**System Test Plan**  
(Systemtest Plan)

**(TINF18C, SWE I Praxisprojekt 2019/2020)**

Project: DD2AML Converter

Customer: Rentschler & Ewertz

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| --- | --- | --- | --- |
| **Version** | **Date** | **Author** | **Comment** |
| 0.1 | 07.09.2018 |  | created |
| 0.2 | 03.04.2020 | Wermerskirch | First draft |
| 0.3 | 15.04.2020 | Wermerskirch | Second draft |
| 0.4 | 16.04.2020 | Wermerskirch | Changes after Review  Updated Features and Test Equipment |
| 0.5 | 04.05.2020 | Wermerskirch | Added Test Cases |
| 1.0 | 09.05.2020 | Wermerskirch | Finalization |

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# Scope

The STP (System Test Plan) specifies the test strategy and test planning. It references tests to be performed to verify the accordance of the demanded features given by the SRS (System Requirements Specification) to the implemented features. The document derived from the STP is the STR (System Test Report) where additionally the results are given.

# Definitions

**TC** Testcase

**TS** Testsuite

**MC** Multicast

**CLI** Command Line Interface

**GUI** Graphical User Interfac

# Product Names and Attributes

The following test objects must be verified:

|  |  |  |  |
| --- | --- | --- | --- |
| **Ref.-Id.** | **Product Number** | **Product Name** | **Product Description** |
| 1 | Build v1.0 | DD2AML Conversion Library | Library which is responsible for the conversion to AML |
| 2 | Build v1.0 | DD2AML CLI and GUI | Command Line Interface and Graphical User Interface for conversion |

# Features

The following requirements must be verified, as long as they are not classified as “not to be tested”. This table shows the test coverage between functionality and test suites or test cases.

|  |  |  |  |
| --- | --- | --- | --- |
| **Req. - ID** | **Functionality** | **Priority** | **Testsuite ID** |
| LF10: Format analysis | Checks which file format was selected | A | TS-001: Conversion Library |
| LF20: Input validation | Checks whether input file can be serialized | A | TS-001: Conversion Library |
| LF30: Conversion | * Converting an IODD file to AML * Converting a CSP+ file to AML | A  A | TS-001: Conversion Library |
| LF40: AML Packager | Creates the AMLX package | B | TS-001: Conversion Library |
| LF50: File conversion library | * Converts a file to an AML string * Converts a file to an AMLX package | B  A | TS-001: Conversion Library |
| LF60: File conversion command line | Conversion using a CLI | A | TS-002: CLI |
| LF70: File conversion GUI | Conversion using a GUI | A | TS-003: GUI |
| LF80: Error handling | Provides understandable error messages to the user | B | TS-001: Conversion Library |

# Test Preparation Strategy

The creation of tests will be application case-based. Three main application cases can be identified, the conversion library, the CLI, and the GUI.

The Conversion Library contains the main functions of the converter. The correct conversion of an IODD file and a CSP+ file must be tested. The conversion can only be triggered by using the provided interfaces. The functionality of the library is therefore tested particularly using the CLI, which the library uses for the conversion.

The CLI is another main application case. It is used to pass arguments like the file path of the input file and optionally the output path to the application to start the conversion. As there are several flags that can be passed to the command line tool, the equivalence class method will be used to reduce the number of tests.

The GUI is the last main application case. Unlike the CLI, the Gui provides input fields in which the respective file path is inserted. These fields must be checked.

# Test Execution Strategy

Since it is a further development of an already existing software, a complete test is not necessary, but it is still useful. The test should be divided into the following phases:

1. Command Line Interface
2. Conversion Library
3. Graphical User Interface

Since the CLI is needed for the conversion so that the conversion library can be tested and used, the CLI is tested first.

To verify that the conversion of an IODD or CSP+ file to an AML file works correctly, which is the main function of the program, it is tested next.

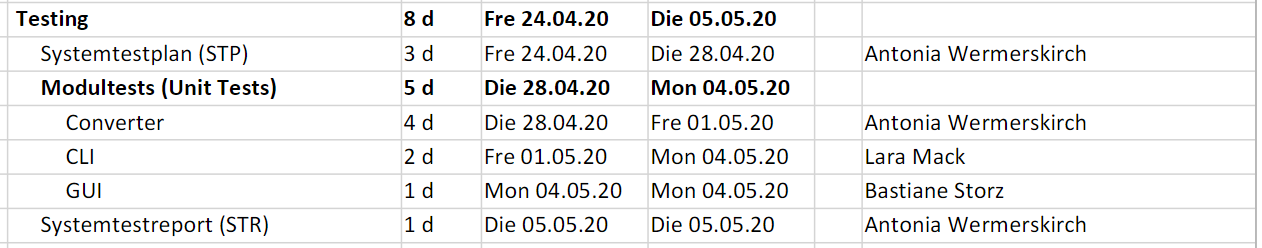
In the end, the GUI is tested.

# Test Equipment

The following equipment must be available for testing:

* A computer with Windows 7 or higher
* Installed AutomationML Editor ([Download here](https://www.automationml.org/o.red/uploads/dateien/1581316979-AMLEditor%205.3.3.SetupX64.zip))
* The DD2AML software

# Test Schedule and Budget



The testing of the CLI begins as soon as the CLI is completed. This makes it possible to make the necessary corrections quickly. The conversion library can only be tested once the rules for one input format, but preferably both input formats, have been established. Since only minimal changes are made in the installer of the GUI, the GUI can be tested as soon as all adjustments intended for the GUI have been made.

No budget is needed for the tests, as they are all performed by hand.

# Test Planning

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Testsuite** | **Test objective** | **Testplan Creator** | **Testplan Reviewer** | **Tester** |
| TS-001 | Conversion Library | Antonia Wermerskirch | Bastiane Storz | Antonia Wermerskirch |
| TS-002 | Command Line Interface | Antonia Wermerskirch | Bastiane Storz | Antonia Wermerskirch |
| TS-003 | Graphical User Interface | Antonia Wermerskirch | Bastiane Storz | Antonia Wermerskirch |

# References / Standards

[1] [SRS TINF18C DD2AML](https://github.com/WAntonia/TINF18C_Team_3_DD2AML-Converter/wiki/System-Requirements-Specification)

# Appendix: Testcases

## Testsuite <TS-001 Conversion Library>

### <TC-001-001> (File Validation with valid input file)

|  |  |  |  |
| --- | --- | --- | --- |
| **Testcase ID:** | | TC-001-001 | |
| **Testcase Name:** | | File Validation with valid Input file | |
| **Req.-ID:** | | LF20, LF10, LF30, LF40, LF50 | |
| **Description:** | | The test case verifies that it recognizes if a valid file has been selected. | |
| **Test Steps** | | | |
| **Step** | **Action** | | **Expected result** |
| 1 | Install the DD2AML tool and open the CLI by typing cmd in the windows search. | | The DD2AML tool is installed on the system. The CLI is open. |
| 2 | Select a valid input file for the validation, for example:  dd2aml –input /filePathTo/Balluff-BNI\_IOL\_355\_S02\_Z013-20170315-IODD1.1.xml | | The validation is executed successfully, and the conversion is completed correctly without error message. |
| 3 | Then open the logs of the CLI. These can be found under:  C:\Users\USERNAME\AppData\Local\DD2AML\Logs\CLI | | After replacing the USERNAME tag with the real username, the CLI folder with all logs opens. The most recent log is opened. |
| 4 | Find the log message that shows that the file was successfully deserialized. It can be found at the beginning of the log file. | | The log message “DD file was deserialized correctly.” should be found approximately in the fourth line of the log. |
|  | | | |

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| --- | --- | --- | --- | --- | --- |
| **Testdata:** | | TD-001-001 | | | |
| **Dataset** | **File** | | **Validation** | **Permission Input** | **Permission Output** |
| 1 | Balluff-BNI\_IOL\_355\_S02\_Z013-20170315-IODD1.1.xml | | valid | given | given |
|  | | | | | |

### <TC-001-001> (File Validation with invalid input file)

|  |  |  |  |
| --- | --- | --- | --- |
| **Testcase ID:** | | TC-001-001 | |
| **Testcase Name:** | | File Validation with invalid input file | |
| **Req.-ID:** | | LF20, LF80 | |
| **Description:** | | The test case verifies that errors are detected during the validation of the input file and a corresponding error message is displayed with a description of the error and line details in the log. | |
| **Test Steps** | | | |
| **Step** | **Action** | | **Expected result** |
| 1 | Install the DD2AML tool and open the CLI by typing cmd in the windows search. | | The DD2AML tool is installed on the system. The CLI is open. |
| 2 | Select a valid input file for the validation, for example:  dd2aml –input /filePathTo/BrokenBalluff-BNI\_IOL\_355\_S02\_Z013-20170315-IODD1.1.xml | | The conversion is aborted after the failed validation. |
| 3 | Then open the logs of the CLI. These can be found under:  C:\Users\USERNAME\AppData\Local\DD2AML\Logs\CLI | | After replacing the USERNAME tag with the real username, the CLI folder with all logs opens. The most recent log is open. |
| 4 | Look at the first error message in the logs. | | The error message can be found approximately in the 5th line. Detailed information about the error, as well as line details are given. |
|  | | | |

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| --- | --- | --- | --- | --- | --- |
| **Testdata:** | | TD-001-002 | | | |
| **Dataset** | **File** | | **Validation** | **Permission Input** | **Permission Output** |
| 1 | BrokenBalluf-BNI\_IOL\_355\_S02\_Z013-20170315-IODD1.1.xml | | invalid | given | given |
|  | | | | | |

## Testsuite <TS-001 Conversion Library>

### <TC-002-001> (View CLI help text)

|  |  |  |  |
| --- | --- | --- | --- |
| **Testcase ID:** | | TC-001-002 | |
| **Testcase Name:** | | View CLI help text | |
| **Req.-ID:** | | LF60 | |
| **Description:** | | The test case verifies that the converter displays all possible functions as help text as soon as the passed argument contains "--help". All other passed arguments are ignored. | |
| **Test Steps** | | | |
| **Step** | **Action** | | **Expected result** |
| 1 | Install the DD2AML tool and open the CLI by typing cmd in the windows search. | | The DD2AML tool is installed on the system. The CLI is open. |
| 2 | Run the DD2AML CLI with valid arguments and use the help flag. | | Regardless of the other valid arguments, only "--help" is executed and a help text is displayed, showing all possible functions. |
|  | | | |

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| --- | --- | --- | --- | --- | --- |
| **Testdata:** | | TD-002-002 | | | |
| **Dataset** | **File** | | **Validation** | **Permission Input** | **Permission Output** |
| 1 | Balluff-BNI\_IOL\_355\_S02\_Z013-20170315-IODD1.1.xml | | valid | given | given |
| 2 | 0x1099\_BNI CIE-508-105-Z015\_2.0\_en.cspp | | valid | given | given |
| 3 | GSDMLV2.33.xml | | valid | given | given |
|  | | | | | |

### <TC-002-002> (Converting without output flag)

|  |  |  |  |
| --- | --- | --- | --- |
| **Testcase ID:** | | TC-001-002 | |
| **Testcase Name:** | | Converting without output flag | |
| **Req.-ID:** | | LF60 | |
| **Description:** | | The test case verifies that a conversion is also possible without a given output path. | |
| **Test Steps** | | | |
| **Step** | **Action** | | **Expected result** |
| 1 | Install the DD2AML tool and open the CLI by typing cmd in the windows search. | | The DD2AML tool is installed on the system. The CLI is open. |
| 2 | Run the DD2AML CLI with valid input flag, for example:  dd2aml –input /filePathTo/Balluff-BNI\_IOL\_355\_S02\_Z013-20170315-IODD1.1.xml | | The conversion is executed successfully. Since no output path is given, the output file is saved in the file path of the input file. |
|  | | | |

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| --- | --- | --- | --- | --- | --- |
| **Testdata:** | | TD-002-002 | | | |
| **Dataset** | **File** | | **Validation** | **Permission Input** | **Permission Output** |
| 1 | Balluff-BNI\_IOL\_355\_S02\_Z013-20170315-IODD1.1.xml | | valid | given | given |
| 2 | 0x1099\_BNI CIE-508-105-Z015\_2.0\_en.cspp | | valid | given | given |
| 3 | GSDMLV2.33.xml | | valid | given | given |
|  | | | | | |

## Testsuite <TS-003 GUI>

### <TC-003-001> (GUI Input field verification)

|  |  |  |  |
| --- | --- | --- | --- |
| **Testcase ID:** | | TC-003-001 | |
| **Testcase Name:** | | GUI Input field verification | |
| **Req.-ID:** | | LF70 | |
| **Description:** | | Run converter via a graphical user interface with an empty Input field. The test case ensures that a conversion is not possible without an input file. | |
| **Test Steps** | | | |
| **Step** | **Action** | | **Expected result** |
| 1 | Install the DD2AML Software and open the GUI. | | The software is installed and the GUI window opens. |
| 2 | Try to start the conversion by pressing the “Convert” button at the bottom centre. | | Conversion not possible, because "Convert" button stays deactivated. |
|  | | | |

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| --- | --- | --- | --- | --- | --- | --- |
| **Testdata:** | | TD-003-001 | | | | |
| **Dataset** | **Input File** | | **Validation** | **Permission Input** | **Permission Output** | **Output File** |
|  |  | |  |  |  |  |
|  | | | | | | |

### <TC-003-002> (GUI Input file selection via file explorer)

|  |  |  |  |
| --- | --- | --- | --- |
| **Testcase ID:** | | TC-003-002 | |
| **Testcase Name:** | | GUI Input file selection via file explorer | |
| **Req.-ID:** | | LF70 | |
| **Description:** | | The test case verifies that only the permitted file formats can be selected as input via file explorer.  Permitted file formats: .xml and .cspp | |
| **Test Steps** | | | |
| **Step** | **Action** | | **Expected result** |
| 1 | Install the DD2AML Software and open the GUI. | | The software is installed and the GUI window opens. |
| 2 | Click on the "..." button at the end of the input text field. | | The file explorer opens in a new window. |
| 3 | Click on "Files" in the lower right corner directly above the buttons for open and cancel | | A drop-down menu opens showing that only file suffix with .xml or .cspp are allowed. |
|  | | | |

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| --- | --- | --- | --- | --- | --- | --- |
| **Testdata:** | | TD-003-002 | | | | |
| **Dataset** | **Input File** | | **Validation** | **Permission Input** | **Permission Output** | **Output File** |
|  |  | |  |  |  |  |
|  | | | | | | |

### <TC-003-003> (GUI Input file selection via drag and drop)

|  |  |  |  |
| --- | --- | --- | --- |
| **Testcase ID:** | | TC-003-003 | |
| **Testcase Name:** | | GUI Input file selection via drag and drop | |
| **Req.-ID:** | | LF70 | |
| **Description:** | | The test case verifies that only the permitted file formats can be selected as input via drag and drop  Permitted file formats: .xml and .cspp | |
| **Test Steps** | | | |
| **Step** | **Action** | | **Expected result** |
| 1 | Install the DD2AML Software and open the GUI. | | The software is installed and the GUI window opens. |
| 2 | Open the file explorer and select any file. Drag the selected file and drop it into the GUI input text field. | | If the selected file has a valid file suffix, its absolute file path will appear in the input field. If it has an invalid suffix, it is not possible to drop the file into the input field. |
|  | | | |

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| --- | --- | --- | --- | --- | --- | --- |
| **Testdata:** | | TD-003-003 | | | | |
| **Dataset** | **Input File** | | **Validation** | **Permission Input** | **Permission Output** | **Output File** |
|  |  | |  |  |  |  |
|  | | | | | | |

### <TC-003-004> (GUI Output file path generation)

|  |  |  |  |
| --- | --- | --- | --- |
| **Testcase ID:** | | TC-003-004 | |
| **Testcase Name:** | | GUI Output file path generation | |
| **Req.-ID:** | | LF70 | |
| **Description:** | | The test case verifies whether an output file is automatically suggested for a given input. This output file should no longer have the file format of the input file in its name. | |
| **Test Steps** | | | |
| **Step** | **Action** | | **Expected result** |
| 1 | Install the DD2AML Software and open the GUI. | | The software is installed and the GUI window opens. |
| 2 | Select a valid file of IODD, CSP+ or GSD format in the Input text box. | | As soon as the file including file path is in the input field, an output file is suggested for the same directory. The output file has the suffix .amlx and does not have the file format of the input file in its name. |
|  | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Testdata:** | | TD-003-004 | |
| **Dataset** | **Input File** | | **Output File** |
| 1 | .\Balluff-BNI\_IOL\_355\_S02\_Z013-20170315-IODD1.1.xml | | .\Balluff-BNI\_IOL\_355\_S02\_Z013-20170315.amlx |
| 2 | . \0x1099\_BNI CIE-508-105-Z015\_2.0\_en.cspp | | .\0x1099\_BNI CIE-508-105-Z015\_2.0\_en.amlx |
| 4 | .\GSDML-V2.33.xml | | .\V2.33.amlx |
|  | | | |