

MBARI Expedition Database Modernization Project

Capstone Project Requirements

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6 September 2023

I. Project Overview

MBARI continues to use a 25 year old web application for scheduling ship time and managing data collected from our expeditions. The software supporting this application is at end of life and we need to rebuild this mission critical tool using a modern software stack.

The current web application used Microsoft SQL Server and Perl Active Server pages. We can no longer upgrade underlying operating systems and libraries and our support contract has increased in cost due to the legacy nature of this situation. MBARI is keenly interested in having a modern web application with separate backend and frontend components that use a well-defined API for their communication. Multiple capstone teams could compete with their favorite web application stacks to deliver such solutions.

There are two main data entry pathways for the Expedition Database: the pre-cruise and the post-cruise processes. Both require a user to be logged in with an assigned role. Three roles are recognized by the web application: 1) MBARI Employee, 2) Registered User, and 3) Logistics Coordinator. How these roles are used are described in the following sections which detail the pre-cruise and post-cruise data entry processes.

The goal of this project is to produce a minimal viable product that demonstrates the capabilities outlined in the next 3 sections. The design should be easy to understand and navigate by a diverse group of users.

II. Pre-cruise Process

A pre-cruise must be submitted and approved by the Logistics Coordinator before an MBARI research vessel is scheduled for an expedition. This is done with an intranet web application where one or more pages containing input elements are presented for the MBARI Employee to fill in the information and submit it for approval. The items to be entered (and element type) include:

1. Ship Name (pick list)
2. Purpose (up to 8000 character text field)

3. Chief Scientist (pick list)
4. Principal Investigator (pick list)
5. Scheduled Start Datetime (calendar datetime entry)
6. Scheduled End Datetime (calendar datetime entry)
7. Equipment Description (up to 8000 character text field)
8. Participants (up to 8000 character text field)
9. Region Description (up to 2048 character text field)
10. Planned Track Description (up to 6144 character text field)

Some example HTML for the Ship Name pick list may look like:

```
<select id="ShipName" name="ShipName" size="1">
  <option value="unknownShip">Please Select A Ship</option>
  <option value="dpkd">R/V David Packard</option>
  <option value="rcsn">R/V Rachel Carson</option>
  <option value="prgn">R/V Paragon</option>
</select>
```

The entries for the Chief Scientist and Principal Investigator pick lists will be populated from a query of a Person table in the database. That table will contain first_name, last_name, and email_address fields.

The web application will collect user entry of the above items and upon submission insert them into the database. Notification will then be sent to the Logistics Coordinator with a request for approval. Only the person who has the Logistics Coordinator role may approve the pre-cruise. Once approved, notifications will be sent to the ship operators and it will appear as approved in the web application.

III. Post-cruise Process

Upon completion of an expedition the science team is required to complete a Post-cruise. The fields to be populated are (these fields can be in the same table as the fields used in the pre-cruise):

1. Actual Start Datetime (calendar datetime entry)
2. Actual End Datetime (calendar datetime entry)
3. Accomplishments (up to 6144 character text field)
4. ScientistComments (up to 6144 character text field)
5. SciObjectivesMet (checkbox)
6. OperatorComments (up to 2048 character text field)
7. AllEquipmentFunctioned (checkbox)
8. OtherComments (up to 2048 character text field)
9. UpdatedBy (id of person filling out the form – not a visible element on the page)

In addition to this general information about the expedition, information about the Remotely Operated Vehicle dives conducted as part of the expedition must be entered. Only Registered Users can enter Dive Start and End times. There can be multiple dives related to a single expedition. The information to be collected for each dive includes:

1. Rov Name (text field)
2. Dive Number (integer number in text field)
3. Dive Start Datetime (calendar datetime entry)
4. Dive End Datetime (calendar datetime entry)
5. Dive Chief Scientist (pick list)
6. Brief Accomplishments (up to 2048 character text field)

IV. Reports

To verify successful operation of the pre-cruise and post-cruise data entry a reporting function must be provided that will list the Expeditions and the Dives related to them. An example search form for selecting records entered into the database is shown in this screen capture from MBARI's existing legacy web application:



Advanced Search of Expedition Database

Enter any parameters below to restrict search for expeditions,
or use [keyword search](#).

Join fields below with: ☒ AND ☐ OR

ShipName	< --Select First (If Known)-->	Sequence Number	for legacy sake
DiveNumber	May precede with first ROV Name Letter (e.g., V3296, T1001, D1, M32)	Status	
Date Choices	Based on scheduled start time	YYYYDDD	e.g. 1999075
Start Date	First of Specify End Date too --->	End Date	First of
Purpose		Single Date	
Site/Track		Participants	
Accomplishments		Chief Scientist	
Operator Comments		Principal Investigator	
Scientist Comments		Data Comments	

Return results as: ☒ Cruise Report List ☐ Data Table

Reset Form Fields

Search For Expeditions

The response from this search can be in whatever format you like. This screen capture is provided for illustration purposes only, not all of the fields are required. You may design your form and the report output however you like.

V. Resources to draw from

MBARI recently updated its external web site with several resources that may be helpful for building a new Expedition Database web application. Please use the descriptions and imagery from the following links for inspiration:

A. MBARI Research Vessels

1. R/V Rachel Carson: <https://www.mbari.org/our-work/ships/r-v-rachel-carson/>
2. R/V Paragon: <https://www.mbari.org/our-work/ships/r-v-paragon/>
3. R/V David Packard: <https://www.mbari.org/our-work/ships/r-v-david-packard/>

B. Remotely Operated Vehicles

1. Ventana: <https://www.mbari.org/technology/rov-ventana/>
2. Doc Ricketts: <https://www.mbari.org/technology/rov-doc-ricketts/>

You are also encouraged to learn more about MBARI by connecting on social media and subscribing to our newsletter, which you can do at this link: [Connect with Us • MBARI](#).

There is also a [great exhibit that is currently at the Monterey Bay Aquarium](#) that highlights MBARI's research. I hope that you are able to visit it.