



**US Army Corps
of Engineers®**
Engineer Research and
Development Center

Department of Defense Surface-water Modeling System

Technology

The US Army Corps of Engineers has developed the Surface-water Modeling System (SMS); the most sophisticated riverine, wetland, coastal, and estuarine modeling environment available today. The SMS is a comprehensive package, which provides tools for every phase of a hydraulic simulation including site characterization, model development, post-processing, calibration, and visualization. SMS provides an integrated graphical environment for performing surface flow, contaminant fate/transport, and project design evaluations.

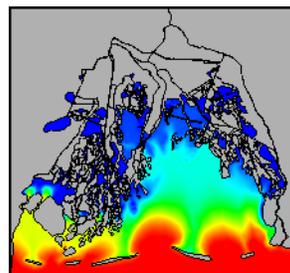
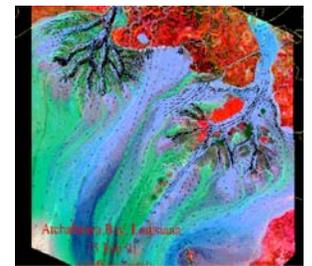
Problem

Throughout its history of managing and maintaining navigation, coastal and inland waterways, and wetland areas, the US Army Corps of Engineers has encountered environmental problems due to the unpredictable and complex conditions created by nature. Impact of flooding in terms of lives and property damage continues to escalate as modern developments encroach on natural floodways and coastal zones and thereby changing general circulation patterns and water quality of the receiving water bodies. Meeting the challenge to facilitate understanding and therefore managing these waterways is SMS, a comprehensive graphical modeling environment incorporating a suite of numerical modeling programs that allow users to visualize these waterways, evaluate design proposals and alternatives, and predict their effectiveness.

Background And Examples

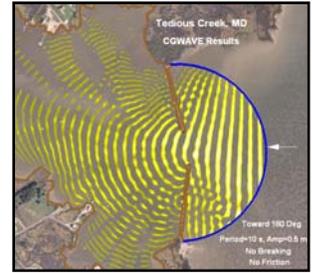
SMS has evolved from a simplistic mesh generator to an all-inclusive tool for start-to-finish numerical modeling of surface water related issues. The graphical interface houses independent numerical models used to conduct everything from hydrodynamic circulation patterns, to sediment transport or contaminant transport. The user may conceptualize the boundary conditions for the model domain and choose to analyze the results from one of a dozen numerical models supported within SMS.

For example, the southern Louisiana, Wax Lake and Atchafalaya River outlet study is an estuarine application that used the SMS interface along with the RMA2 and SED2D numerical models. This region is of particular interest because of the sediment-laden waters contributing to the formation of a new delta.



Another southern Louisiana estuarine example is the Houma-Terrebonne Marsh demonstration study. It used the SMS interface along with the ADH numerical model to solve for hydrodynamics and coupled salt transport. This region is of particular interest because of the environmentally rich marsh habitat and its susceptibility to storms.

A third example application is a shallow-draft harbor in Tedious Creek Maryland. The focus of this study was to determine if the existing structures needed to be lengthened to provide better wave protection for commercial and recreational vessels at the county boat dock. CGWAVE model results of wave heights are displayed.



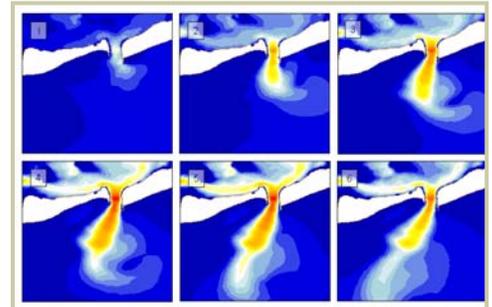
The fourth example is from the ADCIRC numerical model showing the formation of the ebb jet (velocity magnitude) at Shinnecock Inlet, New York.

Expected Cost To Implement

SMS is available at no cost to employees of the US Army Corps of Engineers, its research labs, and on-site contractors.

Benefits/Savings

SMS integrates and simplifies the process of hydraulic and coastal modeling including circulation, wave transformation, and sediment transport by bringing together all of the tools needed to complete a successful study. SMS provides a comprehensive graphical environment for numerical modeling and tools for site characterization, model conceptualization, mesh and grid generation, and graphical visualization. Using SMS can save time and money, as much as 30 percent on overall project design costs.



Status

SMS is available for Microsoft Windows-based operating systems. The current version of SMS provides a complete interface for the numerical models: ADCIRC, ADH, CGWAVE, CMS-Flow and -Wave, TABS-MD (RMA2, RMA4, SED2D), TABS-MDS (aka RMA10-WES), STWAVE, FESWMS, and other generic models. The Lagrangian Particle Tracking Model (PTM) was added to SMS 10.0.

ERDC POC

Earl V. Edris, Jr., CEERD-HF-H, e-mail: Earl.V.Edris@usace.army.mil
Phone: 601-634-3378. For additional information on SMS, please contact Ms. Barbara P. Donnell at 601-634-2730 (Barbara.P.Donnell@usace.army.mil).

Distribution Sources

SMS is distributed via Internet download, which includes the full program, tutorial files, documentation, and supported model executables. U.S. Army Corps of Engineers employees may contact the SMS Support located at the U.S. Army Engineer Research and Development Center, Vicksburg, MS. Voice: 601-634-4286. FAX: 601-634-4208. e-mail: SMS@usace.army.mil, Home page: <http://chl.ercd.usace.army.mil/sms>. All other users may contact Aquaveo Water Modeling Solutions at <http://www.aquaveo.com>, Phone: 801-691-5530.

Available Documentation

SMS Program, Tutorial Documentation, and Supported Model Documentation are provided with the "Full Install" download of the software.
<http://chl.ercd.usace.army.mil/sms>

Available Training

Inquiries by USACE users can be directed to the ERDC-CHL, SMS Support, e-mail: SMS@usace.army.mil. Training can be customized to the times and needs of the client. Others can contact Aquaveo Water Modeling Solutions.

Available Support

USACE users may direct questions to ERDC-CHL SMS Support, CHL Building 3200, U.S. Army Engineer Research and Development Center, Vicksburg, MS 39180. Voice: 601-634-2344. FAX: 601-634-4208. e-mail: sms@usace.army.mil Home page: <http://chl.ercd.usace.army.mil/sms>. All other users may direct questions to Aquaveo Water Modeling Solutions.