Long Core System Repositioning Study

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Long Core System Repositioning Study Introduction

- Feasibility Study:
  Concept and ROM Cost for Repositioning Long Core System
  - R/V *Marcus G Langseth*
  - R/V *Thomas G Thompson* (AGOR 23)
  - R/V *Roger Revelle* (AGOR 24)

- Long Core System Overview
- Long Core Integration Concepts
- Summary of Findings

Long Core Repositioning Study
System Overview

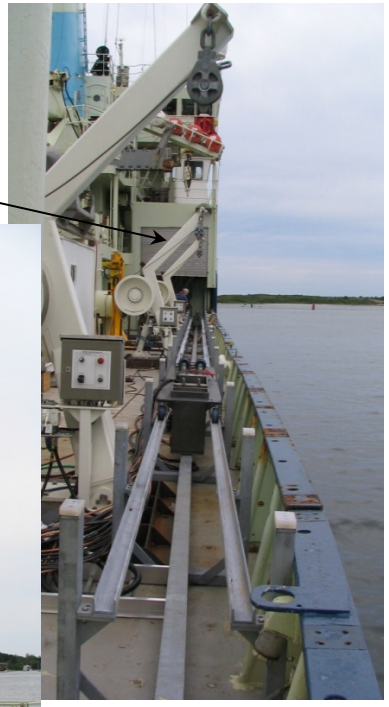
- Long Core System Deployed on R/V *Knorr*

Coring Capability:
45m Cores in 6,500m water depth

Coring Missions To-date:
42.5m max recovered core length
67 Cores, 200m - 5,400m water depth

Long Core Repositioning Study
System Components

- Core Barrel Davits
- Core Handling Grapple
- Long Core A-Frame
- Lift Line Sheave
- Line Winch System

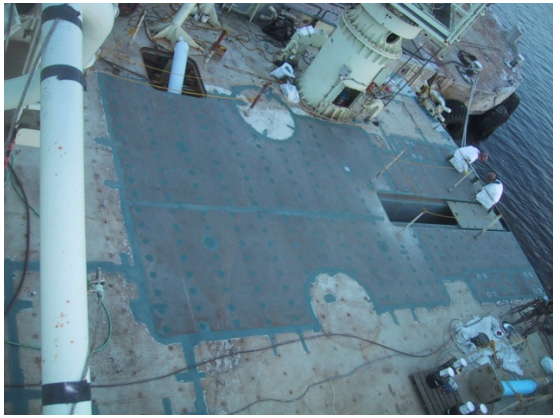


Long Core Repositioning Study
System Interface Requirements

- **Permanent Structural Modifications**

  Knorr modifications required on all candidate vessels

  - Grapple Foundation
    Transom-mounted bolting flange
  - Lift Line Sheave Foundation
    Aft deck slot for 60 inch diameter, cassette-mounted sheave
  - A-Frame Foundation
    Bolted, flush deck interface for A-Frame base
  - Lift Line Winch Foundation
    Flat, reinforced area with high capacity sockets
  - Hydraulic Power System
    For A-frame and Grapple



Long Core Repositioning Study
System Interface Requirements

- Vessel Interfaces

  Capability and Features Required for Long Core Support

  - Clear Side Deck Area

    To support core assembly, retrieval, and extrusion
  - Clear Aft Centerline Deck Area

    For Lift Line winch, reel and related gear
  - Deck Crane

    To handle corehead and auxiliary weights + general deck service
  - Lab Area

    1,200 ft^2 Main Dk Dry Lab + 500 ft^2 Aux. Lab for core processing
  - Container Stowage

    Four containers – two 20ft refrigerated, one 20 ft storage, and one custom 16ft
  - Station Keeping

    Maintain position for core location targeting and vertical lift line

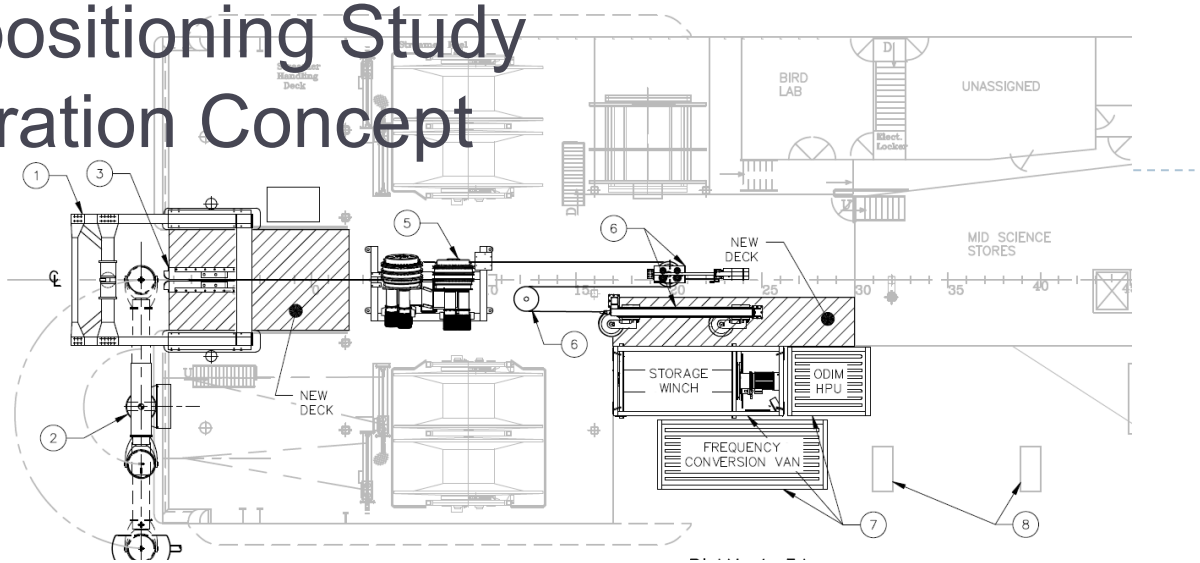
Long Core Repositioning Study
Integration Overview

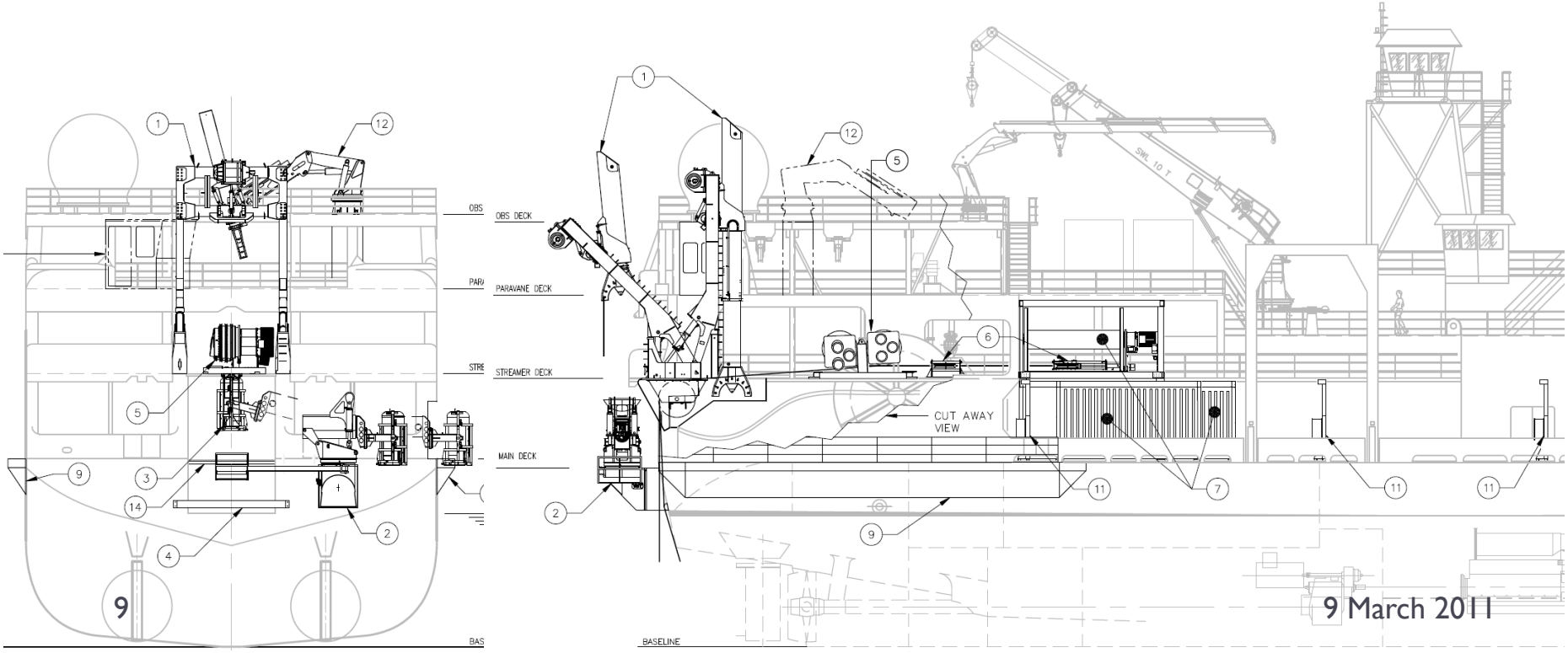
- Minimize Changes to Existing Long Core System
  - Coring process is mature and proven
    - 67 recovered cores, 2000+ m of recovered sediment
  - Coring Equipment is custom, long lead equipment
- Single Vessel Integration
  - Vessel modifications are required
    - Structural foundations and customized interfaces (Grapple/Winch)
  - Semi-permanent equipment not portable
    - Part of vessel general science outfit (A-frame)
    - Significant expense to duplicate

Long Core Repositioning Study
Langseth Integration Concept

- Maximum core barrel length: 42m
- Estimated Integration Cost: $2.7M
- Modifications leverage unique features of *Langseth*
  - Stacked aft deck requires/allows permanent installation of lift line systems (winch and sheaves)
- Seismic Mission Impact
  - Minimal/zero with alternating mission
- General Science Impact
  - Reduced deck area and science payload with Long Core on-board
- Risks and Issues
  - Stability – Low Margins and Aft Trim require mitigation/engineering

Long Core Repositioning Study
Langseth Integration Concept



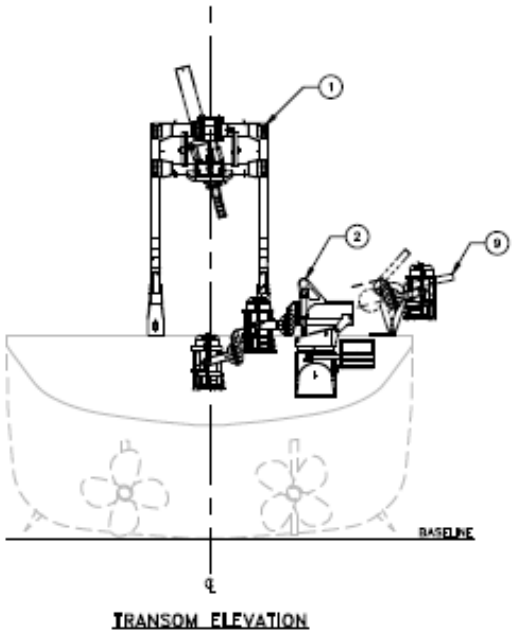


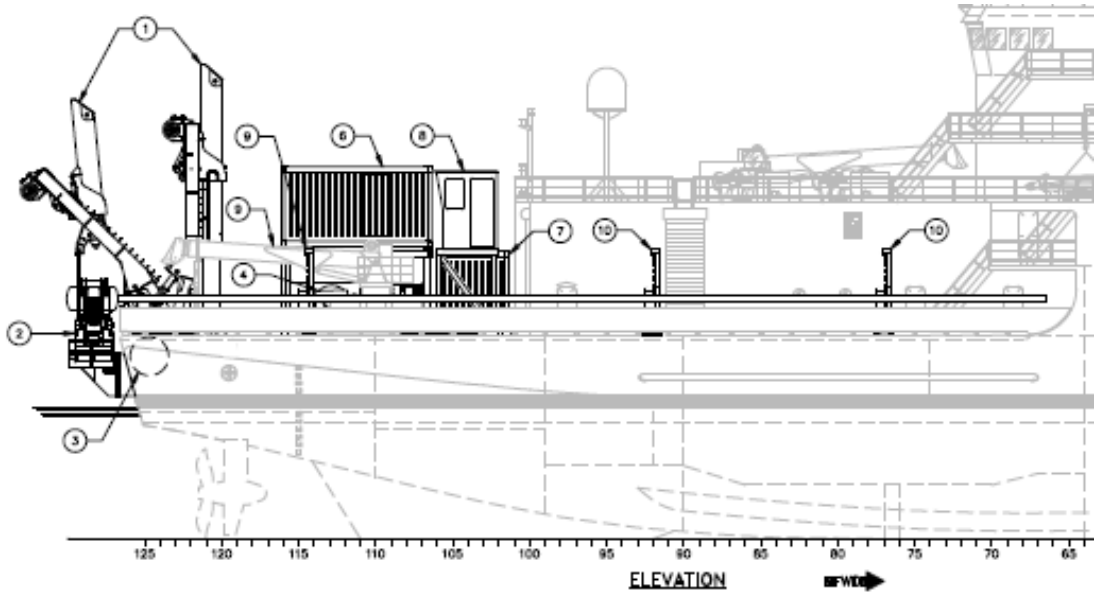
9 March 2011

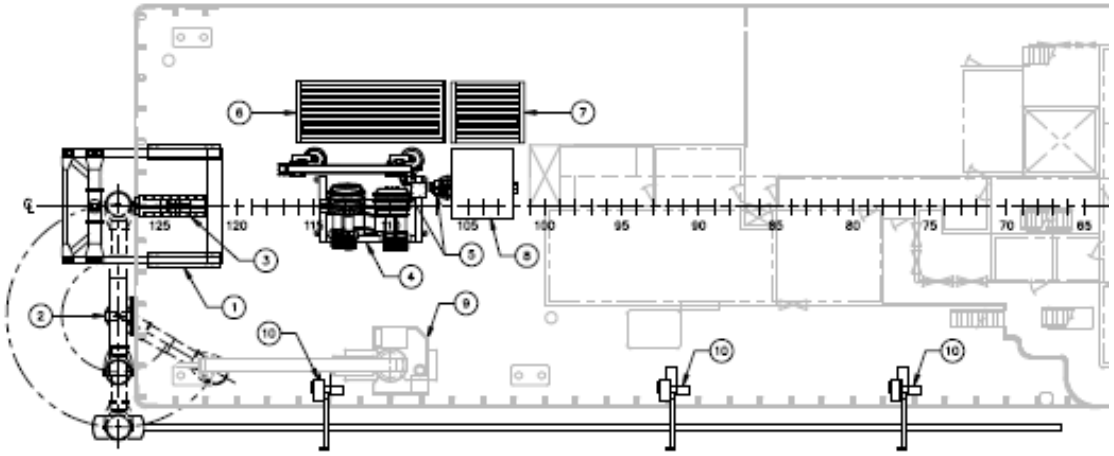
Long Core Repositioning Study
AGOR 23/24 Starboard Integration Concept

- Maximum core barrel length: 36m
- Estimated Integration Cost: $1.6M
- Modifications mimic *Knorr* integration scope
  - Design of Long Core system included AGOR 23/24 starboard integration capability (grapple reach)
- General Science Impact
  - Reduced deck area and science payload with Long Core on-board
  - De-mobilize Long Core for full general science capability
- Risks and Issues
  - Starboard Main Deck arrangement limits core barrel length (45m target/current barrel length)

Long Core Repositioning Study
AGOR 23/24 Starboard Integration Concept







Long Core Repositioning Study
AGOR 23/24 Port Integration Concept

- Maximum core barrel length: 45m
- Estimated Integration Cost: $2.6M
- Modifications leverage clear port 01 level length
  - Vessel modifications mimic *Knorr* scope
  - Aft 01 deck extension (portable platform)
  - Grapple modifications for reach
- General Science Impact
  - Reduced deck area and science payload with Long Core on-board
  - De-mobilize Long Core for full general science capability
- Risks and Issues
  - Grapple extension is a complex modification/rebuild
  - Aft 01 level platform adds gear to handle

Long Core Repositioning Study
AGOR 23/24 Port Integration Concept