

The Expanded Small Scale Physical Model



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**2014 State of the Coast Conference
March 20, 2014**



committed to our coast

Presentation Overview

- **SSPM Background and History**
- **SSPM vs ESSPM**
- **Components of the ESSPM**
 - River Modeling Center
 - CPRA *Working* Exhibit
 - Expanded Model
- **Closing Remarks/Questions**

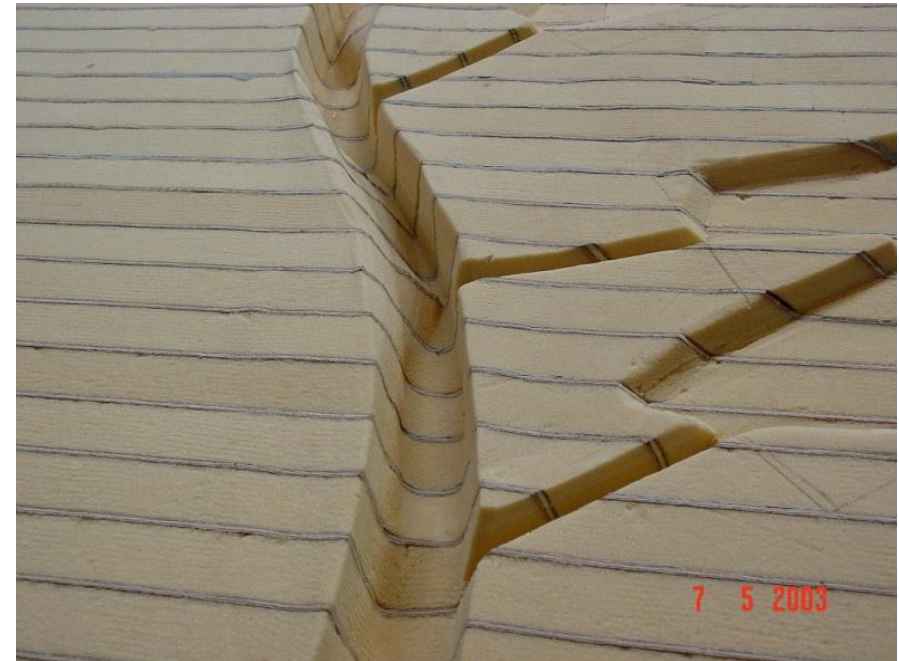
SSPM Background and History

SSPM Background and History

- **Designed by CPRA (LDNR) in 2002**
 - Design contracted to BCG Engineering
- **Constructed and Calibrated in 2003**
 - Originally constructed at Sogreah Facility (France)
 - Disassembled, shipped, and reassembled at LSU
- **Initial Model Program performed in 2003/2004**
- **Total Cost: ~\$840,000**
 - Includes Engineering, Model Construction, and Model Facility.

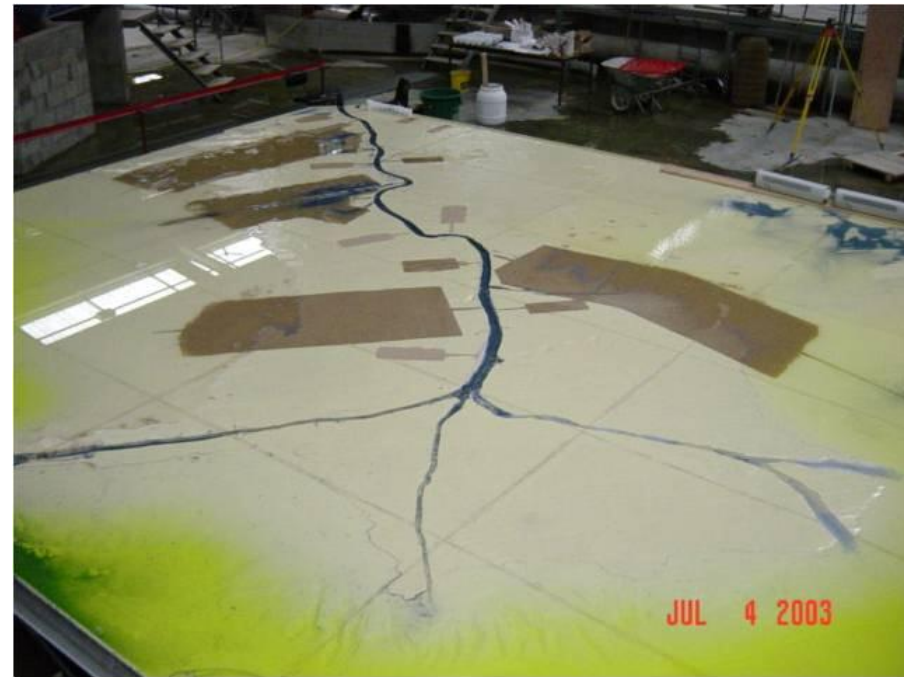
SSPM Background and History

2002-2003: Construction and Initial Calibration (France)



SSPM Background and History

2002-2003: Construction and Initial Calibration (France) cont'd



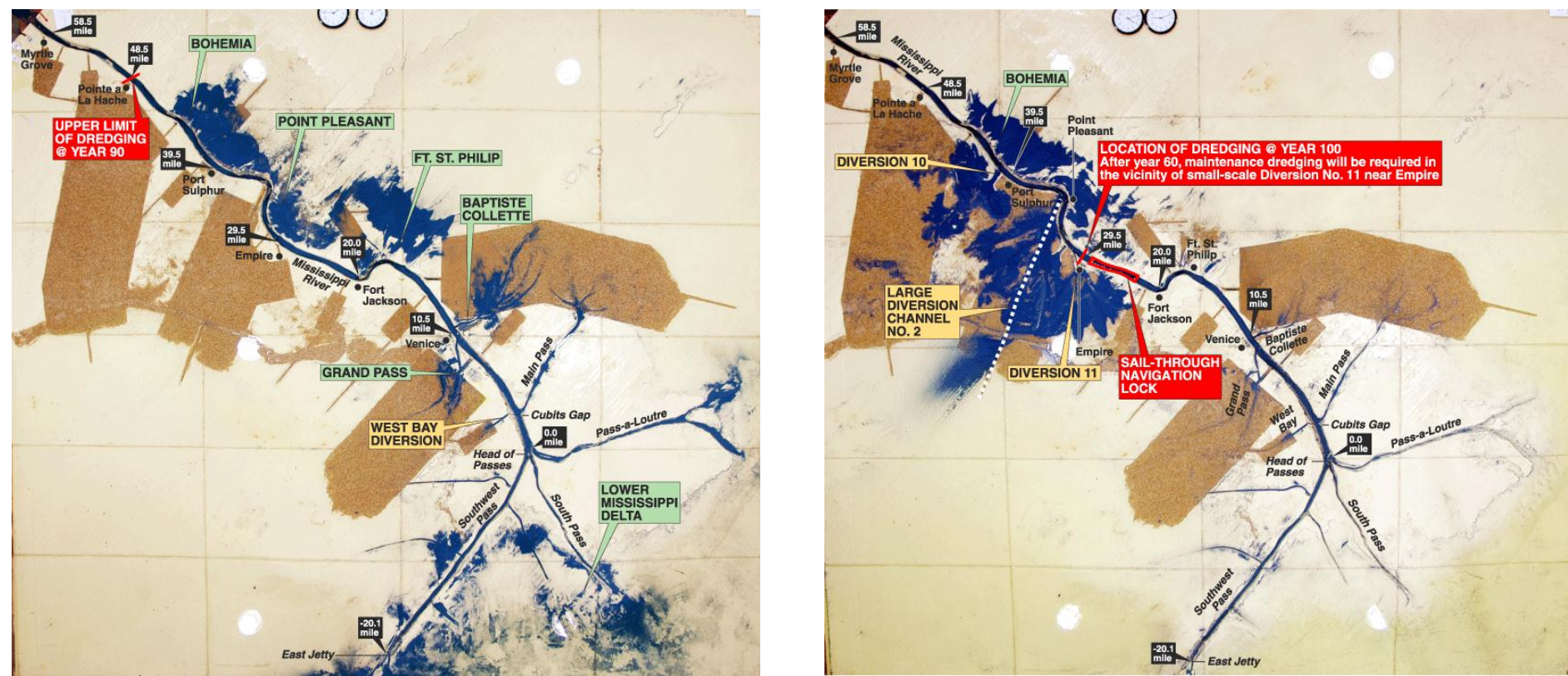
SSPM Background and History

2003-2004: Model Reassembly and Operations (LSU)



SSPM Background and History

2003-2004: Model Reassembly and Operations (LSU) cont'd

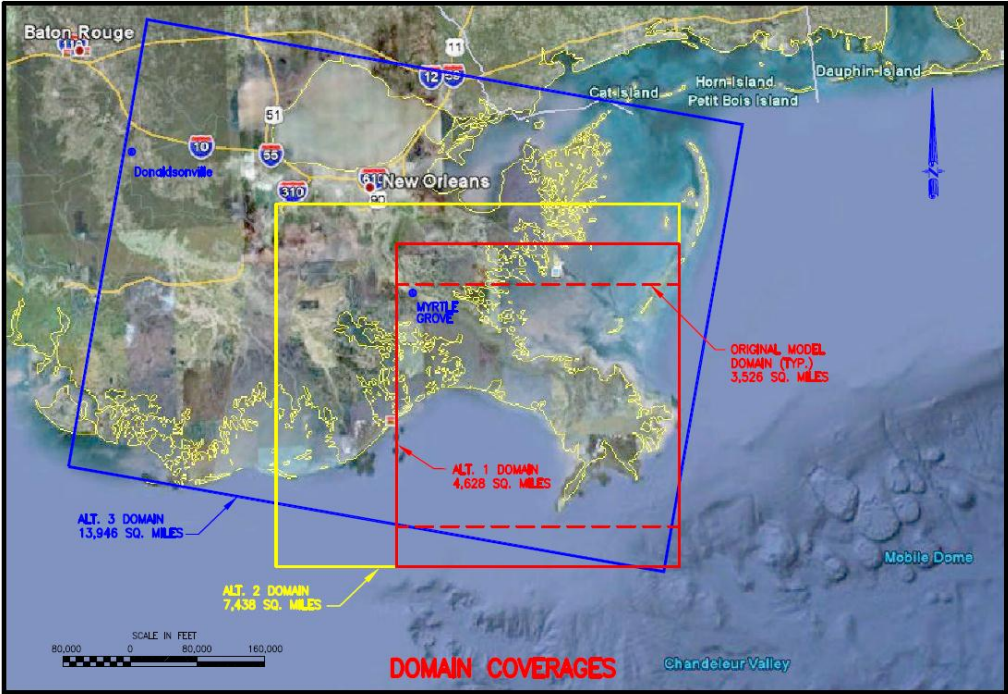


SSPM Background and History

- **In June 2010 LSU reported that the Current SSPM was reaching the end of its useful life**
- **In December 2010 CPRA tasked BCG to assist in the investigation of the SSPM's future**
- **In February 2011 BCG reported that 11 of 24 SSPM panels needed to be replaced**
- **CPRA initiated a full Feasibility Study on Rehabilitation, Modification, or Expansion of the SSPM**

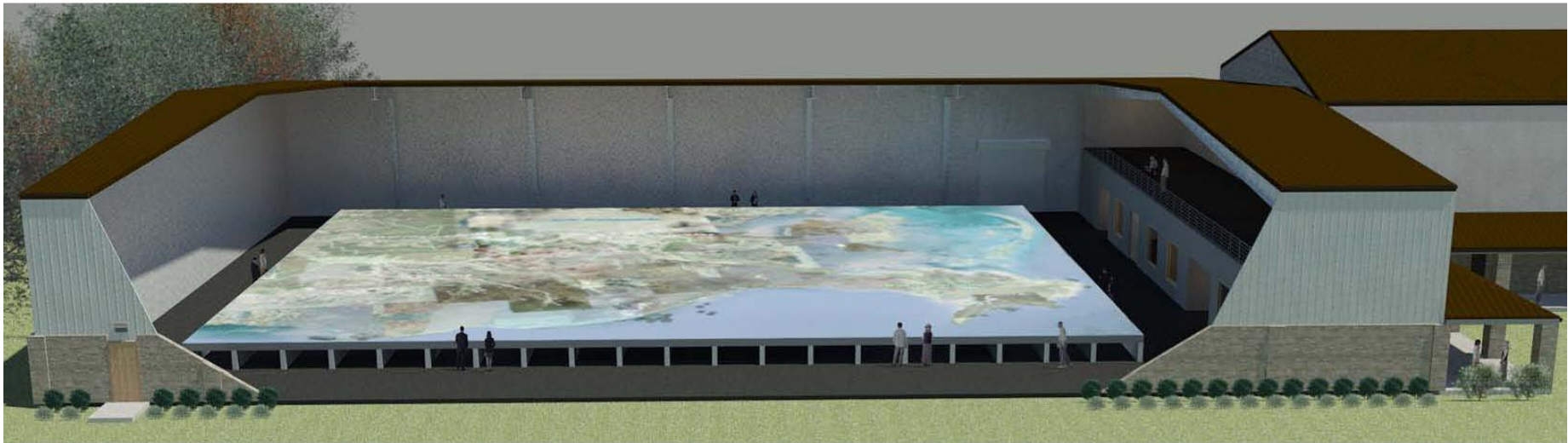
SSPM Background and History

2011: Initial Expansion Plan



SSPM Background and History

2011: Initial Expansion Plan cont'd



SSPM vs ESSPM

SSPM vs ESSPM

Scaling

- Geometric
 - Horizontal - 1:12,000 versus 1:6000
 - Vertical - 1:500 versus 1:400
 - Distortion - 24 versus 15
- Froude scaling
- Shield Scaling / Incipient Motion
- Re scaling (For conditions with suspended sediment)
- 3000 – 5000 versus 7000 – 12,000

Domain

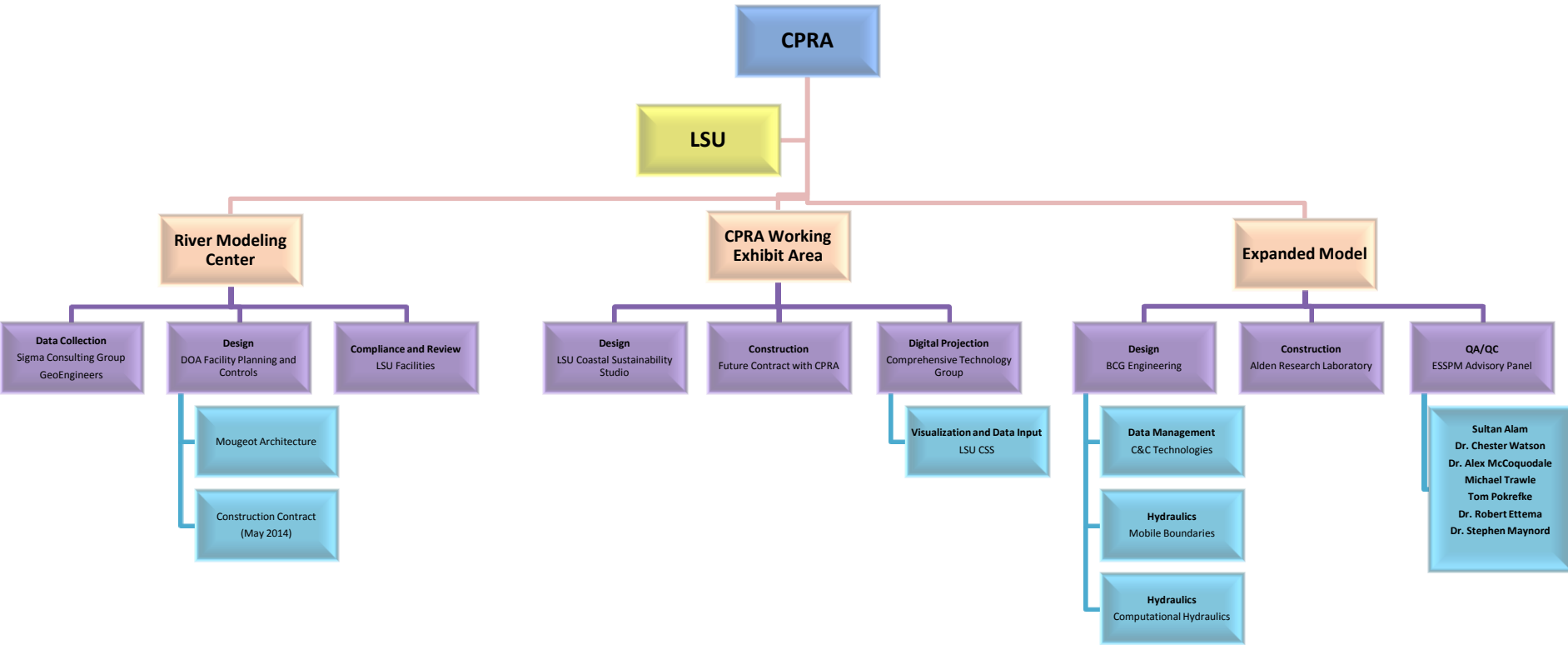
- Myrtle Grove to GOM versus Donaldsonville to GOM
- 4600 Sq. mi versus 14,000 Sq. mi

SSPM vs ESSPM

- **Construction Methodology**
- **Modifications to Model Bed**
 - Overhead gantry crane
- **Testing Program:**
 - Automated Sediment Injection
 - Automated Flow Control
 - Water Level/Flow Recording

Components of the ESSPM

Components of the ESSPM



Components of the ESSPM

Three Main Design Components:

- **River Modeling Center**
- **Working Exhibit Area**
- **Expanded Model**

River Modeling Center

Project Initiation - 2012

- **Primary design contract with Mougeot Architecture (through Facility Planning and Controls)**
 - DOA Architectural Selection Process
- **Design began in Summer 2012**
 - Facility was to be constructed adjacent/around existing SSPM on LSU's campus

River Modeling Center (v1.0)

LSU Campus



River Modeling Center (v2.0)

Baton Rouge Water Campus

- **Facility site moved to Baton Rouge Water Campus**
 - First building to be constructed on The Water Campus
- **Re-Design began in Fall 2013; overhauled 70% of original building design**
 - Included new site surveys, foundation design
 - Involved a complete re-design of floor plan since existing buildings were no longer an issue
- **Design Details:**
 - Exhibit/Front Office Area = 9,900 SF
 - River Model Area = 25,000 SF
 - Additional Offices Area = 5,000 SF
 - Additional Laboratory/Storage Area = 4,000 SF

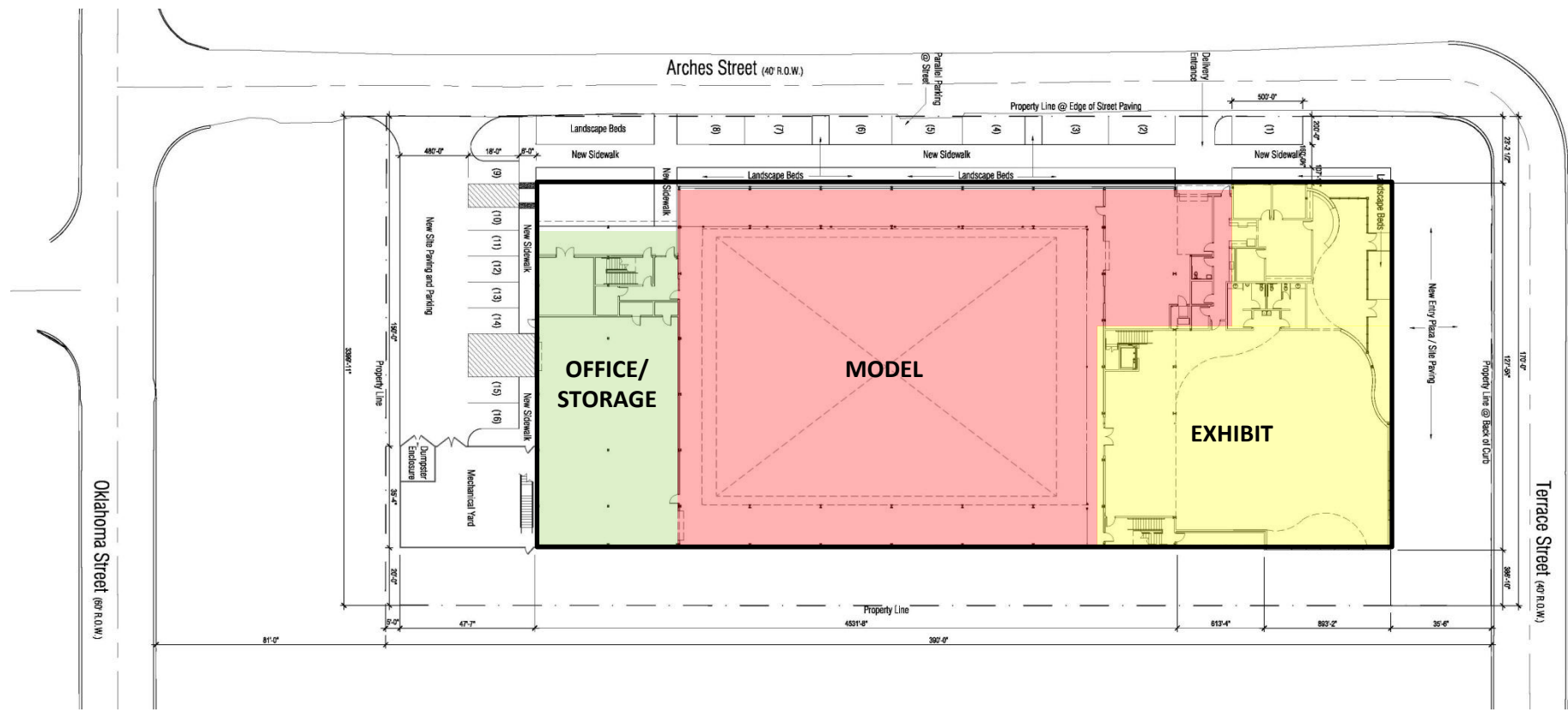
River Modeling Center (v2.0)

Baton Rouge Water Campus



River Modeling Center (v2.0)

Facility Floor Plan



River Modeling Center (v2.0)

Exterior Rendering



River Modeling Center (v2.0)

Interior Rendering – Model Area



CPRA *Working* Exhibit

- **Design and Development work contracted to LSU Coastal Sustainability Studio**
- **Exhibit Construction to be performed under separate contract to be issued after completion of River Modeling Center**

CPRA *Working* Exhibit

- **Engage visitors with three programmatic ideas, each with increasing levels of engagement with CPRA work:**
 - 1. View:** display of digital and physical artifacts - *Artifacts, equipment, digital and printed displays of CPRA work*
 - 2. Assemble:** built-in sloped seating for presentations and meeting - *Large digital presentation capabilities to accommodate groups of people*
 - 3. Study:** work area for researchers - *Areas for individuals and small groups for access to CPRA data*

CPRA *Working* Exhibit

For the display of natural artifacts
Hall of Biodiversity, New York



For the display of technological artifacts
Chemical Heritage, Philadelphia



For the display of graphic digital data
IBM 100: Think, New York



Model Expansion

Design Overview

- **Model Design - BCG Engineering Team:**
 - C&C Technologies
 - Mobile Boundary Hydraulics
 - Computational Hydraulics
 - Eustis Engineering
 - Dewberry
- **Design substantially completed in January 2013**
- **Alden Research Laboratory was contracted in March 2013**
 - Consultation on remain design and constructability
 - Labor for actual construction

Model Expansion

Design Overview

- **Model domain covers over 14,000 Sq. miles of Coastal Louisiana:**
 - RM 179 to the GOM
 - Includes Lake Pontchartrain; Barataria Basin; most of Terrebonne Basin
- **3D model surface created using multiple datasets:**
 - USACE Hydrographic Surveys
 - CPRA MR Multi-Beam Data
 - LIDAR
 - NOAA Nautical Charts
- **216 - 5 ft. X 10 ft. High Density Foam Panels**
 - Dimensionally stable closed cell material
 - Easy to machine; durable
 - Density = 20 lb/cu. ft.; Weight = 1000 lbs per panel

Model Expansion

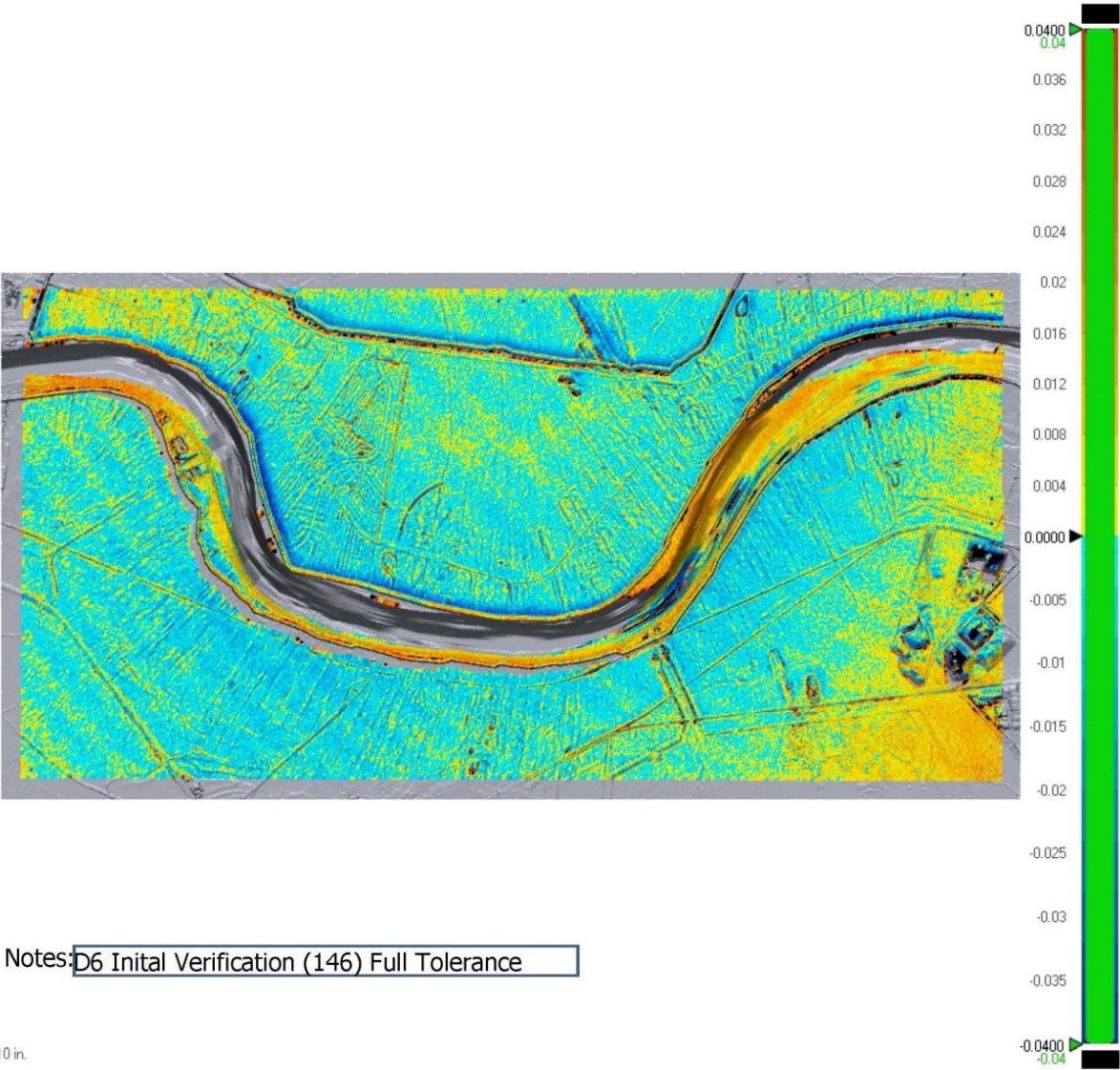
Construction Overview

- **Model bed to be constructed using CNC Router**
- **Additional equipment:**
 - Vacuum/air handling system
 - Jack supports frame bed
 - Laser Scanner/Optical Level
 - GeoMagic Software
- **'Guinea Pig' Model**
 - Seven panel test model
 - Domain – from Bonne Carre Spillway to New Orlean East
 - Results will be compared to actual 2011 Bonne Carre data

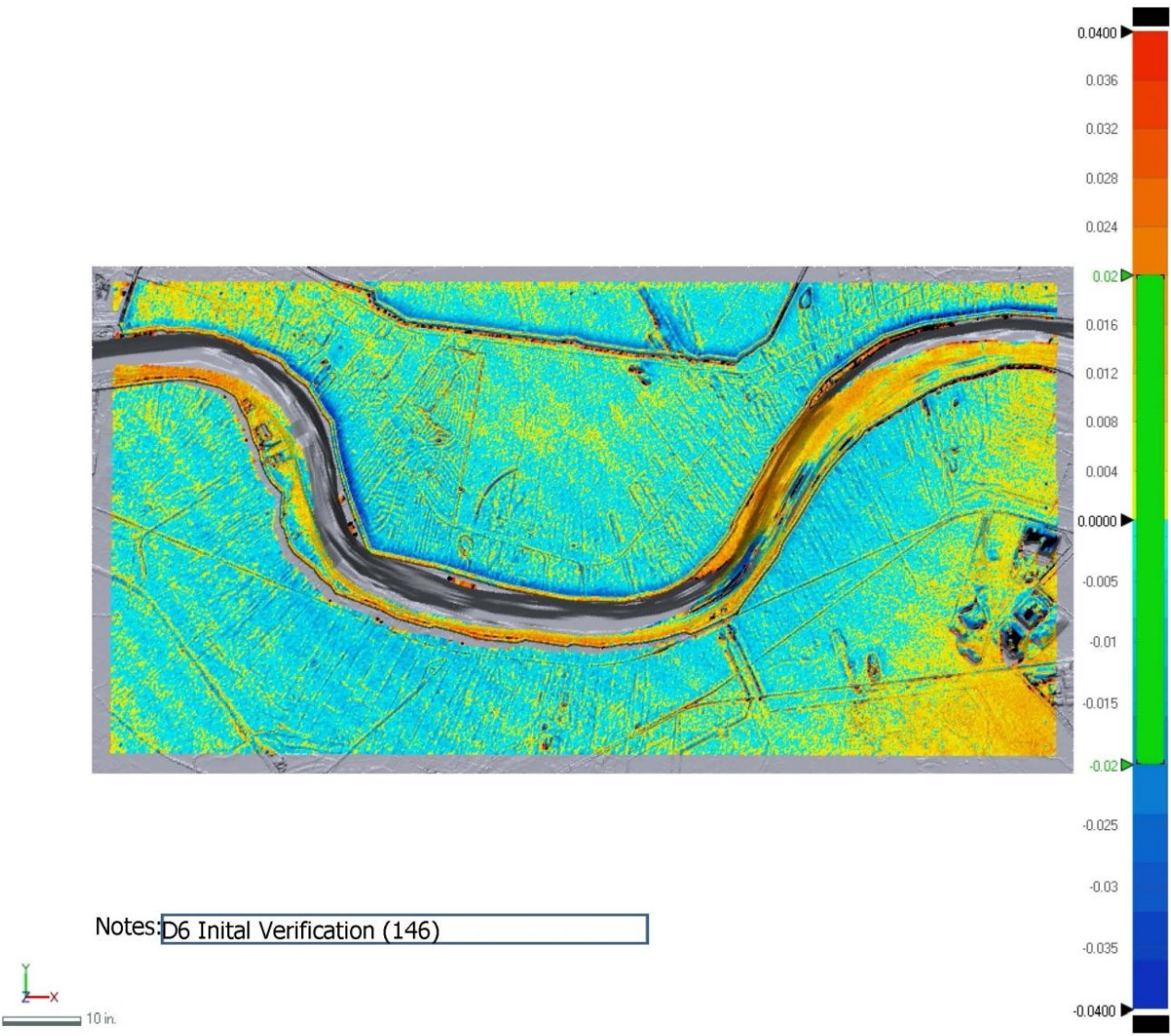
'Guinea Pig' Model



Laser Scan Verification



Laser Scan Verification



'Guinea Pig' Model



'Guinea Pig' Model



Closing Remarks

- **Funding Source:** 100% State; CIAP Grant
- **Schedule:**
 - Guinea Model Construction – March 2014
 - Guinea Model Testing – Spring/Summer 2014
 - Expanded Model Routing – through RMC completion

 - River Model Center Bid – Summer 2014
 - River Model Center Construction – Summer 2015

 - Model Assembly – Fall 2015
 - Model Operation – Late 2015

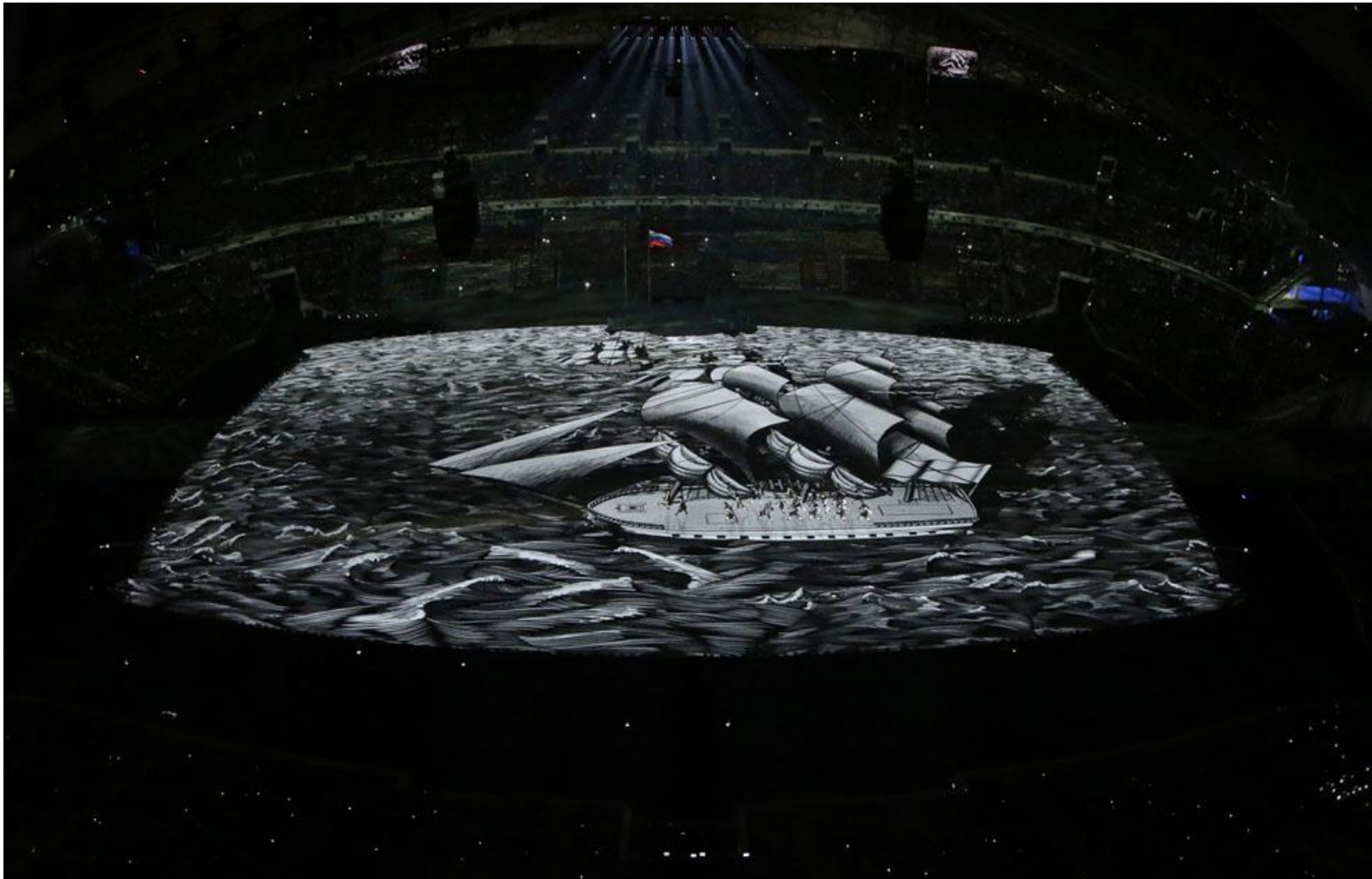
Closing Remarks

Digital Projections



Closing Remarks

Digital Projections



Acknowledgements

CPRA Team

Jenny Kurz
Andrea Galinski
Julia Wall
Jerry Carroll
Chris Boudreaux
Kyle Graham

BCG Team

David Dodgen
Cecil Soileau
Robert Tisdale

LSU/CSS Team

Clint Willson
Jeff Carney
Jacob Mitchell
James Sullivan
Shelby Doyle
Brad Cantrell

Alden Team

Dan Gessler
Kevin Bastien
Chris Miller

Mougeot Team

David Mougeot
Tommy Dauzat

THANKS YOU!

Questions