Innovative Technology Focus Area

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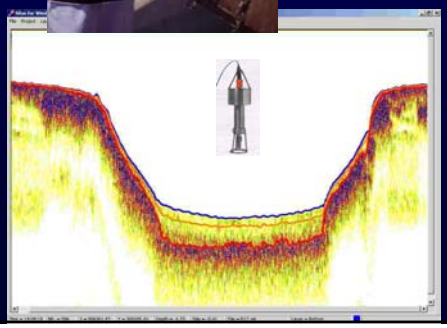
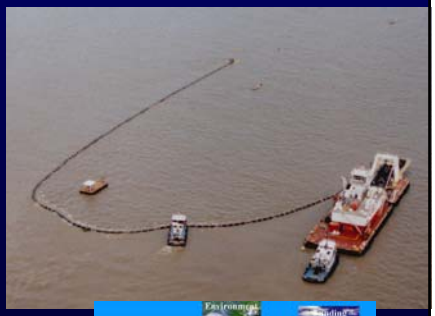
ERDC





Presentation Outline

- Define Innovative Technologies (IT)
- Describe IT Focus Area
  - Evaluations and Cooperative Demonstrations
  - Dredging Operations Decision Support System
  - Silent Inspector
  - Fluid Mud Measurement
- Summary

Definition of Innovative

"1: The introduction of something new. 2: A new idea, method, or device."

Webster's Ninth New Collegiate Dictionary

Definition of Technology

Webster's Ninth New Collegiate Dictionary

"1: Technical language

2: a. applied science
b. a scientific process for achieving a practical purpose

3: The totality of the means employed to provide objects necessary for human sustenance and comfort"

IT Objective

- Identify, evaluate, and develop innovative technologies *and provide the guidance for their use* to help the field user improve operation and management of dredging activities in federal navigation projects.

IT Focus Area Work Units

- Evaluations and Cooperative Demonstrations
- Dredging (Operations) Decision Support System
- Silent Inspector
- Fluid Mud Measurement

Evaluation and Cooperative Demonstrations (ECD) Why?

- New Technology Continually Developed
- Districts have low tolerance for risk
- Few Objective Evaluations
- Need Clearing House
- Need objective evaluation on Corps Projects
- Need Technical Transfer of Information

ECD Objective

- Provide the “missing link” between Corps problems and use of innovative technology

ECD Role in Technology Demonstrations

- Identification/Evaluation
- Match Technology and Sponsor
- Assist in Demo Planning
- On-site Monitoring Funds
- Evaluation
- Technical Transfer
- Guidance

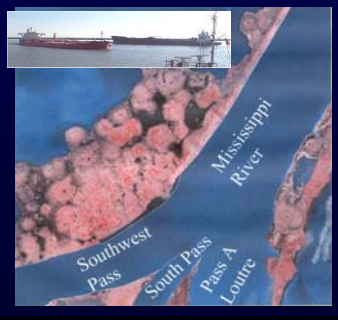
ECD Thrust Areas

- Demonstrate Innovative Dredges
- Demonstrate Innovative Rehandling/Beneficial Uses at CDFs
- Demonstrate Innovative Tools/Techniques
- Technology Evaluation/Technical Transfer/Guidance

Flexible Discharge Dustpan Demo at Head of Passes

PROBLEM:

- LA looses 25 sq miles of coastal marsh annually
- @ Head of Passes use hoppers for traffic, rigid pipeline dredges too slow
- 4.5M yd³/year disposed in water w/o BU – pump-out too costly



IMPACT:

- Loss of BU opportunity
- Have to re-dredge same material later

SOLUTION:

- Dustpan with flexible discharge capable of:
  - safely maneuvering in HOP traffic
  - efficiently pumping material far enough for BU

Dredged Material and Recycled Glass

Blending Innovation and Engineering

Dredging Operations Decision Support System (DODSS)

- A system that monitors and analyzes on-going events and provides recommendations for action to human managers.

What does DODSS do?

- Synthesis of past and present data from databases
- Executes mathematical models and simulations
- Reason with heuristic knowledge
- Evaluate multiple solutions
- Combined visual presentation

DODSS Objectives

- Schedule maintenance dredging
- Optimize cost-performance of dredging
- Anticipate episodic and emergency dredging
- Real-time planning for emergency response
- New work planning

DODSS Questions & Answers

Who are the users?	Dredging Operations Managers
How does it work?	A continuously operating Web server that sends email advice
How will it help Dredging Managers?	Save time, heads up, more data & options

Silent Inspector (SI)

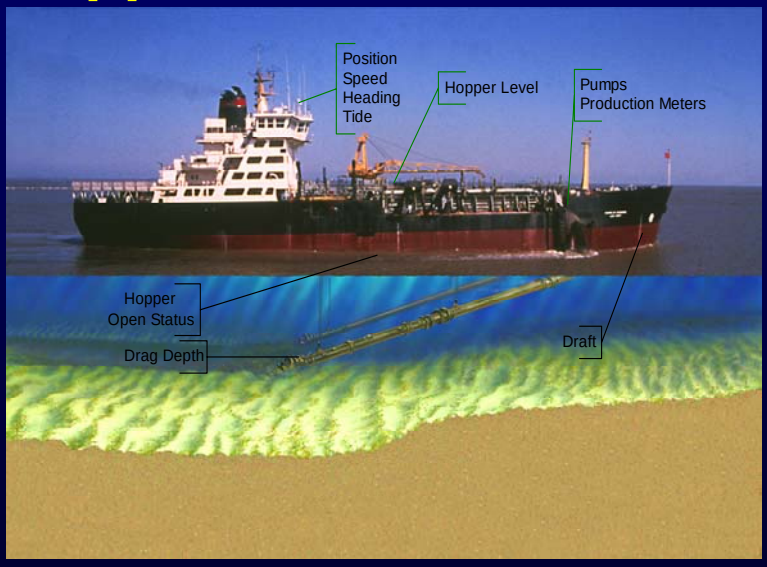
Automated, standardized, dredge monitoring system designed to improve dredging contract administration

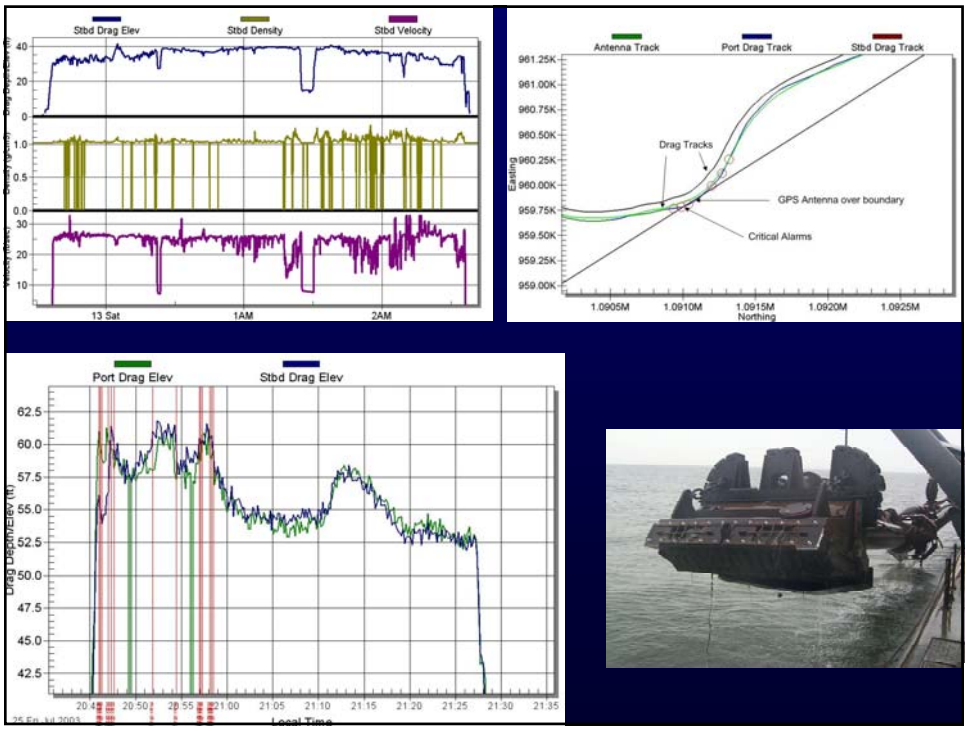
- 80- 85 % of Corps Dredging by Contract
- Fewer Inspectors
- Greater Scrutiny
- Claims
- Want Improved Efficiency

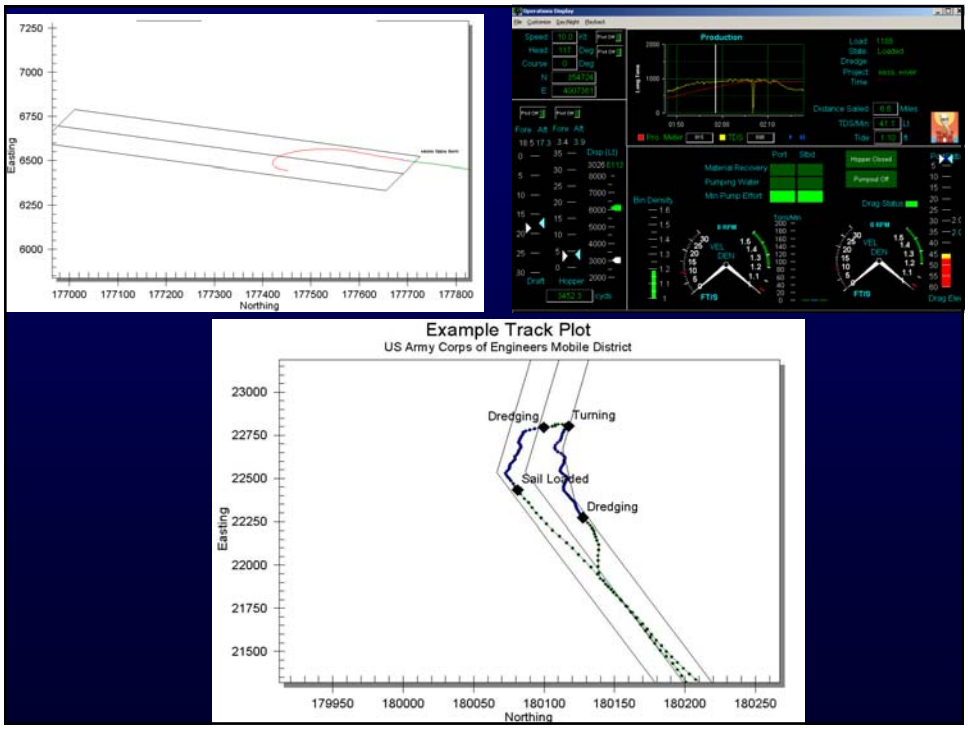
How does it work?

- Contract specs provide detailed implementation guidance
- Uses contractor's sensors and instrumentation
- Contractor hardware - Corps Software
- Corps does QA and analysis

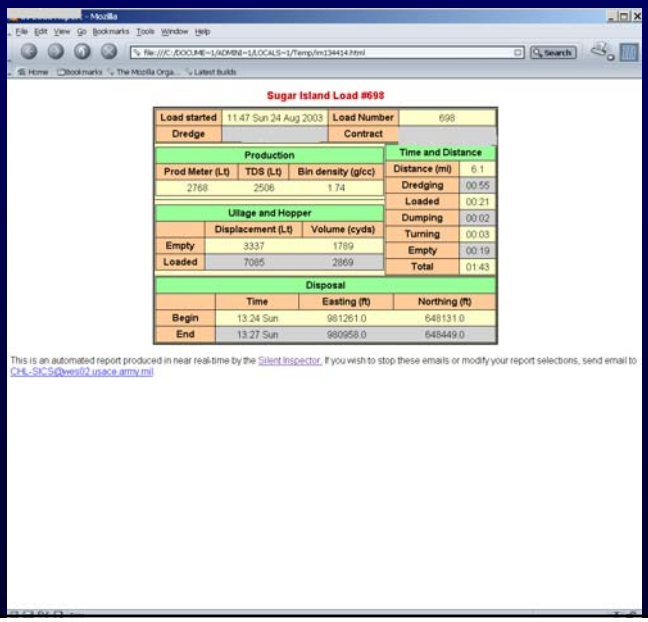
Hopper SI Measurements




Stbd Drag Elev
Stbd Density
Stbd Velocity
13 Sat
1AM
2AM
Antenna Track
Port Drag Track
Stbd Drag Track
Drag Tracks
GPS Antenna over boundary
Critical Alarms
Easting
Northing
Port Drag Elev
Stbd Drag Elev
Drag Depth/Elev (ft)
Local Time


Easting
Northing
Production
Example Track Plot
US Army Corps of Engineers Mobile District
Dredging
Turning
Sail Loaded
Dredging
Easting
Northing

Email Load Report



Sugar Island Load #698

Load started	11:47 Sun 24 Aug 2003	Load Number	698
Dredge		Contract	

Production		
Prod Meter (Lt)	TDS (Lt)	Bin density (g/cc)
2768	2506	1.74

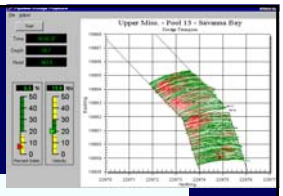
Ullage and Hopper		
	Displacement (Lt)	Volume (cyds)
Empty	3337	1789
Loaded	7085	2869

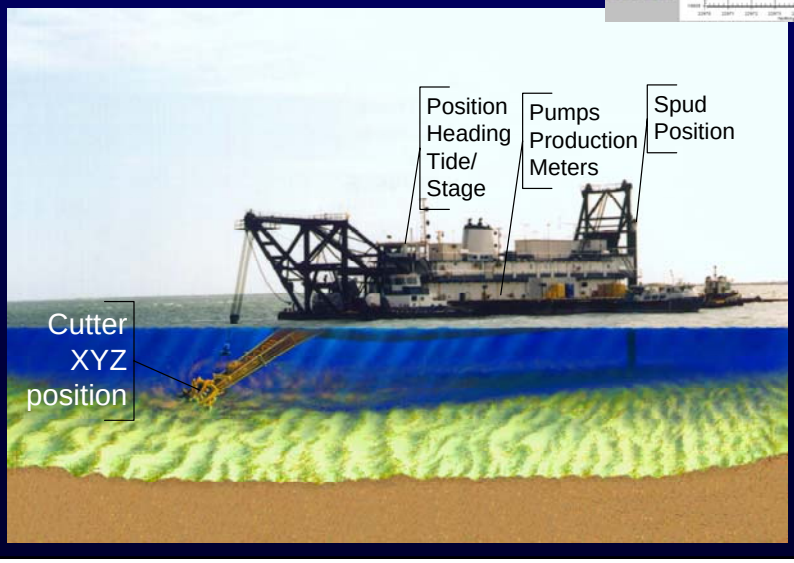
Time and Distance	
Distance (mi)	6.1
Dredging	00:55
Loaded	00:21
Dumping	00:02
Turning	00:03
Empty	00:19
Total	01:43

Disposal			
	Time	Easting (ft)	Northing (ft)
Begin	13:24 Sun	981261.0	648131.0
End	13:27 Sun	980958.0	648449.0

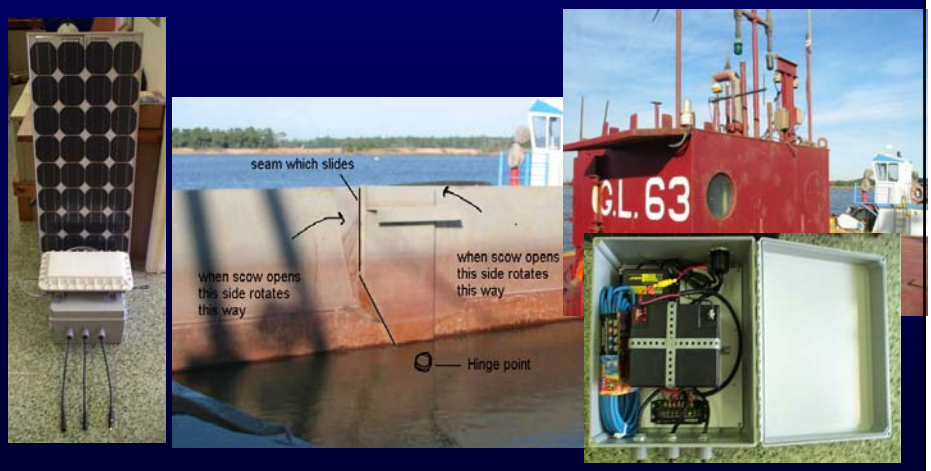
This is an automated report produced in near real-time by the Silent Inspector. If you wish to stop these emails or modify your report selections, send email to CHL-SIC-SI@wes02.usace.army.mil

Pipeline Dredges

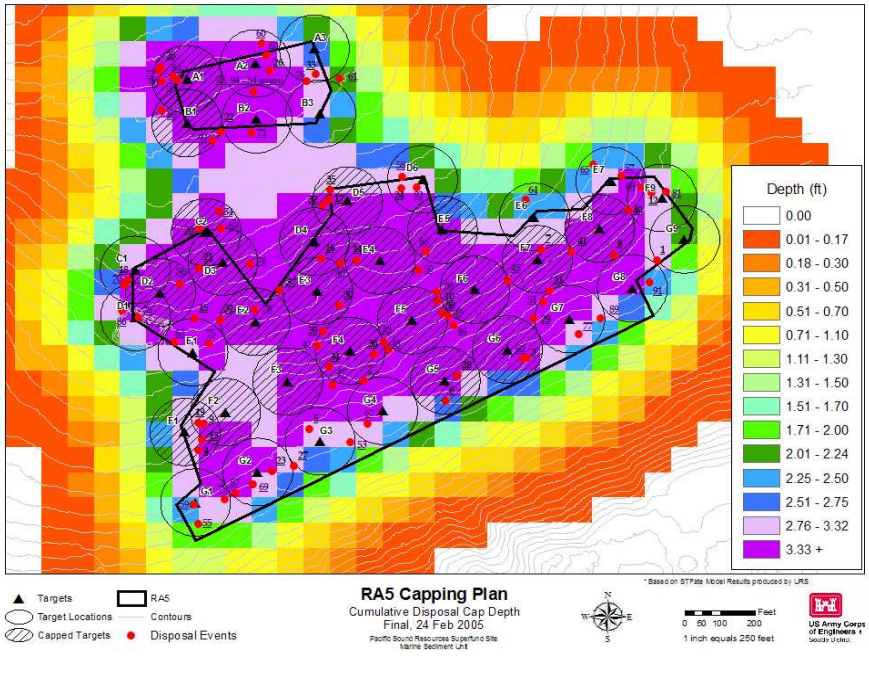




SI Scows



Standard Reporting; Contractor requirements



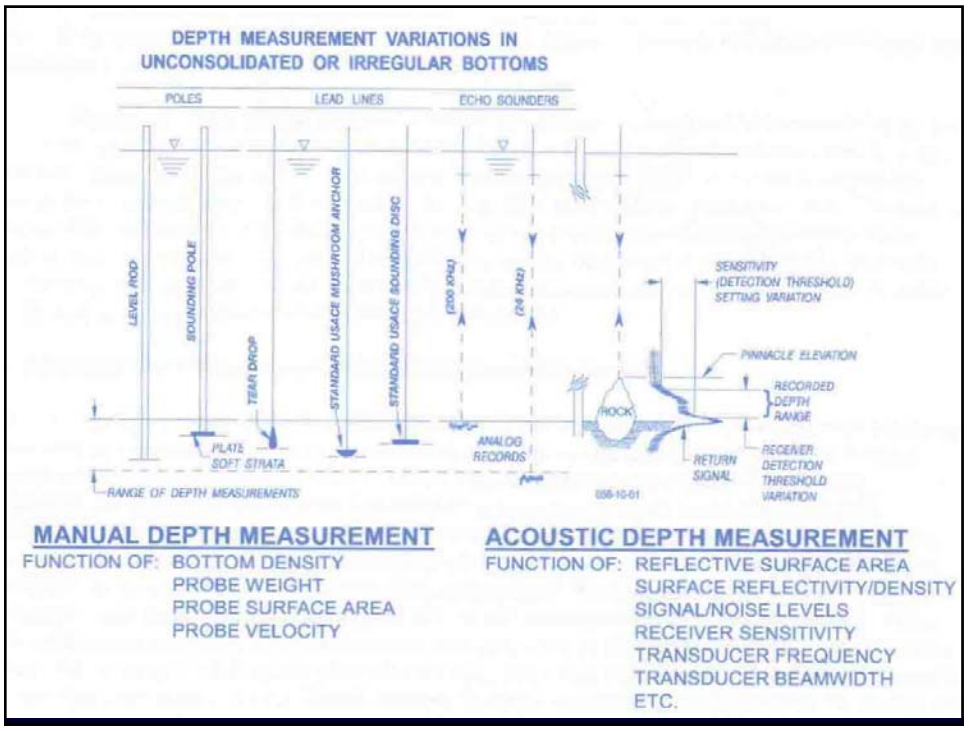
http://si.wes.army.mil/index.html

Fluid Mud Measurement

Fluid Mud (Teeter 1997)

- ρ = 1.05 to 1.35 g/cm^3
- solids 50 to 500 g/l
- 2-13% percent solids by volume
- contains silt and clay-sized materials with clay minerals and organic material

- fluid consistency?

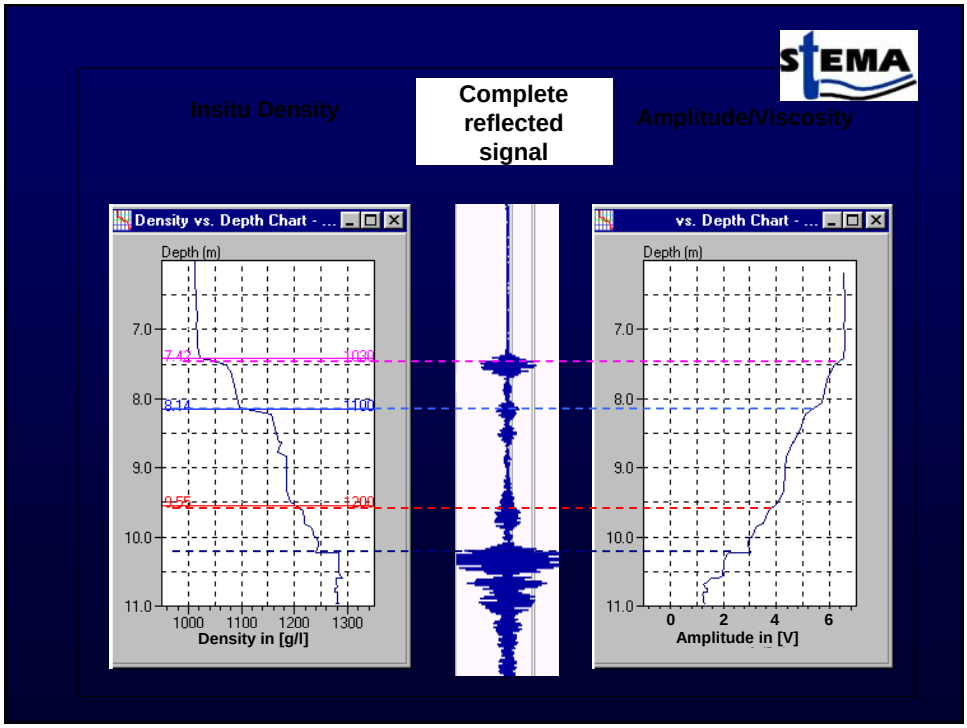


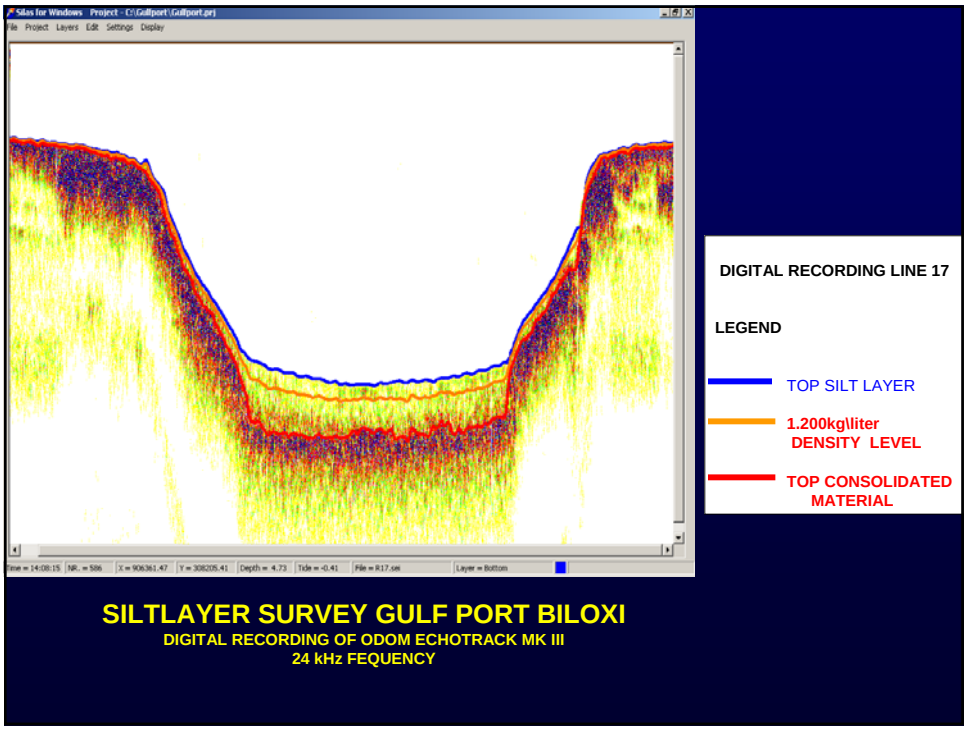
STEMA Densitune and Silas

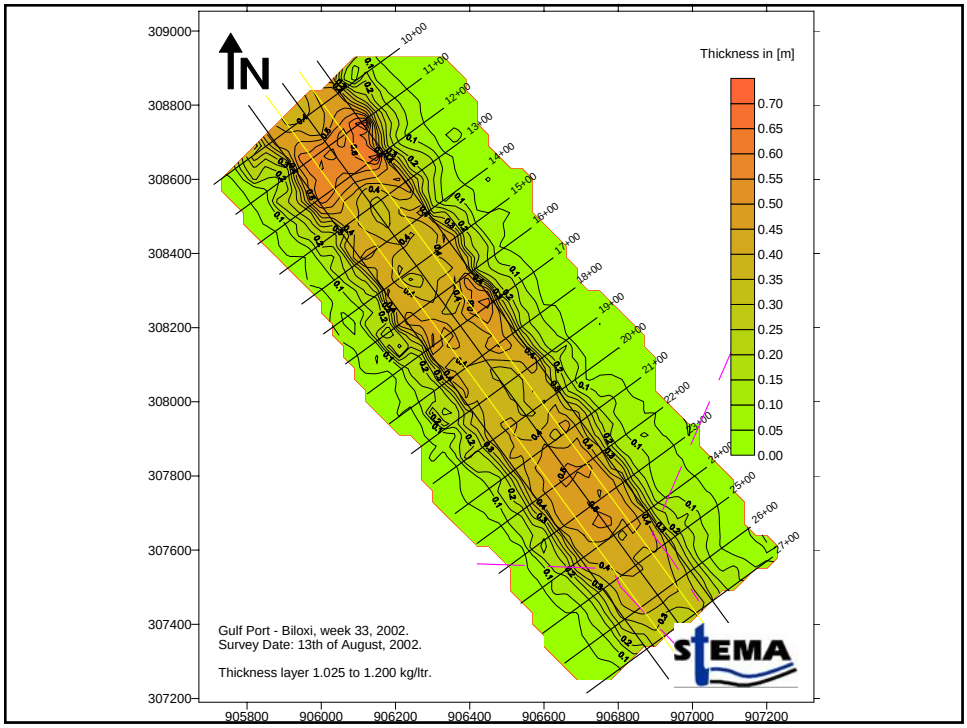
Vicksburg Densitune Testing 22 May 2003

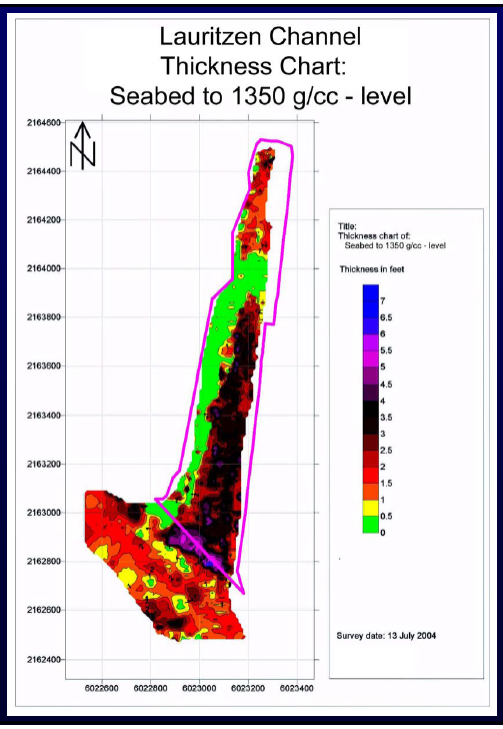
Column test with Barge Canal Mud

Valve #	Handheld Density	Densitune Density	Relative Difference %
1	.998	1.000	0.2
2	.998	1.000	0.2
3	.998	1.000	0.2
4	.999	1.000	0.1
5	.999	1.000	0.1
6	1.004	1.022	1.8
7	1.259	1.319	4.5
8	1.284	1.361	5.6
9	1.295	1.362	5.0




DIGITAL RECORDING LINE 17
LEGEND
TOP SILT LAYER
1.200kg\liter
DENSITY LEVEL
TOP CONSOLIDATED
MATERIAL
SILTLAYER SURVEY GULF PORT BILOXI
DIGITAL RECORDING OF ODOM ECHOTRACK MK III
24 kHz FEQUENCY


IN
Thickness in [m]
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
309000
308800
308600
308400
308200
308000
307800
307600
307400
307200
905800
906000
906200
906400
906600
906800
907000
907200
Gulf Port - Biloxi, week 33, 2002.
Survey Date: 13th of August, 2002.
Thickness layer 1.025 to 1.200 kg/ltr.
STEMA



Summary

- ECD
- DODSS
- SI
- Fluid Mud Measurement

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