**Weekly Report**

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| **Name:** | Sky | **Team/Group:** | Imaging Cargo | **Date:** | 20/01/2025 – 24/01/2025 |

**Tasks & Progress**

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| **Tasks/Projects** | **Descriptions** | **Remarks** |
| R&D Requirements | Continued work on new R&D requirements and compared SFML, GLFW + GLAD, and SDL libraries for features, performance, and use cases. |  |
| SDL Libraries | Surveyed SDL installation methods, successfully installed via vcpkg, resolved issues with SDL2, ImGui, and OpenGL bindings—documented step-by-step installation and configuration process, including environment variables, project properties, and test code integration. | Notes for linking libraries and installation written. |
| UI, Pan and Zoom | 1. Improved UI layout by reorganizing buttons, integrating the status bar into the top panel, and enabling dynamic adjustments for resizing. 2. Enhanced zoom and pan functionality with smoother transitions, proper viewport constraints, and accurate scaling. 3. Adjusted the zoom-level text display for clarity. | Addressed coordinate mismatches and viewport alignment issues during panning and zooming. |
| Rotation and Undo Functionality | 1. Added clockwise and counterclockwise image rotation, updating display and status bar to reflect new dimensions. 2. Implemented undo functionality using a history stack, enabling seamless reversal of modifications such as cropping, rotation, and calibration. | Both features are fully functional and provide better user interaction and control. |
| Crop Functionality | 1. **Updates:**    1. Adjusted cropping logic to account for the scaling and transformation applied to the image when compressed to fit the display view.    2. Introduced scaling factors (scaleX, scaleY) to map the selection box coordinates from the display view back to the actual image data.    3. Enhanced boundary checks to ensure cropping dimensions remain within the bounds of the original image.    4. Debugging tools were added to validate the mapping between view coordinates and actual image data, ensuring better alignment. 2. **Issues:**    1. The image is scaled and compressed to fit the display view, causing a mismatch between the selection box rendered on the screen and the cropped region from the actual image data.    2. Precision discrepancies may arise due to floating-point rounding errors during coordinate transformations.    3. Edge cases, such as extreme zoom levels, non-uniform scaling, or small images, still cause cropping misalignments.    4. Undo operations sometimes reset the view incorrectly, leading to cropping based on the wrong dimensions.   \*Refer to Appendix A for screenshots of issues. | Pushed the code to GitHub, but the issues will be solved after this. |
| Mouse Pointing Issues | 1. Fixed inaccuracies in mouse pointer position mapping to image coordinates. 2. Updated logic to account for viewport offsets and control panel height correctly. 3. A coordinate display was implemented in the status bar, indicating whether the cursor was inside or outside the image. | Improved but requires further refinement to handle edge cases with dynamic viewport adjustments. |
| Selection Box Rendering | 1. Implemented a robust solution for selection box rendering using OpenGL. 2. Boxes are drawn accurately with proper scaling and transformation. 3. Supports dynamic pan, zoom, and real-time adjustments. 4. Resolved earlier issues with rendering logic and coordinate mismatches. | Selection box rendering is fully functional and meets the requirements. |
| GitHub Integration | Pushed projects using ImGui, Boost.Signals2, and SDL to GitHub, including a README.md detailing functionalities, libraries used, and current issues. | Completed and shared with the team. |
| CT Demo Code Study | Received the SDK for CT and downloaded the SDK locally. | After CNY, a short update on the study will be given. |

**Appendix A**

A computer screen shot of a machine

Description automatically generated

**Image with Selection Box for Crop**

**A screenshot of a computer

Description automatically generated**

**Result for Crop function on the selected region**