

UNDERWAY GEOPHYSICS LABORATORY PROCEDURES



JOIDES Resolution

November 2003 Version

TABLE OF CONTENTS

1	INTRODUCTION
2	SOP – STANDARD OPERATING PROCEDURE
3	UW START-UP GUIDE
4	UW WATCHSTANDER GUIDE
5	UW WATCH SOFTWARE (LAB VIEW)
6	WINFROG – CONFIGURE VEHICLE
7	WINFROG - CONFIGURE DEVICES
8	WINFROG – WAYPOINTS
9	WINFROG – EVENTING
10	WINFROG – COASTLINES
11	WINFROG – SECOND VEHICLE
12	WINFROG – SURVEYLINES
13	MAGNETOMETER GENERAL
14	GMT ZONES AND CORRECTED DEPTH
15	SITEFIX
16	SEISMIC DATA COLLECTION
17	SEISMIC DATA PROCESSING
18	FINAL BACKUPS
19	DATUM CLOCK

UNDERWAY LAB INTRODUCTION

The Underway Geophysics Laboratory on the JOIDES Resolution acquires navigation, seismic reflection, bathymetry (3.5 and 12 kHz), and magnetic field data. In addition to scientifically useful data, a primary function of these data are to ensure drilling safety by reconfirming site positions and distinguishing seafloor and sub-seafloor characteristics. Navigation and seismic data are used to ensure the ship is drilling in the position that has been reviewed and approved by the Pollution Prevention and Safety Panel (PPSP) and by the internal safety panel.

GPS can be used as emergency backup in case dynamic positioning system (DPS) failure (e.g., seafloor beacon failure). GPS data will allow ship to maintain position over the site while the drill pipe is pulled out of the hole. In addition, high-resolution echo-sounder data (3.5 and 12 KHz) can be used to determine the seafloor and sub seafloor geotechnical characteristics such as slope and shallow sub bottom characteristics.

The principle navigation equipment on the Joides Resolution is an Ashtech GG24 Sensor System (GPS+GLONASS)

Data Collection

ODP collects navigation data at all times while under way, even when no geophysical data are collected. Navigation data are automatically collected from various sources (heading, speed, wind, Transit and GPS satellites) and are stored on magnetic tape for reduction into a smooth cruise track. Geophysical data (bathymetry, seismics, magnetics) are collected whenever possible while underway and systematically during site surveys. When necessary, ODP is responsible for obtaining permission to collect underway geophysical data from the appropriate coastal states. The decision to collect this data is made during the Co-Chief Scientists pre-cruise meeting, and is based on the need to collect data in under-explored or key areas. During the cruise, collection of geophysical data can be vetoed by the captain for safety considerations.

Equipment

Navigation

- * Ashtech GG24 Sensor (GPS+Glonass)
- * 2 /Omnistar dGPS capable receivers.

Bathymetrics

- * 3.5 kHz - Raytheon PTR 105B transceiver w/single-element 10 kw transducer
- * 12 kHz – Raytheon PTR 105B transceiver w/ EDO 323B transducer
- * 2 Raytheon CESP-III Correlators (~20-db signal-to-noise improvement)

Seismic Guns

- * 1/210 cu. in. SSI GI Gun
- * 3 /80 cu. in. SSI water guns.

- * 1 /400 cu. in. SSI water gun.
- * 1 /1500 Bolt Airgun capable of 120 to 1000 cu. in.

Streamers

- * 3 Teledyne single channel, 60 phone, oil filled.

Imaging

- * 4 EPC Model 9802 Thermal GraphicRecorders
- * HP DesignJet 650C Large Format Color Plotter

Software

- * Winfrog Realtime Navigation System
- * U/W Watch LabVIEW application
- * U. of Hawaii a2d Seismic Data Aquisition System
- * SIOSEIS Seismic Processing

NOTE: WINFROG NAVIGATION AND DATA MANAGEMENT SOFTWARE

The WinFrog is an integrated navigation and data management software package. It was developed by Racal Pelagos, Inc. of San Diego, California. ODP uses it to manage data and/or data collection from Global Positioning System (GPS) satellite fixes, magnetometer, bathymetry and seismics.

WinFrog software is installed on two computers in the underway lab. WINFROG 1 is set up as the “Master”, WINFROG2 is usually run as a slave but also has the security key that enables it to be run as a Master. In addition, the ship has three other computers with WinFrog software. The User room (can be viewed shipwide on the TV), the Bridge, and DP. The DP runs its own Master. The User room machine runs as a slave to UW. The Bridge can either be a slave to UW or DP. To be a master, the computer must have a security key or a “dongle”, a yellow plug in the back of the computer.

The current version of WINFROG is 2.62_21. Original disks should be stored in the stbd set of drawers, third from top.

To start Winfrog1 after rebooting, log into underway (hit return for password).

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Version: Demob, November 2003

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