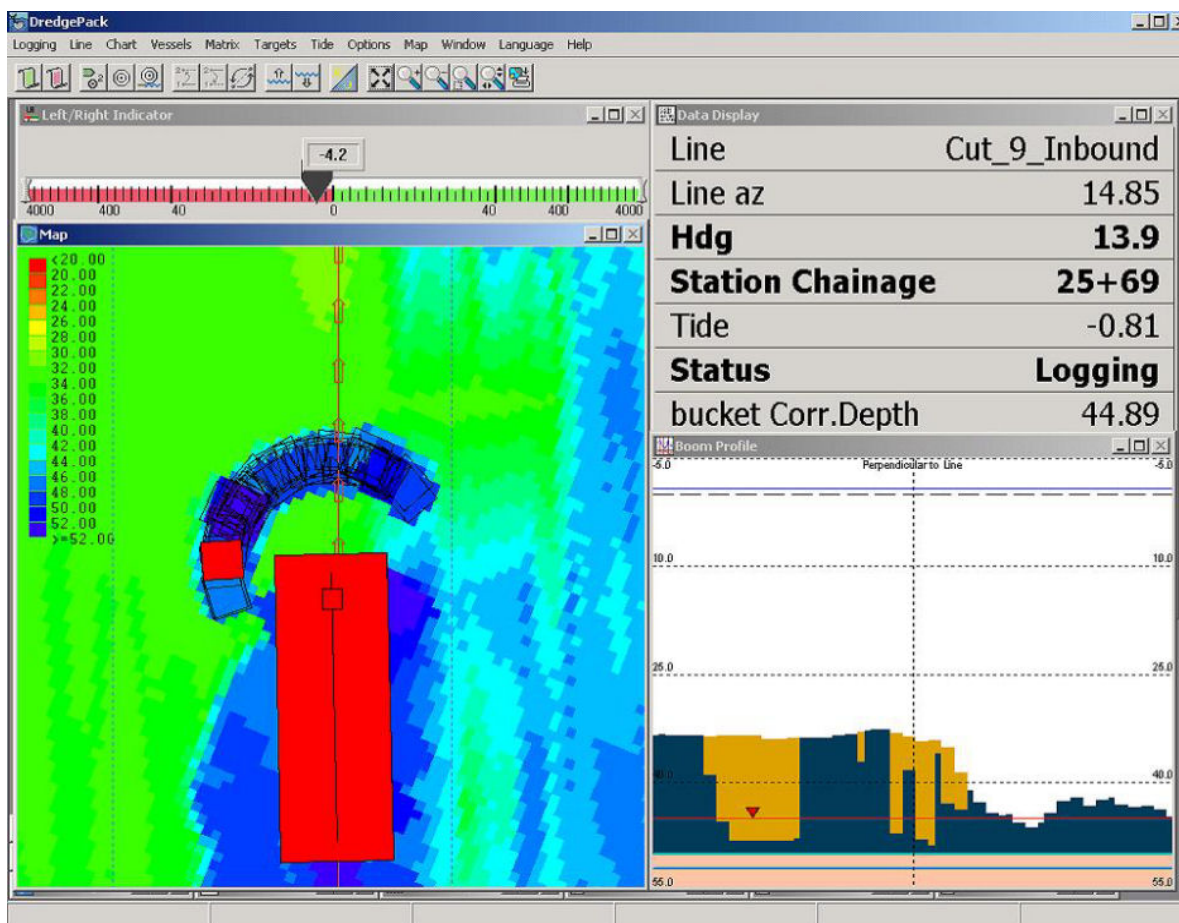




Crane and Bucket Dredge System



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INTRODUCTION

This document describes all the components included in our crane system:

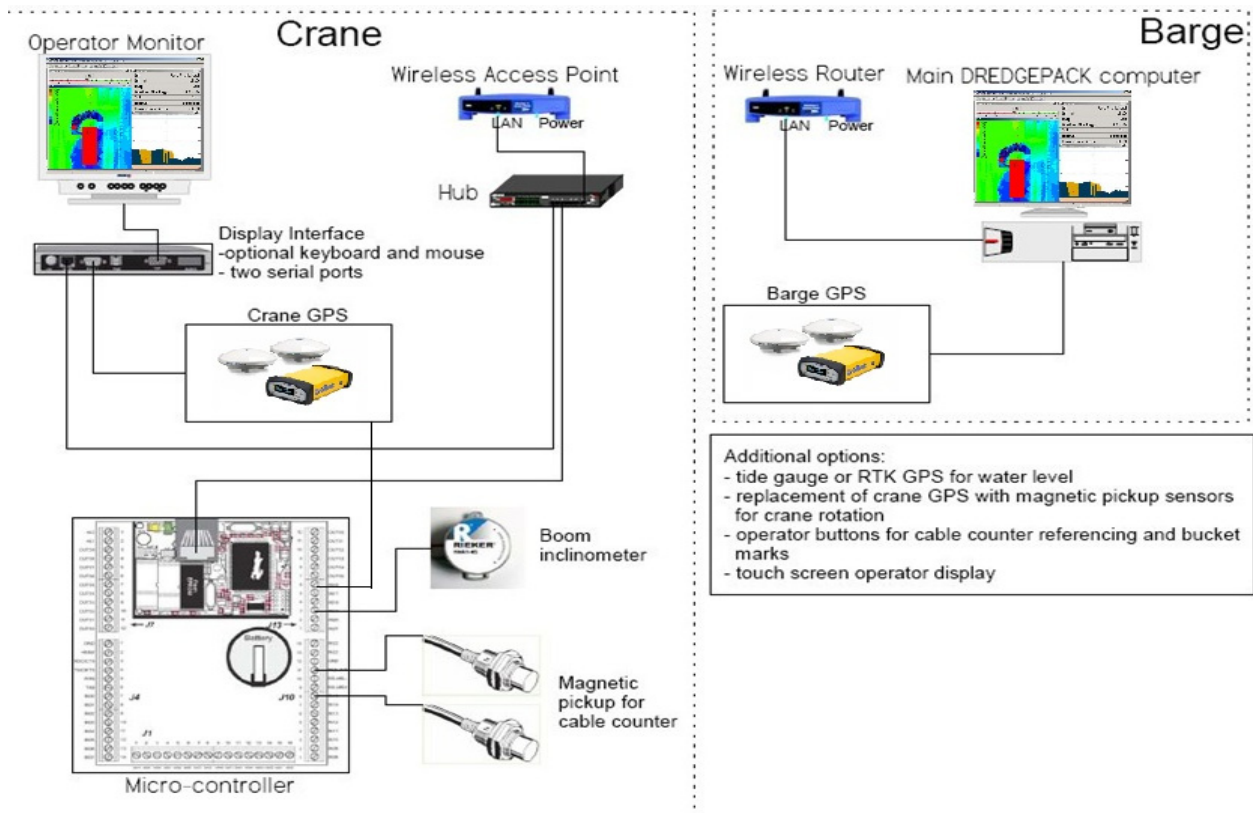
- Hardware
- Software
- Training

CRANE AND BUCKET DREDGE SYSTEM OVERVIEW

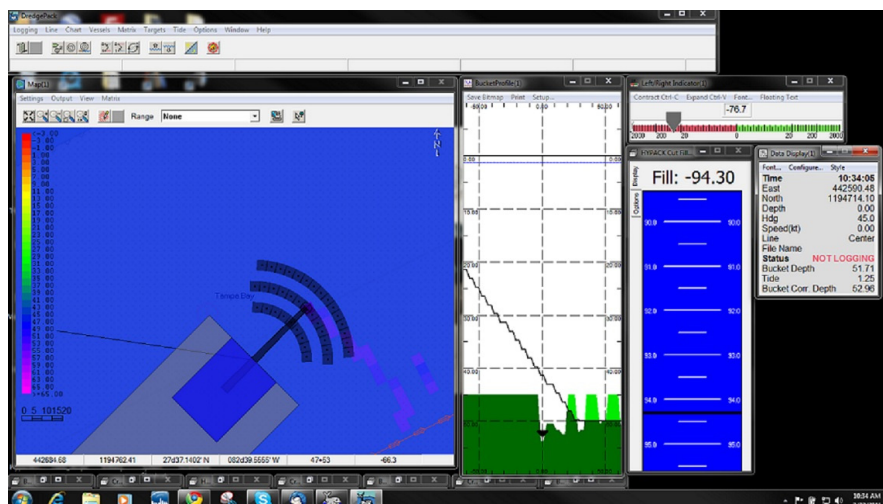
Our DREDGEPACK® crane and bucket dredge positioning system (CDPS) consists of the following:

DREDGEPACK	Real Time Dredge Positioning and digging software
Dual Antenna DGPS:	For dredge positioning and heading.
Depth System Solution:	To calculate bucket depth
Wireless and Remote System	To setup and operate DREDGEPACK® from remote location in the barge.
PC System:	PC for data collection and data display
Tide Gauge (Optional)	Real time tide correction

FIGURE 1. Crane and Bucket Dredge System



DREDGEPACK® REAL TIME DREDGE MANAGEMENT SYSTEM



DREDGEPACK® enables you to monitor and track digging operations for hopper, cutter, and other dredge types. DREDGEPACK® monitors the position and depth of the cutting tool on the operator's screen in real time and re-maps the bottom based on the depth and location of the digging tool. The color-coded depth information is displayed in plan and sectional views to show the “As Surveyed” and the “As Dredged” depths for millions of cells. This enables you to maximize digging efficiency while providing a record of digging operations. In DREDGEPACK®, the operator can track the location of bucket ‘digs’ or ‘placements’.

Each day DREDGEPACK® creates a file to store that day's buckets.

- Allows easy determination of the area dredged in any period of time.
- Allows the user to disable unnecessary data to clear the screen.

DREDGEPACK® is not meant for hydrographic surveying. It is a stand-alone product and the only requirement is to feed it with an XYZ file for the dredging area. To produce such a file you need other tools to produce a hydrographic survey. HYPACK® Max is preferred, but you can use any other survey package.

DATA REQUIREMENTS IN DREDGEPACK®

In DREDGEPACK® there are three pieces of information we need to know:

- **Dredge position:** Most dredges now operate using a differential or RTK GPS receiver. We offer a Dual Antenna GPS.
- **Dredge heading:** There are several solutions available for vessel heading. We offer a Dual Antenna GPS
- **Depth of cutting tool:** For crane and bucket dredges, the preferred method to calculate the depth of the cutting tool is to use either a magnetic or optical sensor to monitor the direction and movement of the drum on the crane, and an inclinometer mounted on the boom. DREDGEPACK® can then determine the depth and position of the bucket.

DREDGE POSITION AND HEADING: DUAL ANTENNA DIFFERENTIAL GPS

FIGURE 2. *Dual Antenna Differential GPS*

Dredge position: Most dredges now operate using a differential or RTK GPS receiver.

Dredge heading: There are several solutions available for vessel heading. We offer a Dual Antenna GPS

Barge position and heading: A second GPS can be used for barge positioning and heading



CRANE DEPTH SYSTEM



DREDGEPACK® can determine the depth and position of the bucket. For crane and bucket dredges, the preferred method to calculate the depth of the cutting tool is to use either a magnetic or optical sensor to monitor the direction and movement of the drum on the crane, and an inclinometer mounted on the boom to measure the boom angle.

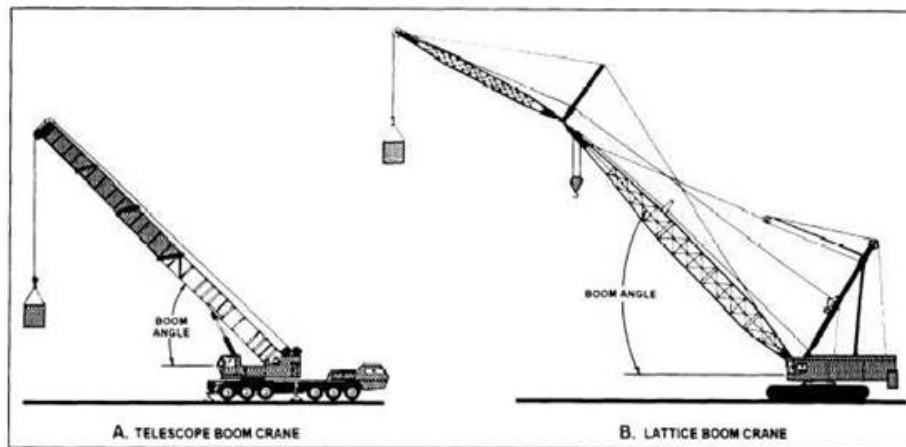
We provide a complete Crane Depth System Controller Box solution that includes:

- Inclinometer for boom angle
- Depth sensors (magnetic sensor, optical sensors or rotation sensor)
- 2 push button (Bucket switch)
- Wireless Interface and Remote Display system (Optional)

All components are included in a waterproof box. Controller status can be accessed over a VNC Viewer over a wireless network. Crane status can be checked and programmed via iPhone!

CRANE BOOM ANGLE:

FIGURE 3. Measuring the Crane Boom Angle



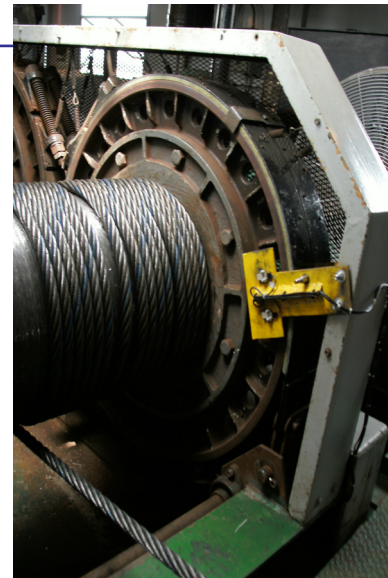
As the crane changes the boom angle, the depth of the bucket will also vary. We mount an inclinometer on the boom to determine the angle change.

DEPTH SENSORS

FIGURE 4. Sensors on the Drum Measure Cable -out

We use sensors (magnetic, optical or rotation sensor) mounted on the drum of the crane to measure the cable payout. We use different sensors depending on the design of the drum. The three options are:

- Can be magnetic proximity sensors (count teeth on a geared wheel)
- Optical sensors (count holes in a drum)
- Rotation sensor

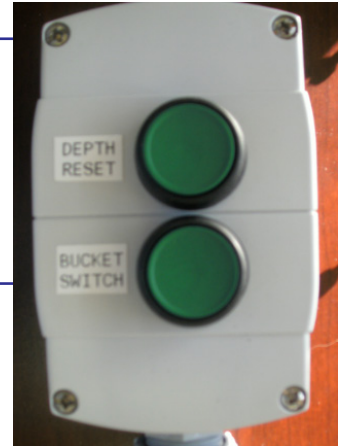
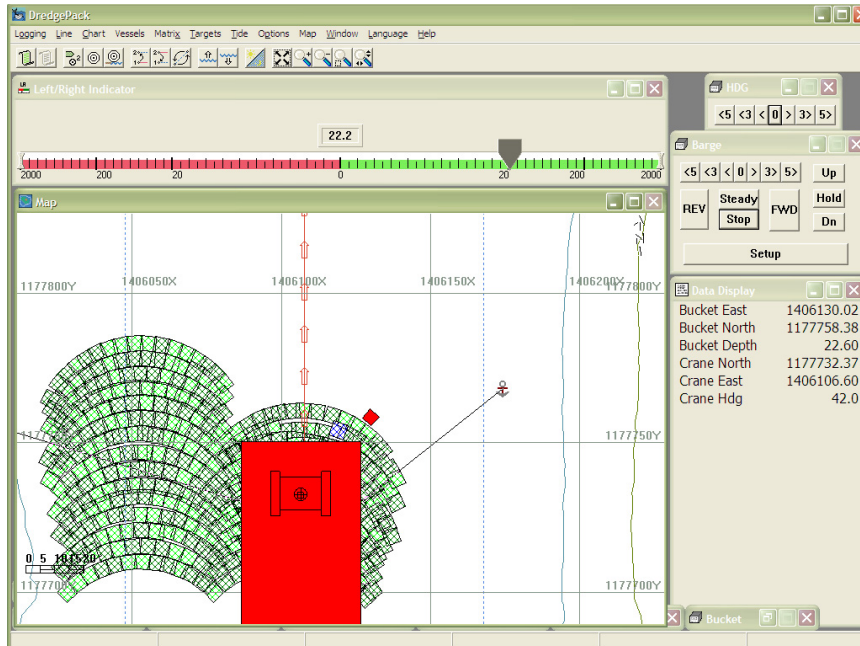


BUCKET PRINT SWITCH

FIGURE 5. Bucket Switch

The Depth System Solution also includes a bucket print switch to mark the bucket location in DREDGEPAK®. In DREDGEPAK®, the operator can track the location of bucket 'digs' or 'placements'.

FIGURE 6. Tracking Buckets in DREDGEPAK®



WIRELESS INTERFACE AND REMOTE ACCESS SYSTEM

- Digi Connect Port Display.
- Wireless Access Point and antennas
- Network Hub (4 ports).
- Wireless mouse and keyboard

COMPUTER SYSTEM:

SEMI RUGGED NOTEBOOK

With a 14" HD LED display, the latest Intel® Core™ processors and an oversized multi touch touchpad, it performs like a desktop. Options for a sunlight-viewable Panasonic CircuLumin™ touchscreen, backlit keyboard, 4G LTE mobile broadband, an integrated webcam and enhanced connectivity, make this the most versatile semi-rugged PC ever.



CRANE MONITOR:

10.2" TFT LCD Monitor w/ VGA & AV inputs

VGA Input × 1 with Video Input × 2; Native Resolution: 800 x 480 WVGA (2400 x 480 dots); Supports 640 x 480 ~ 1024 x 768 display resolution; For In-Car Computing, PC, Server, and other VGA Use; NTSC/PAL Multi-System, On Screen Display Control; Thin Outline, Lightweight Design



INVERTER:



FIGURE 7. 24V DC to AC 2300 Watt Power Inverter

This heavy duty inverter plugs directly to a 24 Volt DC battery to power a small microwave, power tools and electronics in your vehicle!

REAL TIME WATER LEVEL TIDE GAUGE

A tide gauge is used for real time water levels.

ON-SITE INSPECTION

On-site inspection is recommended prior to ordering the system. It allows a HYPACK® specialist to inspect the dredge to ensure that all needed equipment is ordered. The technician can also give you guidelines for installing the equipment to ensure it will be done correctly. On-site inspections can usually be completed in one day.

CALIBRATION AND TRAINING

The equipment must be installed and configured prior to the on-site visit. You will be responsible of the mechanical parts of the installation such as welding and placing of the sensors, etc. HYPACK technicians will calibrate the system. Calibration should take 1 day. Once the calibration has been completed, training will take 3-5 days.

If you do not complete the pre-installation or delays occur due to system problems, a follow-up visit will be required and billed at normal daily rate plus travel expenses.

MAINTENANCE PLAN

First time customers receive a 1-year, free subscription to our Maintenance Plan.

Being part of the Software Maintenance Program includes:

- The newest versions of DREDGEPAK® software automatically upon release, at no charge.
- Access to program updates, patches and technical documentation on our support site.
- Prompt, courteous and knowledgeable technical support via telephone, email, or fax.
- Reduced registration fee to our annual HYPACK® Training Conference.

For any technical questions, you can contact help@hypack.com.

PRICING

For pricing or for additional information please contact sales@hypack.com

