Software Engineering Group Project

COMP2211 Increment 3 Report

Runway Redeclaration

Team 5:

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Contents

Response to feedback

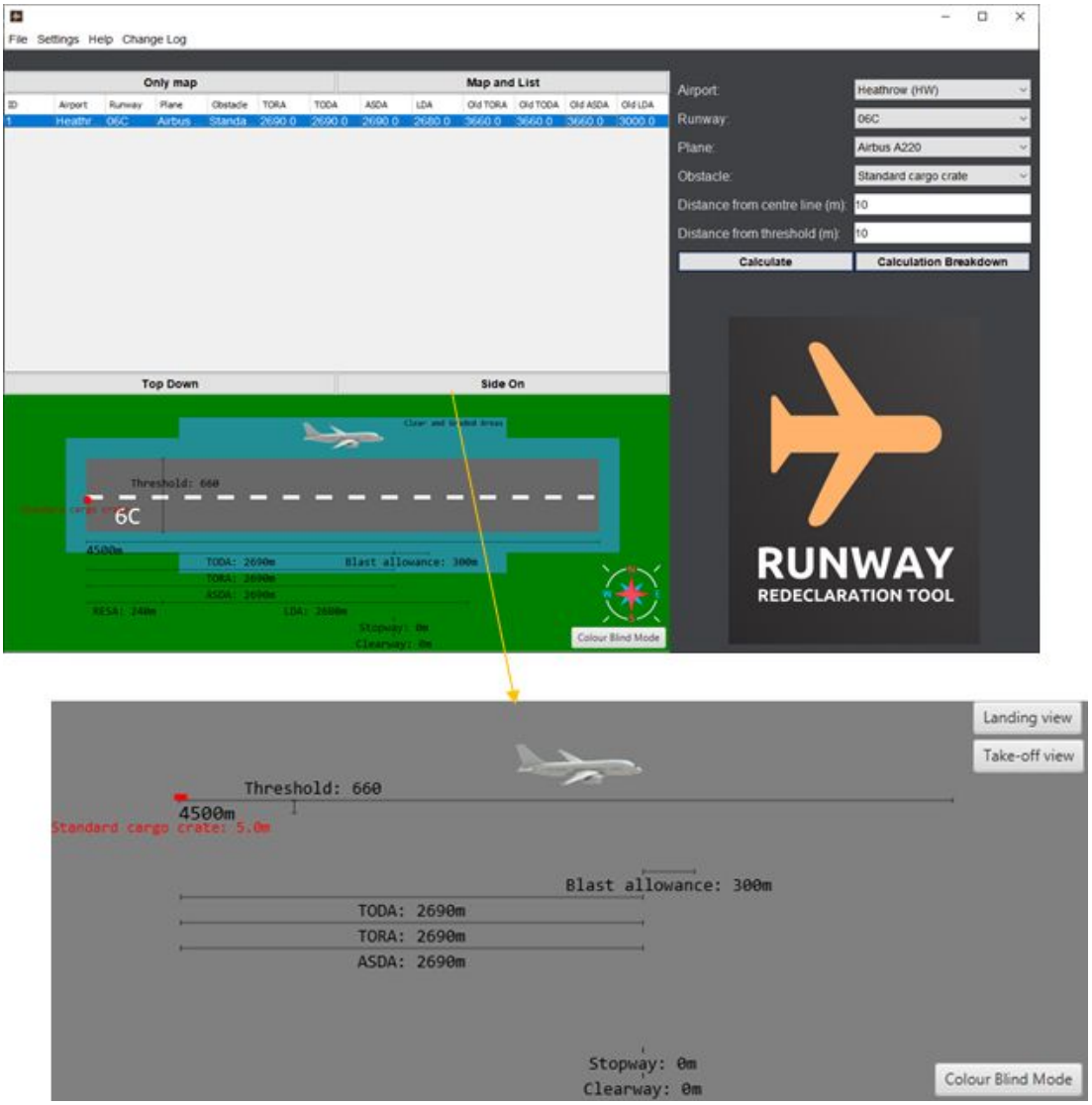
Feedback	Response
Unnecessary use of blank space	Upon application launch the spaces for runway visualisation were present but empty (visually unappealing); we have filled or reduced these spaces wherever possible (e.g. adding a logo in the bottom left).
Testing linked to storyboards	There was no connection between our front-end testing and our storyboards. During this increment, we assigned story boards to specific people to test them and then provide us with suitably linked feedback.
UML diagram	Last increment's UML diagram elicited praise, though we identified improvements to its visual clarity could be made. This has been addressed through decreasing text volume, with greater font size, utilising different colours for acuity, and filling space more proportionally.
Specific user testing	Feedback on the testing method employed during the last increment was addressed through having participants test specific features/accomplish certain goals and give targetted feedback (rather than general).
Burndown chart lacked linear trajectory	Our last burndown chart lacked a graphical indicator to delineate the rate of work -- a feature added in this increment's report.
Sprint task breakdown	The breakdown for the current sprint has been expanded after feedback highlighting its previous scarcity of information, with additional detail afforded primarily toward the more important tasks.

Discussion of the Key Design Choices

Key Design Choice	Discussion
Making GUI more presentable	Our previous GUI was lacking in visual design, and missing some functionality -- we have overhauled the design with better proportioned space, text, etc. Graphical visualisations of the runway were remade to scale properly.
Error handling	To maintain continued operation of the application under stress we have implemented error handling functionality -- now encompassing a wider range of cases such as type checking.
Scalability	The application now scales correctly when arbitrarily resized.
User guide	In the Help tab of the application we provide the user with a guide that should familiarise them enough with the program's features to be able to utilise them effectively.
Accessibility for people with colourblindness	Guided by principles outlined by the *National Eye Institute* (link: https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/color-blindness), our research on different types of colour blindness culminated in our choice of switching to a yellow background on the application upon a user toggling a button to activate colourblind accessibility features.
Login and encryption	To keep potentially sensitive data secure and help separate that of multiple users, we have security features such as logins (with users' stored data being encrypted and accessible only to them).

Key Storyboards

Gui on start-up



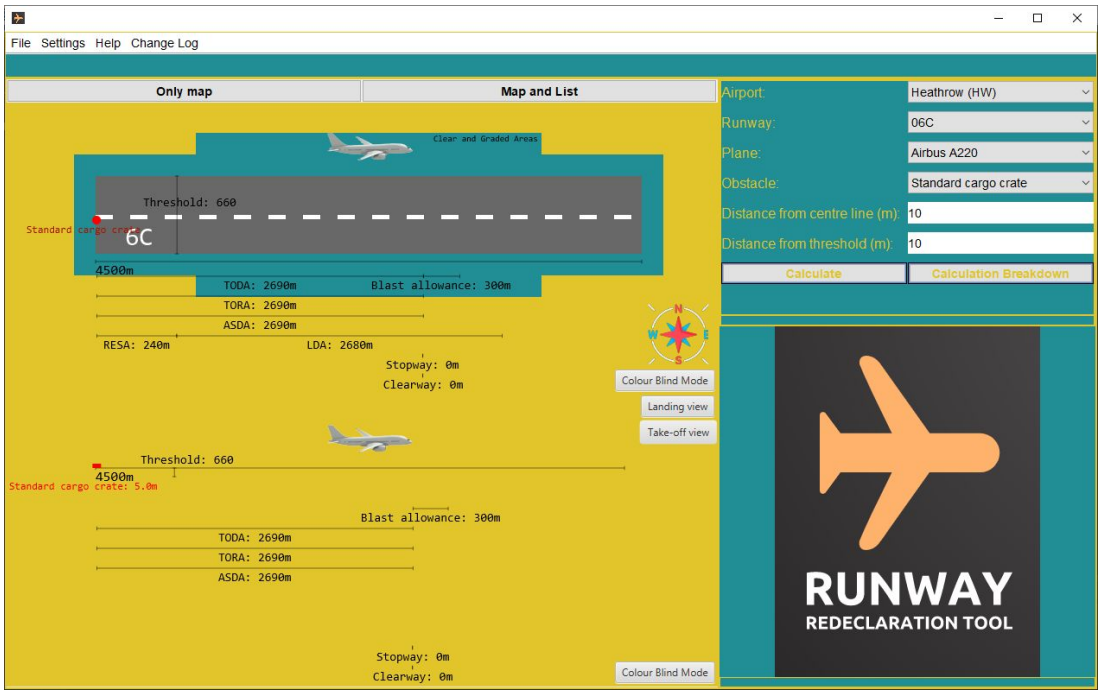
The above storyboard is the updated, final version of the interface. After an initial calculation is performed following program initialisation, the aforementioned screen is displayed.

The breakdowns of this and any subsequent calculations are listed in a table and can be accessed through selecting the row detailing the intended redeclaration instance and pressing the "*Calculation Breakdown*" button on the right side of the screen.

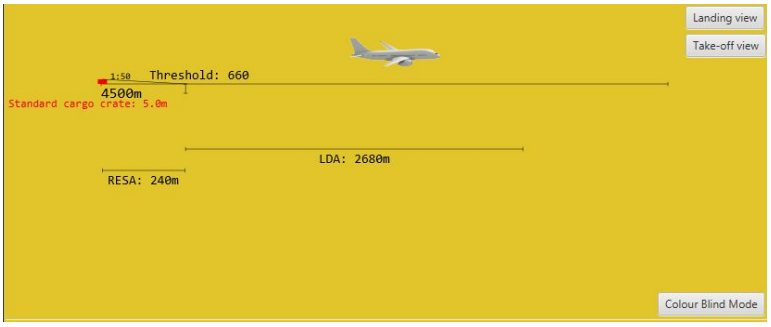
The "*Only Map*" option near the top left of the screen allows the user to see only the top-down and side-on diagrams of the state of the runway following redeclaration on the left side of the screen, without the table listing previous calculations as is currently displayed.

File settings have not been changed from the last increment, but the text size and spacing have improved for a more cohesive interface.

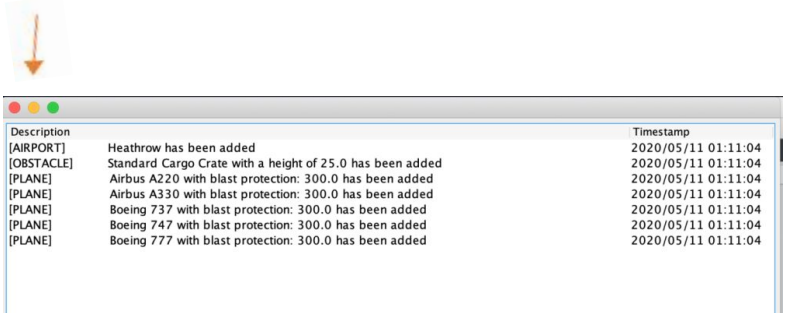
A new addition to the settings panel is *Accessibility*, with options for colour blind users:



The runway can also be toggled to display colourblind mode by the button on its bottom left:



The last storyboard displays a new, additional feature: a "*Change Log*" panel which displays the additions made by user action in a text file, with an associated timestamp of when said changes were performed.



Description		Timestamp
[AIRPORT]	Heathrow has been added	2020/05/11 01:11:04
[OBSTACLE]	Standard Cargo Crate with a height of 25.0 has been added	2020/05/11 01:11:04
[PLANE]	Airbus A220 with blast protection: 300.0 has been added	2020/05/11 01:11:04
[PLANE]	Airbus A330 with blast protection: 300.0 has been added	2020/05/11 01:11:04
[PLANE]	Boeing 737 with blast protection: 300.0 has been added	2020/05/11 01:11:04
[PLANE]	Boeing 747 with blast protection: 300.0 has been added	2020/05/11 01:11:04
[PLANE]	Boeing 777 with blast protection: 300.0 has been added	2020/05/11 01:11:04

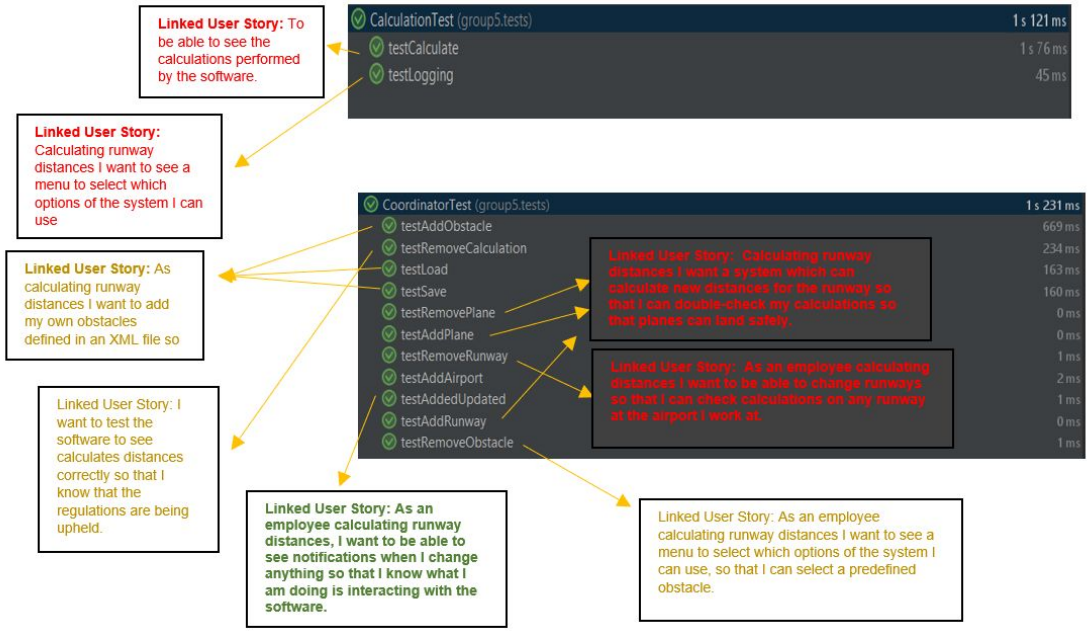
Unit, Regression and Acceptance Testing

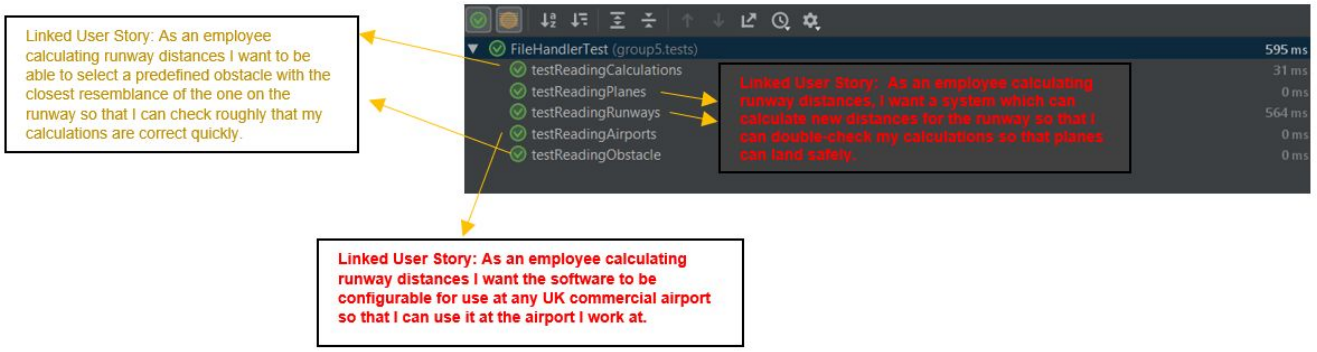
Front-end

People	Scenario	Comments on the interface about the scenario
Jia Stein	*"As an ATC apprentice I want the system to have a simple interface so that I can clearly understand it."*	The interface provided is easily navigable and self-explanatory. New users will be able to quickly pick it up, with the guide if need be.
Joss Neale	*"As an ATC manager I want to be able to change aspects of the UI so that I can cater to employees with accessibility needs."*	Changing the scheme to be suitable for, say, a colourblind person is fairly simple, with a colour scheme that is not displeasing for non-colourblind people to use.
Ishan Power	*"As an employee calculating runway distances I want to be able to see notifications when I change anything so that I know what I am doing is interacting with the software."*	In the application, a notification appears whenever I make an important change, which makes it abundantly clear that the software is registering my actions.
Louie Dunlap	*"As a user I want to switch between top-down and side-on view so that I can see it from all angles and catch any oversights."*	After any calculation, the visuals of top-down and side-on are clearly indicated and it is easy to switch between them or even have them both displayed simultaneously.

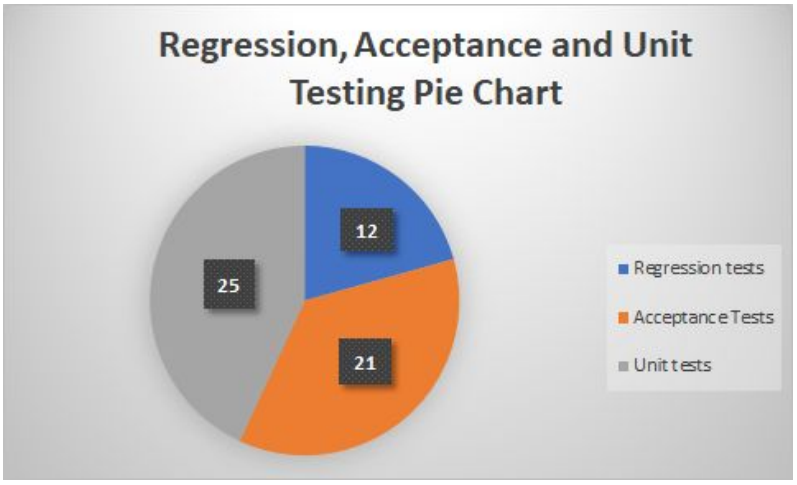
Back-end

All the tests were written to be directly linked to a user story to ensure that we addressed the relationship between them.





Additional Testing



Requirement	Testing type	Description of testing
Top view	Acceptance testing	Tested if all distances were correct. Real-life accuracy of distances were not necessary but we ensured that they were representative of, and would work with, the actual distances.
Side view	Regression testing/Acceptance testing	Tested against some scenarios and identified some errors, rectified the application and re-tested these scenarios to ensure the errors were averted.
Accessibility for users with colour blindness	Acceptance testing	Once this feature was implemented, we revisited our research website (provided in *Key Design Choices*), and checked if the colour scheme would be easy for all individuals to discern regardless of any visual disability.

We also performed regression testing by re-running the unit tests for the calculations written in Increment 2. Acceptance testing is re-performed as we have a new GUI, ensuring that we meet our criteria points.

Sprint 3: Breakdown & Burndown chart

Tasks *(ID, Task name, MoSCoW prioritisation)*

11: *User guide (Should Have)*

- This feature provides a multi-page user guide for the users on how to properly utilise the program and access its features within the application window.

12: *Rotate runway (Could Have)*

- This feature includes functionality for the user to supply a runway angle, with the representation of the runway changed to display a suitably rotated view. (***We decided against implementing this feature as it is flavourful and non-essential***)

13: *Improve GUI (Could Have)*

- Improved visual effects, colors, etc. of the GUI.
- Text size and the spacing have been improved for better visual clarity.
- Breakdown table changed to be in the top-middle part of the screen, with the breakdown of calculations now appearing in a pop up window.

14: *Security features (Could Have)*

- Security features (e.g. login, encryption) for the application and its stored data to keep potentially sensitive data confidential.

15: *Zoom and pan the application (Could Have)*

- This feature allows the users to zoom in and out from the application, furthering customisability to ensure user comfort.

16: *Improve aesthetic of runway visualisation (Could Have)*

- In the previous increment we only had time to visualise the top down view of the runway, a side view has been implemented during this increment.
- The side-on view has the option of being seen in *take-off* or *landing* modes.
- Improved JavaFX panels to have a clearer and easy-to-read design for user benefit.

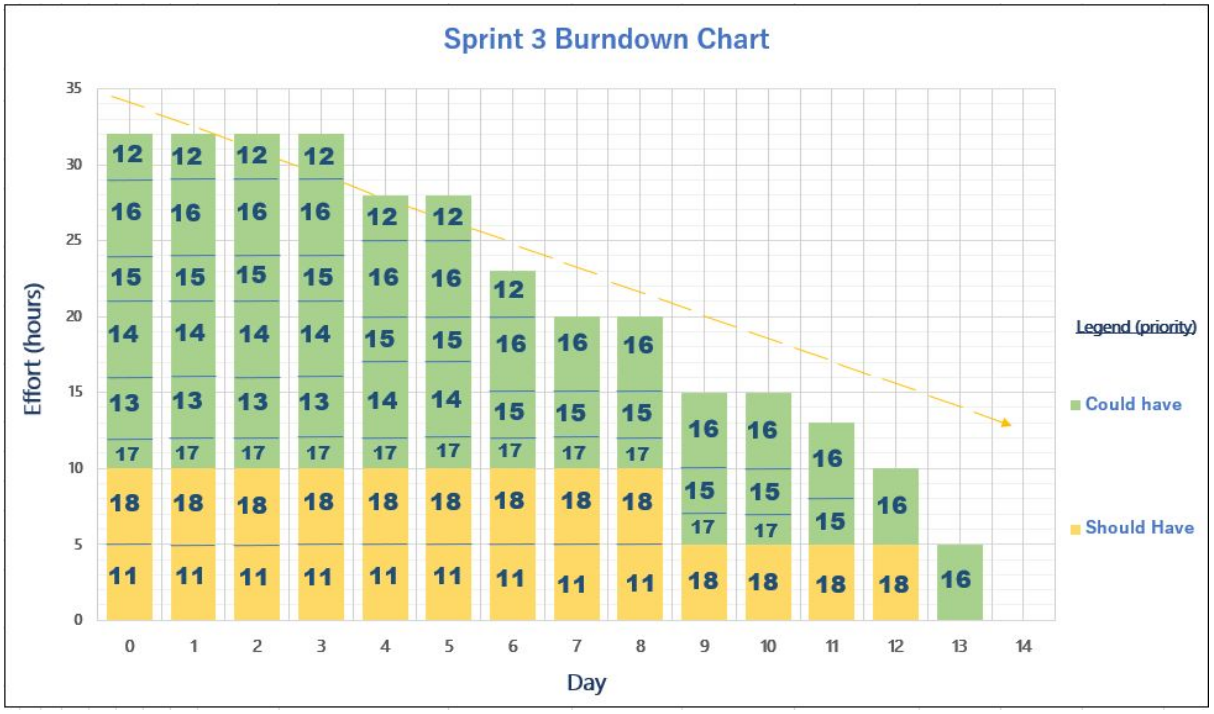
17: *Allow users to customize GUI (Could Have)*

- Allow the user to customise aspects of the GUI for accessibility (primarily the colour palette of the application through provided options in the settings).
- New colourblind mode has added to the application.

18: *Intermediate error handling (Should Have)*

- Improved error handling to cover for a wider range of errors such as type checking.

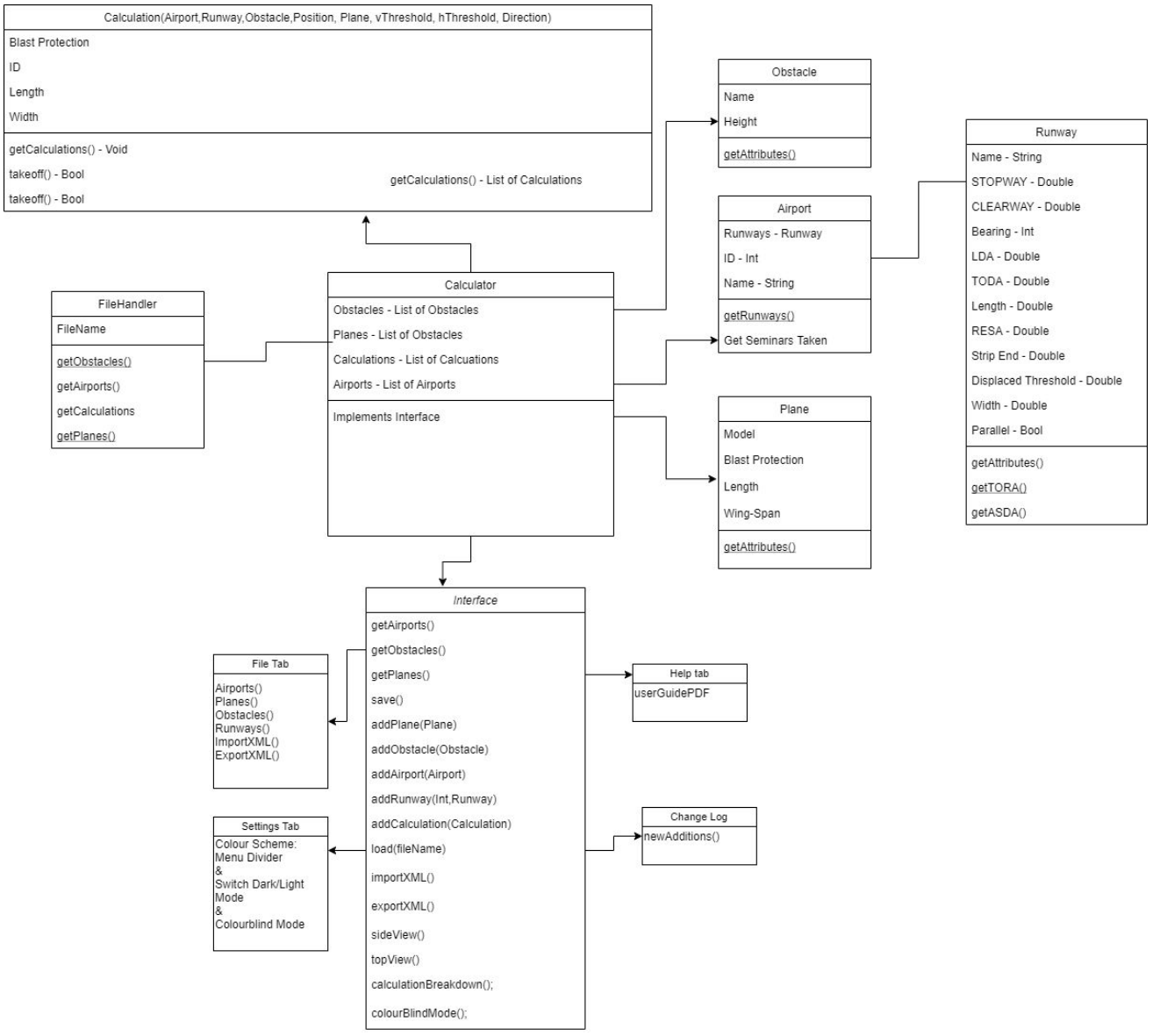
Burndown chart



The burndown chart indicates an increased velocity in the final week of the sprint. This could be attributed to Covid-19 disruption, which was outlined in our risk assessment,

UML Diagram

Class diagram:



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