Wavelength Sail Manager

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# Introduction

## Background

In sail racing, every class or model of boat will have different performance characteristics. To enable different classes to compete against each other in the same race, a handicap scaling factor is applied rather than simply first across the line. This scaling factor is a universally recognised standard as defined by the Royal Yachting Association.

These ‘true’ results must be calculated at the end of the race by hand. This exposes many inadequacies of the system as the Race Officer must first record the type of craft racing and their handicaps. The 5-minute sailing counter must then be started and the lap and finish times recorded as well as process special classifications e.g. DSQ (Disqualification). After the race, the true times must be calculated and input into a database which may then be read at different times throughout the year. This process is repeated manually multiple times each day.

My project is intended to eliminate these tasks by creating an intuitive race management program operating on a tablet or touch screen device whereby the manual effort is removed. This is likely to help a wide variety of race officers and in particular, those who are new to the role or may be less tech-literate. In addition, it will significantly reduce the possibility of error.

There will be many technical challenges with this project, particularly in relation to the storing and manipulation of very complex customisable data. A multitude of administrative features must also be implemented providing the ability to add sailors, classes and configure races amongst others.

A useful feature that should be implemented is the use of serverless technologies to generate data about the weather and current location. These are pieces of information which will be useful for administrators and race officers.

## Aim

In this project I aim to create an all-in-one handicap racing solution where the user starts and manages the race as well as calculating the racing results and providing data manipulation tools for each series of races.

## Objectives

* Create a mechanism for building a library of boat characteristics.
* Create an efficient way for the user to add boats that are racing to a timing screen.
* Allow for the 5-minute sailing countdown to be triggered, reset and managed to remove the need for a clock.
* Provide the ability to calculate results including being able to base off lap times should the race be shortened.
* Give the ability to finish boats easily and calculate the results acknowledging the handicap.
* Display and store the results for future use and administration.
* Make the user processes as simple as possible to ensure widespread usability.
* Provide flexibility for administrators to configure the application in a way that is suitable for the club.

# Project Review and Tecnhical Investigations

## Stakeholder Investigation

## Requirements and analysis

### Requirements Gathering techniques

#### Primary stakeholder

In my project I selected to have one primary stakeholder. This is primarily because I have substantial experience in this area myself. I choose Liz as my primary stakeholder due to her numerous years as chief race officer for Newcastle Yacht Club. As part of this she has invested significant amounts of time working with a similar but distinct application, HalSail. Liz also has vast experience as a race officer working with multi-class fleets of sailing dinghies.

##### Primary stakeholder strategy

My primary method for gathering resources and requirements from the primary stakeholder is an interview style format. The focus of this initial interview is to gather requirements of the ideal program. This is likely to be specific to the needs of a small club, this is ideal as it’s the programs intended purpose. I also plan to gain information around the way Hal is used within the club and gather the improvements that could be made. Unfortunately, neither Liz nor anyone else I know has used the mobile version, likely due to its very limited support. Due to that I plan to discuss the app with Liz and perform brief usability testing to gather the immediate issues.

The purpose of this interview is also two-fold, one part to gain requirements and the other to understand common issues within existing applications and aim to fix them. The requirements will form a significant proportion of the information gathering session, by the end I will hopefully have a set of comprehensive notes which I can turn into requirements.

##### Planned 1st stage questions

* Can you give a description of managing a race from the perspective of a race officer when not using software to assist and working with everything manually?
* Can you give a description of managing a race from the perspective of a race officer when using software to assist (HAL)?
* Can you tell me why you prefer one option over the other?
* How do you normally organise the timing aspect of the race?
* Have you ever used a software alternative to manage the timing aspect of the race?
* Do you have any frustrations with the timing aspect of the race currently?
* Do you have any frustrations with the entering of race data into HAL?
* You are an administrator of HAL, how friendly do you find the use of the application from administrators’ perspective?
* Are you happy with the way Hal manages the data?
* Can you think of any immediate improvements you would make with HAL?
* Here’s a mobile application with timing functionality, take a look around and play with the app.
* Would you find using an app that also records the data for a series useful?
* Do you have any improvement suggestions for the app?
* Finally, is there anything you would like to see in a future application used to manage both the timing aspect as well as the data handling.

##### Main stakeholder Interview

An hour-long interview was conducted early in the refinement gathering process. More information on the questions to be asked is included in add location here. The primary stakeholder is the chief race officer at Newcastle YC. Liz manages all aspects of racing and as such will have a clear view of the race administrator process. Through this interview key takeaways were gained which will heavily influence the requirements that are set and the prioritisation of each. An example of some of the key items gathered that previously hadn’t been discovered through analysis are shown below:

* The membership secretary should be able to maintain a list of the racing craft and sailors. This is important to allow those who have access to the information to set the correct information.
* Race officers generally prefer to be on the water. As such the software could be on a portable waterproof device to assist with this.
* Can use a stopwatch style timing system rather than a current time calculation. Allows for more flexibility.
* PY calculation should be flexible and adjust for different numbers of laps.
* Include buttons to lap and record lap times. The number of laps completed should be included to increase race officer understanding.
* Allow assigning of special values at any point in the race.
* Add series calculation functionality to show winners and results per series.

#### Secondary stakeholders

##### Secondary stakeholder strategy

Although I have a key primary stakeholder, I would still like to include further officers to ensure that I have accurately captured the end user and not just the administrator’s perspective. For this I will create a survey which will be shared within the main group of people who share race management responsibilities, the survey questions can be found below:

* When performing race officer duties do you prefer to use pen and paper to calculate the results or software on the laptop? \*
* How many times in a year are you likely to be race officer or interact with series management? \*
* Rate the current difficulty of starting, finishing and timing a race?
* What are the top 3 improvements you would make to the race management from a race officers perspective?
* Do you normally interact with a data recording system when on duty (e.g. HalSail, SailWave) \*
* If yes or sometimes, rate how easy that application is to use and understand.
* Have you ever used an app to manage the timing aspect of the race? e.g. Boat Timer
* How likely are you to use the following features if they are available?
  + Add boats to that day’s racing by being able to select them from a list rather than asking each individual? \*
  + Start a race at any time by pressing a button which provides a countdown rather than starting a race based on a specific time? \*
  + Record the finish time of each boat when they cross the line by pressing a button, where the handicap time is then calculated automatically? \*
* Are there any other features you may find useful?

##### End user questionnaires

End user questionnaires were sent out to a variety of individuals who have interactions with race management on a regular to semi-regular basis. In total 6 individuals responded, this is a good number for small club. The questions asked can be viewed at insert section.

The results received were useful to corroborate the views of the chief race officer however two questions asked provided more interesting results. These were ‘Have you ever used an app to manage the timing aspect of the race? E.g. Boat Timer’ (Q1) and ‘When performing race officers duties do you prefer to use pen and paper to calculate the results or software on the laptop’ (Q2).

The results received from Q1 (Fig 1) show a clear gap in the market to introduce a mechanism for timing. 83% of respondents indicated that they previously hadn’t used an automated system to manage the racing.

The results from Q2 show that 2/3rds of the respondents indicated they prefer using a software option rather than working out the results manually, this is perhaps not unexpected as the users that indicated this tended to be more tech-literate. The users who prefer the software option also tend to perform the role more so may find using an automated process has an increased efficiency.

### Existing Software Analysis

#### Introduction and overview

In the market currently there are 2 different types of solutions available, these are:

* Solution 1 - A management and timing system of the race itself, often features functionality to add racers, start and finish the race and display a summary of a results sheet.
* Solution 2 – A records keeping system for races, often can manage a series of races. Usually, database style features are available as well as customisation features to allow individual clubs to setup race schedules.

#### Currently available soloutions

##### HalSail

The most popular app for solution 2 is called HalSail (Hal), this is the app that my local sailing club uses for storing the races. Hal works solely based on user input, this includes the start and finish time of each boat. There are no timing features within Hal. Hal maintains a database of different sailors and their classes and allows the race officer to add each to a race. The main feature of Hal is a deep feature set of historical races and allowed computation of multiple series.

Positives:

* Very in-depth back end allowing an administrator to execute queries for series podium prizes.
* Contains a repository for storing boats and their respective sailors to allow simple adding to races.
* Has the ability to customise handicap values (PY) including adding new craft.
* Provides clients with a results sheet which can be shared online easily.
* Allows the input of special race classifications e.g. OCS – Over the line

Drawbacks:

* Although feature rich the user interface displays this badly, this often causes difficulties for those not used to the application.
* Although a craft may finish the race in hours and minutes e.g. 1 hour 10 minutes, the program only accepts a finish time in 24 hr format. This means for each boat a finish time must be calculated by adding duration to the start time.
* There is no start time functionality, this means the 5-minute sequence must be managed separately.
* The ability to add sailors who sail multiple classes of boat is poor and often causes confusion.

##### Sail Results

An app which I used previously was called sail results. Although this app is no longer functioning on the latest version of android it was intended to solve some of the problems from solution 1. This app provided an interface which started with a countdown timer and allowed boat classes to be added to the race, it was then up to the user to ensure all craft were added and then start the race along with lapping. At the end of this race the app would display results however its long-term storage functionality was very limited.

Positives:

* Used a sailing timer to start the race, providing sounds at each interval (intervals are a common standard for sailing watches).
* Allowed the restarting of the countdown with ease
* Allowed the boats to be added prior to the countdown starting
* Provided the ability to lap boats
* Had a good summary of results on the final page including the ability to email results

Drawbacks:

* The UI was not user friendly which led to the following problems
  + The functionality to add a boat to the race relied on the user entering a CSV style list with no spaces, this was unhelpful for non-tech savvy officers.
  + There was no button to finish craft, instead the last lap function was used. This often-caused confusion.
  + It was particularly difficult to set a schedule of races, this caused issues where multiple races could accidentally be added.
* There were no collections of boats that had sailed previously, this meant the app relied on the race officer individually adding each sailor and boat for each race or series. This method was prone to mistakes and there was no functionality to rectify.
* Customisable PY (Handicaps) could not be added, this meant some classes without predefined handicaps could not be raced.
* There was no ability to add special result classifications e.g. OCS – Over the line.

##### SailWave

SailWave is an application which doesn’t directly solve either of the solutions but regardless is an important application to look at due to its widespread use in many clubs and regattas.

SailWave is a much simpler version of both of the above applications, its design is based around all of the racing craft being the same fleet with the same PY. It can also be used for handicap racing but this is not the main feature of the application. SailWave can be likened to an excel spreadsheet in its management of results and is mainly used by professional race officers and larger racing clubs. This is possible because many of the race organisation teams do the manual recording on paper prior to adding to SailWave.

As SailWave isn’t designed to implement either solution above we can’t draw positives and drawbacks however there are still takeaways from what it does well. This includes:

* A simple administration interface, this is particularly useful for series customisations.
* Interface can be likened to the results printout; this provides instant feedback for the race officer.
* Boats can be added very quickly to the races.

#### Takeaways

The main aim of my project is to combine solution 1 and 2 into one product, this means its key to retrieve takeaways from existing products that implement or partially implement each. I should also retrieve takeaways from other similar solutions such as the SailWave application.

The takeaways I aim to include are shown below, this list only includes possible component improvements from the analysed solutions. These should form part of the requirements refinement process:

* There should be a query results function to allow an administrator to select the results they wish to view.
* There should be a store of boats matched up to sailors allowing race officers to add craft to races easily.
* It should provide PY handicap valuation manipulation with stock handicap values being gained from online services.
* Provide a sharable link for results so racers can easily see how they performed.
* Allow special classifications to be added instead of numerical place values.
* Implement a timing solution that functions based on a stopwatch mechanism.
* Be able to lap and finish boats individually as they cross the line.
* A customisable starting sequence should be implemented including a sailing style timer.
* A series setting ability should be available to set when races should start.

### Prioritisation

#### Moscow

#### Relative weighting

## Risks

# Appendix

## Fig 1

Chart, pie chart

Description automatically generated

## Fig 2

Chart, pie chart

Description automatically generated