Marine Biological Association

Invitation to Tender – Continuous Plankton Recorder Data Infrastructure

The Marine Biological Association (MBA) is a Company incorporated by Royal Charter and Charity registered in England and Wales (Registered number 1155893). The MBA was founded in 1884 and is a centre of excellence for marine science, with over 130 years of experience of the delivery of world-class marine science. The MBA also operates the Continuous Plankton Recorder (CPR) Survey, which is the most geographically extensive marine monitoring programme in the world and has been monitoring the health of our oceans since 1931. The CPR Survey is operated from the MBA laboratory which is situated at Citadel Hill, Plymouth PL1 2PB.

The MBA wishes to invite tenders for provision of a web-based tool and associated database to support the capture, storage, management and publication of data and associated information relating to the activities of the Continuous Plankton Recorder Survey.

Requirement and Technical specification
As detailed in Appendix 1. All "Must Have" elements need to be delivered in a Minimal Viable Product (MVP).

The criteria for selecting the successful candidate will be:
1. Value for money
2. Fit for purpose
3. Level of experience of supplier
4. Quality of product based on customer satisfaction on their products
5. Speed of delivery
6. Warranty and post-purchase servicing agreement (length of cover and level of support)
7. Timely and full quote by the published closing date and time

A written quotation (excluding and including VAT) for supplies, shipping costs, services and timelines for delivery must be submitted to Dan Lear (dble@mba.ac.uk) by the closing time and date. Late submissions may not be eligible.

An indicative timetable for the process is provided below:

28th April	-	Published date
19th May		Closing date for Clarification questions
2nd June at 18:00		Closing time and date for submissions
16th June		Bidders notified of outcome
TBC with successful bidder	-	Contract start date
TBC with successful bidder		Contract end date

Clarification questions should be sent to Dan Lear (dble@mba.ac.uk) by the closing date. Clarification questions and answers will then be circulated to all bidders.

Bidders should provide with their quotation:

1. Company details
- Name of main contact
- Proof of company registration and nature of business:
- Employers and Public Liability Insurance certificates
- Environmental Policy
- Health and Safety Policy

2. Itemised list of deliverables and a description of how they meet the specification.

3. Experience

- Please provide examples of previous involvement in similar projects to the Requirement

4. Quality of Product:

- Please provide 2 examples of similar previous products provided within the past 3 years with the following details:
  - Description of contract
  - Dates
  - Value of contract
  - Contact details and name of client contact who we may approach for a reference or evidence of product reviews.

5. Ongoing support and service agreements available.

6. Estimated delivery period from purchase

All bidders will be notified of their tender outcomes by the date provided.

Yours Sincerely.

David Johns
Director of Research Facilities
Head of CPR Survey

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Appendix 1 Technical Specification

CPR Survey Data Management & Publication Platform

Technical Specification

Introduction

The Marine Biological Association (MBA) is one of the world's longest-running societies dedicated to promoting research into our oceans and the life they support. Since 1884 we have been providing a unified, clear, independent voice on behalf of the marine biological community and currently have a growing membership in over 40 countries. We also run a leading marine biological research laboratory where many eminent scientists - including 7 Nobel prize winners - have carried out their research.

Driven by almost a century of sustained plankton observations, scientific excellence and innovation, the Continuous Plankton Recorder (CPR) Survey is a globally recognised leader on the impacts of environmental change on the health of our oceans.

As a large-scale global survey, it provides the scientific and policy communities with a basin-wide and long-term measure of the ecological health of marine plankton. Established in 1931, the CPR Survey is the longest running, most geographically extensive marine ecological survey in the world and the home to a considerable database of marine plankton and associated metadata that is used by researchers and policy makers to examine strategically important science pillars such as climate change, human health, fisheries, biodiversity, pathogens, invasive species, ocean acidification and natural capital.

Project Aims

This contract aims to produce a cloud-based data management and publication solution to meet the operational needs of the CPR Survey.

The solution will enable rapid and accurate data entry, analysis, visualisation and publication using global standards for marine biological data.

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Project Background

The CPR survey is wholly dependent on the ability to effectively capture, manage and publish data relating to CPR tows. New and emerging opportunities to augment the traditional survey outcomes with data resulting from ancillary instrumentation, new analytical techniques ('Omics and other molecular approaches) and the improvements identified through the iCPR project have increased the need for a 360 degree view of the entire CPR data lifecycle. However the current infrastructure is no longer fit for purpose. It is therefore timely to re-specify and re-engineer a bespoke data infrastructure to ensure the CPR survey remains relevant, trusted and transparent and able to deliver high-quality data to key end users in a timely manner.

The CPR Console and the underlying data infrastructure is at the heart of the planning, capture and quality assurance of CPR data. It has been developed over a number of years and by several developers with differing approaches to programming and database management. In addition there are differing levels of associated technical and user-level documentation.

There are several key risks around the current state of the database and CPR console, including the reliance on old, legacy code and that the underlying database is based on commercial, licensed software.

Given the importance of Console and the back-end database to the effective functioning of the CPR Survey, it is now necessary to undertake work to ensure that the next revolutionary steps can take place from a solid foundation.

The development of the instrumentation area of work through the iCPR project and the application of 'Omics approaches to the 'traditional' CPR require the restructuring and reengineering of the whole application into a modular application with the core data at its hub.

We have initiated this work through the collection of a suite of 'User stories' to capture requirements that the new system must meet.

Project Governance

A project Steering Group will be established made up of key MBA staff involved in the use of the current CPR data infrastructure, including operations, research, analysis and data management. Their role will be to provide feedback on development, clarify and expand upon existing User Stories, and ultimately provide ‘sign-off’ for completion of the project.

Key Assumptions

- The outputs will be aligned with the CPR strategy and underpin all aspects of CPR survey activity
- This project will rebuild the CPR database and associated console from the ground up
- The resulting outputs will be hosted in the cloud for scalability and accessibility
- The MBA will have full access to the database.
- The MBA will have access to the raw code.
- The solution will include a standardised export to support the CPR research programme
- The database will include the capability to integrate additional data types including new types of measurements and improvements identified through the iCPR project and additional work in the area of instrumentation

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CPR Survey Process Description

Continuous Plankton Recorder (CPR)

The Continuous Plankton Recorder (CPR) is an instrument designed to capture plankton samples, towed by a fleet of ships over huge areas of ocean.

The CPR works by filtering plankton from the water over long distances on continuously moving bands of filter silk. The filter silk band is wound through the CPR on rollers turned by gears, which are powered by a propeller. The internal mechanism of the CPR is a self-contained cassette that is loaded with the filtering silk at the laboratory. On some tows, the ships are supplied with several cassettes, which they load into the CPR body to increase the sampling range.

Route

The CPR Survey uses a number of predefined routes. A route is a named set of points across a stretch of ocean.

Tow

A tow is one use of the CPR over a specified route. On return to the laboratory, the silk is removed from the mechanism and divided into samples representing 10 nautical miles of towing.

Samples

The plankton taxa on these samples are then analysed by analysts according to standard procedures.

Check Blocks

Sometimes the initial analysis reports unexpected results. Senior Analysts raise check blocks to request further investigation of those unexpected results, to confirm or change the initial analysis.

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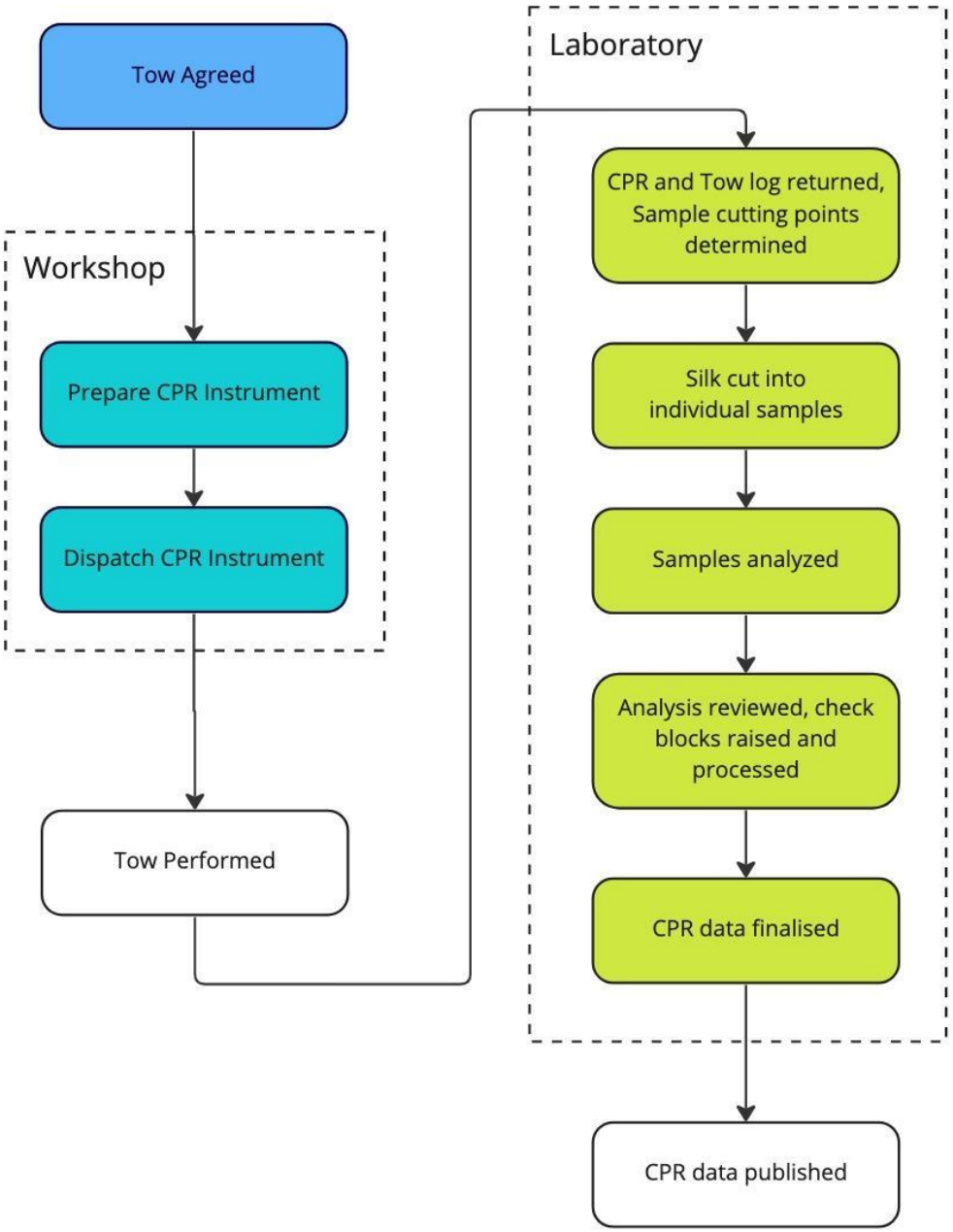
Process Overview



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Existing Solution

Overview

The core of the existing functionality is to create and manage CPR tows and samples data, and to publish finalised data. This includes recording details of completed tows, recording tow sample cutting, recording the results of sample analysis, creating and processing sample check blocks and publishing the finalised data.

Please refer to Appendix 2 for full details of the existing functionality

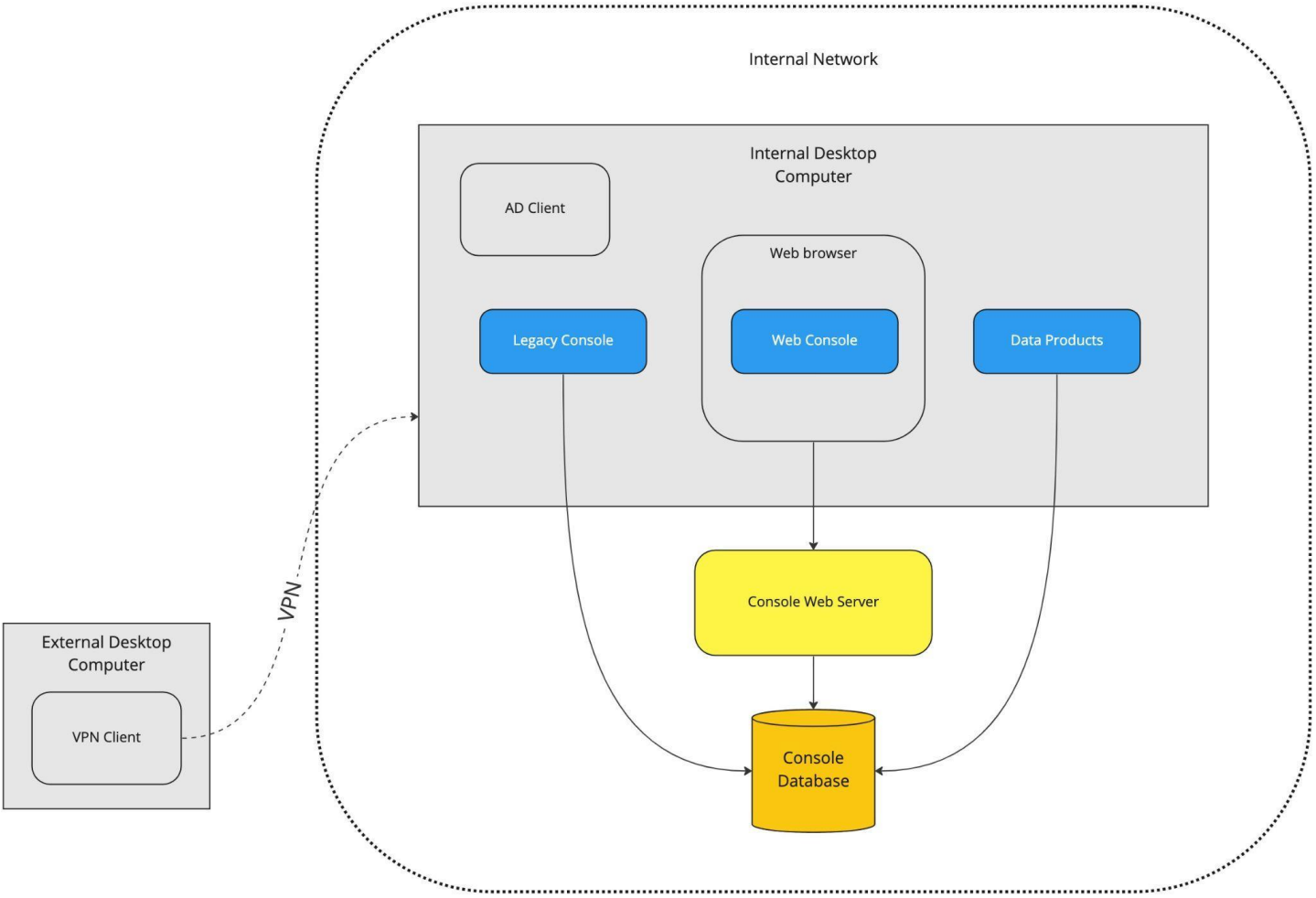
The existing data model centres on tow and sample data models, and includes related data models that support those main data models. The current CPR data schema has grown organically, and does not currently reflect database design best practice. Currently hosted on Microsoft SQL Server with a development version running on PostGres, there is a need to review and reengineer the underlying data model to best reflect current and future CPR Survey activities. This should include the use of community and domain controlled vocabularies and GUIDs where applicable to increase external interoperability.

Please refer to Appendix 3 for full details of the existing data model

Components

The existing solution is made up of the following components:

- CPR Database
- CPR Web Server
- Legacy console
- Web console
- Data Products



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Product Specification

Overview

The new solution should be an entirely new platform that provides the desired existing features and builds upon them with a number of new features. Its primary purpose is to facilitate data entry, analysis, visualisation and publication relating to the CPR Survey.

General requirements

Accessibility

The system should be compliant to at least WCAG “A” level accessibility, where possible, providing alternative text and help tips and a clean visual appearance. However, if possible within the available initial build budget, AA accessibility would be preferable.

Backups/Disaster recovery

The system must have the ability to recover from severe data corruption/loss through a backup system. Backups will be taken at an agreed frequency and retention on discussion with the user group considering cost implications.

Future proofing

The system must be extensible, allowing for additional parameters and fields to be added to the data model as survey techniques change, and allow for the ability to extend the model to further tables.

Geographic data

The system must hold true geospatial data.

Legislation

The system must be Compliant with the NCSC - National Cyber Security Centre - 14 Cloud Security Principles and be GDPR compliant by design.

Availability

The system must be appropriately available, excepting planned downtime for development and scheduled tasks, which will be agreed with the project governance groups.

Performance

It should provide adequate performance levels to allow a user to manage and analyse their data without significant impairment.

Security

The system must be secure against the most common forms of attack (e.g. SQL injection). The system must incorporate a suitable access and permissions model. The developers must be certified with Cyber Essentials +.

Scalability

The system must be scalable to allow for both additional data and additional users to be added.

Usability

User interfaces should be fully descriptive and laid out in a manner that guides the user along the process required to enter/edit/view data. Where functionality is not immediately intuitive in-context help should be provided.

The digital processes embodied in the platform should work harmoniously with existing paper systems.

Data Migration

All existing data from the current CPR Survey database needs to be migrated to the new solution.

Including:

- Users
- Ships
- Routes
- Tows (Finalised & Unfinalised)
- Samples (Finalised & Unfinalised)
- Taxa
- Taxa hierarchy
- Check blocks
- Preset geospatial grid “squares”

The migration process will need to include full checks on data integrity and user acceptance.

A testing system needs to be developed to compare data from the old console system to the new platform to ensure that the data is correct.

As part of the migration, a list of all notes from each tow / sample should be provided to MBA. This will form the basis of a new tagging system. MBA staff should then set flags on each tow / sample based on the notes.

Quality Assurance

The reliability of the data and the system is critical to the ongoing operation of the CPR Survey.

As such there is a significant emphasis on Quality Assurance, including the need for :

- Detailed design & specification of all features prior to development, including:
    - Consideration of impact on existing data
    - Consideration of impact on existing functionality
    - Consideration of security
    - Consideration of permissions
    - Consideration of usability
    - Consideration of performance

- Appropriate branching strategy
- Code reviews
- Unit tests for all frontend and backend features
- End to end tests for all frontend and backend features
- Generation of manual test checklists
- Continual documentation updates in line with release of new features
- Manual testing before each release
- Minimum of 3 platform environments:
    - Test
    - Staging
    - Production
- Automated monitoring of all services
- Access control monitoring
- Reporting of issues, particularly including those related to:
    - Security
    - Availability
    - Data integrity

Future Development

It is expected that there will be continued future development of the platform including enhancing existing features and development of new features, particularly relating to the addition of new instrumentation and data publishing options. It is required that the developer is able to continue to develop the platform beyond the initial version.

Offboarding

A robust ‘offboarding’ strategy for data model, data and software to avoid vendor lock-in and in the event that the system becomes non-operational.

Documentation & Training

The system should be documented, providing all information that users and administrators require in order to competently interact with all aspects of the system.

Feature Number	User Story	MoSCoW
1.1	Training video showing how to use each feature	COULD
1.2	Searchable help site showing how to use each feature	MUST
1.3	FAQ site	COULD
1.4	In person training workshop on delivery	MUST
1.5	Technical documentation of system architecture	MUST
1.6	Technical documentation of each feature including explanation of logic	MUST
1.7	Documentation of each database table ● Relations ● Possible values	MUST
1.8	Documentation must be updated after any changes	MUST
1.9	Flow chart of user processes	MUST
1.10	Project management documentation	SHOULD
1.11	Access to version control for system changes	MUST

Maintenance & Support

- Office hours
- 1 hour responses on urgent queries
- Immediate investigation, prioritise
- Same-day responses on non-urgent (before 4pm)
- 99.5% uptime
- Scheduled maintenance windows
- Appropriate penalties for failure to meet maintenance and support commitments

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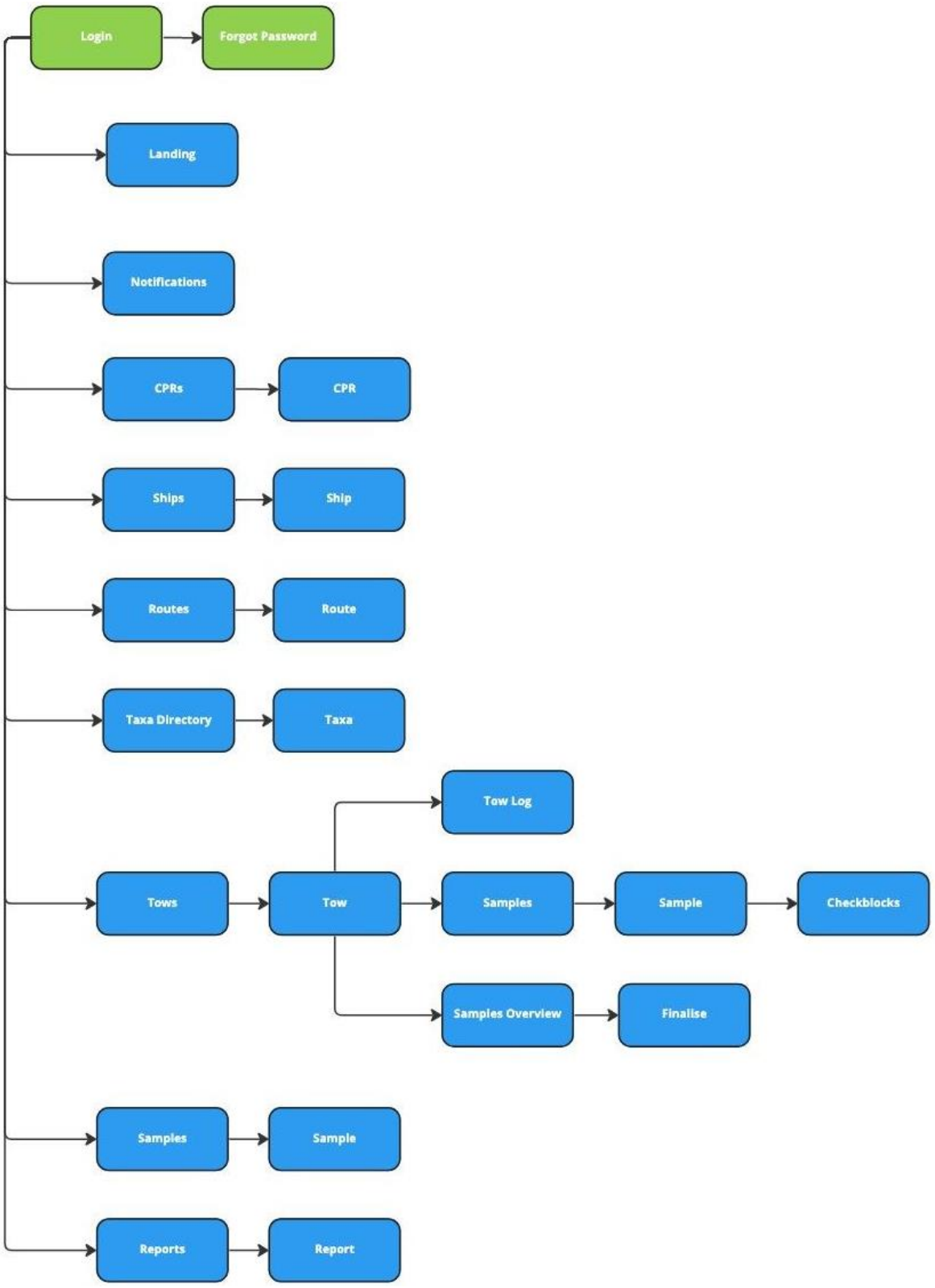
Sitemap



Database Requirements

Feature Number	Requirement	Notes	MoSCoW
2.1	Data should be stored in NoSQL database	Allow for ongoing future dynamic changes to data model with minimal development effort	SHOULD
2.2	Data stored in first class cloud database provider		MUST
2.3	Data encrypted at rest		MUST
2.4	Least privilege RBAC for database		MUST
2.5	Correct handling of timezones is critical. All dates to be stored as UTC datetimes.		MUST
2.6	Using correct data types for each field is critical		MUST
2.7	Differentiate between blank and zero for all numeric fields		MUST
2.8	Deletes should be “soft” - (marked as deleted rather than actually deleted)		MUST
2.9	All data should have createdAt, updatedAt and deletedAt fields		MUST

2.10	Backup snapshot schedule: ● Hourly for 7 days ● Daily for 8 weeks ● Weekly for 3 months ● Monthly for all time		MUST

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Backend Requirements

Feature Number	Requirement	Notes	MoSCoW
3.1	Backend implemented as an API using modern, industry standard technology		MUST
3.2	API Implemented as microservice architecture		MUST
3.3	API hosted in industry standard cloud hosting platform		MUST
3.4	Implemented as a modular data system - based on the tow and sample as the anchor data model, with any number of different data models attached to it. Initially PCI, taxa counts being the first two. Future data models may include temperature for example.		MUST
3.5	Correct handling of timezones is critical. All datetimes to be stored as UTC. API to only accept UTC datetimes, and to process and return UTC datetimes.		MUST

Frontend Requirements

Feature Number	Requirement	Notes	MoSCoW
4.1	The platform frontend must be compatible with Chrome desktop browser		MUST
4.2	The platform frontend should be compatible with Edge and Safari desktop browsers		MUST
4.3	The platform frontend should be compatible with mobile Chrome and Safari browsers		COULD
4.4	The platform frontend must have a responsive frontend that is compatible with standard desktop resolutions.	Standard desktop resolutions: ● 1366x768 (22.98%) ● 1920x1080 (20.7%) ● 1536x864 (7.92%) ● 1440x900 (7.23%) ● 1280x720 (4.46%)	MUST
4.5	The platform frontend must have a responsive frontend that is compatible with standard mobile web resolutions :	Standard mobile web resolutions : ● 360×800 (8.56%) ● 414×896 (6.95%) ● 360×640 (6.45%) ● 412×915 (4.77%) ● 390×844 (4.75%)	COULD

Authentication Requirements

Feature Number	Requirement	Notes	MoSCoW
5.1	All functionality of the platform should only to be accessible to authorised users		MUST
5.2	It should not be possible for users to register their own accounts. All user accounts should be created by existing admin users and linked to Azure AD users.		MUST
5.3	All user-accessible functionality of the platform should require multi-factor authentication (MFA)		MUST
5.4	All passwords should be a minimum of 10 characters with at least one number, uppercase letter and special character		MUST

Roles & Permissions

Permissions

The following permissions should control access to specific functionality in the platform

Scope	Available Permissions
User	view/edit
CPR	view/edit
Ship	view/edit
Route	view/edit
Tow	view/edit/cut/finalise
Sample	view/edit/allocate/finalise
Checkblocks	view/edit/comment

Taxa Directory	view/edit
Reports	view
Audit	view

User Stories

Authentication

The users of the system will be MBA staff and other personnel authorised by MBA.

Story Number	User Story	Required Permissions	MoSCoW
US1.1	Users can log into the platform using Azure AD		MUST
US1.2	Users can log in to the platform using a username and password		MUST
US1.3	Users should be able to log out		MUST
US1.4	Users should be able to reset their password		MUST
US1.5	Users should be able to set an MFA authentication device		MUST
US1.6	Users should be able to enter an MFA code to gain access to the system		MUST

Navigation

The platform must feature appropriate navigation options to access the different platform features.

Story Number	User Story	Required Permissions	MoSCoW
US2.1	All users should be presented with a landing screen after logging in		MUST
US2.2	All users should be presented with navigation that allows them to easily access the screens that they have access to		MUST

Notifications

Users must be notified of certain events in order to take the appropriate next steps.

Story Number	User Story	Required Permissions	MoSCoW
US3.1	All users should be shown a list of notifications		MUST
US3.2	All users can mark notifications as view or dismissed		MUST
US3.3	All users can filter their notifications to only include unread, or to include read notifications and to include dismissed notifications		MUST

US3.4	All users can further filter their notifications by:
	• Type
	  ○ Tow status has been updated
	  ○ Sample has been assigned to current user
	  ○ Check block has been assigned to current user
	  ○ Check block assigned to current user has been updated
			MUST

	○ All samples for tow have been finalised ● Initiating User		

Routes

CPR Survey routes data must be displayed and editable in the platform.

Story Number	User Story	Required Permissions	MoSCoW
US4.1	All users should be able to view a list of routes	Routes view	MUST
US4.2	All users should be presented with a list of routes that is sorted alphabetically by default	Routes view	MUST
US4.3	All users should be able to view a specific route, represented as a list of points and displayed on a map	Routes view	MUST
US4.4	All users should be able to view a history of route changes	Routes view	MUST
US4.5	Senior Engineer users should be able to create new routes	Routes edit	MUST
US4.6	Senior Engineer users should be able to edit routes	Routes edit	MUST

CPRs

Details of the CPR devices must be displayed and editable in the platform.

Story Number	User Story	Required Permissions	MoSCoW
US5.1	All users should be able to view a list of CPRs	CPR view	MUST
US5.2	All users should be able to view details of a specific CPR, including:	CPR view	MUST

	• Status • Capacity • Future allocation (to tow) • Tow history		
US5.3	All users should be able to view a history of CPR changes	CPR view	MUST
US5.4	Senior Engineer users should be able to edit details of a specific CPR	CPR edit	MUST
US5.5	Senior Engineer users should be able to create new CPRs	CPR edit	MUST
US5.6	Senior Engineer users should be able to delete CPRs	CPR edit	MUST

Ships

CPR Survey ships data must be displayed and editable in the platform.

Story Number	User Story	Required Permissions	MoSCoW
US6.1	All users should be able to view a list of ships	Ships view	MUST
US6.2	All users should be presented with a list of ships that is sorted alphabetically by default	Ships view	MUST
US6.3	All users should be able to view a specific ship	Ships view	MUST
US6.4	All users should be able to view a history of ship changes	Ships view	MUST
US6.5	Senior Engineer users should be able to edit details of a specific ship, including: • Contract	Ships edit	MUST

	• When to change blocks
	• When to examine
	• Equipment category
	  ○ A - permanently installed: Installed cert 5 year load test
	  ○ B - accessories 6 months
	  ○ C - Tow wire with shackles
	  ○ Risk assessments issues		

US6.6	Senior Engineer users should be able to create ships	Ships edit	MUST
US6.7	Senior Engineer users should be able to add ships to AIS Fleet Maintenance list	Ship edit	MUST
US6.8	Senior Engineer users should be able to delete ships from ships to AIS Fleet Maintenance list	Ship edit	MUST
US6.9	Senior Engineer users should be able to set ships status ac active/inactive in AIS Fleet Maintenance list	Ship edit	MUST

Tow Statuses

Tows can have one of the following statuses

Tow Status	Notes
Created	
Prepared	
CPR Dispatched	
CPR Returned	

Cutting	
Allocation	
Analysis	
Checkblocks	
Finalised	
Reopened	

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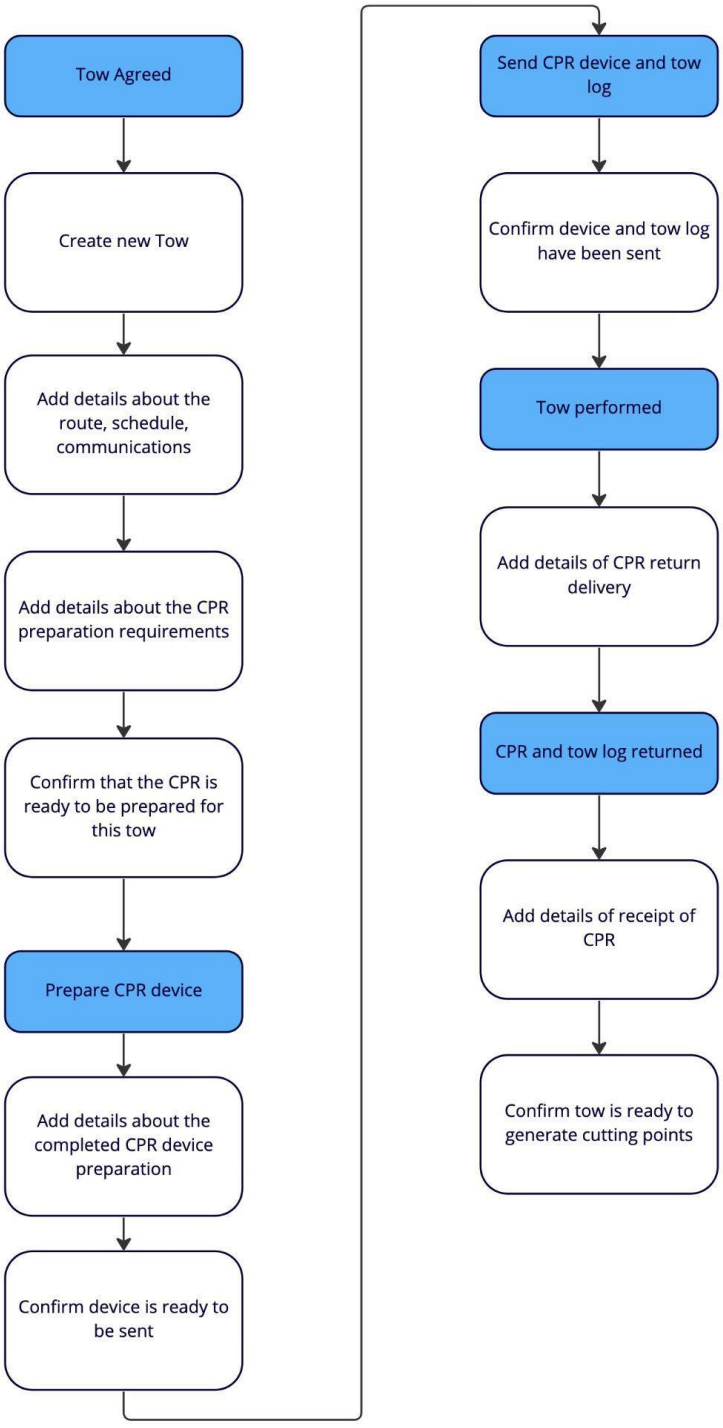
CPR Preparation

Details of a tow from planning stage, through to cutting, analysis and finalising must be presented and editable via the platform.



Story Number	User Story	Required Permissions	MoSCoW
US7.1	All users should be able to view a list of existing tows. The list should show at least the following fields: • Tow ID • Route ID • Tow completion date (within a range) • Finalised date (if finalised) (within a range) • Status (planned / active / returned) • Finalised yes/no • Last modified date (range)	Tows view	MUST
US7.2	All users should be presented with a list of tows that is sorted by last modified date by default	Tows view	MUST
US7.3	All users should be able to sort tows by: • Last modified date • Tow ID (alphanumerical) • Route ID (alphabetic), then Tow Number (numeric) • Tow completion / returned date • Finalised date (if finalised)	Tows view	MUST
US7.4	All users should be able to filter lists of tows by: • Last modified date (range) • Tow ID • Route ID • Tow completion date (within a range) • Finalised date (if finalised) (within a range) • Status • Finalised yes/no • Has samples currently assigned to active user • Has checkblocks	Tows view	MUST

	• Has checkblocks assigned to current user • Geographic (map square; radius from lat/lng; polygon) - maybe more appropriate elsewhere?		
US7.5	All users should be able to view a specific tow	Tows view	MUST
US7.6	Senior Engineer users and engineer users should be able to edit preparation data on specific tows, including: • IMO + Ship name • Route • Plankton Recorder ID • Internal ID(s) • Length of silk • Length of wire • Extras (eg Replacement blocks fit) • Prop setting • Pack into (customs, dangerous material, regulations stickers etc) • Where to send • Date to send • Has request been sent? • Tow Window • Has been boxed up • Has been sent • Emailed to notify • Tow log received • Ship paid • Signed for • iCPR / other sensor details • Delivery reference(s) • Export details	Tows edit	MUST
US7.7	Senior Engineer users should be able to create new Tows	Tows edit	MUST
US7.8	When tows are in the created status, Senior Engineer and Engineer users can set the following details of the tow: • Route Id • Tow ID	Tows edit	MUST

	• CPR Internal ID • Ship • Prop Setting (with option to generate) *Details of the prop setting generation algorithm will be provided by MBA.*		
US7.9	When tows are in the CPR dispatched status, Senior Engineer and Engineer users can set the following properties: • Delivery notes • Delivery reference	Tows edit	MUST
	All users should be able to print the tow log	Tows view	MUST

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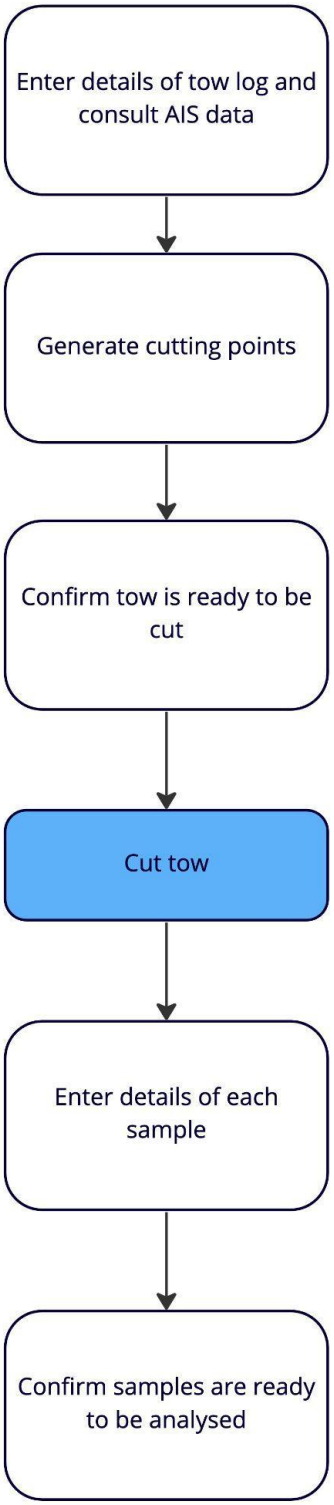
Tow Cutting



Story Number	User Story	Required Permissions	MoSCoW
US8.1	When tows are in the CPR Returned Status, Cutting Technician users can set the following properties: ● Validity ● Silk start ● Silk End ● Tow points ● Tow success scoring ● Date returned ● Body unloaded ● Fault codes on CPR ● Last point (QLA?) ● Silk Distortion (how straight)	Tow cut	MUST
US8.2	When tows are in the CPR Returned Status, Cutting Technician users can enter tow points manually as a series of rows, each with the following fields: ● Datetime - (In UTC) ● Type (Shoot/Haul/Altered course,mid-haul and mid-shoot) ● Latitude ● Longitude ● Log (miles, speed, course) ● Comments	Tow cut	MUST
US8.3	Cutting Technician users can add and remove tow point rows	Tow cut	MUST
US8.4	When tows are in the CPR Returned Status, Senior Engineer users or Cutting Technician users can fetch AIS ship position data and view the AIS data displayed alongside any manually input tow points	Tow cut	MUST

	AIS is a third party subscription service that provides current and historical ship location information via an API On saving the tow points, additional details should be generated (towed miles, sampled miles, average speed, miles per division) *Details of the sample / cutting point generation algorithm will be provided*		
US8.5	When the tow points have been saved, the tow points should show on a map. *AIS ship position data should be requested and displayed alongside any manually input tow points* *When the tow points have been saved, cutting points and samples should be generated*	Tow view	MUST
US8.6	When tows are in the Cutting Status, Cutting Technician users can allocate a PCI colour to each sample	Tow cut	MUST
US8.7	When tows are in the Cutting Status, Cutting Technician users can set the cut date and add any cutting comments.	Tow cut	MUST

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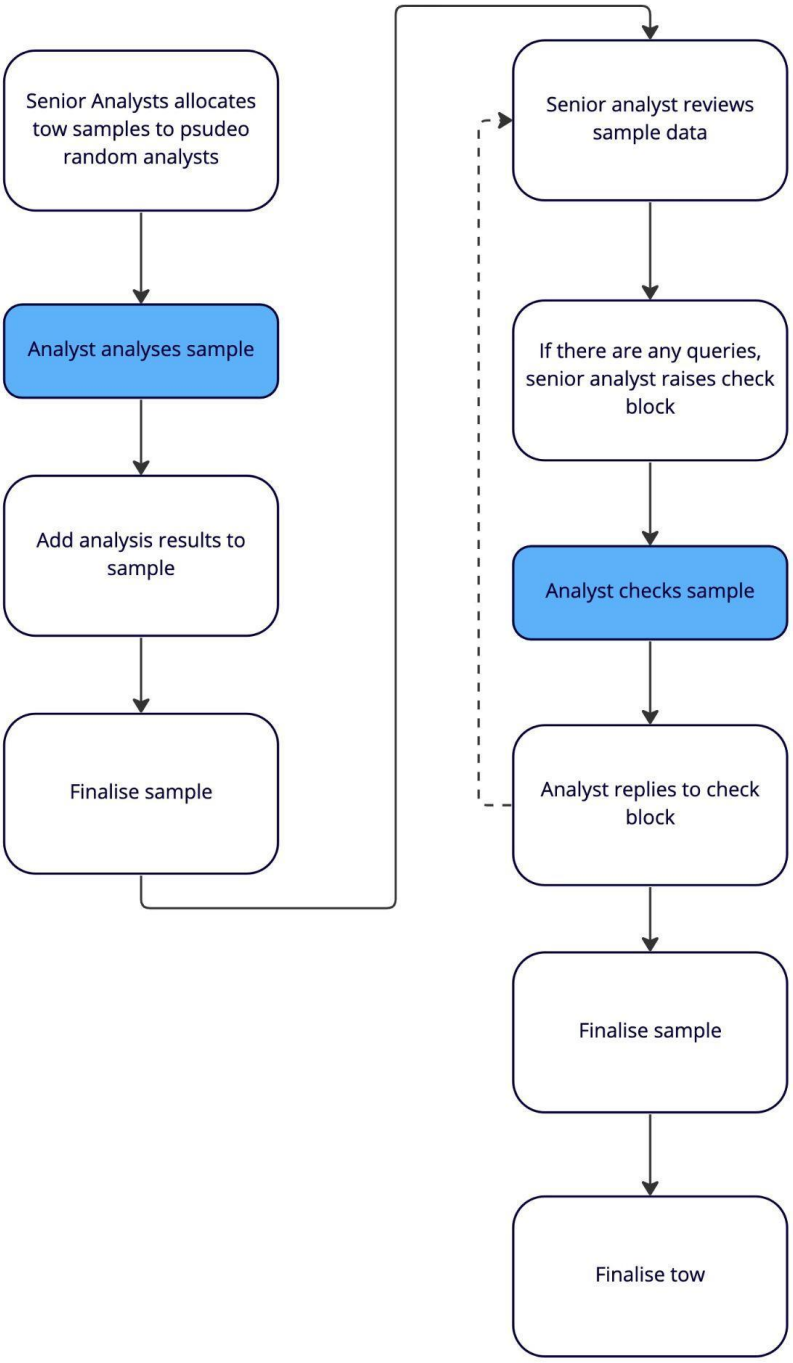
Analysis

Details of individual samples, including allocation, taxa counts and check blocks must be presented and manageable via the platform.



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Samples

Story Number	User Story	Required Permissions	MoSCoW
US9.1	When tows are in the Allocation Status, Senior Analyst users can allocate samples to specific analysts	Sample allocate	MUST
US9.2	Senior Analyst users can use a random generator to allocate samples to analysts Random allocator should allow to generator for every sample in tow, every other sample, or a predefined step (every xth sample)	Sample allocate	MUST
US9.3	Senior Analyst users can reallocate samples to different analysts	Sample allocate	MUST
US9.4	Senior Analysts should be able to finalised jammed tows	Sample finalise	MUST
US9.5	Analyst users should be able to filter samples by: ● Datetime ● Position ● Allocated y/n ● Analysed y/n	Sample view	MUST
US9.6	Analyst Users should be able to add flags to a sample	Sample edit	MUST
US9.7	Analyst users should be able to enter the microscope ID	Sample edit	MUST
US9.8	Analysts should be able to add notes to sample	Sample edit	MUST
US9.9	Analyst users should be able to edit samples provided the sample is assigned to them and has not been finalised	Sample edit	MUST

US9.10	Analyst users should be able to add taxa counts to a specific sample that is assigned to them Including details of: ● Species (all levels) ● Life stages ● Plastic On entering taxa information, the system should suggest newer names where appropriate On entering taxa information, he system should suggest region specific alternative variation where appropriate	Sample edit	MUST
US9.11	When adding taxa counts, Analyst users should be able to add taxa data as either Phyto, Traverse or eye Count	Sample edit	MUST
US9.12	When adding taxa data Analyst users should be able to use an autocomplete to select the taxa they are looking for	Sample edit	MUST
US9.13	When adding taxa data, Analyst users should be able to see taxa group counts for the taxa that has been counted. Group counts should be generated automatically.	Sample edit	MUST
US9.14	Analyst users should be able to finalise a sample When finalising the sample, Analyst users should be shown a summary of warnings and errors before finalising.	Sample finalise	MUST

	Logic for generating warnings and errors to be provided by MBA		
US9.15	Senior Analysts should be able to finalise a tow	Tow finalise	MUST
US9.16	Senior Analyst users should go through a number of review steps when finalising tows ● Review all tow data ● Review all sample data	Tow finalise	MUST
US9.17	Senior Analyst users are sent a notification when last sample on tow has been finalised	Sample view	MUST
US9.18	Senior Analyst users should be able to reassign to different sample	Sample allocate	MUST

Story Number	User Story	Required Permissions	MoSCoW
US9.19	Senior Analyst users should be able to view the status of all samples on a specific tow	Tow view	MUST
US9.20	Senior Analyst users should be able to view an overview table showing the taxa counts of all samples in a specific tow. The overview table should have 3 modes that colour the cells according to specific rules: ● Finalised/unfinalised ● Heatmap ● Difference to “normal” ● Unusual for region ● Unusual for day / night	Tow view	MUST

	The overview table should show a red warning icon on each cell which has an open check block assigned to it The overview table should show a blue checked icon on each cell which has a completed check block assigned to it		
US9.21	Senior Analyst users should be able to create check blocks on a specific sample	Sample edit	MUST
US9.22	Senior Analyst users can print the tow overview	Tow view	MUST
US9.23	Senior Analyst users can finalise tows	Tow finalise	MUST
US9.24	When finalising the tow, the Senior Analyst user is shown the full details of the tow	Tow finalise	MUST
US9.25	Senior Analyst users can print the full details of the tow	Tow finalise	MUST
US9.26	When finalising the tow, the Senior Analyst user is shown a summary of all warnings for this tow *Logic for generating warnings and errors to be provided*	Tow finalise	MUST
US9.27	When finalising the tow, the Senior Analyst user can click a button to finalise the tow.	Tow finalise	MUST
US9.28	Senior Analysts should be able to see status of all checkblocks ● Across all tows ● Across single tow	Checkblocks view	MUST

Check Blocks

Details of check blocks must be presented and manageable via the platform.

Story Number	User Story	Required Permissions	MoSCoW
US10.1	Senior Analyst users should be able to create check blocks on a specific sample.	Checkblocks edit	MUST
US10.2	When creating a check block, Senior Analyst users should be able to select the reason for the check block.	Checkblocks edit	MUST
US10.3	Analyst users should be notified of check blocks that have been created on samples that are assigned to them	Checkblocks view (only assigned)	MUST
US10.4	Analyst users should be able to respond to check blocks	Checkblocks comment (only assigned)	MUST
US10.5	Senior Analyst users should be able to add multiple comments to check blocks	Checkblocks comment	MUST
US10.6	Analyst users should be able to add multiple comments to check blocks	Checkblocks comment (only assigned)	
US10.7	Senior Analyst users and Analyst users should be able to view the comment history of check blocks that relate to samples assigned to them	Checkblocks view	MUST
US10.8	Senior Analyst users and Analyst users should receive an email notification when check blocks are created that are assigned to them	Checkblocks view	MUST
US10.9	Senior Analyst users and Analyst users should receive an email notification when check blocks have new comments added that are assigned to them	Checkblocks view	MUST

US10.10	Senior Analyst users can print all check block slips for a specific tow	Checkblocks view	MUST

Taxa Directory

A directory of all available taxa must be presented and manageable via the platform.

Story Number	User Story	Required Permissions	MoSCoW
US11.1	Users should be able to view the taxa directory	Taxa Directory view	MUST
US11.2	Users should be able to search the taxa directory by: ● Taxa name ● Taxa ID ● Any previous ids ● Any previous names ● Third party IDs	Taxa Directory view	MUST
US11.3	Users should be able to view details of a specific taxa The taxa page should include the following details: ● Taxa name ● Accepted ID ● Taxa ID ● Any previous ids ● Any previous names ● Routine analysis y/n ● Third party IDs (Aphia, ITIS, BioSys) ● Links to third party online directories (Aphia, WoRMS) ● Taxa name history ● Taxa ID history ● Group hierarchy ● Rank (1-4) based on reliability of data	Taxa Directory view	MUST

	• Counting vs presence absence • Phyto / Traverse / Eyecount • History of When started counting, when stopped counting (can be multiple changes), when changing between counting and presence / absence • Map showing locations where taxa has been counted • Timeline of counts for location (compare tows?) • Photos (online / microscope?) • Species (all levels) • Life stages • Plastic details		
US11.4	Senior Analyst users should be able to add new taxa to the directory	Taxa Directory edit	MUST
US11.5	Senior Analyst should be able to edit existing taxa data	Taxa Directory edit	MUST

Export

It must be possible to export the data via the platform.

Story Number	User Story	Required Permissions	MoSCoW
US12.1	Data Publisher users should be able to export sample data in specific formats: • Darwin Core Archive (DwC-A) • DAM Resource Space • Pelagic Lifeform Extraction Tool (PLET)	CPR data view Ship data view Route data view Sample data view Tow data view	MUST

US12.2	Data Publisher users should be able to configure sample data to export by: ● Finalised yes/no ● Date range ● Route(s) ● Geospatial Polygon ● Present geospatial grid "square" ● Taxon id(s) ● Taxon Categories (Phytoplankton, Eyecount Zooplankton, Traverse Zooplankton, +custom taxon groupings)	CPR data view Ship data view Route data view Sample data view Tow data view	MUST
US12.3	Data Publisher users should be able to export tow data	Tow data view	MUST
US12.4	Data Publisher users should be able to export taxa data	Sample data view	MUST
US12.5	Data Publisher users should be able to export route data	Route data view	MUST
US12.6	Data Publisher users should be able to export ship data	Ship data view	MUST
US12.7	Exported data should have any additional notes / disclaimers metadata and other metadata, dates, routeID etc		MUST
US12.8	Data Publisher users should be able to export data with optional solar height and position if appropriate		MUST
US12.9	Data Publisher users should be able to export data with optional day/night if appropriate		MUST

US12.10	Data Publisher users should be able to export data with optional Aphia ID		MUST
US12.11	Data Publisher users should be able to export data via the user interface		MUST
US12.12	Data Publisher users should be able to export data via direct API access		MUST

Users

Users must be presented and manageable via the platform.

Story Number	User Story	Required Permissions	MoSCoW
US13.1	Platform Admin users should be able to view a list of users	Users view	MUST
US13.2	Platform Admin users should be able to search for a specific user by: ● Name ● Email address	Users view	MUST
US13.3	Platform Admin users should be able to change user profile details	Users edit	MUST
US13.4	Platform Admin users should be able to change user permissions. It should be possible to add/remove any permission to any user.	Users edit	MUST
US13.5	Platform Admin users should be able to view details of a specific user	Users view	MUST
US13.6	Platform Admin users should be able to delete users	Users edit	MUST

US13.7	Platform Admin users should be able to add new users	Users edit	MUST

Reporting

It must be possible to generate reports over a number of metrics via the platform, including status of samples, user workload and the status of CPR units.

Story Number	User Story	Required Permissions	MoSCoW
US14.1	Reporting users should be able to view reports	Reports view	MUST
US14.2	Reporting users should be able to view CPR stats potentially including the following: ● How many and which CPRs active / in workshop / returned ● Allocation for specific CPR - which, where ● How many samples did we do in e.g. January ● How many samples were analysed, by who, and when? ● What's left to do from e.g. January ● How many did user x do in e.g. January ● How many checkblocks done & generated by person ● Checkblock score	Reports view	MUST
US14.3	Reporting users should be able to view the number of tows finalised within a configurable date range	Reports view	MUST
US14.4	Reporting users should be able to view the number of samples finalised within a configurable date range	Reports view	MUST
US14.5	Reporting users should be able to see user workload (samples assigned)	Reports view	MUST

US14.6	Reporting users should be able to see user sample velocity (samples processed)	Reports view	MUST
US14.7	Reporting users should be able to filter the number of tows by: ● Tow Status ● Route ● Year ● Taxon ID (appearing in sample linked to tow) ● Finalised	Reports view	MUST
US14.8	Reporting users should be able to filter the number of samples by: ● Tow ID ● Route ● Finalised ● Analyst ID ● Taxa ID ● Check blocks	Reports view	MUST
US14.9	Reporting users should be able to see the number of checkblocks by: ● Tow ID ● Route ● Finalised ● Analyst ID ● Taxa ID ● Check block type	Reports view	MUST
US14.10	Reporting users should be export reports to excel	Reports view	MUST

Audit

It must be possible to see a history of access and activity for all data and users of the platform.

Story Number	User Story	Required Permissions	MoSCoW
US15.1	Add create, edit and delete events should be logged as audit events along with the date and time and the		MUST

	id of the user that performed the action		
US15.2	All login events should be logged as audit events along with the date and time		MUST
US15.3	Platform Admin users should be able to a history of all activity in the system	Audit view	MUST
US15.4	Platform Admin users should be able to filter by: ● Datetime ● User ID ● Event type	Audit view	MUST
US15.5	When clicking on an audit event, Platform Admin users should be able to see details of the audit event	Audit view	MUST

Deliverables

- Fully documented project management
- Documentation including:
  - System diagrams
  - Training materials and user guide for administrators and organisational users
- Onboarding of key administrators and data managers;
- Details of source code IPR, licensing and ownership
- Operational data management solution built on cloud infrastructure covering all priority user stories
- An appropriate hosting solution
- An appropriate support and maintenance contract in place
- A robust 'offboarding' strategy for data model, data and software should the system become non-operational

Cost

The MBA expects a fixed cost quotation for development including details of how the supplier will meet the specification. Each potential supplier should outline the full technology stack that will be deployed, a detailed Gannt chart (or similar timeline) for project delivery, details of the team that will be responsible for delivery and outline any perceived risks and mitigating measures they will put in place to ensure timely delivery of the completed product.

In addition we ask potential suppliers to include the cost for support and ongoing development/updates as a separate line item in their submission.

Acceptance criteria

Successfully delivery and final payment to the provider will be dependent on finalisation and sign-off of a UAT document and a completed checklist for each of the user stories.

Timelines/Development Sprints

To be confirmed at project commencement.

Appendix 2 - Console User Journey

CPR Console Screen grabs and user journey – Available on Request from data@mba.ac.uk

Appendix 3 - Database Schema

CPR Database Schema Diagram – Available on Request from data@mba.ac.uk