

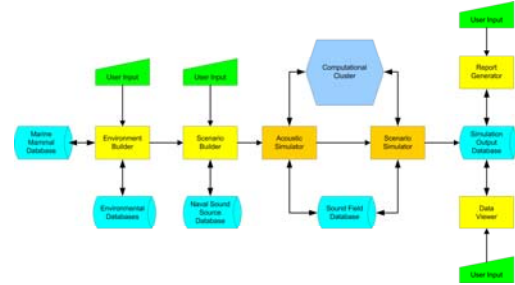
ESME Future Development Efforts:

Acoustic Impact Modeling

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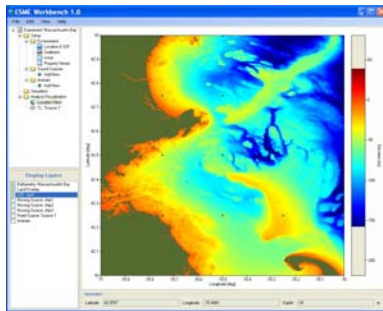
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ESME Workbench Block Diagram



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Current ESME User Interface



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New User Interface

- **Three tabs to change available user options**
 - Experiment Creation
 - Simulation Monitor and Control
 - Simulation Output Management
- **For all tabs, the user console will have same look and feel as the current ESME version**
 - Menu tree in upper left
 - Property grid in lower right
 - Graphics in main window and in daughter windows

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BU Task List

- **Experiment Creation**
 - Task 1: Environment Builder
 - Task 2: Scenario Builder
- **Simulation Monitor and Control**
 - Task 3: Acoustic Simulator
 - Task 4: Scenario Simulator
- **Simulation Output Management**
 - Task 5: Data Viewer
 - Task 6: Report Generator
- **Public Outreach**
 - Task 7: Software Dissemination and Training

12-Jan-09

Environment Builder Features

Feature	Current Status	Features to be Added
1.1 Region selection	N/A	Graphical or numerical selection
1.2 Bathymetry	Manual import	Automatic import from DBDB-V
1.3 Sound-speed profiles	Manual import	Automatic import from GDEM-V
1.4 Sediment database	N/A	Create sediment database
1.5 Sediment parameters	Manual data entry	Automatic import from new database
1.6 Surface loss	Sinusoidal wave model	Support more advanced (TBD) models
1.7 Mammal density	N/A	Create interface to SSSD density model
1.8 Data display	Bathymetry and sound speed	Add sediments and mammal density

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Scenario Builder

Feature	Current Status	Features to be Added
2.1 Platform op-area	N/A	Arbitrary polygon specified numerically or graphically
2.2 Platform database	N/A	Create platform database
2.3 Sound-source database	N/A	Create sound source database
2.4 Sound-source user interface	Sound-source properties and platform tracks entered manually	User chooses platform type and behavior and associates sound sources with platforms
2.5 Marine mammal behavior database	Generic mysticete and odontocete plus 5 specific species available	Populate database for remaining species and add bathymetry driven behavior
2.6 Animat user interface	Animat species and locations entered manually	Default species types and densities from density database but user can modify parameters

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Acoustic Simulator

Feature	Current Status	Features to be Added
3.1 Precomputed sound fields on uniform location grid	Sound fields only computed at ship track waypoints. Recomputed for each new ship track	Support precomputed uniform density source location grids to speed up computation time
3.2 Sound-field database	Fixed sources and predefined ship-track waypoints precomputed	Precompute at grid points in region of interest
3.3 Multiple propagation algorithms	Only Bellhop TL available	Add RAM, etc. and time series models, k log R
3.4 Distributed computation	N/A	Grid computing supported

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Scenario Simulator

Feature	Current Status	Features to be Added
4.1 Multiple sources and receivers	Completed	none
4.2 Animat behavior	Responds to only one source at a time	Implement multiple simultaneous sources capability
4.3 Statistical models	N/A	Use a probability density function for 3D animat density instead of computing actual animat tracks
4.4 Monte Carlo simulations	N/A	Monte Carlo simulations supported
4.5 Simulation output database	Independent output files for each platform and animat	Create simulation output database
4.6 Distributed computation	N/A	Grid computing supported

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Data Viewer

Feature	Current Status	Features to be Added
5.1 Individual source plots	Horizontal and vertical 2D TL and SPL plots for single fixed sources	Add choice of axes (meters from source or lat. long.)
5.2 Multiple source plots	N/A	Animations of summed instantaneous levels and cumulative levels
5.3 Animat oriented plots	N/A	Received level and cumulative exposure vs. time
5.4 Animat tracks	N/A	Static horizontal line plot. Horizontal location animation. Depth vs. time or distance traveled. Use color to represent received level or cumulative exposure
5.5 Ship tracks	Static horizontal line plot	Add animation capability including instantaneous beam pattern
5.6 Take plots	N/A	Stacked bar charts by source, by time, or by range
5.7 3D animator	Single animat, multiple surface ships	Add capability for submarines, aircraft, etc. and multiple animats

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Report Generator

Feature	Current Status	Features to be Added
6.1 Preconfigured reports	Summary statistics by species for single simulation runs	Summary statistics for Monte Carlo simulations
6.2 User-configured reports	N/A	TBD based on user input

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Software Dissemination and Training

- Software distribution DVD
 - Release I: December, 2009
 - Release II: December, 2010
- Hands-on training
 - To be held in conjunction with national meetings and workshops
- Peer reviewed publications
 - Publication 1: to be submitted Dec. 2009
 - Publication 2: to be submitted Dec. 2010

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