

# **Testing Document**

Mavis

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## Introduction

This document describes the testing process of Mavis software engineering project group. Mavis group had two software processes which were partially concurrent. First we made bugfixes and improvements to Ikayaki software, which is interface software for controlling SQUID magnetometer. Ikayaki was developed last year by another software engineering project group. Client also needed new software for analyzing data produced with Ikayaki, so we developed one for them.

Because the structure of development workflow wasn't like ones in typical software engineering projects, testing also followed different kind of model.

Despite of all, the goal of the testing process was to convince everybody that the program works as expected and it's totally bug free. The program is also required to meet all defined requirements.

## Testing Ikayaki

### ***Workflow***

Most important bugfix to Ikayaki was fixing the freezing problem which potentially could have done some serious damage to the SQUID magnetometer. SquidEmulator was developed and used in this phase to make sure that our fixes were working correctly and the software could be run without failures in production environment.

New version of Ikayaki including improvements and bugfixes was given to client for testing after each block of iterative process model. Ikayaki also had some debug log functionality in action and serial port log software was used when client used test version in production environment. The log data and clients instant feedback gave us invaluable information to be used in further development.

We came into conclusion that Ikayaki had too many code lines and way too many complex relations between classes that we didn't accomplish comprehensive unit tests. Also we assumed that initial developers of Ikayaki worked out full tests and so we could concentrate to only our own changes and additions. Later we found out that the assumption was wrong, but didn't have time to develop massive JUnit testclasses.

Every programmer tested classes/methods he had worked on. Integration and system testing was carried out by using SquidEmulator and by going through GUI use case tests. Client was using latest test version when we were developing next iterative version.

Many flaws were found by project group and also by client. Every noticed bug was fixed and therefore there shouldn't been any, at least critical, flaws left.

## Testing Mavis

### ***Workflow***

Mavis wasn't developed from scratch. We had so tight timeline for implementing this piece of software that we made use of many classes used in Ikayaki. Only couple of totally new classes were developed. Classes from Ikayaki were used without any modifications or with only slight changes.

Also quite a few classes do any calculations or data handling. Most classes are somehow related to the graphical user interface.

Likewise as in Ikayaki, comprehensive unit tests were not accomplished to reused classes. Due to using Ikayaki classes (and Ikayaki style architecture) the class hierarchy and relations are very complex, so comprehensive unit tests could have been too time consuming, and we indeed had lack of time.

Classes and methods which make calculations and data handling were tested as fully as possible by the programmer of functionality. Usage of JUnit testing framework was not required but advisable.

Integration testing was done by going through GUI component test cases. Test cases were derived from requirements defining the software.

Acceptance testing was done by the client. Release candidate version of software was handed over to the client and software was used like it would be used in production environment. Client gave us instant feedback of any detected misbehaviour (and last minute improvement requests) and critical bugs were corrected right away.

## **GUI test cases**

### **Mavis (MainViewPanel)**

*(starting the program)*

**Test:** No parameters.

**Expectation:** Mavis starting normally.

**Result:** OK

**Test:** No parameters, without config file

**Expectation:** Mavis starting normally. Default config file should be created.

**Result:** OK

**Test:** No parameters, with config file with history data.

**Expectation:** previously used project should be opened

**Result:** OK

### **ProjectExplorerPanel**

#### **1. Directory text field**

**Expectation:** Shows autocomplete popup when typing and typed text matches to one or more directory.

**Test:** Type different letters.

**Result:** OK

**Expectation:** Shows directory history on down-arrow click.

**Test:** down-arrow click

**Result:** OK

#### **2. Browse button**

**Expectation:** Opens a dir chooser dialog.

**Test:** Push the button.

**Result:** OK

**Expectation:** Opens last good directory in drop dialog.

**Test:** Input different values on directory text field.

**Result:** OK

**Expectation:** (*browse window*) Changes to chosen directory if "Open" selected; updates text field.

**Test:** Select open.

**Result:** OK

### 3. Project file table

**Expectation:** Shows project files in current directory & updates on the fly while changing directories.

**Test:** Change directories.

**Result:** OK

**Expectation:** Shows only project files.

**Test:** Try various directories.

**Result:** OK

**Expectation:** Highlights open project.

**Test:** Change project.

**Result:** OK

**Expectation:** Loads project on project file mouse click.

**Test:** Left button mouse click.

**Result:** OK

**Expectation:** Shows "unable to open" popup when trying to load broken file.

**Test:** Try loading broken files.

**Result:** OK

**Expectation:** No actions with right button mouse click.

**Test:** Click project with right button.

**Result:** OK

**Expectation:** Column width is changeable.

**Test:** Resize column with mouse.

**Result:** OK

## ProjectInformationPanel

### 1. Text fields

**Expectation:** Project information is loaded and displayed correctly when project is changed.

**Test:** Change project.

**Result:** OK

**Expectation:** Text fields are editable.

**Test:** Try to edit data in fields.

**Result:** OK

**Expectation:** Latitude, longitude, strike, dip, volume, mass and susceptibility accept only numbers.

**Test:** Try to input characters.

**Result:** OK

**Expectation:** Density and Q are calculated correctly.

**Test:** Compare to given formulas.

**Result:** OK

**Expectation:** Modified project information is saved to .ika file.

**Test:** Modify project information, check .ika file.

**Result:** OK

*(If there's components in component table)*

**Expectation:** Component values are recalculated when *latitude* or *longitude* is edited.

**Test:** Edit latitude and/or longitude.

**Result:** OK

## MeasurementSequencePanel

### 1. Table of measurement steps

**Expectation:** All steps of open project are displayed correctly in table rows.

**Result:** OK

**Expectation:** Origin step with amplitude/temperature field set to 999 is included.

**Result:** OK

### 2. Calculate component button

**Expectation:** Disabled if less than three components are selected.

**Test:** Select none, one or two components.

**Result:** OK

**Expectation:** Enabled if at least three components are selected.

**Test:** Select three or more components.

**Result:** OK

## MagneticComponentPanel

### 1. Table of calculated components

**Expectation:** Correct steps column value.

**Test:** Select set of measurement steps and calculate a component.

**Result:** OK

**Expectation:** Correct range column value.

**Test:** Select set of measurement steps and calculate a component.

**Result:** OK

**Expectation:** Correct excluded column values.

**Test:** Select a continual set of steps and deselect some steps between first and last one; calculate a component.

**Result:** OK

**Expectation:** Correctly calculated D/I/MAD/dj/Plon/Plat values (with different .ika files).

**Test:** Compare to given sample set of .ika and .tfc files.

**Result:** OK (differences might be shown because of slightly different calculation methods; client has approved results)

**Expectation:** Updates Plon/Plat values if Lat/Lon is changed in *ProjectInformationPanel*.

**Test:** Change values.

**Result:** OK

**Expectation:** (*AP checkbox unselected*) Negates inclination value and adds 180 degrees to declination when selected.

**Test:** Select AP.

**Result:** OK

**Expectation:** (*AP checkbox selected*) Negates inclination value and decreases 180 degrees from declination when selected.

**Test:** Deselect AP.

**Result:** OK

## 2. Remove component button

**Expectation:** Removes selected component from the table.

**Test:** Select component, press button.

**Result:** OK

## MeasurementGraphsPanel

### 1. Intensity plot

**Expectation:** Displays data from open project's measurement steps correctly.

**Test:** Compare to same plot in Ikayaki.

**Result:** OK

### 2. Stereoplot

**Expectation:** Displays data from open project's measurement steps correctly.

**Test:** Compare to same plot in Ikayaki.

**Result:** OK

### 3. Zijderveld plot NW

**Expectation:** Displays data from open project's measurement steps correctly.

**Result:** OK

**Expectation:** Displays new magnetic component line when component is calculated.

**Result:** OK

**Expectation:** Removes magnetic component line when component is deleted.

**Result:** OK

**Feature:** Zoom in.

**Expectation:** Zooms in to selected area. Should be synchronized with Zplot NU.

**Test:** Select rectangular area from the plot with left mouse button.

**Result:** OK

**Feature:** Zoom out.

**Expectation:** Zooms out if plot is in zoom mode. Should be synchronized with Zplot NU.

**Test:** Right click on zoomed plot.

**Result:** OK

### 4. Zijderveld plot NU

**Expectation:** Displays data from open project's measurement steps correctly.

**Result:** OK

**Expectation:** Displays new magnetic component line when component is calculated.

**Result:** OK

**Expectation:** Removes magnetic component line when component is deleted.

**Result:** OK

**Feature:** Zoom in.

**Expectation:** Zooms in to selected area. Should be synchronized with Zplot NW.

**Test:** Select rectangular area from the plot with left mouse button.

**Result:** OK

**Feature:** Zoom out.

**Expectation:** Zooms out if plot is in zoom mode. Should be synchronized with Zplot NW.

**Test:** Right click on zoomed plot.

**Result:** OK

## FileActionsPanel

### 1. Directory text field

**Expectation:** Shows autocomplete popup when typing and typed text matches to one or more directory.

**Test:** Type different letters.

**Result:** OK

**Expectation:** Shows directory history on down-arrow click.

**Test:** Down-arrow click.

**Result:** OK

### 2. Save to Table button

**Expectation:** Saves data from magnetic component table to .csv file with projects file name to last used directory.

**Result:** OK

**Expectation:** Appends data to existing file.

**Result:** OK

**Expectation:** Button is disabled if there isn't any components.

**Result:** OK

### 3. Save As button

**Expectation:** Displays directory change dialog and saves data from magnetic component table to user defined .csv file in user defined directory.

**Result:** OK

**Expectation:** Appends data to existing file.

**Result:** OK

**Expectation:** Button is disabled if there isn't any components.

**Result:** OK

### 4. Print button

*with "Sample Data" checkbox selected:*

**Expectation:** Attempts to print sample data.

**Result:** OK

*with "Graphs" checkbox selected:*



**Expectation:** Attempts to print intensity plot, stereoplot and combined Zijderveld plot.

**Result:** OK

*with both checkboxes selected:*

**Expectation:** First attempts to print sample data. After that attempts to print intensity plot, stereoplot and combined Zijderveld plot.

**Result:** OK

## 5. Preview button

*with "Sample Data" checkbox selected:*

**Expectation:** Displays *DataPrintPanel* with sample data print preview.

**Result:** OK

*with "Graphs" checkbox selected:*

**Expectation:** Displays *GraphPrintPanel* with print preview of intensity plot, stereoplot and combined Zijderveld plot.

**Result:** OK

*with both checkboxes selected:*

**Expectation:** 1. Displays *DataPrintPanel* with sample data print preview.

**Expectation:** 2. (after printing or cancelling) Displays *GraphPrintPanel* with graphs print preview.

**Result:** OK

## DataPrintPanel / GraphPrintPanel

### 1. Print preview window

**Expectation:** Displays assigned data with correct layout.

**Result:** OK

### 2. Print button

**Expectation:** Attempts to print previewed page with printer connected to system.

**Result:** OK

### 3. Cancel button

**Expectation:** Closes the window.

**Result:** OK