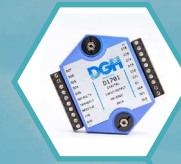




# Dredge Disposal Site Boundary Indication System



- **Objectives:** Create precise dredge monitor and control system
- **Solution:** DGH D1701 Digital I/O Module
- **Benefits:** Increased dredging disposal accuracy
- **Results:** System with precise location and disposal control

## Overview

Today's commercial, passenger and recreational boating vessels are becoming larger and larger. As these vessels increase in size, the draft of these vessels becomes an important factor when selecting waterways to operate through with safe passage. A vessel's draft is considered the measured distance from the vessel waterline to its deepest point in the water. For safe passage of these vessels, waterways such as rivers, ports and harbors require the evacuation of underwater sediment and materials. The sediment and material evacuation process is called dredging, and the removed materials are referred to as "dredged material".

Dredging is required to create underwater channels that will allow for the safe passage of vessels through waterways. The dredging process may be required periodically or infrequently. Without dredging waterways, these waterways would potentially become impassable over time. Potentially cutting off the flow of commercial deliveries, prevent passenger vessels from visiting destinations and recreational boaters from using waterways.

Dredging waterways must be done in accordance with federal regulations. Dredging contractors must rely on monitoring and control systems to remove

sediment and materials from the waterway floor. As the dredged material is removed, normally by suction or mechanical bucket, it is brought to the surface and onto a split-hull scow or hopper dredge. The material is then moved upland for beneficial use or taken offshore and disposed of within an EPA approved designated disposal site.

The designated disposal sites contain strict boundaries where the material must be placed. In accordance with regulatory guidelines, contractors must position the scow or hopper dredge inside the designated disposal site before placing the dredged material. To ensure the scow or hopper dredge is located within the specified boundaries, ADISS Inc., a commercial solutions provider for the marine construction industry, developed a remote monitoring system that relays GPS positional data and vessel sensor information to operators responsible for placement of the dredged material. Using this incoming data, ADISS, Inc.'s onboard software analyzes position, sensors, speed and even time to determine if all the regulatory conditions are met to allow placement. If so, an onboard lockout system is disabled, and the disposal can take place.



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# Project

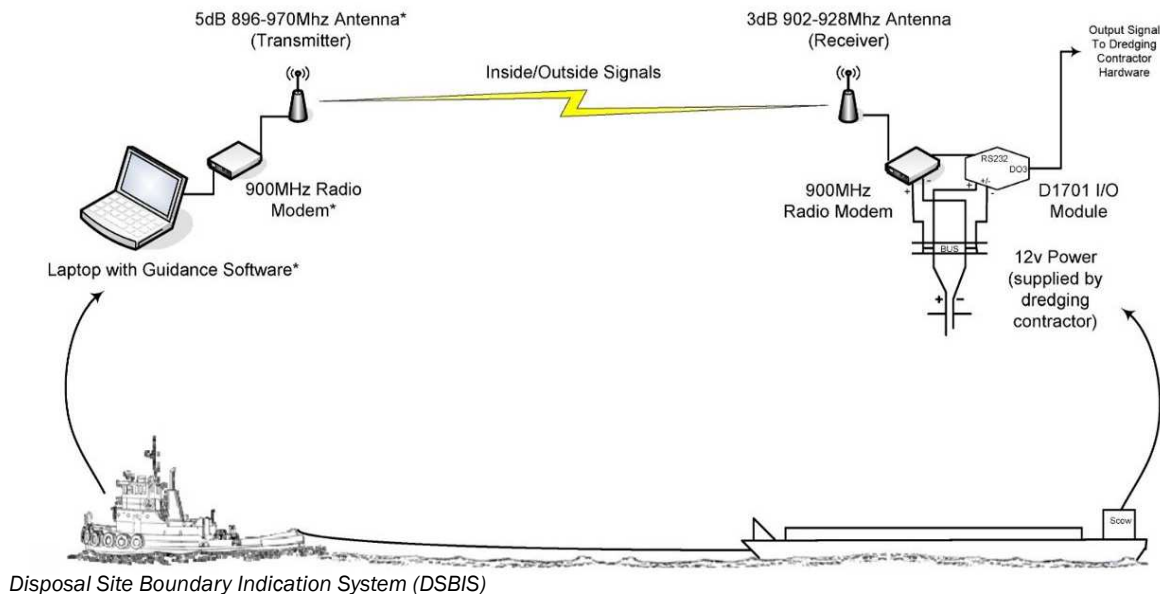
Disposal of dredged materials in non-designated areas can lead to significant penalties and fines for dredging contractors. To assist operators with positioning the scows and hopper dredges, a system was needed to accurately locate vessels within the designated area and then allow the disposal of the material.

ADISS, Inc. was asked by multiple dredge contractors to design a disposal monitoring system that would provide operators with precision location system, a lock-out feature and other real-time dredging operations data. The system requirements included an interactive graphical user interface, a GPS for precise location of the scow or dredge, RF communications using radio modems, the monitoring of safety On/Off switches, digital control signals to enable disposal of material, and onboard instrumentation for

monitoring additional important parameters such as water depth, hydraulic pressures, and vessel speed.

DGH Corporation was asked to provide a hardware solution that would communicate with radio modems, monitor On/Off switches, and provide digital output control signals when the scow or hopper dredge is inside the designated site boundaries. DGH provided a D1701 digital input output module with a serial interface to monitor switch status and provide output control signals to enable the disposal operation.

The completed system needed to comply with dredging regulatory guidelines and provide operators with real-time operational data. All system data must be logged and stored for future review. This data can be used for report generation, determining improvements in dredging practices, and provide assurance of regulatory compliance.



## Monitoring and Control System

The new dredge material disposal lockout system designed by ADISS, Inc. is referred to as their “disposal site boundary indication system” or DSBIS. This system contains a supervisory computer for monitoring and restricting the remote-control disposal of dredged material, data collection, a graphical software user interface, 900 MHz radio modems for communications, a GPS for precise location tracking, a DGH module for monitoring contact closures, output control signals, and instrumentation for monitoring additional sensors. All components are mounted inside a weatherproof NEMA enclosure for a watertight seal.

From the tugboat or dredge pilot house, operators can visually monitor the entire disposal process

in real time using the graphical user interface. Communications with the DGH switch sensing and control module occur through a radio modem link. One radio modem is mounted near the pilot house and the other remote radio modem is mounted on the scow under tow or on the deck of the hopper dredge. This allows RF modem connection allows for easy vessel disconnect or separation without concern for hard wired cables being cut or disconnected.

Once the scows or hopper dredges are filled then they are towed or moved to a designated disposal site where the dredged materials can be placed. There is often significant strict EPA or federal regula-



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tory oversight pertaining to the disposal sites, their location, their size, and the materials that can be dumped. The system GPS provides precision location data to ensure that the scow or hopper dredge is located within the designated dumping area. Failure to comply with locating inside the designated area can lead to significant fines and penalties for the dredging contractors. When the location data is verified, and the vessel is within the designated area, then a request is sent through the radio link to the DGH D1701 module to enable the electrical

signal to allow the vessels remote control “OPEN” command to pass through and dredge material to be disposed of from the scow or hopper dredge. Once the disposal process is complete or any if the regulatory conditions are no longer being met, the DGH module is commanded to disable the electrical signal and avoid a potential misplacement.

The position data is logged along with other critical sensor information to document the process in accordance with regulatory requirements.

## Results

Since the late 1990's, ADISS, Inc. has delivered monitoring and control systems to dredge companies, large and small throughout the United States and the Caribbean. They have relied on quality products from DGH Corporation for their switch status monitoring and remote relay control signals. Combined with the GPS, miscellaneous sensors and computer software, their systems provide dredging contractors with real-time operational data, improved location accuracy of the disposed material, and a “lock-out” feature that only allows the dredged material to be placed inside the boundaries of the designated disposal area. These important features reduce the possibility of human error, ensuring that dredging contractors do not accidentally dispose of material in the wrong location. This significantly reduces the possibility of heavy fines and penalties.

## About ADISS, Inc.

ADISS, Inc. specializes in remote monitoring dredging projects, and has provided real-time tracking and control services to commercial dredging companies since 1997. Over that time ADISS, Inc. has monitored over 1,100 beneficial use, maintenance and improvement projects, documenting more than 300,000 loads of dredged material to offshore and upland placement sites.

Their tracking services have even been used on projects where no formal monitoring was required. Instead, they have applied their experience to utilize a variety of techniques and sensor packages to find operational solutions for their customers. Their previous applications have contributed to beach nourishment, reef building, capping, and CAD (Confined Aquatic Disposal) cell projects, as well as offshore and upland placements. All have included the elements of real-time tracking for asset management and alarm notification.

On the strength of their performance, they have become the industry standard for placement monitoring, and have been recommended by the U.S. Army Corps of Engineers for meeting the nationally mandated Dredge Quality Management (DQM) requirements.



Real-time GPS monitoring system using DGH I/O Modules

## About DGH Corporation

Established in 1985, DGH is an industry-leading manufacturer of data acquisition hardware for use in the process monitoring and control industry. Our products have been used worldwide in such industries as water & wastewater management, pharmaceutical, scientific laboratories, military, transportation, energy sectors, and power utilities.

As part of Jewell Instruments, LLC, DGH Corporation continues to innovate products for use in a wide range of data acquisition applications. Our products have been designed into OEM applications and used by systems integrators across many industries. Contact a member of our sales team today and see if DGH can provide a solution for you.



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