

# Obfuscate Model Tool

March 2021



McMaster Centre for Software Certification (McSCert)

# Contents

<b>1</b>	<b>Introduction</b>	<b>3</b>
<b>2</b>	<b>How to Use the Tool</b>	<b>3</b>
2.1	Prerequisites and Installation . . . . .	3
2.2	Getting Started . . . . .	4
2.3	Functionality . . . . .	5
2.3.1	Recurse into Model References . . . . .	5
2.3.2	Remove . . . . .	5
2.3.3	Rename . . . . .	6
2.3.4	Hide . . . . .	7
<b>3</b>	<b>Example</b>	<b>7</b>

# 1 Introduction

The Obfuscate Model Tool removes, renames, and/or hides various details of a Simulink model in order to hide confidential information. This can be useful for eliminating proprietary details when sending models to third-parties, or even by removing details from models in order to create images suitable for publication.

**Disclaimer:** The authors of this tool make no guarantees that all proprietary/confidential information is indeed removed from the Simulink model file. Users should inspect the model to verify that no proprietary/confidential remains according to their needs.

## 2 How to Use the Tool

This section describes what must be done to setup the Obfuscate Model Tool, as well as how to use the tool.

### 2.1 Prerequisites and Installation

1. Use MATLAB/Simulink 2018b or newer.
2. To install the tool, use one of the following approaches:
  - (a) **Download the .zip from GitHub**
    - i. Unzip the contents into your desired location.
    - ii. Add the unzipped folder and subfolders to your MATLAB search path.
    - iii. Download the [Simulink-Utility](#) in the same manner. Add the folder and subfolders to your MATLAB search path also. This is a dependency for the tool to work correctly.
  - (b) **Use the Git command line**
    - i. Use the following command to download the tool and any necessary submodules.

```
git clone --recursive https://github.com/McSCert/Obfuscate-Model
```
    - ii. Add the folder and subfolders to your MATLAB search path.
  - (c) **If you already have the files**
    - i. Add the tool folder and subfolders to your MATLAB search path.
3. Ensure your model is open and unlocked.

**Troubleshooting:** If running the command “`which ObfuscateModelGUI`” indicates that the script is not found, then the tool needs to be added to the MATLAB search path. For information on adding files to the MATLAB search path, please see the [MathWorks documentation](#).

## 2.2 Getting Started

The tool can be launched by double-clicking the `ObfuscateModelGUI.mlappr` file, or by running the command `ObfuscateModelGUI` from the Command Window. This will open the Graphical User Interface (GUI) shown in Figure 1.

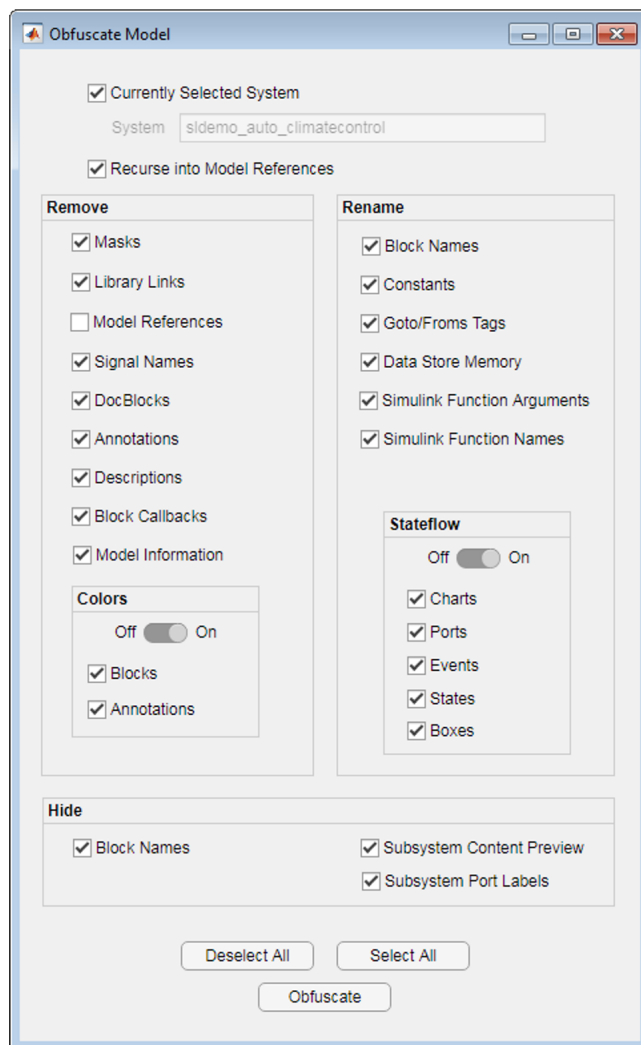


Figure 1: The tool GUI.

## 2.3 Functionality

This section describes the tool functionality when being used from the GUI (Figure 1). Each section describes one of the groups of options in the GUI.

### 2.3.1 Recurse into Model References

This check-box will apply the removing (Section 2.3.2), renaming (Section 2.3.3), and hiding (Section 2.3.4) options inside of any referenced models.

### 2.3.2 Remove

The options in the *Remove* group will discard elements of the model.

- Masks – Block [masks](#) are commonly used to customize the block appearance of custom blocks. This option removes the masks of all blocks.
- Library Links – Library [links](#) can be used in a model to reference blocks that reside in other libraries. This option removes (or “breaks”) all library links so that blocks are stored directly in the model instead of the library. This means that the model is no longer dependant on external libraries.
- Model References – The use of a [model](#) block introduces a reference to another model. This option resets all model reference blocks so that they no longer point to other models. *Note: This may impact the model functionality.*
- Signal Names – This option turns off [signal propagation](#).
- DocBlocks – A DocBlock stores [documentation](#) about the model. This options removes all DocBlocks.
- Annotations – This option deletes all text, area, or image [annotations](#).
- Descriptions – This options removes the *description* information of [lines](#), [blocks](#), and annotations.
- Block Callbacks – Blocks can have custom [callbacks](#). This option removes all callbacks.
- Model Information – A Simulink model stores [information](#) about itself, such as its creator’s name and version number (Figure 2). This option resets this data.
- Colors – These options remove the colours of blocks and annotations so that they revert to their default color.

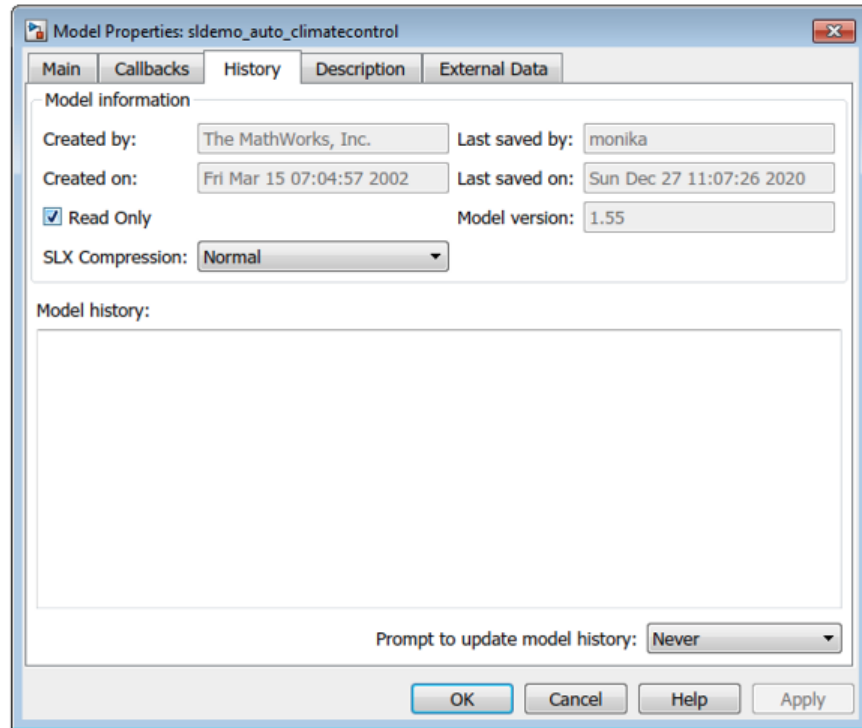


Figure 2: Model Information.

### 2.3.3 Rename

The options in the *Rename* group will rename elements of the model to use generic names.

- Block Names – Each block in a model has a *name* that is typically displayed underneath the block. This option renames all block names to a generic name based on the block type. For example, an **Inport** block will be renamed to Inport1.
- Constants – Each constant block has a *value* that is a number or a variable name. This option renames any values that are variable names to be generic (e.g., Constant1). Numerical constants will remain. *Note: You must manually change the definition of the data to match the new name. This tool does not currently rename data in the base workspace or data dictionaries.*
- Goto/From Tags – A **Goto** block has a *goto tag* that matches it to its **From** blocks. This option renames tags to generic names (e.g., GotoFrom1) and renames any matching **From** blocks as well.

- **Data Store Memory** – A **Data Store Memory** block has a *data store name*. This option renames all **Data Store Memory** blocks to be generic (e.g., `DataStore1`) as well as all associated **Data Store Read** and **Data Store Write** blocks.
- **Simulink Function Arguments** – A **Simulink Function** can have inputs and outputs using **ArgIn** and **ArgOut** blocks. This option renames the *argument name* of **ArgIn** and **ArgOut** blocks to be generic (e.g., `u1` for an input, `y1` for an output).
- **Simulink Function Names** – The trigger within a **Simulink Function** specifies the function’s name. This option renames it to a generic name (e.g., `f1`), and updates any corresponding **Function Caller** blocks to match.
- **Stateflow** – These options rename the various named **Stateflow elements** to have generic names. Currently inputs, outputs, events, boxes, and states are renamed.

#### 2.3.4 Hide

The options in the *Hide* group will hide elements of the model from view.

- **Block Names** – This option hides the name of a block from view.
- **Subsystem Content Preview** – This option turns off the **content preview** that is displayed in blocks such as subsystems.
- **Subsystem Port Labels** – This option hides the port labels shown on blocks such as subsystems.

## 3 Example

Use the command `sldemo_auto_climatecontrol` in the Simulink Command Window to open the example model, shown in Figure 3. To run the tool, run the command `ObfuscateModelGUI` from the Command Window, and then press the **Obfuscate** button. The resulting model is given in Figure 4. We can see that the colors, annotations, masks, names, port labels, and many other elements have been removed, renamed, or hidden in the model.

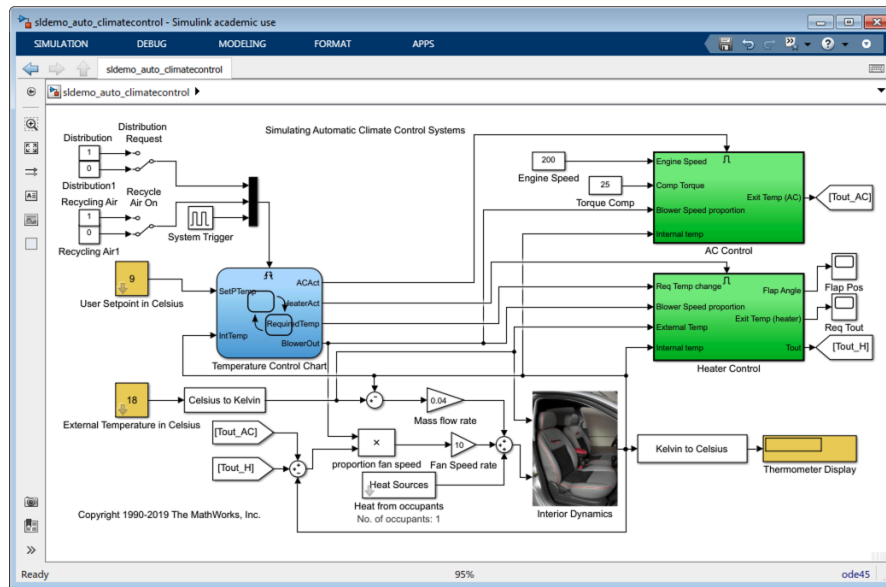


Figure 3: Original demo model.

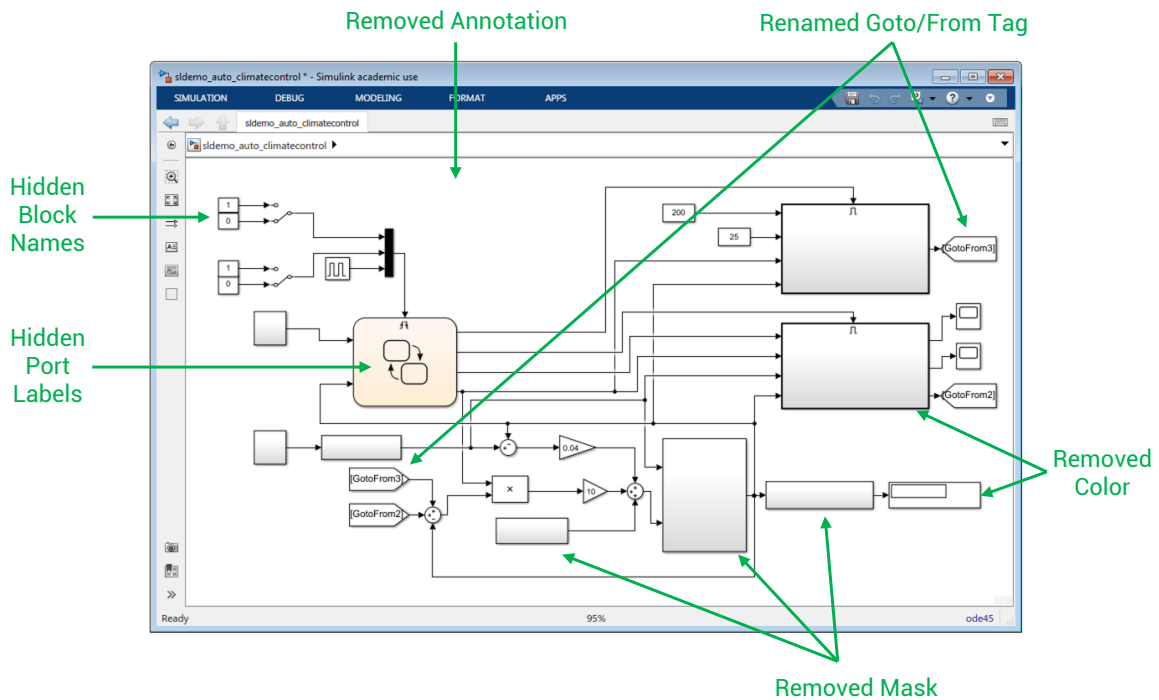


Figure 4: Resulting model after obfuscation.