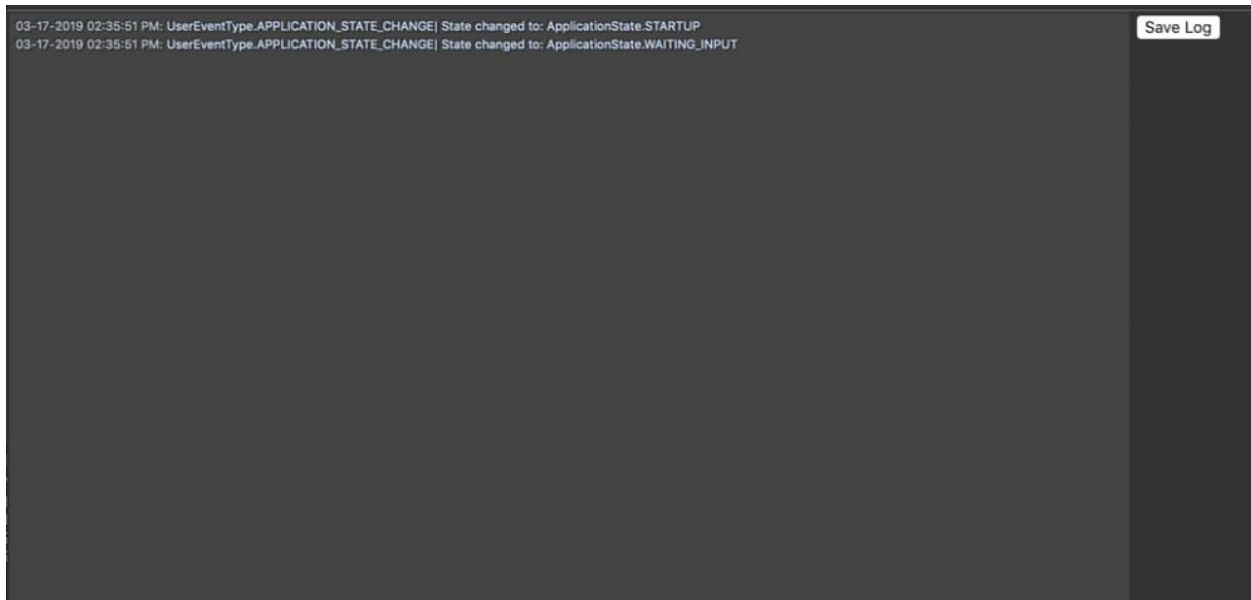The Rapid LDraw Parts Definition program will support feedback.

1. A scrollable textbox will be presented that outputs status information.
2. This textbox will inform the user of what step is underway and what percentage of the overall conversion is complete.
3. There will be a new entry in the textbox at least every 5-7 seconds. Each entry will be preceded by a timestamp.

4. The contents of this textbox have the ability to be saved in a human readable file (.txt).
   a. This functionality will adhere to the file selection paradigms laid out in the input and output file selection requirements.
5. Selecting an input file will clear the feedback textbox. The completion of the input file selection will be the first entry in the feedback textbox (so, something like: "XYZ.stl file selected for processing".)

Windows:


```
03-17-2019 02:35:11 PM: UserEventType.APPLICATION_STATE_CHANGE| State changed to: ApplicationState.STARTUP          Save Log
03-17-2019 02:35:11 PM: UserEventType.APPLICATION_STATE_CHANGE| State changed to: ApplicationState.WAITING_INPUT
03-17-2019 02:35:11 PM: UserEventType.WORKER_LOG_MESSAGE_AVAILABLE| Starting mesh to LDraw conversion.
```

Mac OS:


```
03-17-2019 02:35:51 PM: UserEventType.APPLICATION_STATE_CHANGE| State changed to: ApplicationState.STARTUP          Save Log
03-17-2019 02:35:51 PM: UserEventType.APPLICATION_STATE_CHANGE| State changed to: ApplicationState.WAITING_INPUT
```

7. Errors

If errors occur, an error dialog (screen) will be presented to the user.

1. The error will be in the non-technical language. (For example, if out of disk space, the message might be something like "Not enough disk space to save file.")
2. The error should contain text to help the user clear the error. (Continuing the above example, there should be something like "Delete some files on your hard drive to free up disk space.")
3. The error dialog MAY contain an error code (if useful for debugging or development)

4. The error dialog will have a dismiss button (to close the dialog). The label on the button should be consistent (so, close or okay or dismiss, whatever).

03-17-2019 02:35:11 PM: UserEventType.APPLICATION_STATE_CHANGE| State changed to: ApplicationState.STARTUP
03-17-2019 02:35:11 PM: UserEventType.APPLICATION_STATE_CHANGE| State changed to: ApplicationState.WAITING_INPUT
03-17-2019 02:35:11 PM: UserEventType.WORKER_LOG_MESSAGE_AVAILABLE| Starting mesh to LDraw conversion.
03-17-2019 02:38:44 PM: UserEventType.LOG_INFO| Input filepath cannot be blank.
03-17-2019 02:38:46 PM: UserEventType.LOG_INFO| Output file path cannot be blank.
                                                                              Save Log

8. Processing
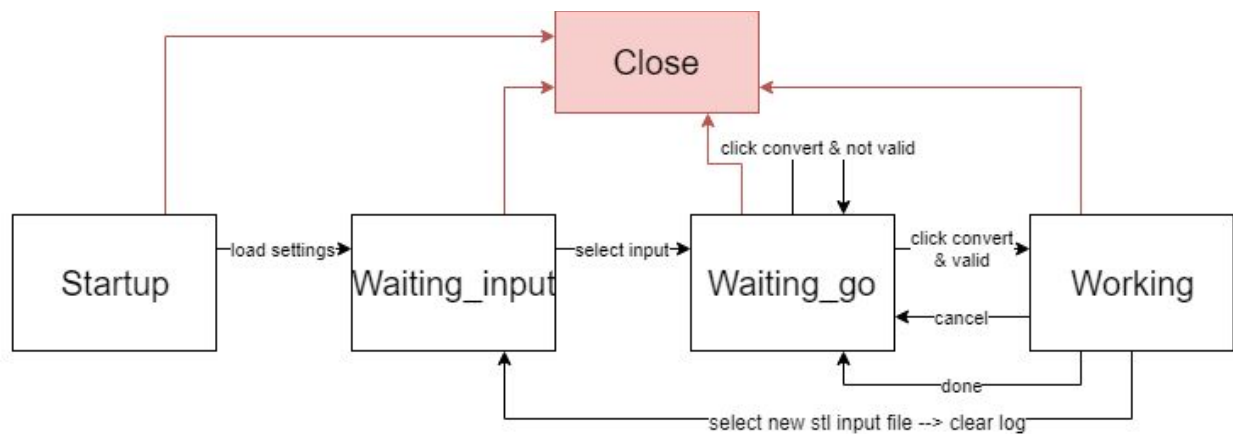
8.1 Start of Processing

Starting of the conversion process will be controlled by the user.

1. The conversion process will NOT be automatically started. A labeled button will be used to start the conversion process
2. The labeled button will be disabled until all preconditions required by the conversion process are met. Here, the requirements are that the primary input file and LDraw primitives directories.
3. The labeled button will be disabled after the conversion process is started. It is only enabled again once the conversion is complete, cancel, or an error was encountered.

8.2 Pause/Continue of Processing

The user will have the ability to pause and continue the processing. Performance time is 1-10 seconds.

1. A labeled button will be used to pause the conversion process.
2. The pause button will be enabled only while the conversion process is running.
3. A labeled button will be used to continue the conversion process.
4. The continue button will be enabled only while the conversion process is paused.
5. The same button may be used for pausing and continuing where the label changes based on the appropriate functionality. This button will be disabled until the conversion process is running.

8.3 Cancel Processing

The user will have the ability to cancel the processing. Note: Cancellation should reset the processing pipeline. Clicking the Cancel button, selecting a new input file, then clicking the Start button clears the feedback textbox. Performance time is 1-10 seconds.

1. A labeled button will be used to cancel the conversion process
2. The cancel button will be disabled unless the conversion process is either running or paused.
3. The Start button will be enabled after cancellation.
4. The cancel functionality will not alter the selected input file (thus, the processing can be restarted without a selection of a new STL file).
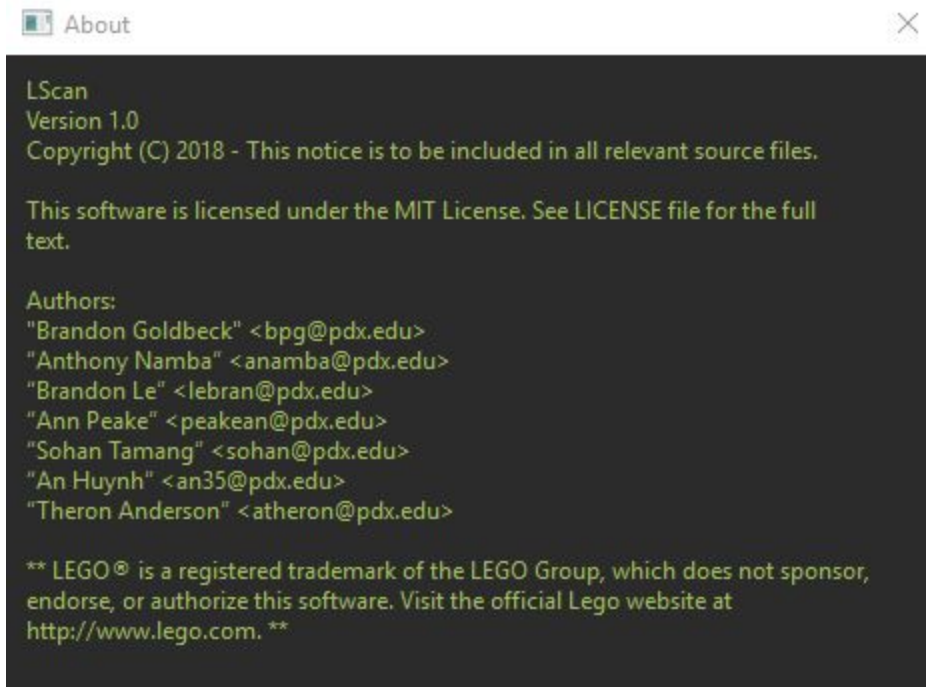
9. Metadata Input

1. The input of the metadata will be presented on a separate window.
2. This screen will be presented to the user after the conversion is complete and when they click on the "Save Conversion" button.
3. The screen will have a back button (that will return to the output file selection)
4. The screen will have a "save" button that will
   a. Add the metadata to the converted LDraw part file
   b. Write the converted LDraw part file to the file system
   c. The "save" button will be disabled until all required metadata has been entered.
5. As stated in the Output File Selection section, the file name is added to the LDraw parts definition file.

6. A required entry box that cannot be blank for:
    a. Author's name
        i. The author's name will be pre-populated with the last name entered
        ii. on the first invocation, the text "your name" will be presented
    b. License text
        i. The license text will be pre-populated with the last license text entered.
        ii. On the first invocation, the license text will be "!LICENSE Redistributable under CCAL version 2.0: see CAreadme.txt" will be presented.

10. About

The program will present an **About** window.

1. The screen will contain
    a. The name of the program will be presented
    b. The version of the program will be presented.
    c. Copyright information will be presented.
    d. Licensing information will be presented (including any third party license requirements).
    e. The authors of the program.
2. The **About** functionality will be invoked with either an icon button or a button.
3. The information for the functionality will be stored in an *about* file.
4. Users will close the screen by using the "x" icon.

```
    About                                                    ✕

LScan
Version 1.0
Copyright (C) 2018 - This notice is to be included in all relevant source files.

This software is licensed under the MIT License. See LICENSE file for the full
text.

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http://www.lego.com. **
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11. Help

The program will present a help screen. This screen will present any information that will
be helpful to the user in using the program. Among that information (but not limited to) is

1. Explain any limitations of the program.
2. Assist the user in troubleshooting common errors (if any).
3. How to update the LDraw parts library (this should include a link to the LDraw site).
4. The help functionality is invoked via an icon button or a button.
5. The help information will be saved in a help file.
6. Users will close the screen by using the "x" icon.

Help   ×

Program Use:
  • This program allows the user to convert STL model files to LDraw format.
  • Select an input STL file, and an output file location.
  • Imported STL models may be viewed and inspected in 3D space.
  • Click 'Convert to LDraw' when ready to begin conversion.
  • The log will display progress and indicate when conversion is complete.
  • Click 'Save Conversion' to save LDraw file to the specified output directory.

Limitations:
  • 3D model viewer requires OpenGL 4.2 or above.
  • Imported STL models should be pre-centered for best results.

Troubleshooting:
  • Visit https://github.com/bgoldbeck/lscan/issues

How to update LDraw Parts Library:
  • Manually: Download the update provided at:
    http://www.ldraw.org/library/update/lcad<year><release>.zip

  • Additional/automatic instructions available at:
    http://www.ldraw.org/article/13.html

  • Unofficial library instructions available at:
    http://www.melkert.net/LDCad/faq#faq_unoflib

12. Window Sizing

1. The primary window may support resizing.
   a. the minimum should be 1024x640.
   b. The expectation is that resizing is NOT a scaled resize. This means that buttons and icons should not get larger or smaller. Further, labels and entry boxes should not get taller (but can get wider).
   c. The feedback textbox can get taller and wider

13. Moonshot (MS)

The moonshot is the collection of features that will be added to the project if time permits and all other sections of the previous sections are fully implemented, fully tested, and adhere to their requirements. Therefore, the following features and requirements may or may not appear in the final release product.

13.1 Rendering

The program presents previews of the STL file and the converted LDraw file.

1. They will be presented side-by-side.
2. Minimally, they will present an orthographic view
3. 3D rotation can be supported. However, if supported, the two views will be synchronized (so rotating the STL view 10 degrees in X will rotate the LDraw view 10 degrees in X).
4. Zoom can be supported with view synchronization.
5. The STL preview can be displayed prior to completion of the conversion.
6. The LDraw preview will be displayed upon successful completion of the conversion (and prior to selection of the output file).

13.2 Command Line

A command line application that has feature parallels with the GUI where relevant.

13.3 Metadata Input

1. A general comment can be added to the LDraw parts file.
    a. An entry box will allow for text entry with character limit of 200 characters.
    b. The general comment can be blank (if blank, not added to file)
2. An uneditable comment attributing the program: "Generated by the [PROGRAM] on [YYYY-MM-DD HR:MM]".

13.4 Window Sizing

1. The render windows can get taller and wider