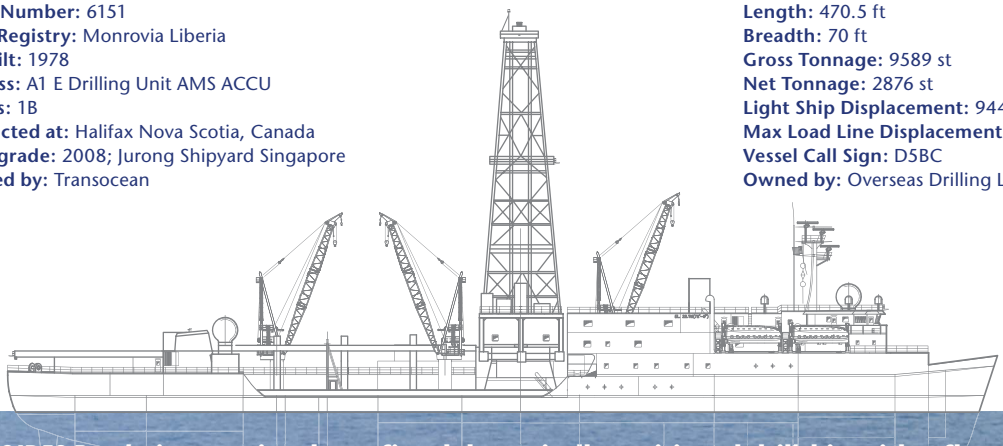
JOIDES Resolution Scientific Ocean Drilling Vessel

Official Number: 6151
Port of Registry: Monrovia Liberia
Year Built: 1978
ABS Class: A1 E Drilling Unit AMS ACCU
Ice Class: 1B
Constructed at: Halifax Nova Scotia, Canada
Last Upgrade: 2008; Jurong Shipyard Singapore
Operated by: Transocean

Length: 470.5 ft
Breadth: 70 ft
Gross Tonnage: 9589 st
Net Tonnage: 2876 st
Light Ship Displacement: 9449 st
Max Load Line Displacement: 18,636 st
Vessel Call Sign: D5BC
Owned by: Overseas Drilling Ltd.



The *JOIDES Resolution*, a uniquely outfitted dynamically positioned drillship with a floating laboratory, has been investigating the Earth's origin and evolution through scientific ocean coring worldwide since 1985. While contracted for the Ocean Drilling Program and the Integrated Ocean Drilling Program, operations have extended from north of the Arctic Circle to south of the Antarctic Circle and from the depths of the Mariana Trench to the coastal areas off New Jersey. The vessel has also conducted gas hydrate investigative programs for government agencies of Japan and India.

Capabilities
Maximum water depth: 27,000 ft
Minimum water depth: 300 ft
Total hanging drill string length: 30,000 ft
Panama Canal capable (height and width)
Time at sea without re-provisioning: 75 days

Drilling Tubular Storage Capacity
Drill pipe: 46,500 ft (5 and 5½ in.)
Drill collars: 2,300 ft (8¼ and 6½ in.)
Casing: 7350 ft (20, 16, 13⅜, 11¾, 10¾ in.)

Power
Engines/Generators: 7 EMD 16 cylinder diesel
5 @ 2100 kW (3000 hp)
2 @ 1500 kW (2200 hp)

Propulsion
12 ea. 750 hp thrusters (10 retractable, 2 fixed)
Main screws: 2 shafts; 9,000 shp

Liquid Capacities
Diesel fuel (MG): 936,000 gal (3000 mt)
Drill water: 354,386 gal
Ballast: 215,208 gal
Potable water: 175 st

Mud/Cement
Mud pumps: 2 ea. Oilwell A1700PT triplex
Liquid mud: 3740 bbl
Bulk capacity: 13,300 cu ft
Cement unit: Halliburton 400 HT

Heave Compensation System
Western Gear model 800-17-20
Lift capacity: 800,000; 1,200,000 locked
Total stroke: 20 ft
Max. operating conditions: 15 ft heave; 7½ sec

Core Retrieving Winch
National duel drum, independent drive
Motor: D 79 electric, 750 hp
Capacity: 31,000 ft of ½ in. line per drum

Derrick
Model: Dreco 147 ft
Height above water line: 205 ft
Rating: 1,200,000 lb Static; 800,000 lb dynamic

Drawworks
Model: Oilwell E3000;
Motors: 2 ea. EMD M89 – ALB x 1200 hp ea.
Line: 1¾ in.
Brakes: Dual Baylor Elmagco model 7838

Drill String Support
Type: Dual elevator handler (no slips; protects pipe)
Model: Varco DEHS/471
Reach: 60 in. horizontal; 36 in. vertical
Elevator size: 350 or 500 ton; modified side door

Drill String Bending Restraint
Moonpool guidehorn (no riser support)

Iron Roughneck
Model: Varco IR 2100
Pipe size: 4 in.– 8½ in. diameter
Make up torque: 63,000 ft•lb
Breakout torque: 75,000 ft•lb

Top Drive
Model: Varco TDS3
Motor: EMD M89 electric, 1000 hp
Continuous torque: 30,000 ft•lb @ 169 rpm
Intermittent torque: 40,000 ft•lb
Breakout torque: 60,000 ft•lb
Maximum speed: 250 rpm

Rotary Table
Model: Oilwell A-49 1/2
Motor: EMD D 79 MB
Maximum speed: 325 rpm

Cranes
Type: Bucyrus Erie Pedestal type
Model: 2 x MK60; 70 ft and 80 ft booms
1 x MK 35 with 80 ft boom

Pipe Rackers
Type: Horizontal racking (triples)
Manufacturers: Western Gear/VMW
Capacity: 24,700 ft of 5 in. drill pipe
: 9900 ft of 5 ½ in. drill pipe

ASK System
Manufacturer: Nautronix
Model: 5002 (dual redundant)
Type: intermediate baseline
Capabilities: 2% of water depth
Signal: Beacon primary; GPS secondary

Personnel Complement
Capacity: 135

Scientific Spaces
Square footage: 18,000 ft^2
Refrigerated core storage: 26,250 cu ft

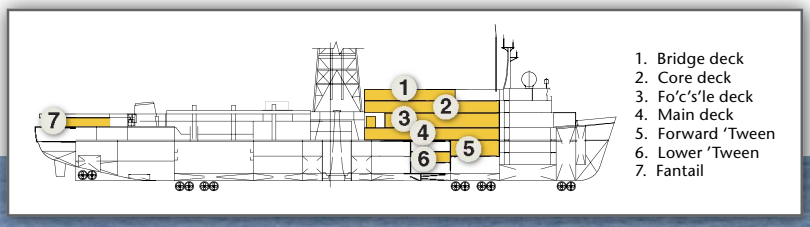
Normal Fuel Consumption
Cruising: 33–47 mt/day
DP (3 engines): 16.5–19.5 mt/day
DP (2 engines): 12–13 mt/day

Transit Speed: 10.5 kt (optimal)

Helideck: Sikorsky S-61 capable

Moonpool: 22 ft diameter

SODV Science Services



Survey Capabilities

- Navigation system
- Bathymetry system
- Seismic sound source and acquisition systems

Drilling and Coring Capabilities

Drilling and Coring

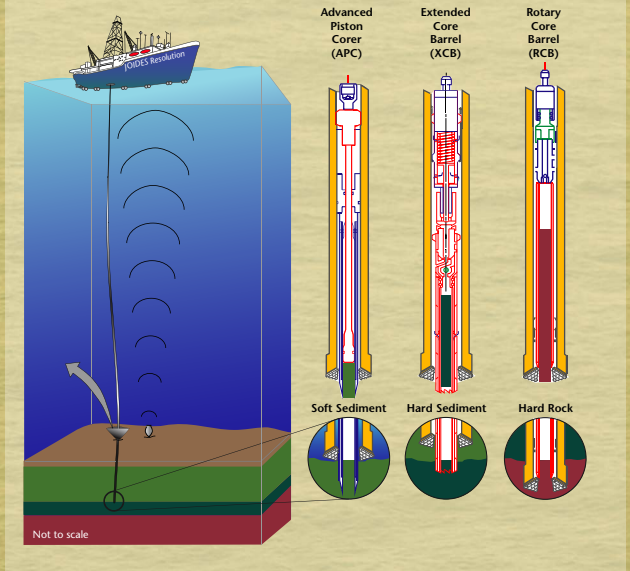
- Soft sediment: Advanced Piston Corer (APC)
- Hard sediment: Extended Core Barrel (XCB)
- Hard rock: Rotary Core Barrel (RCB)
- Borehole reentry capabilities

Downhole Sampling Tools

- Recovery of cores at in situ pressure
- Recovery of in situ formation fluid

Drilling Parameters

- Rig Instrumentation System



Network and Communications

- High-capacity data servers and ~7 TB storage system
- Wireless network available in laboratory areas
- Network connections available throughout ship
- Over 20 Mac and ~50 Windows workstations
- Over 20 Windows instrument hosts
- Laboratory Information Management System
- Printers throughout labs and large-format plotter
- Video distribution system
- 24/7 ship-to-shore communications
- Digital Asset Management System

Curation, Data, and Publication Services

- Shore-based, secure, refrigerated core storage
- Shore-based analytical equipment
- Janus relational database
- Production of state-of-the-art publications since 1986

Formation Measurement Capabilities

IODP and Third-Party Tools

- Formation temperature
- Formation pressure
- Resistivity at the bit

Formation Logging

- Resistivity
- Gamma ray attenuation density and lithology
- Natural gamma radiation
- Neutron porosity
- Acoustic velocity
- Bottom-of-hole check shot
- Vertical seismic profiling
- Borehole temperature

Long-Term Observatories

- Circulation Obviation Retrofit Kit (CORK)

Shipboard Analytical Capabilities

Geological Analyses of Core Samples

- Lithology, structures, fossils, etc.
- Microscopy
- X-ray diffraction mineralogy
- Stratigraphic correlation
- Heat flow analysis

Physical Properties of Core Samples

- Digital imaging
- Moisture and density analysis
- Magnetic susceptibility
- Gamma ray attenuation bulk density
- Natural gamma radiation
- Resistivity
- Thermal conductivity
- Spectral reflectance
- Magnetostratigraphy and rock magnetism
- Acoustic velocity
- Sediment strength

Chemistry and Microbiology

- Hydrocarbon and natural gas chromatography
- Organic constituent analysis
- Pyrolytic hydrocarbon content characterization
- CHNS analysis
- Total organic carbon analysis
- Coulometric carbonate analysis
- ICP-AES elemental analysis
- Ion analysis in aqueous samples and extracts
- Halogenated compound detection
- Microbiological microscopy
- Sample mass measurement
- Gas analysis
- Radioisotope van for sample preparation

Staff Support

- Drilling and coring technical support
- Laboratory and logging technical support
- Information Technology technical support
- Curatorial and data management support
- Publications and Web support