

Flood Risk Management Newsletter

October 2008 vol 2 no 1

Focusing on Coastal Flood Risk Management

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Editor's note: This issue focuses on Coastal Flood Risk Management. The next issue will focus on water allocation/water supply. Note the upcoming themes on the last page and start planning your articles now. We look forward to your contributions. Thanks, Harry Kitch

Coastal Working Group Meeting

In June 2008, the U.S. Army Corps of Engineers (USACE) Coastal Working Group (CWG) convened for a two day-workshop at the USACE Engineer Research and Development Center (ERDC) in Vicksburg, MS. The CWG supports the Hydraulics, Hydrology and Coastal (HH&C) Community of Practice (CoP). The CWG develops lines of communication so field personnel and researchers can define technical needs to enable practitioners to answer the coastal questions being asked today. One underlying theme for the workshop was to define ways to support technical transfer and enhance communication between researchers and the field.



CWG at CHL, taken by Lorraine Smithhart, CHL.

Members of the CWG represent USACE Districts and Divisions from the Pacific, Atlantic,



Gulf of Mexico, and Great Lakes as well as researchers from ERDC, staff from the Institute for Water Resources and USACE Headquarters. During the workshop, District representatives had the opportunity to discuss various coastal issues they deal with everyday and to comment on how research efforts may be leveraged to tackle these issues. They identified program highlights, concerns, lessons learned, and needs associated with their coastal projects.

Panel discussions addressed a wide range of coastal topics including: coastal flooding analysis; climate change and sea level rise; navigation structure assessment and prioritizing; techniques for the use of coastal models in evaluating hydrodynamics and economics. Main points highlighted during these panel discussions included emphasis on the need to define return periods for storms; potential effects of global warming on storm intensity; delineation of a consistent method for coastal structure inspection; the significance in augmenting District modeling efforts with validation and calibration support from ERDC; and the need to develop more guidance to support risk and uncertainty analyses for coastal processes.

Posters and displays highlighting various national coastal programs, numerical model developments and enhancements, and coastal decision-making tools were available. These provided invaluable information on advancements made in the coastal engineering and design fields.

CWG members identified numerous issues affecting the USACE coastal community. One of the biggest issues was current staffing levels. Many Districts are in immediate need of staff. It was suggested that available resources within the coastal community be identified so a plan could be devised to share these resources between Districts until staffing levels can be increased. It was continually stressed that how this community functions under regionalization will affect the future success of the CWG.

A number of additional workshops and meetings were held after the workshop. The Coastal Inlets Research Program (CIRP) provided an overview and hands-on training on the Coastal Modeling System (CMS), a numerical modeling program designed to address sediment transport, morphologic changes, and hydrodynamic processes around coastal inlets. The Joint Airborne Bathymetry Lidar Technical Center of Expertise (JABLTCX) held a Project Delivery Team workshop on spatial data analysis and the national remote sensing effort, highlighting the increasing importance of regional scale data to support coastal investigations and planning. The Regional Sediment Management (RSM) Program, taking advantage of the numerous USACE coastal experts present, met to tackle issues ranging from economic analysis needs for quantifying RSM actions to the importance of leveraging existing planning authorities to efficiently link coastal projects in a regional context.

CWG teleconferences are scheduled the second Tuesday of each month, 1:30 pm ET. Future CWG teleconferences will fortify lines of communication and advance an ever important coastal agenda. We look forward to talking with you. POC: Lynn Bocamazo
Lynn.M.Bocamazo@usace.army.mil.

Errata

We inadvertently omitted some authors of the article, “Evaluating Impacts of Freshwater Diversions” in the July 2008 issue. Mark Dortch, ERDC-EL, was credited, but we would like to



acknowledge contributing authors: Phu Luong and Raymond Chapman of the ERDC Coastal and Hydraulics Laboratory, and Mansour Zakikhani, Mark Noel, Sung-Chen Kim, and Carl Cerco of the ERDC Environmental Laboratory. Our apologies to those we overlooked.

**Registration open – Gulf Coast Hurricane Conference
November 11-14, 2008
Renaissance Riverview Plaza Hotel, Mobile, AL**

ON BEHALF of PIANC USA, the US Army Corps of Engineers, and all of our generous sponsors and cooperating organizations, it is my pleasure to extend this invitation to join us in Mobile, Alabama, for the Gulf Coast Hurricane Preparedness, Response, Recovery & Rebuilding Conference 2008. This upcoming conference has been organized to bring together the nation's and the world's top professionals in the field of hurricane response, ecosystem restoration and infrastructure protection, including more than 200 private sector and governmental participants.



The four-day conference will include technical sessions, field tour opportunities, industry exhibits, technical short courses and networking events. As part of the tours, you will have the opportunity to see up close the latest innovations being undertaken at the Port of Mobile, as well as ongoing recovery of the Mississippi Gulf Coast from Hurricane Katrina. But the strength of the conference lies with the technical program, with more than sixty-five presentations addressing state-of-the-art technical aspects of subjects ranging from Ecosystem Resiliency - Coastal Recovery; Navigation – Ports and Industry; Community Resiliency – Watershed Wide Flood Hazard Master Planning; and Emergency Preparedness and Response. Please visit www.pianc.us for a complete listing of all the interesting presentations that are scheduled to be offered.

The venue, Mobile, Alabama, is a beautiful, historic port city by Mobile Bay. Mobile offers a Southern charm that is welcoming and enjoyable for visitors from around the world.

This Gulf Coast Hurricane Conference promises to be the best ever, having a full array of nationally and internationally recognized speakers. Don't miss this opportunity to network with your industry peers and enhance your professional knowledge. Register today!

We look forward to seeing you in Mobile in November,

HON. John Paul Woodley, Jr.
Chairman, PIANC USA

P.S. For on-line registration and the detailed conference agenda, go to www.pianc.us.



Tammy Conforti named USACE Levee Safety Program Manager



Tammy Conforti has been recently selected as the new permanent (USACE) Levee Safety Program Manager under the Headquarters Directorate of Civil Works. She has previously worked for the Huntington District of USACE for 14 years in the areas of geotechnical engineering and flood damage reduction planning. For last three years, she has worked for the Institute for Water Resources (IWR) focused on the development of the USACE National Flood Risk Management Program, more specifically initiation of the Silver Jackets Program. The Silver Jackets Program establishes a framework for creating and maintaining interagency state teams to leverage information and create a mechanism to solve flood risk management priorities. Also in the last three years, Conforti has worked on several levee policy issues, as well as, other activities under the USACE Levee Safety Program. In her new role, she will assist the HQUSACE Levee Safety Officer, Steven Stockton, and the HQUSACE Special Assistant for Levee and Dam Safety, Eric Halpin with the implementation of the Levee Safety Program. Her main responsibilities will include co-leading the Levee Safety CoP, coordinating/developing levee safety related guidance, and fostering internal and external partnerships related to levee safety. Conforti has a B.S. in civil engineering from Virginia Tech and is a registered professional engineer.

Scenic views with no wave flooding?

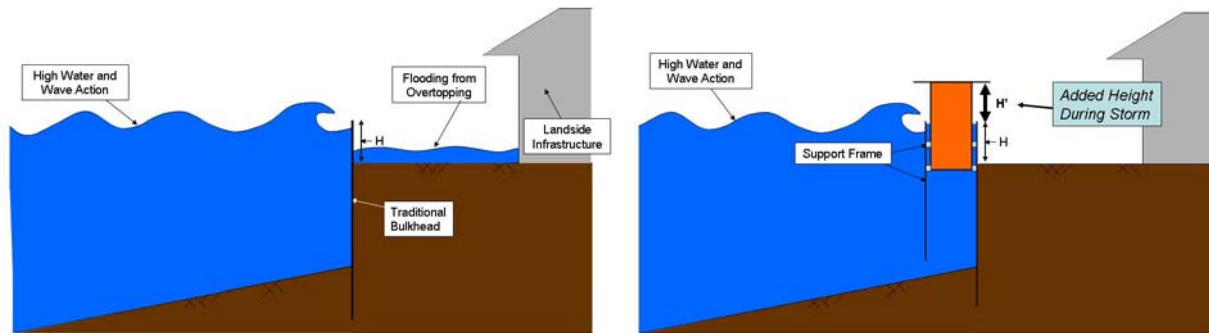
Diane Rahoy, New York District

Would you like to have a clear view of the ocean, but still have protection from wave flooding when you need it? How about having a scenic roadway with lovely vistas that won't flood in bad weather? New York District engineers have envisioned a roadside bulkhead that rises up along with the storm surge, and a levee that increases in height automatically so there is no need to stack sandbags. With some development efforts, this vision may soon become a reality.

Waterfront properties and roadways are often protected by permanent bulkheads. It is a challenge to build them tall enough to be effective, but low enough to preserve high-value views. Some drainage areas behind bulkheads are equipped with pumps to deal with storm surge and wave-induced overtopping. This is a costly and operation/maintenance intensive solution that is particularly ineffective for long stretches of bulkheads such as may be needed for roadways, marinas or levee/floodwalls. There is really no other tried and true option for implementation over long distances that do not require human intervention before and after high water events. This can also be very costly, and requires constant vigilance in order to act in a timely fashion.



Engineers David Rackmales, Robert L. Alpern, and Diane Rahoy with the New York District, USACE, have devised a solution that adjusts vertically, using only the mechanism of a rising water level. The Hydrostatically Operated Variable Height Bulkhead (HOVHB) does not require operator attention, pumping or other mechanical controls. It can be retrofitted to many existing, structurally sound bulkheads that are permanently located and have some depth of water next to them. A floating internal wall is constructed in between the existing barrier and a second, barrier wall. When a surge occurs, the floating wall rises on the water. As the water recedes, the floating wall drops back between the two external walls, and a cover cap falls back in place on the top ledge. Design attention has been given to making the HOVHB as operation- and maintenance-free as possible. Examples of desirable applications include marinas, private waterfront property, harbors, highways, levees/walls, and municipal properties.



Traditional Bulkhead (left) and Variable Height Bulkhead (right)

The concept was tank-tested at Texas A&M University, by Dr. Jennifer Irish and her Ocean Engineering class this past spring. Students devised a test module of a single float unit, and tested its performance with varying buoyancies. This testing showed viability of the concept, i.e., the float unit rises and lowers with changing water levels which in turn changes the amount of overtopping that impacts the landward side.

Though currently not a funded item, USACE is interested in cooperative research and development efforts for this technology, and in licensing out its pending patent for commercial use (Pat. Application 12/006,757, "Hydrostatically Operated Variable Height Bulkhead," filed

Jan 02, 2008). "There seems to be a number of sites throughout USACE that would be interested in field testing the device," according to co-inventor Rahoy. "The challenge right now is to develop a full-sized working model." For more information contact Diane Rahoy, 971-790-8263, diane.s.rahoy@usace.army.mil.



Initial Wave Tank Testing at Texas A&M

Pacific Island Land Ocean Typhoon (PILOT) Experiment & Typhoon Man-Yi, Guam

Cheryl E. Pollock & Stanley J. Boc, ERDC-CHL

The USACE Coastal and Hydraulics Laboratory (CHL) has initiated a 5-year cyclone monitoring effort, and has partnered with the University of Hawaii (UH) School of Ocean Earth and Science Technology, and SCRIPPS Institution of Oceanography. Pacific Ocean island-based field laboratories have been established at Ipan, Guam; Oahu, Hawaii; and Laulau Bay, Saipan. In July of 2007, super typhoon Man-Yi passed to the southeast of Guam as a tropical storm.

The PILOT program, sponsored by USACE, is designed to acquire the data necessary to depict and better understand the physics of the wave–reef interaction during cyclonic storm events. Data collected are used to support development of predictive models for coastal inundation and flooding along the shorelines of islands lined with fringing reefs. This research will be applied to the development of an effective emergency management system that addresses the elevated sea-levels and storm waves associated with land-falling tropical cyclones in island environments.

Past studies by the Federal Emergency Management Agency (FEMA) and USACE concluded that tropical cyclone response and mitigation measures developed for the U.S. mainland populations are often ineffective or inappropriate for island environments, where the road systems may be frail and located at low elevation, and/or there may be no inner-island safe haven for fleeing residents. Cyclone effects that are of little or no concern to mainland residents may pose significant hazards in island environments. These effects can include terrain enhanced winds, elevated coastal water levels caused by wave-induced ponding on reefs, and mudslides caused by heavy rains. Data of adequate quantity and quality depicting the physics of these processes are required to develop models which correctly simulate these effects.

Multiple sites are being used to allow comparison of wave transformation over reefs with significantly different geomorphologies and roughness scales. A separate study to derive low-level wind fields during typhoons using Guam National Weather Service radar data is ongoing with UH. Leveraging with a U.S. Air Force initiative to operate an unmanned aerial vehicle (UAV) meteorological reconnaissance aircraft during close proximity cyclones is being coordinated. An additional site was developed at St. Croix in June 2008; other Caribbean sites are planned for the U.S. Virgin Islands in FY09. For more information, contact Cheryl Pollock, Cheryl.E.Pollock@usace.army.mil or Stanley J. Boc, Stanley.J.Boc@usace.army.mil.

Surge and Wave Island Modeling Studies

Jane McKee Smith, ERDC-CHL

Existing methodologies for analyzing hurricane and typhoon waves were developed for mainland coasts. Islands have special concerns such as adjacent deep water, very large incident storm waves, and fringing coral reefs. Coastal inundation calculation methodologies for island coasts have not received attention commensurate with the importance and complexity of the processes. Surge and Wave Island Modeling Studies (SWIMS) is an element under the Coastal



Field Data Collection Program. The research approach is to develop, improve, link, and validate the next generation models to realistically represent island wave and inundation processes.

SWIMS models include a range of fidelities to meet needs ranging from emergency planning to project design. FY 2008 efforts in SWIMS include laboratory data collection, model validation and evaluation, model upgrades, documentation, and coordination with federal, state, and local agencies. The on-going laboratory study includes a three-dimensional embayment reef with roughness. Previous lab studies have been two-dimensional with a smooth reef. The data collected will be used for numerical model validation. These tests will be ongoing through the end of the FY in the directional spectral wave basin in the JV Hall building. Ernie Smith is leading these tests. The modeling package TWAVE will also be released this FY. TWAVE includes components for modeling hurricane wind fields, deepwater wave generation, nearshore wave transformation, wind and wave setup, tidal and barometric pressure driven water levels, and wave runup. There are several model choices for these components to deliver various levels of fidelity and computation effort. A TWAVE technical report that describes the modeling components, the Microsoft EXCEL user interface, and case studies is presently in the review process and will be published this FY. Alex Sanchez has been leading the TWAVE development. Two other technical reports will be published this FY. The first focuses on hydrodynamic modeling using ADCIRC and STWAVE on the southeast Oahu coast, applying validation data from a Regional Sediment Management project. STWAVE was applied using the new bottom friction option to represent wave dissipation on the reef. Mary Cialone led this effort. The second report intercompares three one-dimensional wave transformation and setup models on reefs, using four laboratory data sets. Zeki Demirbilek is leading this effort. Conference papers have also been presented at the International Wave Hindcasting and Forecasting Conference and will be presented at the International Coral Reef Symposium.

SWIMS was represented at the State of Hawaii Civil Defense hurricane exercise Makani Pahili in May 2008 and provided briefings to the Civil Defense leadership, the city and county of Honolulu, and the Corps of Engineers, Honolulu District. These entities have provided feedback on SWIMS products. SWIMS has also been coordinating with the FEMA and we plan to participate in a Hawaii hurricane modeling focus team with FEMA and the University of Hawaii. More information on SWIMS is available at <http://chl.erdc.usace.army.mil/swims>.

Re-Engineering SDSFIE to meet users' needs – Integrating the USACE FDR Model
William H. Ryder. ERDC-TEC & Marc R. Beckel. Northrop Grumman

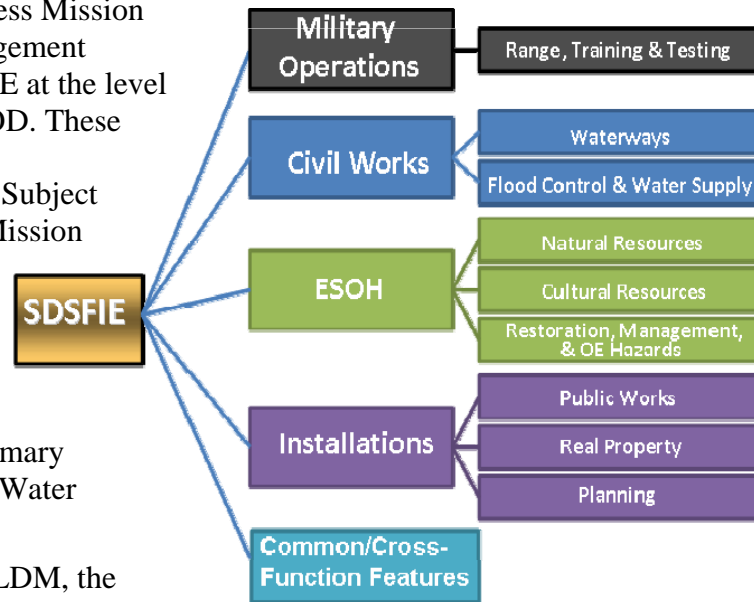
The SDSFIE has been in existence since the early 1990s, loved by few, viewed as a necessary evil by most. However, recent advances in technology have made it possible to redefine this standard. In September 2006, ERDC's Topographic Engineering Center (TEC), working with the SDSFIE Steering Group, let a contract to a team known as The Solutions and Technology for the Advancement and Refinement of the SDSFIE (STARS) Team to re-engineer the SDSFIE standard. This Team is to ensure the resulting product is consistent with higher-level modeling guidance; that it permits service level flexibility; and to promote accurate interpretation of shared geospatial data. The objective is to transition the current SDSFIE to a Logical Data



Model (LDM) recognized by geospatial data standards bodies, implemented by the entire Department of Defense (DoD) community, and maintained through DoD business requirements. The SDSFIE five-year vision:

To be the single DoD spatial standard that supports common implementation and maximizes interoperability for Installations, Environment, and Civil Works Missions.

The SDSFIE LDM has five Business Mission Areas (BMAs) which provide a management classification of the features in SDSFIE at the level of “business ownership groups” in DOD. These BMAs are subdivided into functional “Disciplines” in order to better utilize Subject Matter Experts (SMEs) and specific Mission requirements. For example, the Civil Works BMA includes two disciplines: Waterways, and Flood Control and Water Supply. Flood Damage Reduction (FDR) and Lake Management functions are the two primary components of the Flood Control and Water Supply discipline.



To properly develop the SDSFIE LDM, the STARS Team is facilitating modeling workshops with SMEs to define the level of detail needed for features and attributes within each BMA.

Following a developed set of SDSFIE modeling processes and procedures, the STARS Team is developing the Flood Control and Water Supply model for SDSFIE. A lead team modeler is working with the FDR data model developed by USACE to establish the SDSFIE model for flood control and water supply. This process includes Corps’ SMEs.

The STARS Team began with a review of the Flood Damage Reduction (FDR) model, and other inputs provided by the government. The team is focusing on features consistent with the standards and other inputs to be included in the Flood Damage Reduction model. Upon completion of the review, the STARS modeling team will prepare a comparative analysis of the standards and other inputs, resulting in a candidate list of Flood Damage Reduction features.

An initial kick-off meeting (net-based) was held on 16 April 2008 to brief the SMEs on roles/responsibilities, the goals of the modeling activity, to understand the FDR (and flood control) picture from the SMEs, and to establish the initial schedule for moving forward. The STARS Team had developed an initial baseline model from the SDSFIE 2.6 Release which served as the starting point for the modeling workshop session. During the workshop SMEs identified new content, content for deletion, and content requiring modification. The workshop will allow the lead modeler to identify, based on SME guidance and commentary, by feature: geometry; metadata; attributes defining the “essence” of the feature; and relationships to other features. The STARS Team will then populate the initial Flood Reduction (FDR) model with the selected features and attribution consistent with the SDSFIE standard modeling conventions.

STARS will post the initial model on the SDSFIE website (www.sdsfie.org) for SME review

and comment. Based on input and reviews on this model, the STARS Team will hold a Next Review Meeting with the SMEs. The lead modeler will process comments, feedback, and decisions reached during the meeting and produce a Final Version Model.

Upon completion of the modeling efforts for this activity, the STARS Team will publish the final Flood Damage Reduction model on the SDSFIE website as it will be integrated into the SDSFIE Release 3.0 (LDM). The complete LDM, consisting of all five BMAs, is scheduled for release in January 2009. For more information see www.sdsfie.org. Marc R. Beckel is STARS Team Program Manager, marc.beckel@ngc.com. William H. Ryder is the Program Manager for the ERDC-TEC, william.h.ryder@usace.army.mil.

Wave Information Studies Current Summary

Barbara Tracy, ERDC-CHL

Coastal projects often start with wave information, and the Wave Information Studies (WIS) website is the first stop when wave information is needed: http://frf.usace.army.mil/cgi-bin/wis/atl/atl_main.html. The website provides hourly wave information and related products for all U.S. coastlines. Figure 1 summarizes data currently available on the WIS website. WIS is currently working on a 2000-2005 Pacific regional hindcast using a 1/12-degree grid over the U.S. west coast from Canada to Mexico. In cooperation with NOAA/NCEP, WIS is using the new multi-grid WAVEWATCH III numerical wave hindcast model. The multi-grid modeling technology, coupled with parallel computing resources at the ERDC's High Performance Computing Center (HPC), allows us to run the 1/2-degree Pacific basin grid, a 1/4-degree regional grid, and a 1/12-degree regional grid within the same computer run. The multi-grid wave model allows energy to move freely between the grid boundaries. Figure 2 shows Pacific regional stations where wave information will be available via the website early in FY09. WIS is also beginning new hindcasts for the Great Lakes. Work is in progress for Lake Michigan, and the other Great Lakes and Lake St. Clair will follow.

WIS has been proactive in pursuing new products that give a better definition of the wave climate. Spectral energy matrices are available from WIS staff for all output locations. Jeff Hanson has led us into the area of spectral partitioning. As a result, WIS will soon offer products that show not only the bulk significant wave height, period and direction but also show this information for the wind sea and swell components within the spectrum. Our spectral partitioning code has been included in the output routines of the new WAVEWATCH III numerical wave model, and spectral partitioning output will be available for the new Pacific regional stations and the Pacific basin stations. For information on spectral partitioning, see http://www.waveworkshop.org/10thWaves/Papers/10th_wave_paper_tracy_dhnt.pdf

WIS has moved ahead in areas of spectral validation with measurements and has also used the latest technology available in wave hindcasting. Since WIS depends on users, we welcome feedback on our products. POC: Barbara Tracy, Barbara.A.Tracy@usace.army.mil.



WIS Wave Information

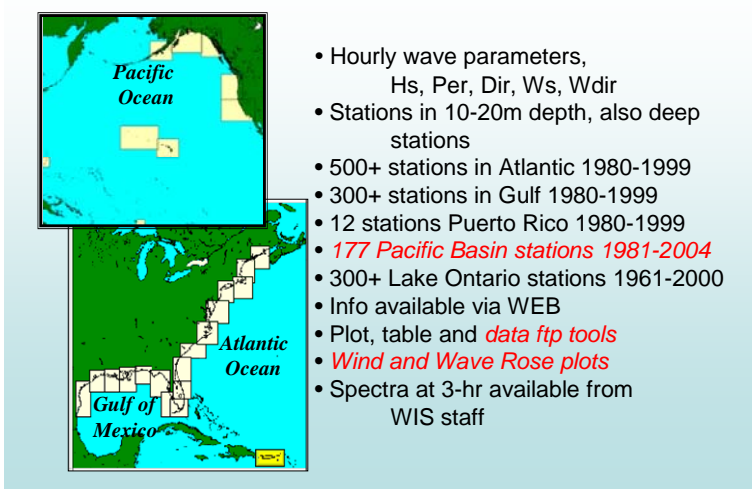


Figure 1. A listing of what is currently available on the WIS website (red indicates addition in the last year). The yellow boxes on the maps show areas that include output stations.

Pacific Regional Stations (preliminary)

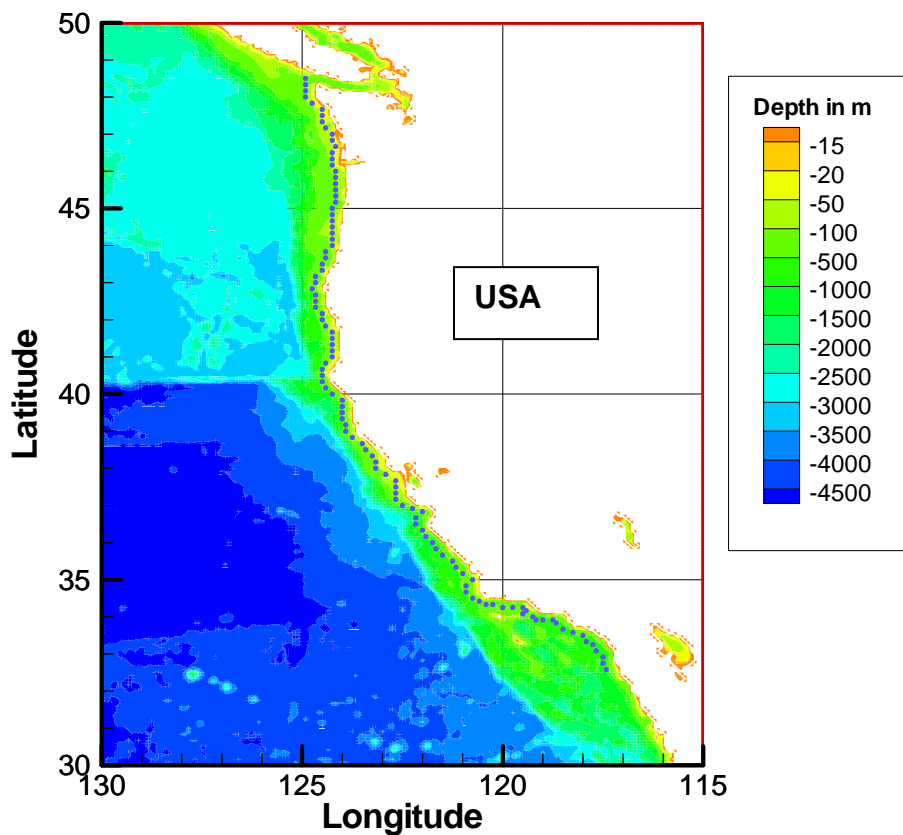


Figure 2. Blue dots show save locations for the Pacific regional hindcast.

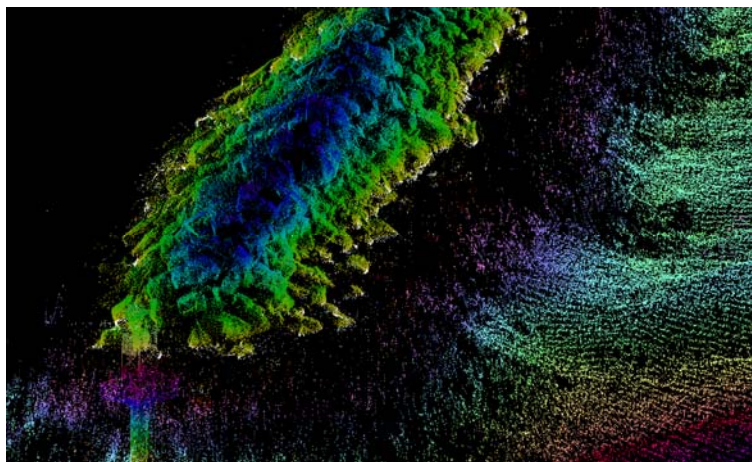
Integrated SONAR/LIDAR Survey System

Mark R Jourdan, ERDC-CHL

A coupled topographic/bathymetric surveying system has been developed which integrates a terrestrial scanning laser with acoustic sonar to provide a complete picture of coastal and riverine structures and landscapes. The survey platform is a boat. This integration was performed in support of the Conditioning Index Work Unit, Navigation Systems General Investigations R&D Program, which is also developing standards and tools for assessment of coastal structures.

The Corps of Engineers has over 650 coastal navigation and hundreds of hardened shore protection structures in place and more are planned. Approximately 100 structures protect major ports' deep draft navigation channels and are critical to the Corps' navigation mission. Corps regulations require yearly inspections of these projects. These inspections and the subsequent condition index evaluations are critical to making decisions on which structures to repair/rehabilitate and to estimating costs. Present condition index methods are subjective, cannot utilize digital technology (e.g., Differential Global Positioning System (DGPS) combined with digital photography), and lack an easy method to quantify changes and trends.

This Integrated Survey System (ISS) can complete a survey of a harbor area in a fraction of the time presently required and will produce a point cloud that is dense enough that individual armor units can be viewed. This system should have multiple applications, including surveying



most types of structures, beach mapping, and real-time construction monitoring. Cross sections derived from this data set could be used in the development of the repair construction documents required.

This project demonstrated that the lidar could be relatively easily integrated into the existing Inertial Measurement Unit (IMU)/sonar system. Data acquired by both sensors were successfully organized into a point cloud representing the coastal landscape including infrastructure. A work flow employing software products was defined to organize the point cloud based on real-time trajectory data. The resulting organized point cloud was of extremely high quality with respect to the accuracies of the system components. Further post-processing of trajectory data would improve data quality.

The tools developed in this work unit will allow the Districts, Divisions, and Headquarters (HQ) to more accurately assess structures' condition and to budget for future rehabilitations. Asset Management and Risk Assessment will be aided by the ability to easily review consistent, measurable, accurate, and comparable condition assessments of USACE coastal structures when they are collected and reported in a standardized process.

PROSPECT Courses FY 2009

No.	Title	Dates	Location
98	Reservoir Systems Analysis With HEC-RES SIM	27 – 31 Oct 2008	Davis, CA
158	Flood Control and Coastal Emergencies	17 - 21 Nov 2008	To be determined
173	Interior Flooding Hydrology	3 – 9 Mar 2009	Davis, CA
270	Economic Analysis	23-27 Mar 2009	Springfield, VA
345	Nonstructural Measures for Flood Risk	30 Mar – 3 Apr 2009	Davis, CA
11	Coastal Project Planning	20 – 24 Apr 2009	Duck, NC
349	Risk Analysis WRP& M	1 - 5 Jun 2009	Davis, CA
209	Risk Analysis – Flood Damage Reduction Project	15 -19 Jun 2009	Davis, CA

Additional Information: <http://pdsc.usace.army.mil/downloads/PurpleBook2009.pdf>

Conferences

This listing is for information only and is not a complete list of FRM-related meetings. These meetings are not endorsed by the Corps of Engineers unless specifically stated.

11 – 15 Oct 2008. 4th National Conference on Coastal and Estuarine Habitat Restoration - Providence, Rhode Island. conference@estuaries.org - <http://www.estuaries.org/?id=4>

19 – 22 Oct 2008. Coastal Zone Asia Pacific Association Conference – Qingdao, China. www.czapa.org/

26 - 27 Oct 2008. Global Water Management Congress – Dubai, United Arab Emirates. <http://www.globalwatercongress.com>

2 - 4 Nov 2008. The First International Conference on Water Resources and Climate Change in the MENA Region – Muscat, Oman. <http://www.waterclimatemena.com/>

5 Nov 2008. Extreme Flooding 2008 – Emergency Planning and Flooding - London, UK. bob.earll@coastms.co.uk

5 - 7 Nov 2008. ICSE-4 Tokyo 2008: Fourth International Conference on Scour and Erosion - Tokyo, Japan. <http://icse-4.kz.tsukuba.ac.jp/index-e.html>



11 – 14 Nov 2008. Gulf Coast Hurricane Preparedness, Response, Recovery & Rebuilding Conference - Mobile, AL. <http://www.pianc.iwr.usace.army.mil>

11 – 14 Nov 2008. International Symposium of the North American Lake Management Society “Lake Management in a Changing Environment” – Alberta, Canada. <http://www.nalms.org/conferences/2008LakesLouise/Default.aspx>

16 – 20 Nov 2008. National Flood Proofing Conference IV – New Orleans, LA. <http://www.floods.org/Conferences,%20Calendar/nfpc4.asp>

17 – 20 Nov 2008. American Water Resources Association’s 44th Annual Water Resources Conference - New Orleans, LA. <http://www.awra.org/meetings/NewOrleans2008/index.html>

17 – 20 Nov 2008. Coastal Cities Summit – St. Petersburg, FL. <http://www.coastalcities.org/>

26 – 28 Nov 2008. 4th International Conference & Exhibition on Consequences of Climate Change & Flood Protection - Hamburg, Germany. <http://www.acqua-alta.de/>

25 - 27 Nov 2008. 21st Annual Emergency Preparedness Conference - Vancouver, British Columbia, Canada. www.jibc.ca/epconference

1 - 6 Dec 2008. International Conference of Water Scarcity, Global Changes, and Groundwater Management Responses - Irvine, CA. www.uwrc.uci.edu/documents/SCARE-WATER-BROCHURE-Final.pdf

2 – 5 Dec 2008. National Ground Water Association (NGWA) Expo and Annual Meeting – Las Vegas, NV. <http://www.ngwa.org/2008expo/index.aspx>

2 – 6 Dec 2008. XV Panamerican Congress and I Congress on Ocean and Coastal Engineering - Brasailia, Brazil. <http://www.wec2008.org.br/>

8 – 11 Dec 2008. Florida Bay and Adjacent Marine Systems Science Conference – Naples, FL. <http://conference.ifas.ufl.edu/FloridaBay2008/>

29 – 31 Dec 2008. Tsunami 2008 – San Jose, CA. <http://www.studentwave.com/>

23 – 26 Feb 2009. International Conference on Implementing Environmental Water Allocations – Port Elizabeth, South Africa. <http://www.wrc.org.za>

2 – 5 Mar 2009. Coastal GeoTools – “Building the Digital Coast” – Myrtle Beach, SC. www.csc.noaa.gov/geotools/index.html

16 – 22 Mar 2009. 5th World Water Forum “Bridging Divides for Water” - Istanbul, Turkey. <http://www.worldwaterforum5.org>



6 – 10 Apr 2009. National Hurricane Conference – Austin, TX.
<http://www.hurricanemeeting.com/>

17 – 21 May 2009. World Environmental & Water Resources Congress – Kansas City, MO.
<http://content.asce.org/conferences/ewri2009/submission.html>

26 - 28 May 2009. 4th Tsunami Society Symposium, East-West Center, University of Hawaii, Honolulu, HI. <http://www.sthjournal.org/2009.pdf>

7 – 12 June 2009. Association of State Flood Plain Managers (ASFPM) 33rd Annual Conference, Orlando, FL. <http://www.floods.org/Conferences,%20Calendar/calendar.asp>

8 – 10 Jul 2009. ECOSUD 2009 – Seventh International Conference on Ecosystems and Sustainable Development – Chiancino Terme, Italy.
<http://www2.wessex.ac.uk/09-conferences/ecosud-2009.html>

19 – 23 July 2009. Coastal Zone 09 – Boston, MA. <http://www.csc.noaa.gov/cz>

14 - 15 Sep 2009. Smart Rivers 2009 Conference. “Contribution of Inland Water Navigation to Climate Protection” - Vienna, Austria. POC: otto.schwetz@tinavienna.at

16 – 18 Sep 2009. Coasts, Marine Structure and Breakwaters 2009 – Edinburgh, Scotland.
<http://ice-breakwaters.com>

Subscribe – Unsubscribe – Feedback

To Subscribe/unsubscribe: <http://operations.usace.army.mil/flood.cfm>.

We would love your input - recommended article length is ½ to 1 page. Articles should be submitted to Doyle L. Jones, Canvassing Editor, Doyle.L.Jones@usace.army.mil. Also, we would appreciate your feedback. Contact Dinah McComas, Managing Editor, Dinah.N.McComas@usace.army.mil or Doyle Jones.

Upcoming Newsletter Themes

So you can begin to formulate articles for future issues, here is the current plan for newsletter themes:

December 2008 – Water Allocation/Water Supply
March 2009 – Emergency Management

