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1. INTRODUCTION

The High-Resolution Multibeam Bathymetry Data Access System provides a centralized repository for processed high-resolution multibeam bathymetry collected from shipboard multibeam surveys. The system provides tools for efficiently disseminating the data in a variety of useful forms via the web.

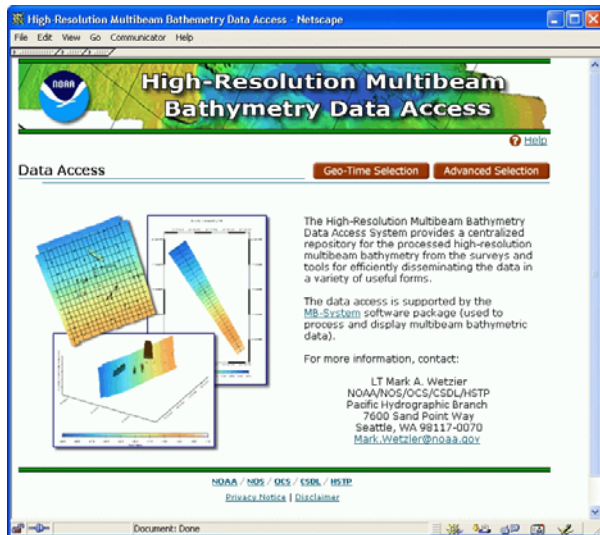


Figure 1. High-Resolution Multibeam Bathymetry Data Access Web Site.

2. SYSTEM ARCHITECTURE

Figure 2 shows the system architecture of the High-Resolution Multibeam Bathymetry Data Access System. The High-Resolution Multibeam Bathymetry Data Access System implements Java Applets and JavaScripts to provide the user with highly interactive selection features. The CGI Perl scripts, GMT [1], and other tools are used to perform back-end data retrieving and the Geo-Map plotting. The data access is supported by the MB-System software package [2] to display multibeam bathymetric data and to generate several output formats including Bathymetry Grids for GMT (netCDF) or ArcView (ASCII), GeoTIFF image, and

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images in GIF and PostScript format. The Multibeam Bathymetry data are maintained in Generic Sensor Format (GSF) binary files [3]. Due to the size of these survey data sets, the results won't be returned to user immediately. Email notification method is used to inform user when the results are available. User then can pick up these plots either via web or via ftp access. Some generic plots are pre-generated off-line to provide quick web access. The metadata is maintained using Relational Database PostgreSQL with the PostGIS as spatial extension to manage spatial searches, such as a point, line, polygon, etc.

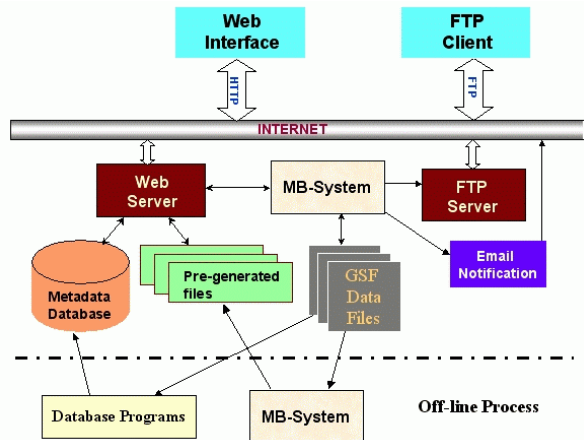


Figure 2. On-line System Architecture

3. USER INTERFACE

The High-Resolution Multibeam Bathymetry Data Access System provides two ways for use to select a survey: interactive map-based geo-time selection and advanced data selection.

A web user can use Java-enhanced Geo-Time Selection interface (Fig. 3) to select the survey by specifying geographic region with mouse-dragging over the map (rubble-band selection), entering lon-lat value in the text fields, or selecting a region by name from a region name list. User can also use tools provided to move, zoom, and reset selected area. Once an area is selected, the map will be re-drawn to reflect selected area with available surveys.

If a user is familiar with the survey information (such as survey ID, Field ID, etc.), he/she can use Advanced Selection interface to select survey more quickly (Fig. 4).

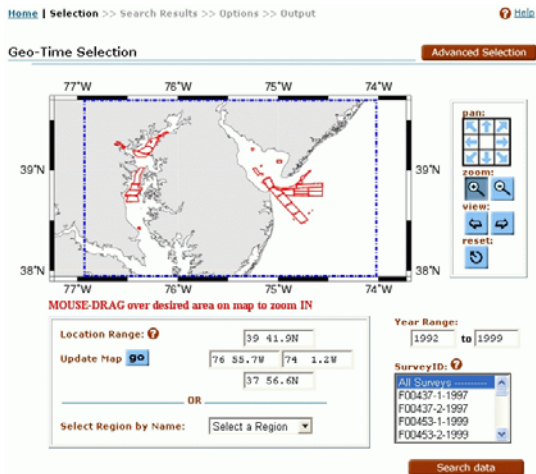


Figure 3. Java-enhanced Interface for Geo-time Selection



Figure 4. Advanced Selection

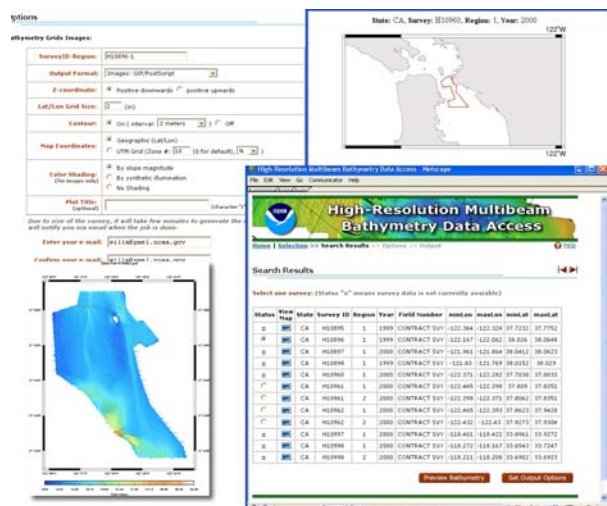


Figure 5. Data Selection and Results Pages

After one or more surveys are selected, the meta information of each survey will be listed. User can view the survey map, view pre-generated plots, make new plots, or generate other data output. User will be notified via Email when the result files are available for user to view or download. Figure 5 shows some data selection pages and results pages.

4. PostgreSQL DATABASE and PostGIS

In support of geographic data search, the PostgreSQL [4] relational database is used with PostGIS [5] to manage the metadata. PostGIS adds support for geographic objects to the PostgreSQL object-relational database. By using PostgreSQL with PostGIS, it allows us to store the polygon of a geographic region for each survey into database, and it makes geographic data searching very efficient. For example, a single database query with a spatial restriction (such as a point, a line, or a rectangle box) will return all surveys whose polygon boundaries overlay with input spatial restriction.

5. Summary

The High-Resolution Multibeam Bathymetry Data Access System provides tools for efficiently disseminating the data in a variety of useful forms via the web. The Java-enhanced interface enables highly interactive selection features. The PostgreSQL database with PostGIS supports the geographic data search.

6. Acknowledgments

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7. References

- [1] Pål Wessel and Walter Smith: GMT - The Generic Mapping Tools. Web site : <http://gmt.soest.hawaii.edu>
- [2] David W. Caress and Dale N. Chayes: MB-System - Mapping the Seafloor: Software for the Processing and Display of Swath Sonar Data. Web site: <http://www.ideo.columbia.edu/res/pi/MB-System/>
- [3] Walter Simmons, Richard Nadeau, Shannon Byrne, and Steven Lemke: Hydrographic Surveying Using the SAIC ISS-2000 System. Web Site: http://www.thsoa.org/pdf/h01/10_4.pdf
- [4] PostgreSQL Web Site: <http://www.postgresql.org/>
- [5] PostSIG Web Site: <http://postgis.refractory.net/>