

# Coastal Inlets Research Program



**Julie Dean Rosati**

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**Jeff McKee**

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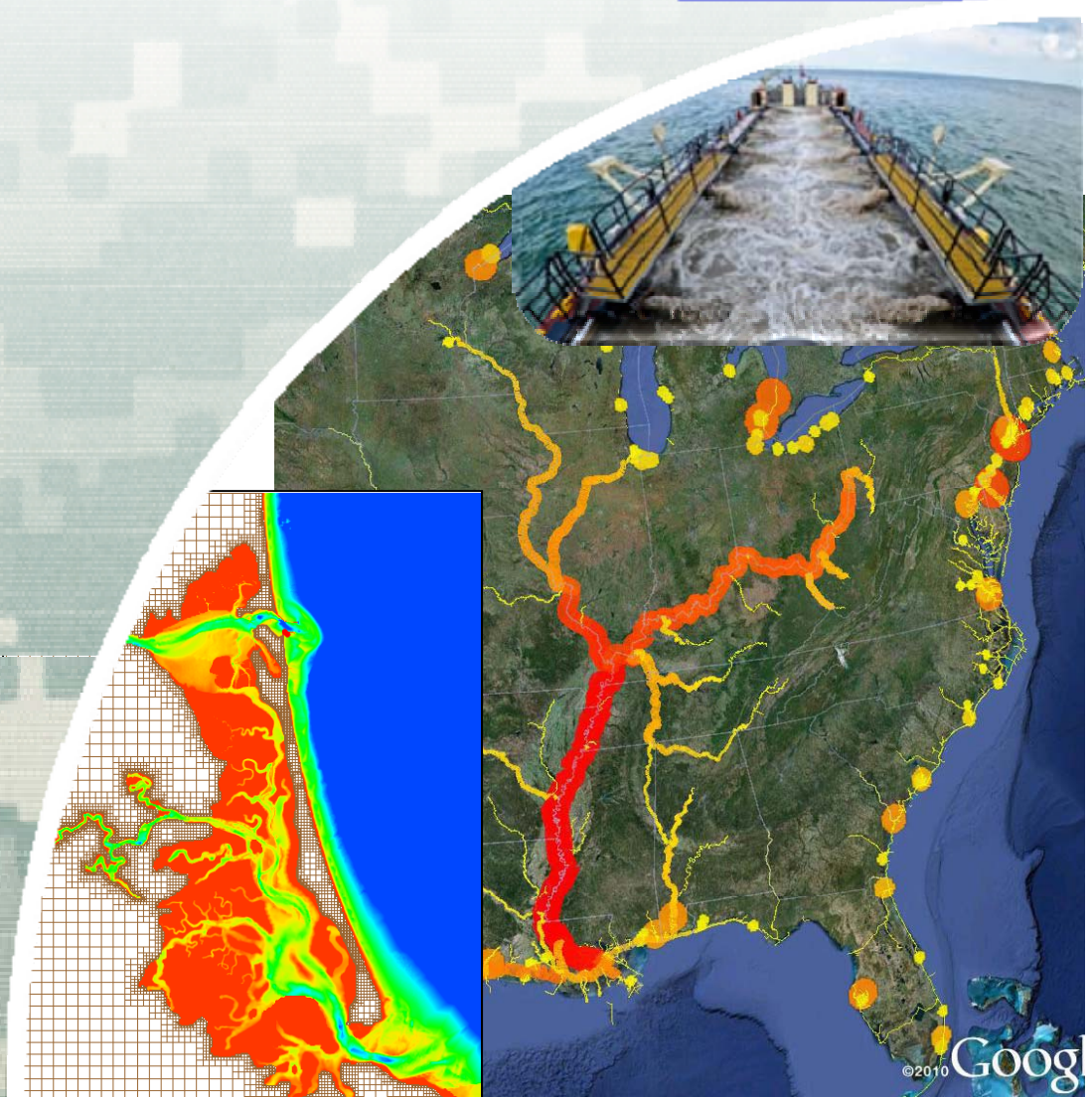
Technical Director

**Eddie Wiggins**

Associate Technical  
Director



US Army Corps of Engineers  
**BUILDING STRONG**<sup>®</sup>



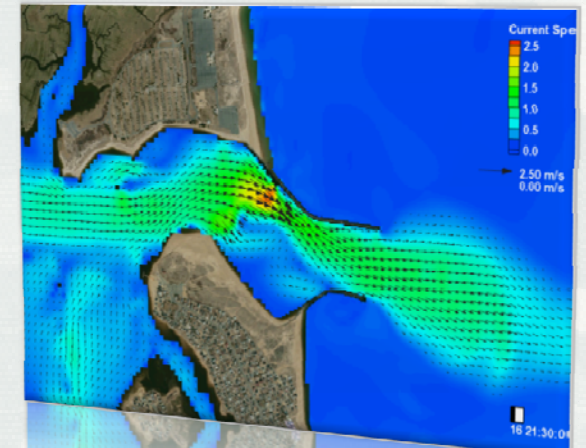
# Report Documentation Page

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- Conduct R&D to **reduce O&M costs** at coastal navigation projects
  - Include inlets, entrances, ports, marinas, harbors, navigation structures, channels and adjacent beaches.
- Develop tools to **support O&M practice**
  - Provide Districts tools for PCs to evaluate inlets, channels, structures, adjacent beaches, dredging and placement within regional systems.



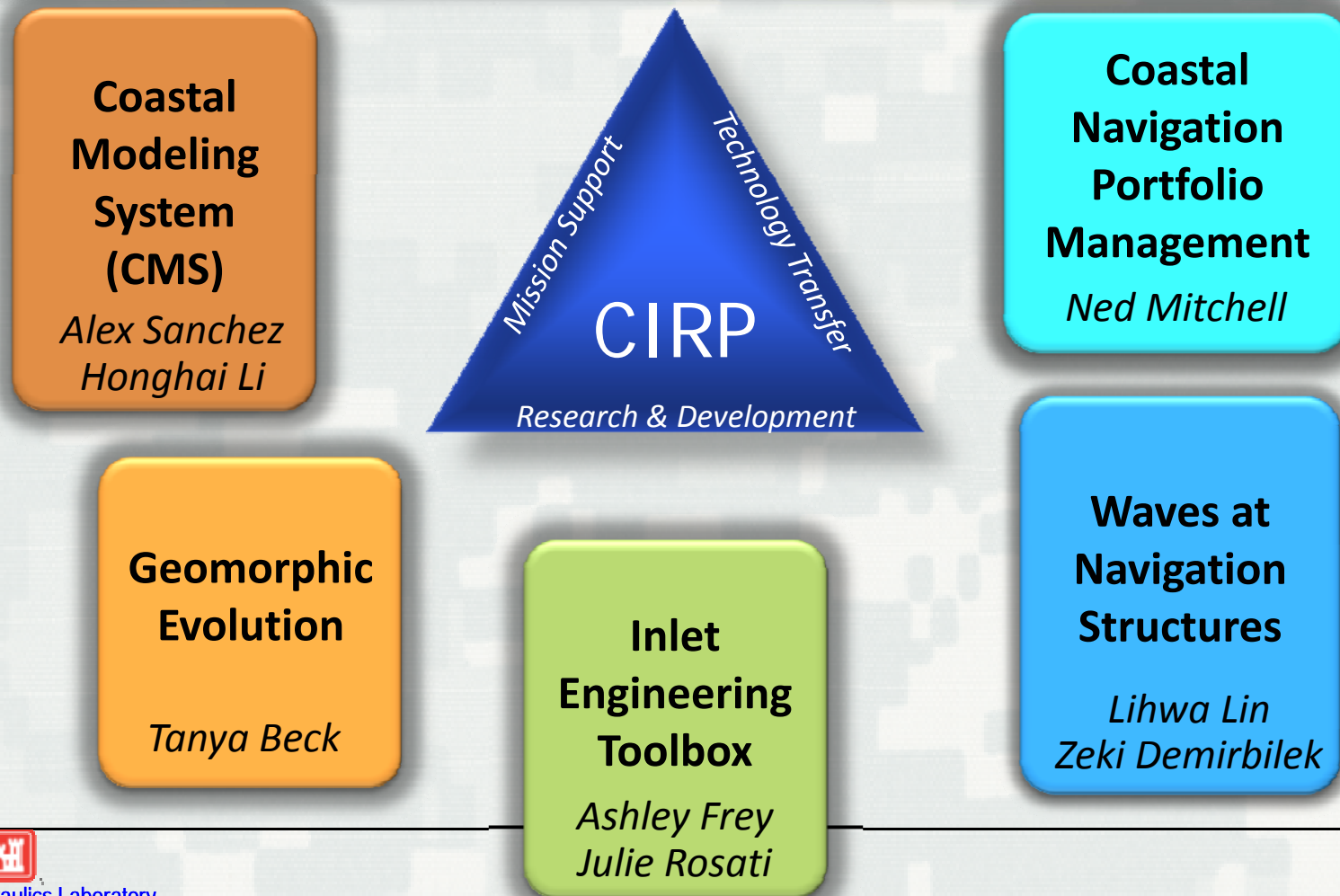
- **Transfer technology** and products
  - Guidance documents, Workshops, models and tools, Web site, Wiki-pages, PC software, Web portals, Mobile device apps, video clips.

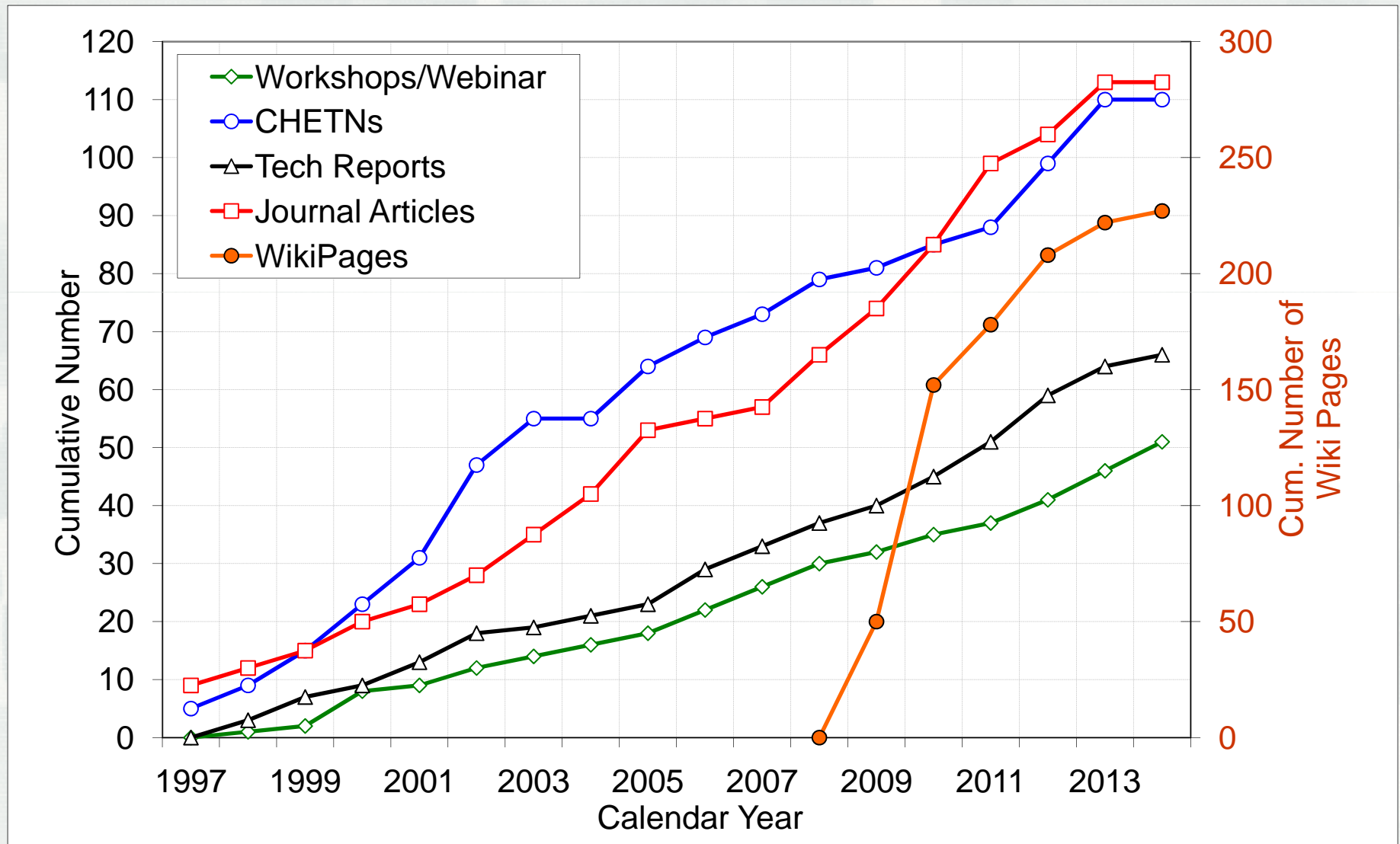




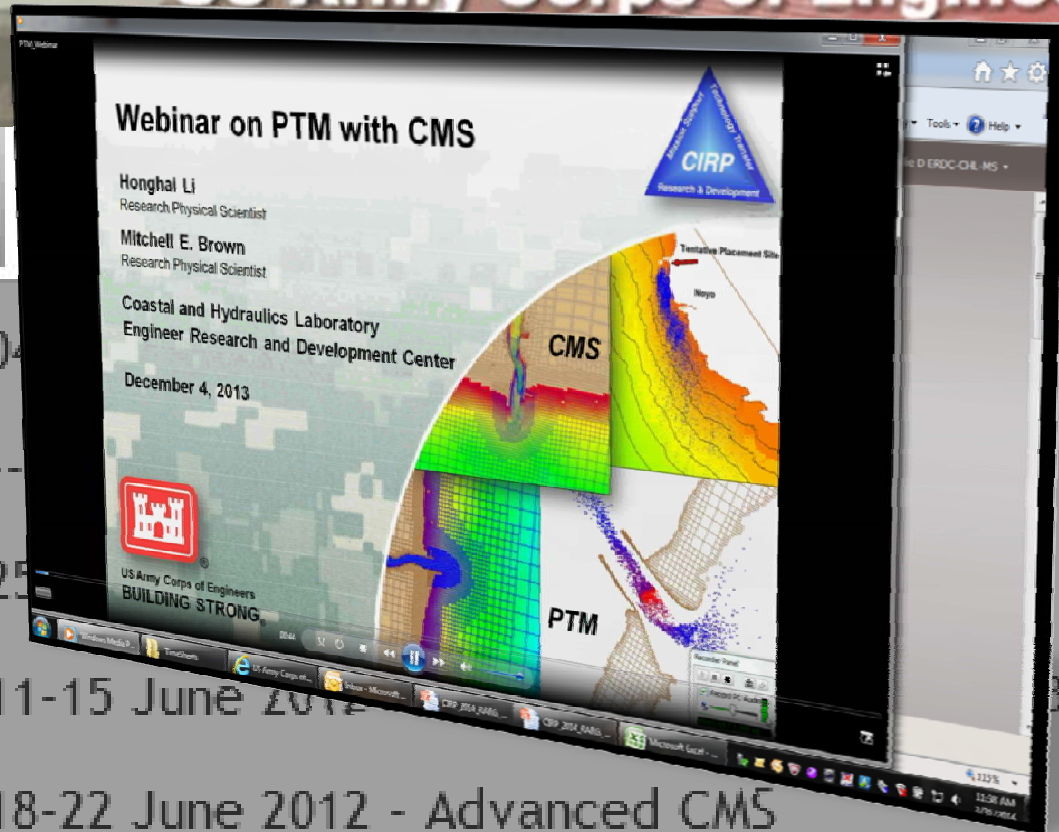
## Program Management and Technology Transfer

*Julie Rosati, Mitch Brown*





Online  
Video  
Clips!



Excellent self-paced, low-cost learning

Photo Collections >>

1-15 June 2012

18-22 June 2012 - Advanced CMS

16-18 October 2012 - GenCade



# Technology Transfer, Nov98 - Apr14



Program Management and Technology Transfer

## 14 Years of Tech Transfer Activities

### Since RARG 2013:

Six On-Site Training Sessions (4 CIRP-DOTS)

2 Webinars to Date (1 more planned)

Jun 2013	Jacksonville, FL	CMS CIRP-DOTS training
Jul 2013	Webinar	Sediment Budget Family of Solutions
Sep 2013	Portland, OR	Particle Tracking Model (PTM) - CMS
Jan 2014	Webinar	CMS and Particle Tracking Model (PTM)
Feb-Apr 2014 (3)	Vicksburg, MS	3 Joint CIRP-DOTS training
Mar 2014	Vicksburg, MS	CIRP-RSM Nearshore Berms Working Mtg
Feb-Apr 2014	Vicksburg, MS	3 Joint CIRP-DOTS workshops
Mar 2014	Vicksburg, MS	Nearshore Berms Workshop

## Program Management and Technology Transfer

*Julie Rosati, Mitch Brown*

**Coastal  
Modeling  
System  
(CMS)**

*Alex Sanchez  
Honghai Li*



**Coastal  
Navigation  
Portfolio  
Management**

*Ned Mitchell*

**Geomorphic  
Evolution**

*Tanya Beck*

**Inlet  
Engineering  
Toolbox**

*Ashley Frey  
Julie Rosati*

**Waves at  
Navigation  
Structures**

*Lihwa Lin  
Zeki Demirbilek*

Coastal  
Navigation  
Portfolio  
Management

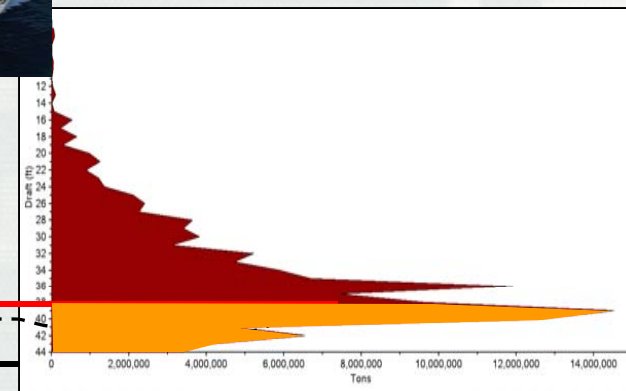
**Focus:** develop **decision-support tools** that provide the USACE with **objective, consistent performance metrics** for inventory of coastal channels, structures, and other navigation assets.



## Channel Portfolio Tool (CPT):

Web-based application that **relates navigable depths to cargo** most vulnerable to shoaling.

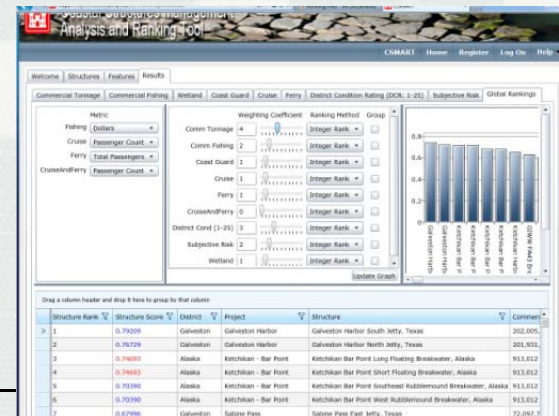
<https://cpt.usace.army.mil>



## Coastal Structures Management, Analysis, and Ranking Tool (CSMART):

Web-based application that **prioritizes coastal structures** according to user-specified criteria and weightings on metrics such as condition rating, commercial tonnage, fish landings, and cruise and ferry passengers.

<https://cpt.usace.army.mil/Silverlight/CSMART>

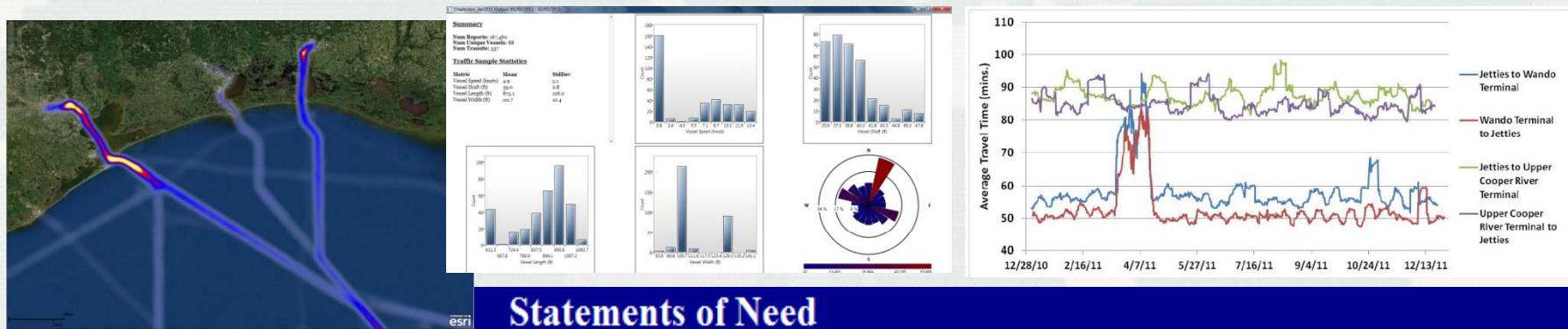




Coastal Navigation Portfolio Management

## Automatic Identification System Analysis Package (AISAP)

- Desktop application that provides access to and analysis capabilities for large amounts of **archived spatial-temporal Automatic Identification System (AIS) data**.
- Uses web services provided by USCG to access archived data of vessels movements in coastal waters and along inland rivers (from LOMA).
- Analysis capabilities include **traffic density patterns, fleet characteristics, avg. speeds, travel times, dwell times, and tidal dependency**.



### Statements of Need

Automatic Identification System (AIS) data use in Navigation operations and engineering.  
Tracking Number 2012-N-5

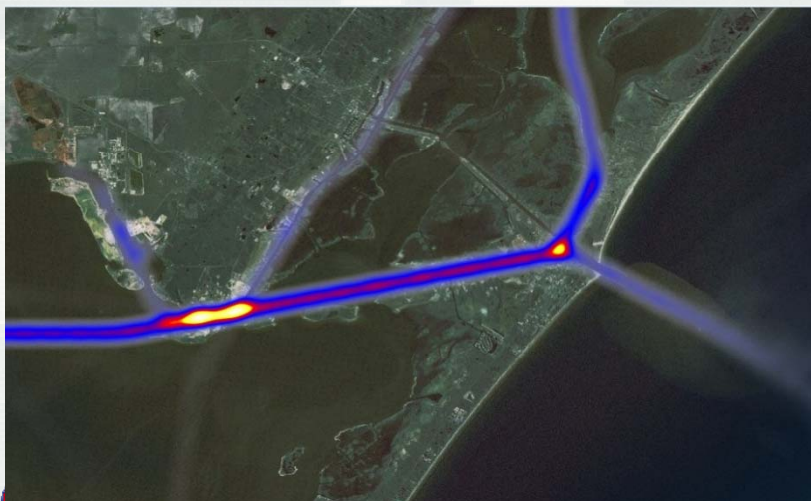
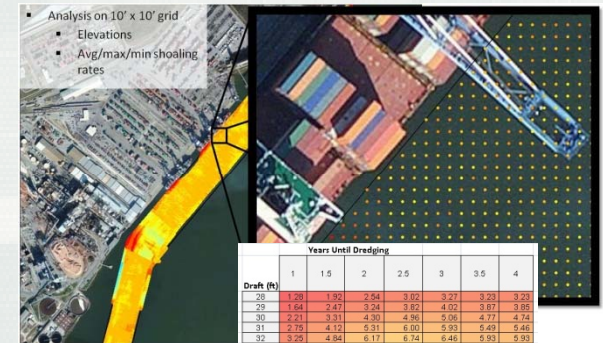
Coastal  
Navigation  
Portfolio  
Management

### CPT:

- Supporting Asset Management with integration of e-Hydro output and Corps Shoaling Analysis Tool (CSAT) forecasts into CPT architecture.
- ✓ Inclusion of FY09-FY13 navigation budget data.

### CSMART:

- ✓ CSMART query saver.
- ✓ Wetlands data, USCG installations.
- ✓ Dynamic interface for easier sensitivity analysis of weightings (FY13 reimbursable with Asset Mgmt.)

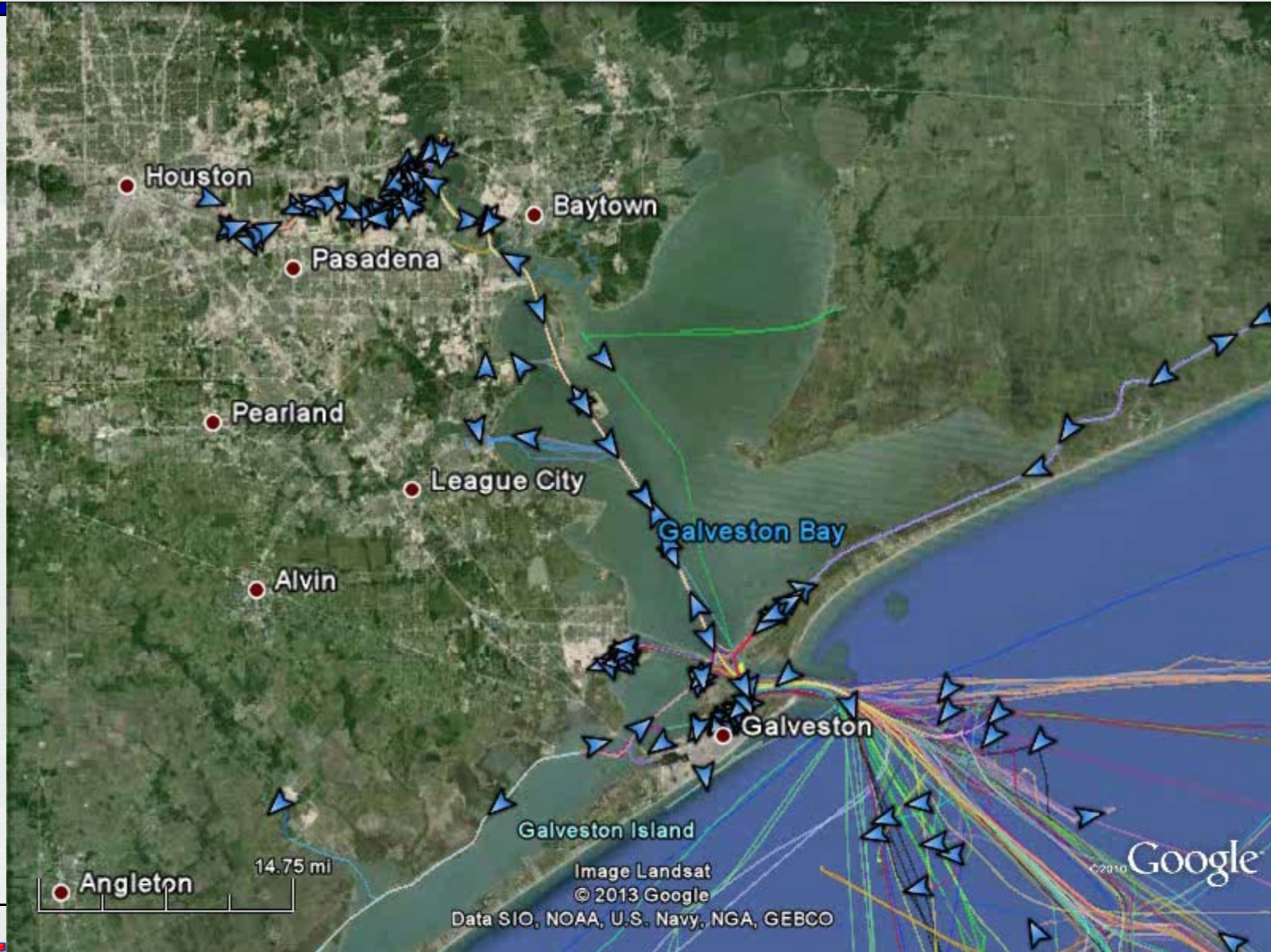


### AISAP:

- ✓ JP: Waterway Performance Monitoring via Automatic Identification System Data (Mitchell and Scully, 2014)
- ✓ Methodology for quantifying tidal influence on vessel transits
- Similar approach for waves, winds, currents

# AISAP:

## Houston-Galveston Navigation Channel



## Program Management and Technology Transfer

*Julie Rosati, Mitch Brown*

Coastal  
Modeling  
System  
(CMS)

*Alex Sanchez  
Honghai Li*

Mission Support

CIRP

Technology Transfer

Research & Development

Coastal  
Navigation  
Portfolio  
Management

*Ned Mitchell*

Geomorphic  
Evolution

*Tanya Beck*

Inlet  
Engineering  
Toolbox

*Ashley Frey  
Julie Rosati*

Waves at  
Navigation  
Structures

*Lihwa Lin  
Zeki Demirbilek*

# Waves at Navigation Structures

PIs: Dr. Lihwa Lin and Dr. Zeki Demirebilek

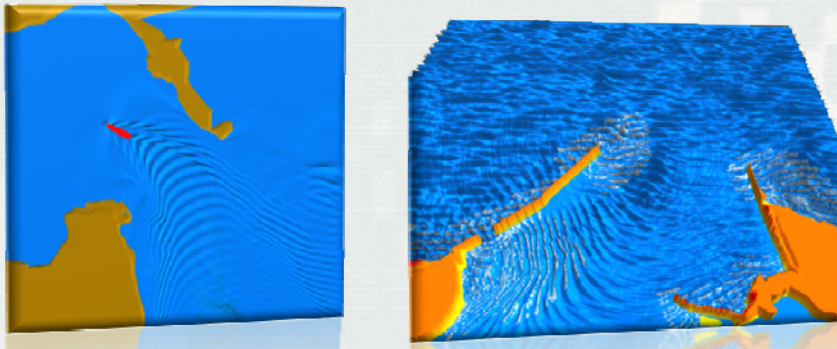
Waves at  
Navigation  
Structures

**Focus:** to **advance wave predictive capability** in support of USACE missions for coastal inlets, navigation, structures, ports/harbors/marinas, and adjacent beaches, reefs and wetlands.

## CMS-Wave:

Spectral wave propagation model including diffraction, reflection, run-up, setup, overtopping, wave generation, structures (breakwaters, jetties, groins, etc.), nested grids; integrated with CMS-Flow

Verification & Validation Cases (14)



## Report 2 - Waves

- Basic Verification for Idealized Problems
  - Ex.1 - Wave generation and growth in limited fetch (~800 KB)
  - Ex.2 - Nonlinear wave-wave interactions (~800 KB)
  - Ex.3 - Wave diffraction at breakwater gap (~1 MB)
- Laboratory Studies
  - Ex.1 - CHL Idealized inlet experiments (~8 MB)
  - Ex.2 - Wave breaking experiments on a planar beach (~2 MB)
  - Ex.3 - Wave runup on impermeable uniform slope (~15 MB)
  - Ex.4 - Experiments for Cleveland Harbor, Ohio (~1 MB)
- Field Studies
  - Ex.1 - Matagorda Bay, Texas (~110 MB)
  - Ex.2 - Grays Harbor, Washington (~41 MB)
  - Ex.3 - Mouth of Columbia River, WA/OR (~34 MB)
  - Ex.4 - Southeast Oahu Coast, Hawaii (~7 MB)
  - Ex.5 - Field Research Facility, Duck, NC (~48 MB)
  - Ex.6 - Mississippi Coastal Improvement Program (~117 MB)
  - Ex.7 - Waves over a submerged rock reef, Indian River County, FL (~18 MB)

**APPROVED**  
Preferred by  
HH&C CoP for  
Engineering

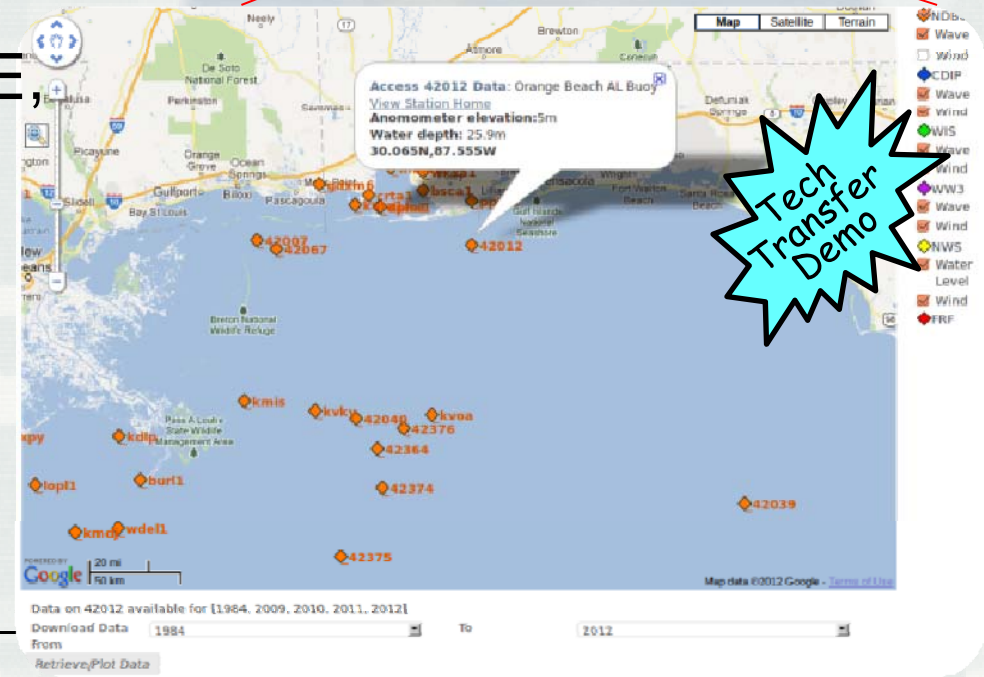
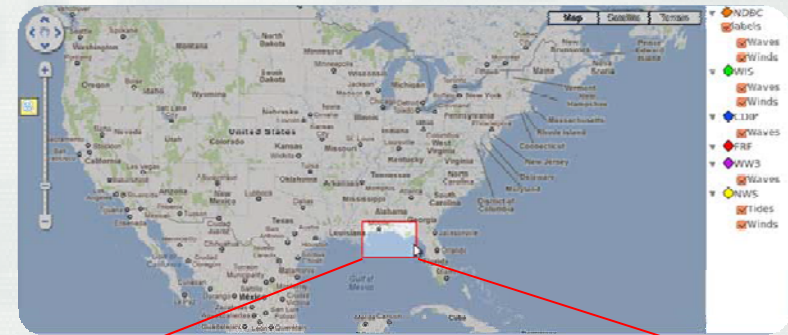


**Bouss-2D:** Phase-resolving shallow-water, nonlinear wave model for ports/harbors/marinas, navigation, fluid-structure interaction, vessel-generated waves.

Waves at  
Navigation  
Structures

**WaveNet:** Web-based interactive GUI with Google Map


- **Purpose:** Access, analyze, plot, and format wave and wind data for projects and models
- **Data Sources:** NOAA, USACE, CDIP
- **Future Additions:** CPT and AIS coupling

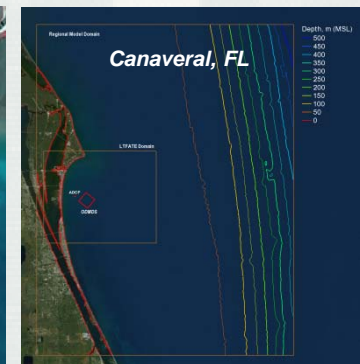
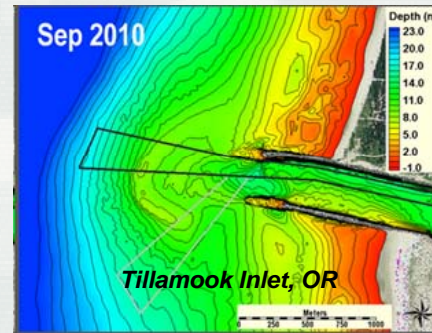


# Waves at Navigation Structures

## FY13 Project Applications/Reimbursables

Waves at Navigation Structures

- NWP: Port Orford, OR  
Tillamook Inlet, OR
- SPN: Half Moon Bay, CA
- SWG: Matagorda Ship Channel, TX  
West Galveston Bay, TX 
- Freeport, TX
- MVN: Terrebonne Bay, LA
- NAE: Merrimack Inlet, MA
- NAN: Ambrose Channel, NY
- LRB: Braddock Bay, NY
- LRE: Sand Island, WI
- NAO: Tangier Island, VA
- SAJ: Cape Canaveral, FL  
St. Johns River, FL
- POH: Kikiaola Harbor, HI

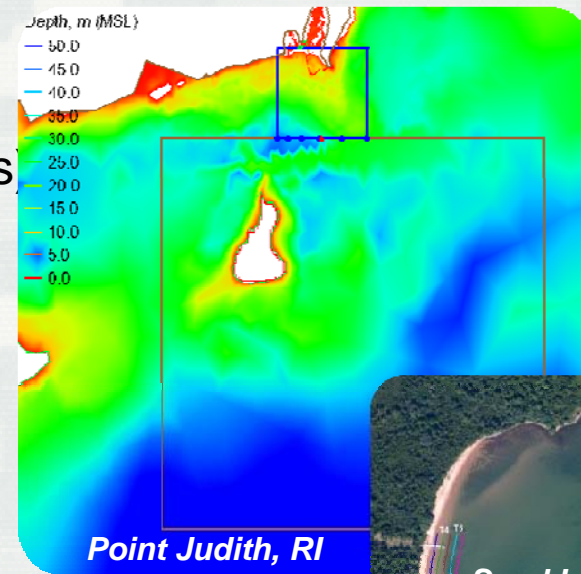


# Waves at Navigation Structures

## FY14 Plan

### Waves at Navigation Structures

- R&D activities
- Tech transfer
- Support to Districts (project applications)
  - R&D
    - Enhancements to CMS-Wave
    - Pre- and post-processing capabilities
    - Complete WaveNet and TideNet
  - Tech Transfer
    - Conduct trainings for wave models for Districts
    - Complete publications (5 TRs, 4 CHETNs, 2 JPs)
  - Support Districts in project studies
    - POH (2)
    - SPN (1)
    - LRC (4)
    - LRE (3)
    - LRB (3)



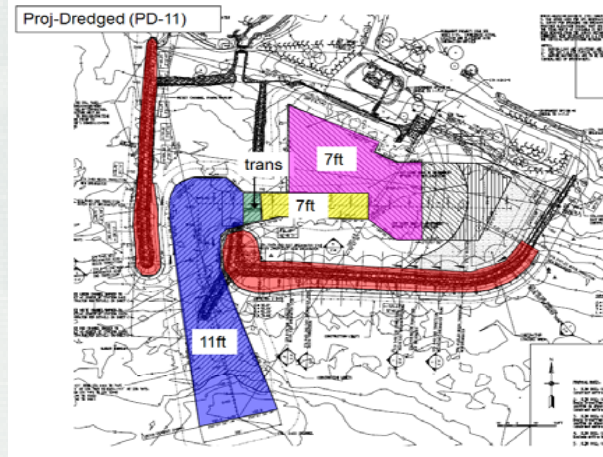
# Example of Support to District Navigation Projects: *Kikiaola Harbor, HI*

Waves at  
Navigation  
Structures

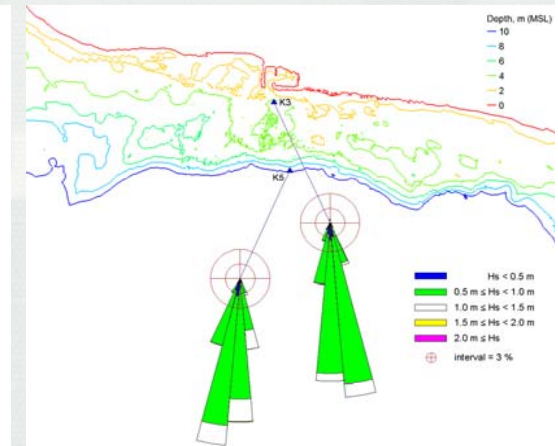
**Purpose:**  
Evaluate  
improvements to  
navigation and  
infrastructure

## Tasks completed:

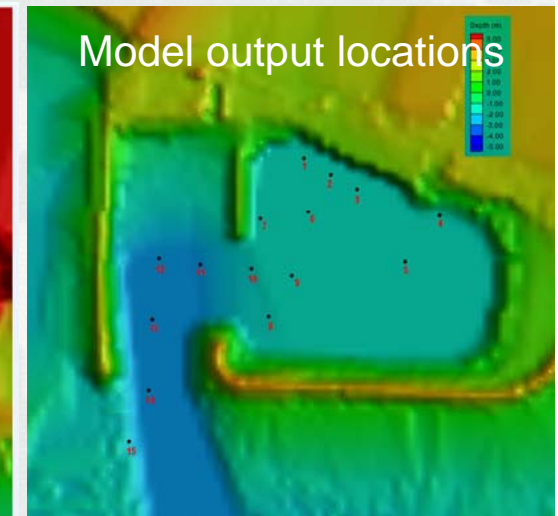
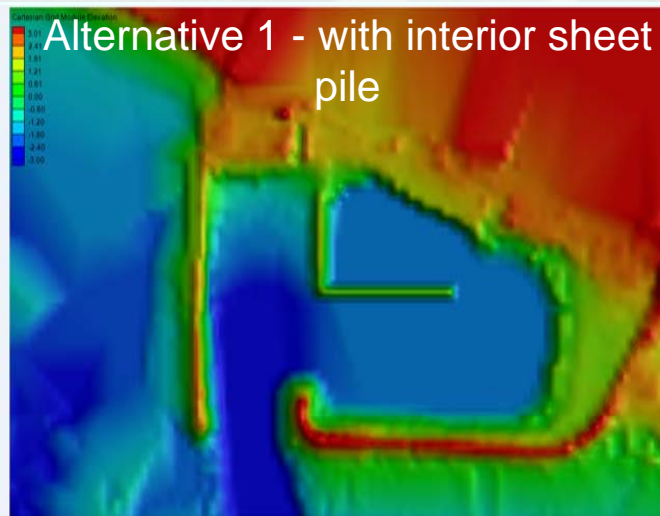
- Defined waves at the entrance and interior harbor
- Ranked 8 alternatives for dominant waves
- Sized infrastructure mods to minimize harbor oscillations (surge) and improve harbor interior basin design



Federal project 2009



Wave roses, Oct 2012 -  
Feb 2013



## Program Management and Technology Transfer

*Julie Rosati, Mitch Brown*

### Coastal Modeling System (CMS)

*Alex Sanchez  
Honghai Li*

### Geomorphic Evolution

*Tanya Beck*

### Inlet Engineering Toolbox

*Ashley Frey  
Julie Rosati*

### Coastal Navigation Portfolio Management

*Ned Mitchell*

### Waves at Navigation Structures

*Lihwa Lin  
Zeki Demirbilek*



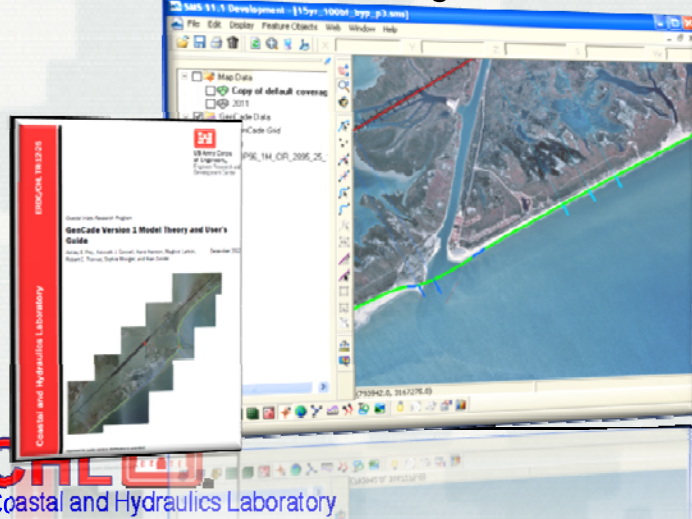
**Inlet Engineering Toolbox**

**Focus:** develop desktop PC and web-based tools to assess how engineering actions affect coastal inlets, navigation channels, and adjacent beaches

**GenCade**

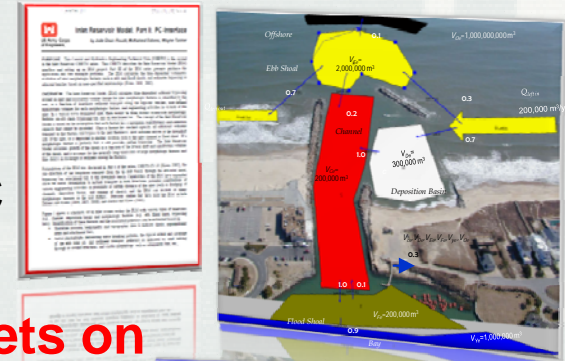
- A 1-line model for shoreline change, sand transport, and inlet sand sharing
- Based on GENESIS (project scale) and Cascade (regional scale)
- TRs and previous webinar audio/video and slides are available

GenCade at Sargent Beach, TX



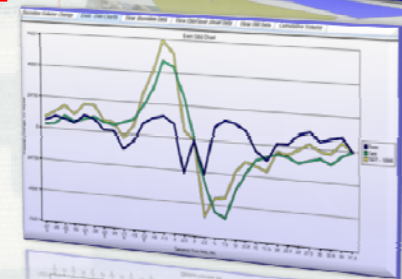
**Inlet Reservoir Model**

- PC-based, time-dependent sand sharing model for inlet morphologic evolution
- CHETN on PC interface



**Impacts of Inlets on Adjacent Beaches (IIAB) application**

- Calculates alongshore extent of inlet influence (CEM method) and total volumetric impact of inlet



**Statements of Need**

Need long-term morphologic evolution predictors  
Tracking Number 2008-N-6

# Inlet Engineering Toolbox

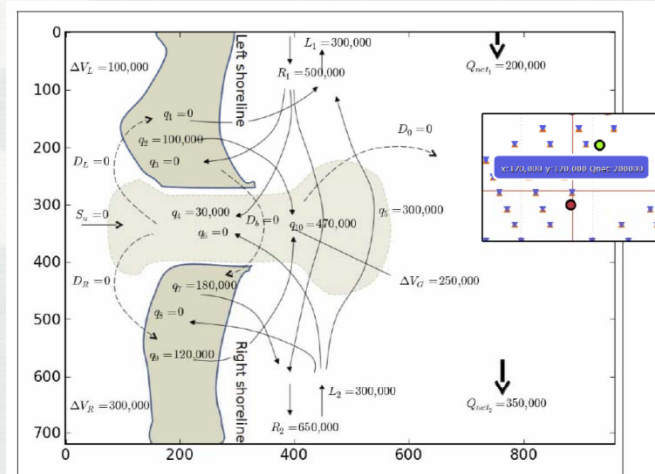
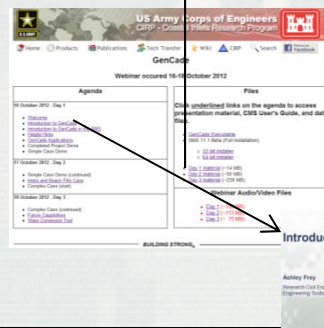
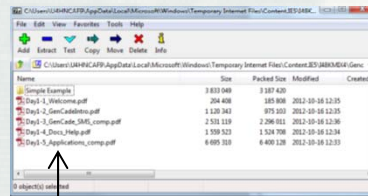
## FY13 Accomplishments

### GenCade

- **Documented Applications and Guidance**
  - Published 2 CHETNs on wave conversion tool
  - Published TR on Matagorda & Sargent Beach application
  - Completed TR on GenCade recommendations and CHETN on 1-line model comparisons (published in FY14)
- **Tech Transfer**
  - DOTS request at NAB
  - GenCade webinar (6 hrs)
  - GenCade webinar for SAW

### Sediment Budget Calculator

- An online web-tool that applies the Bodge Method of formulating an inlet and adjacent beach sediment budget through developing a **Family of Solutions** that satisfy user-defined constraints
- Webinar in July 2013 with 11 attendees from Districts
- CHETN published in August 2013

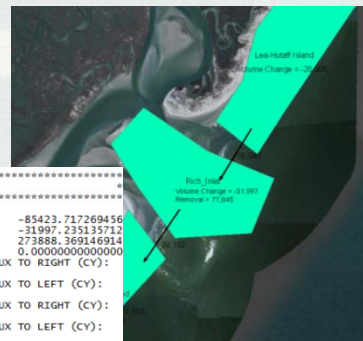
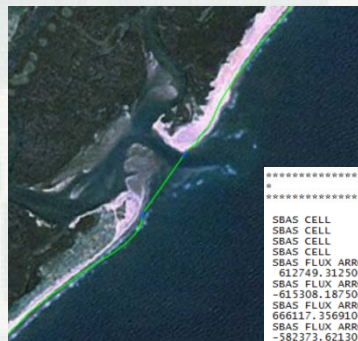


### GenCade

- Model improvements
  - Connect GenCade & SBAS
  - Improve Inlet Reservoir Model (IRM)
  - Apply variable parameters and time-varying structures
- New documentation on comparison of 1-line models (Part 2), a Quick Start Guide, GenCade calibration, and the external wave model
- GenCade YouTube clips

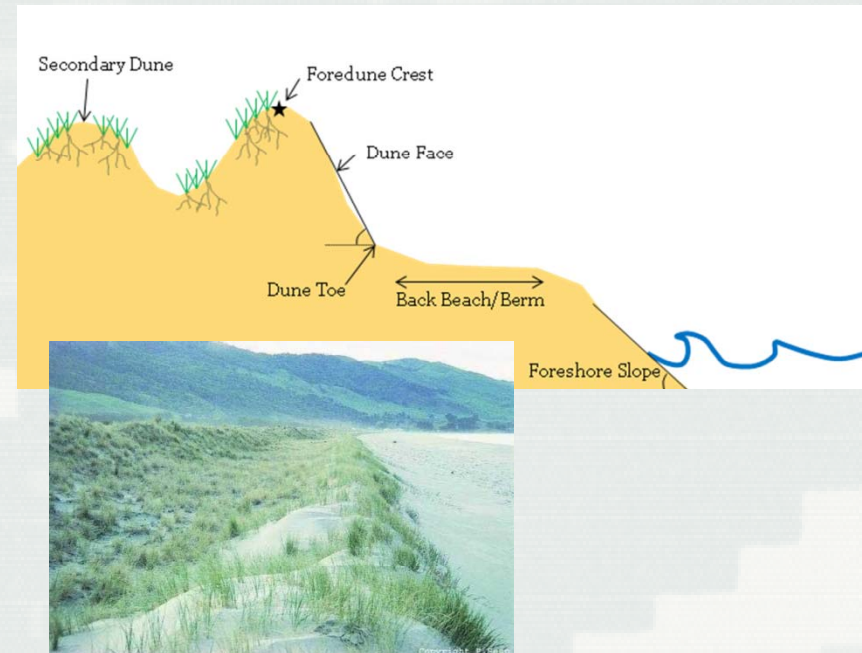
### Foredunes

- Foredune state of response TR
- Develop code to classify foredune state
- Evaluate morphologic response of foredune states to high magnitude storm events



```

SBAS OUTPUT
-----
SBAS CELL      1  VOLUME CHANGE (CY):  -85423.717269456
SBAS CELL      2  VOLUME CHANGE (CY):  -31997.235135712
SBAS CELL      3  VOLUME CHANGE (CY):  273888.369146914
SBAS CELL      4  VOLUME CHANGE (CY):  0.000000000000000
SBAS FLUX ARROW
612749.312500000
SBAS FLUX ARROW
-615308.187500000
SBAS FLUX ARROW
666117.35691000000
SBAS FLUX ARROW
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SBAS FLUX ARROW
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SIGN CONVENTION:  EROSION (-), ACCRETION (+)
    
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## Program Management and Technology Transfer

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*Lihwa Lin  
Zeki Demirbilek*

# Geomorphic Evolution FY13 Accomplishments

**Geomorphic Evolution**

*Develops methods and provides geomorphic perspective for studies on federal navigation and coastal projects concerning scales much greater than dredging cycles, planning timelines, and the dimensions of the navigation channel.*

## Nearshore Berms R&D

Nearshore  
Berm  
Calculator

Mobile  
Tools

Documentation  
& Guidance

Numerical Modeling &  
Scoping Level Calculations  
Nearshore Berms

### Statements of Need

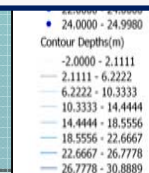
**Design and Evaluation Tool for Nearshore Berm Placement of Non-Beach Compatible Material**  
Tracking Number 2011-N-15

**Nearshore Placement of Dredged Sediment Assessment**  
Tracking Number 2011-N-19

### Statements of Need

**Need long-term morphologic evolution predictors**  
Tracking Number 2008-N-6

Web-based portal for CIRP developed includes Inlets Online Database and the Nearshore Berms Database



# Geomorphic Evolution FY13 Accomplishments

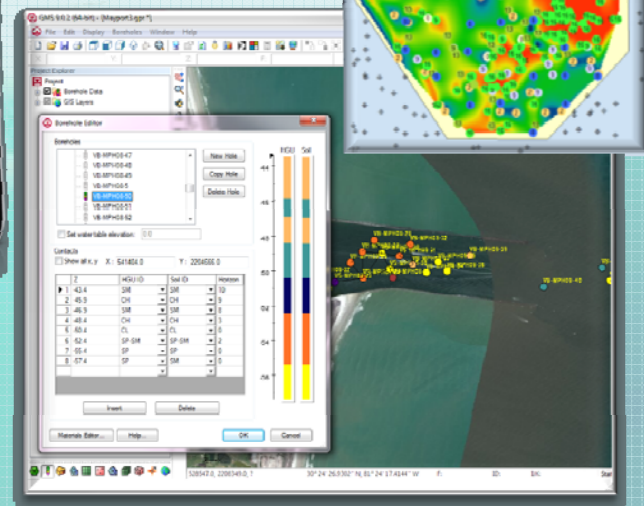
Geomorphic  
Evolution

## Sediment Enterprise Database & Research

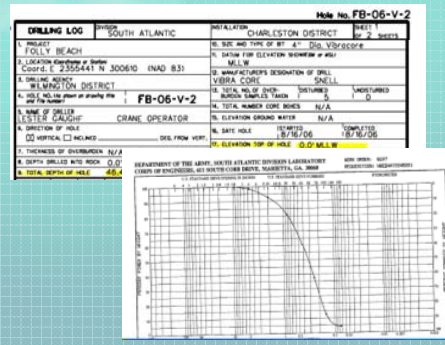
Field Data  
Collection

Initiate Corps-wide  
Sediment Database  
Template (future  
SAGA)

Sediment  
Database & GIS  
Resource  
Mapping Tools






Retaining Digital Data

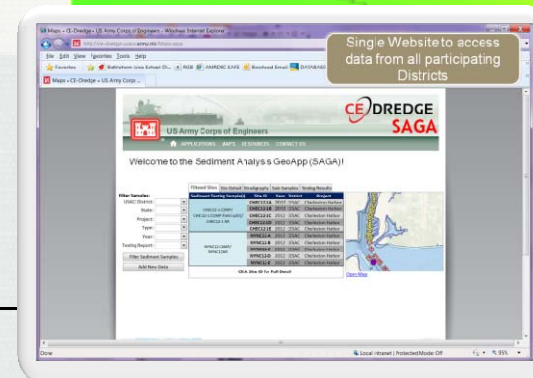
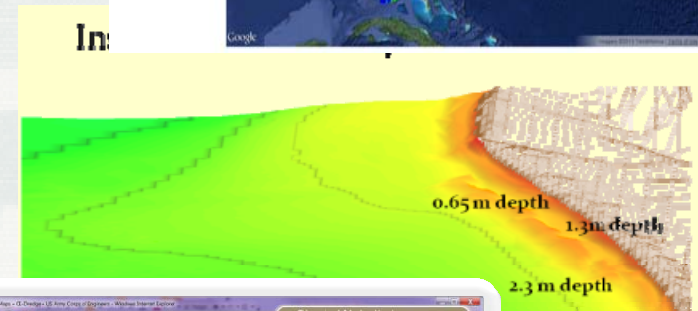
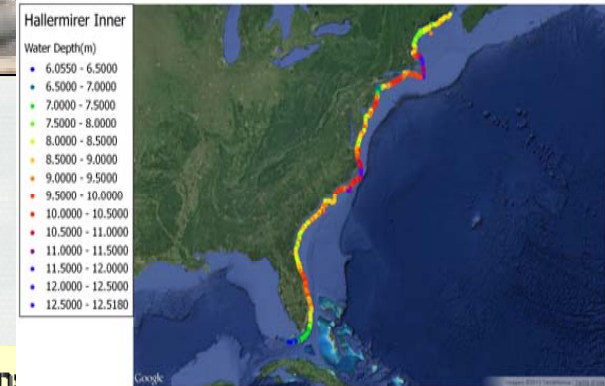


- CIRP, RSM, DOER Leveraged Dredge and Placement Sediment Study at Egmont Key, Florida
- Field monitoring study on the reduction of fines through dredging and nearshore placement process
- DOER-TN: Effect of turbidity on light attenuation over SAVs
- Tech Report: Fate of fines through the dredging process

3D Sediment Resource Tool:  
Integrated to GMS, and designed to  
provide 3D sedimentologic input for  
SMS numerical models

# Inlet Geomorphology FY14 Plans

- 
 ➤ CHETN: Nearshore Berm Working Meeting Summary of Future Operational and Research Needs and Communication Strategy
- 
 ➤ Tech Report: Improving empirical/theoretical formulations for Nearshore Berms
- JP: Nearshore Berm Modeling and Morphodynamic Analysis
- JP: Collaborate with CMS WU on Long-term Morphology Change Modeling of Tidal Inlets
- 
 ➤ Sediment Analysis Geo-App, Release (V1)



## Program Management and Technology Transfer

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*Ashley Frey  
Julie Rosati*

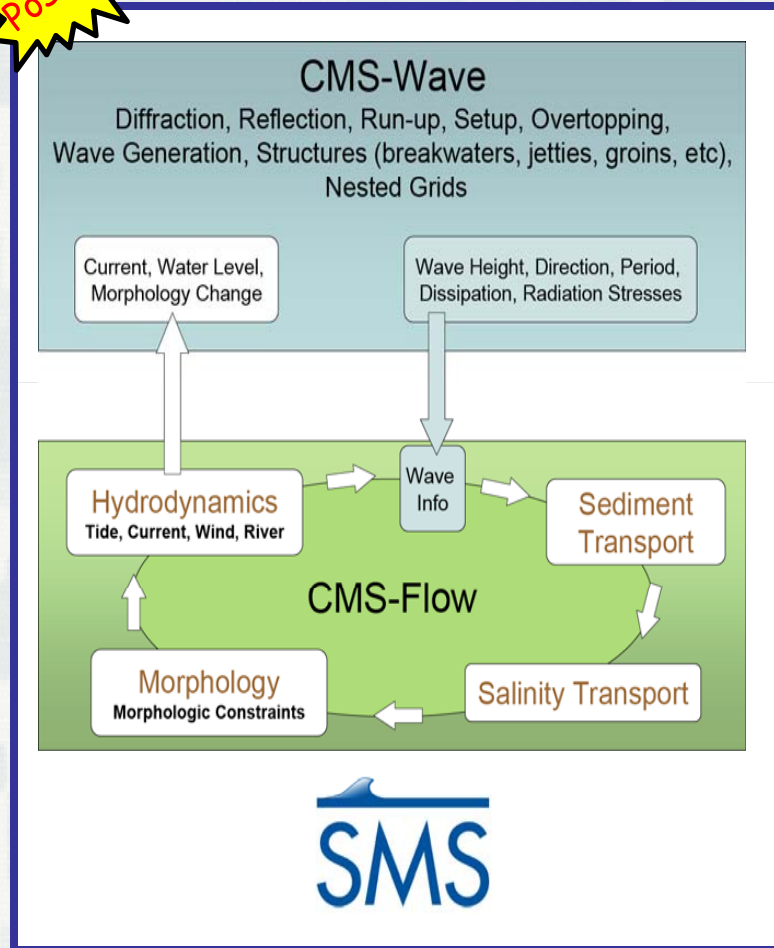
### Waves at Navigation Structures

*Lihwa Lin  
Zeki Demirbilek*

# Coastal Modeling System

PIs: Dr. Alejandro Sanchez, Dr. Honghai Li

Poster!



## What is the CMS?

- **Integrated wave, current, and morphology change model** in the Surface-water Modeling System (SMS).

## Why CMS?

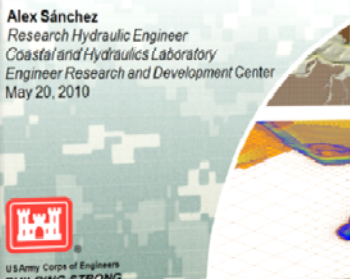
- Operational at 10 Districts and consulting
- Validated with real applications
- Robust and user-friendly
- Practice-oriented: *1 year simulation ~ 1-3 days on PC*

## Types of Applications

- **Channels:** Deepening, widening, lengthening, realigning
- **Jetties:** Lengthening, raising, rehabbing
- **O&M:** Placement areas – berms, wetlands
- **Processes:** *Navigability* – waves and currents; *Environmental* – circulation, sediment transport

**Coastal Modeling System**  
*Overview, background and capabilities*

Alex Sánchez  
Research Hydraulic Engineer  
Coastal and Hydraulics Laboratory  
Engineer Research and Development Center  
May 20, 2010



US Army Corps of Engineers  
**STAYING STRONG**

CMS - CRPWiki Mozilla Firefox

search

Go Search

Navigation

- Home page
- CIRP publications
- CRP products
- CMS main page
- CMS Doc Portal
- Help

links

- CRP Website
- CRP Event Horizon
- CH Website
- USACE Navigation Gateway
- Aguares Website

wiki resources

- User's Guide
- Modeling FAQ
- Modeling mailing list

toolbox

- What links here
- Recent changes
- Special pages
- Install the version
- Remove this link
- Display properties

**CMS**

Coastal Modeling System

Wave & Tide driven current

Morphology Change

Measured

Calculated

CMS takes advantage of the Surface-water Modeling System generation and model setup, as well as plotting and post-processing.

**Background**

The CMS has been a research and development area of the (CIRP) at the United States Army Corps of Engineers - Engineer Development Center (USACE-ERDC), Coastal and Hydraulics Laboratory. It was built from a group of numerical models that have been information on the CIRP and publications on the CMS can be found at:

**Key Features**

- Fully integrated system
  - CMS-Flow - In-line flow, sediment and salinity
  - CMS-Wave - Spectral-wave transformations model
  - CMS-PTM - Particle tracking model

Exporting the bottom friction dataset:

Exporting to a bottom roughness (friction) dataset is useful for creating different project alternatives or when providing the different bottom roughness datasets (type such as the Manning's n) to Bottom Profile Configuration tool. It is also useful for storing multiple runs with different project alternatives.

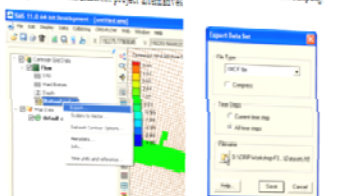


Figure 5.1.2. Manning's n contours after modifying the area under all three bridges.

**Additional Bottom Friction Cards**

Additional advanced cards are available for setting the bottom friction to a constant for the whole grid. These cards are useful for running sensitivity analysis for a wide range of values in cases which can be approximated with a single constant bottom friction value.

Table 5.1.2. Advanced Cards to set bottom friction dataset to a constant value

Card	Argument	Default	Units	Description	Card Number
bottomfriction_constant	value	0.001	1/s	Specifies constant value for the bottom friction dataset	5.1.2
bottomfriction_constant	value	0.001	1/s	Specifies constant value for the bottom friction dataset	5.1.2
bottomfriction_constant	value	0.001	1/s	Specifies constant value for the bottom friction dataset	5.1.2

5.1.2 Wall Friction

The wall friction coefficient is the drag perpendicular to any dry boundary. The wall friction coefficient is set in the form of the CMS-Flow Model Control.

ERDC/CHL TR-05-9

Coastal and Hydraulics Laboratory

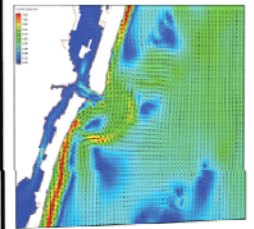
US Army Corps of Engineers  
Engineer Research and Development Center

Coastal Inlets Research Program

**Two-Dimensional Depth-Averaged Circulation Model CMS-M2D: Version 3.0, Report 2, Sediment Transport and Morphology Change**

Authors: M. Saitoh, Christopher W. Reed, Nicholas C. Kraus, Nikolai Orlin, Marcus Larson, Daniel Carrasco, Hans Hanson, Ty Wamsley, and Alan K. Zumbro

August 2005



## Availability

- Comes with SMS installation package
- CIRP website (under Products)
- CMS is **Free** and interface is inexpensive
- POC's: Alejandro Sanchez, Lihwa Lin, Mitchell Brown, Honghai Li


## Documentation

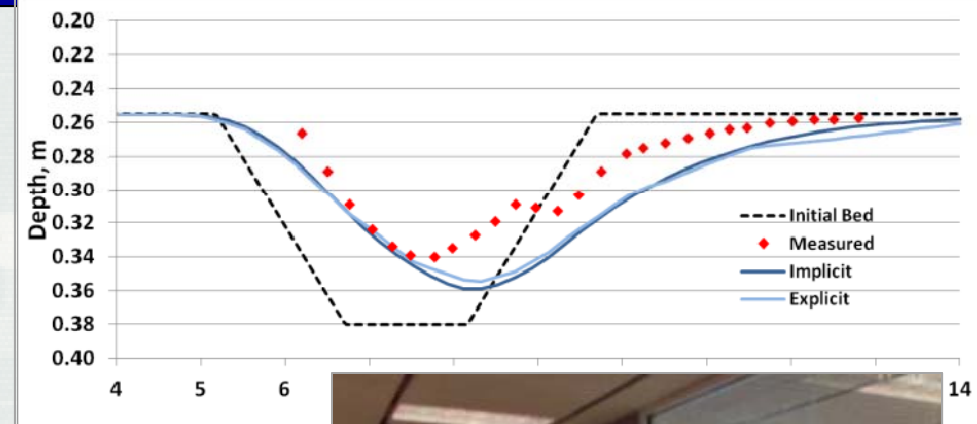
- TRs, CHETNs and journal papers <http://cirp.usace.army.mil/pubs/>
- CIRP Wiki <http://cirp.usace.army.mil/wiki/CMS>

- **New Technical Report** available

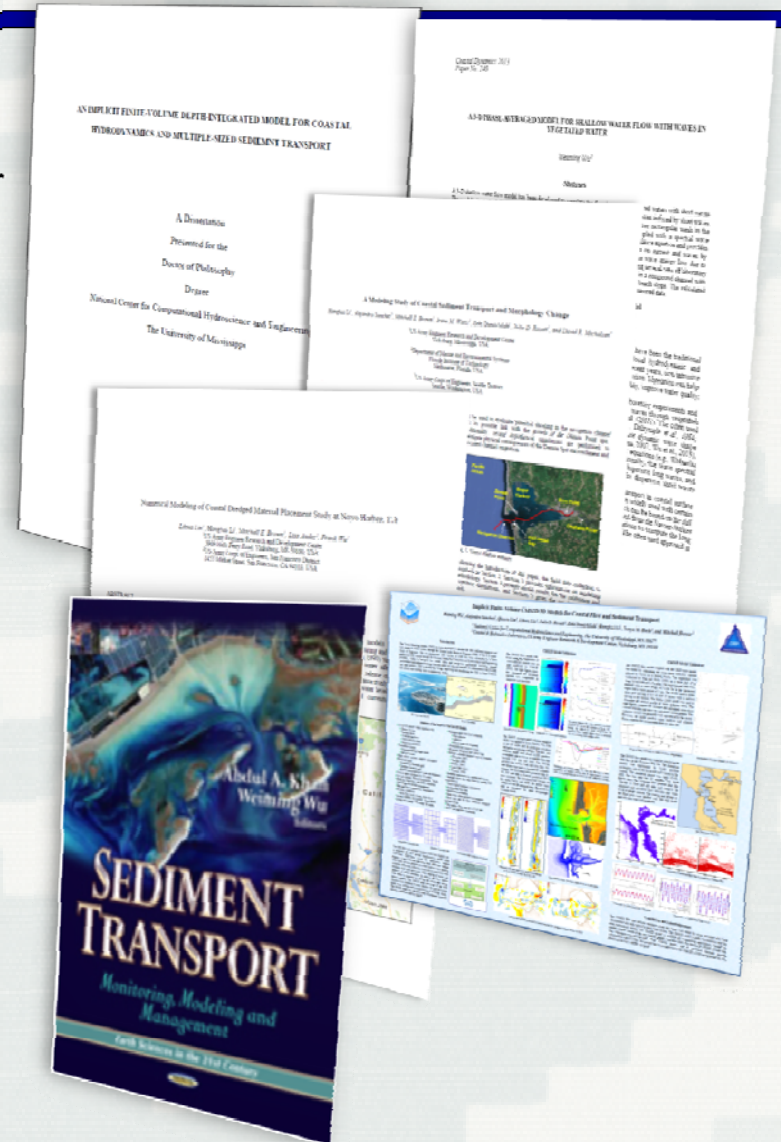
## Training and Support

- Workshops <http://cirp.usace.army.mil/workshops/>
- Webinars <http://cirp.usace.army.mil/webinars/>
- On-site Training

- Completed PhD 
- Publications
- Completed 2 DOTS training for SAJ and NAB
- Release of SMS 11.1
  - Dynamic dialogs
- Release of CMS 4.1
  - Many new features
- Web-based time series analysis tool
  - Prepared routines and posted on CIRP Wiki (data filtering, tidal harmonic, spectral, principal component analysis)



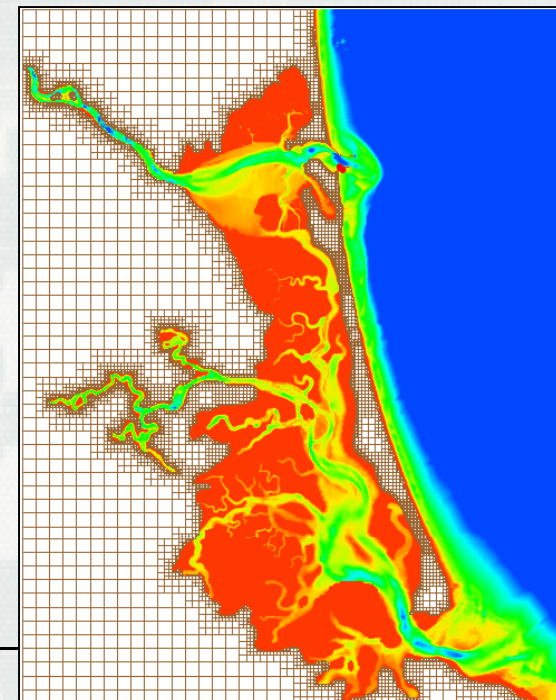
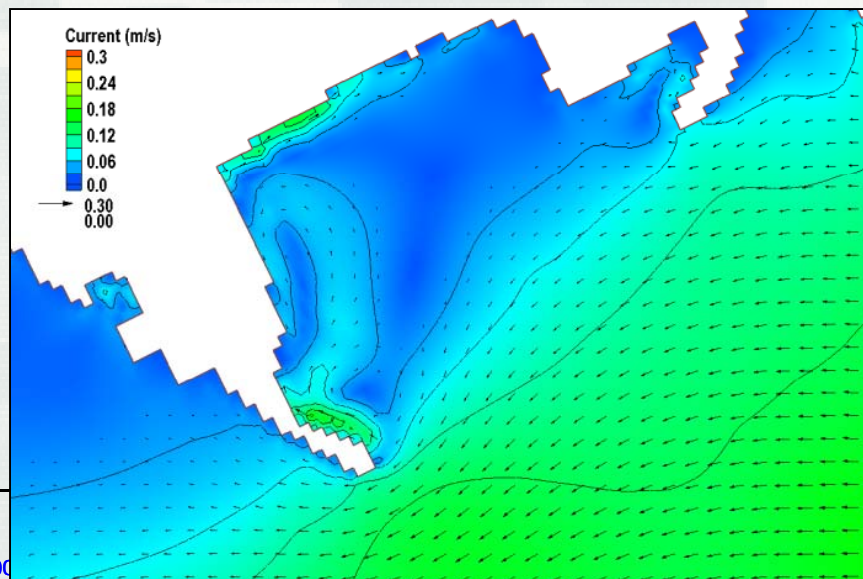
- **Journal Paper**
    - Naval Station Norfolk, VA
    - JP: Sediment transport through permeable breakwater
  - **5 Conference Papers:**
    - Coastal Inundation: Naval Station Norfolk.
    - Sediment transport: Grays Harbor, WA
    - Vegetation flow drag with CMS
    - Dredged material placement: Noyo Harbor, CA
    - Mixed Sediment Modeling: MSC, TX
- Note: 2 Coastal Dynamics papers cancelled due to travel restrictions
- **2 Book Chapters:**
    - Non-Equilibrium Sediment Transport Modeling –
      - Formulations and Closures
      - Extensions and Applications
  - **PhD Dissertation**
    - An Implicit Finite-Volume Depth-Integrated Model for Coastal Hydrodynamic and Multiple-Sized Sediment Transport



- 4 Technical Notes
  - Weirs
  - Rubble mounds
  - Tidal gates
  - Culverts
- 5 Technical Reports:
  - CMS: Theory and Numerical Methods
  - Tillamook Inlet, OR
  - Storm Waves, Circulation, and Sedimentation Study, Dana Point, CA
  - Regional Sediment Management Studies of Matagorda Ship Channel and Matagorda Bay System, TX
  - Pilot Study Evaluating Nearshore Sediment Placement Sites, Noyo Harbor, CA



- NAE: Merrimack Bay/Inlet Modeling Study
- RSM Study: Port Orford Oregon Regional Sediment Model
- NWP: Tillamook Inlet Navigation Study

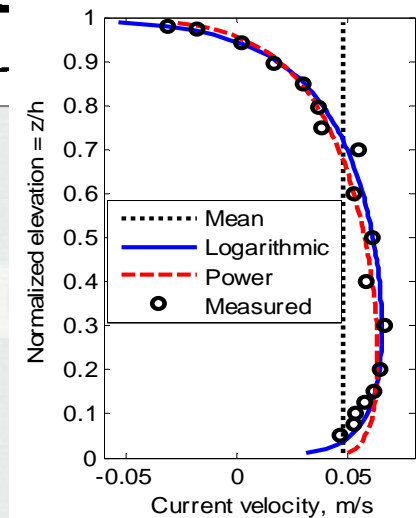
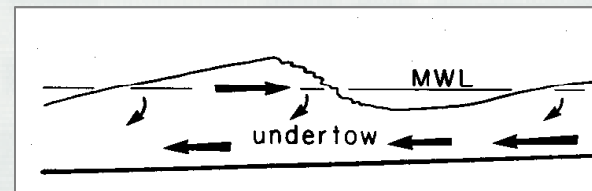
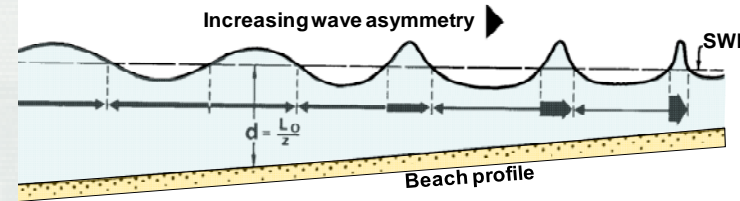
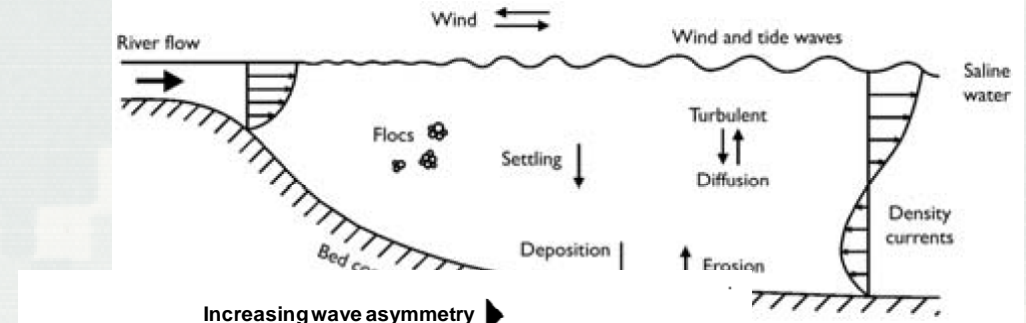


## Features/updates

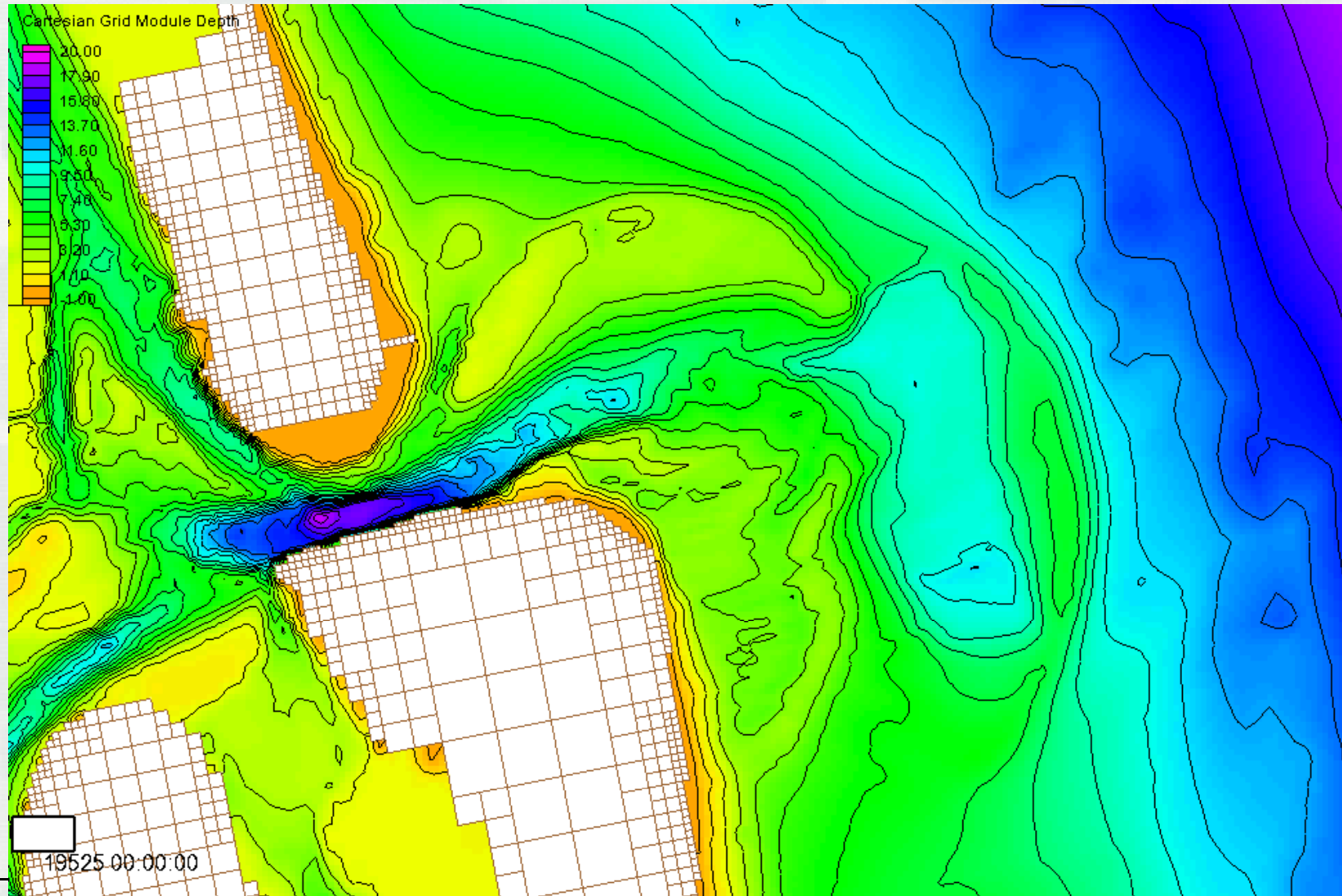
- Sediment mapping
- Dredging module
- Explicit telescoping grid
- Parallelization for HPC

## R&D

- Long-term morphology change
- Quasi-3D
- Swash zone
- Cross-shore transport
- Physical experiments of channel infilling and berms
- Mixed sediments
- Sea level change impacts to navigation projects
- Grid quality indicators



# St. Augustine Inlet, FL





## New Initiatives in FY14:



- Foredunes research
- Coastal Resilience Metrics

## Continuing in FY14:



- FRF Experiment
- CECECP = Corps of Engineers Coastal Engineering Certificate Program

**State of the Foredunes**  
 Coastal Inlets Research Program  
 U.S. Army Engineer Research & Development Center  
 Coast & Hydraulics Laboratory  
 C. Swan, K. Rouse, L.N. Swan

**Field Research Facility Experiment**  
 Jesse McNinch, Jeff Waters, Julie Rosati  
 Coast, Estuary and Overland Processes

**Quantifying Resilience in Integrated Coastal Systems**  
 ERDC INNOVATIVE SOLUTIONS FOR A SAFER, BETTER WORLD

**Coastal R&D Topics**  
 issues and... and severity of... estuarine systems?  
 onshore berm (dredged material) siltation at 2 separate depths  
 on-shore swash zone placement situation  
 quality of geobag constructed... with natural environment  
 floating dredging exposure with... logical communities  
 dred sediment transport  
 ve and nearshore dynamics  
 durability criteria  
 Nearshore hydrodynamics  
 Wave breaking on porous surfaces  
 ve breaking on aquifers of... lying density  
 ve-groundwater morphology  
 erosion  
 erland wave propagation  
 erior breaching thresholds  
 ection of subtidal fouling species  
 er resource management

**Process Feedbacks**  
 Coastal Dynamics + Aeolian Processes + Management = Foredune State

**Physical Features**  
 Profile Slope  
 Height  
 Width  
 Vegetation Density  
 Curvature  
 Alongshore Continuity

**Profile Signatures**  
 Scoured Bases  
 Submerged Berms  
 Foredune Crest  
 Backbeach Slope  
 Beach Face  
 Beach Ridge  
 Dune Crest  
 Straight Beach  
 Curved Beach

**FOREDUNE EROSION**  
 Predicted response to...  
 associated the regions of...  
**FOREDUNE ACCRETION**  
 Predict and monitor the recovery...  
**AIRBORNE LIDAR**  
 Novel algorithm to process...  
 data from all experiments in standard format and database  
 and analysis tool on the fly reporting and...  
 Facilitate future access to data

# Inlet Geomorphology FY13 Accomplishments

**Poster!**

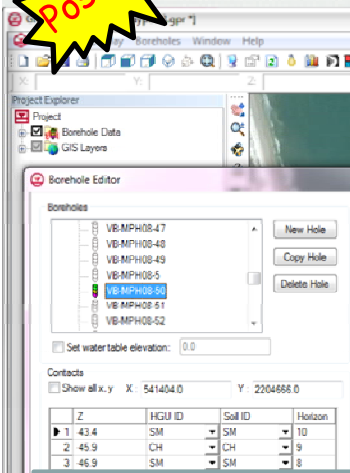
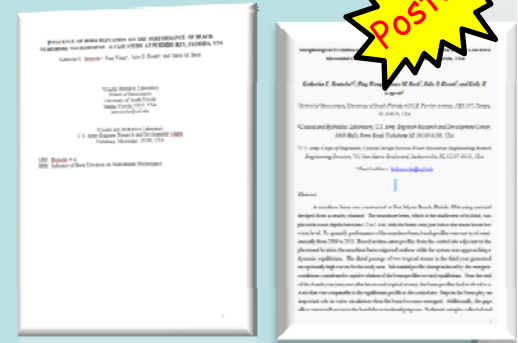
## Release 3D Sediment Resource Tool

- Integrated to GMS
- Designed to provide 3D sedimentologic input for SMS numerical models

## Nearshore Berm Publications

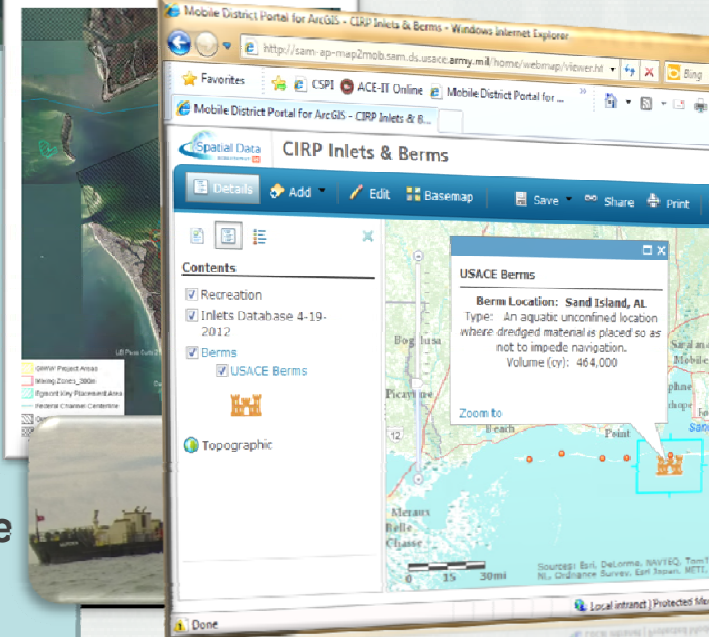
- Ft. Myers Nearshore Berm (Coastal Eng.)
- Perdido Key Swashzone Placement (JCR)

**Poster!**



## CIRP/RSM/DOER: Dredge and Placement Sediment Study at Egmont Key, Florida

- Field monitoring study
- Nearshore placement
- Reduction of fines
- Sediment plume tracking
- One DOER-TN (in review); One Tech Report (drafted); and one Journal Article (drafted)



## Inlets & Berms Portal

- ← Web-based portal
- Inlets Online Database
- Nearshore Berms Database