In the Public Eye

VideoRay use in Science Centers, Museums and Aquaria

Why ROVs in Exhibits?

Education

- Technology demonstration
- Undersea perspective – “fish eye view”
- Distance learning potential

Entertainment

- Skills challenge

Maintenance

- Inspection
- Retrieval

Revenue

- Attract more visitors
- Pay per use

Why VideoRay?

Small size

Easy to operate

Economics

- Low-cost entry point
- Low cost of operation

Customizable

- System modifications
- PC Pilot for Pro Series

Who Uses VideoRays?

Bishop Museum
COSI (Center of Science and Industry)
Discovery World
Lake Champlain Shipwrecks
Liberty Science Center
Marine Resources Development Foundation
Monterey Bay Aquarium, Monterey
National Marine Aquarium
Nauticus, Norfolk
NRG! Exhibits
Tenji, Damariscotta
Underwater World
West Marine

Bishop Museum

Museum

35,000 gallon freshwater tank

3 VideoRay Scouts

3 years

Honolulu, Hawaii, USA

www.bishopmuseum.org

Bishop Museum

The VideoRay is used in an interactive exhibit exploring the new volcano Lo'ihi. Visitors can drive the VideoRay.

COSI (Center of Science and Industry)

Science Center

80,000 gallon freshwater tank

3 VideoRay Scouts

9 years

Columbus, Ohio, USA

www.cosi.org

COSI

The VideoRay is used as an interactive science center exhibit. The controls have been mounted in a kiosk, where museum visitors can pilot the VideoRay within an 80,000 tank.

Discovery World

Science Center

Aquarium use and in the Great Lakes

1 VideoRay Scout

Milwaukee, Wisconsin, USA

www.discoveryworld.org

Discovery World

Discovery World

The VideoRay is used within an aquarium where visitors get the opportunity to drive it.

The VideoRay is also used in programs including the exploration of shipwrecks of the Great Lakes from the S/V Denis Sullivan, a 137 foot three-masted Great Lakes Schooner

Lake Champlain Shipwrecks

Tour Operator

Lake Champlain

1 VideoRay Explorer

3 years

Burlington, Vermont, USA

www.shipwrecktour.com

Lake Champlain Shipwrecks

Lake Champlain Shipwrecks

Lake Champlain Shipwrecks operates a tour service out of Burlington Vermont and offers the public a unique opportunity to explore shipwrecks of Lake Champlain.

Liberty Science Center

Science Center

7,000 gallon saltwater tank with marine life

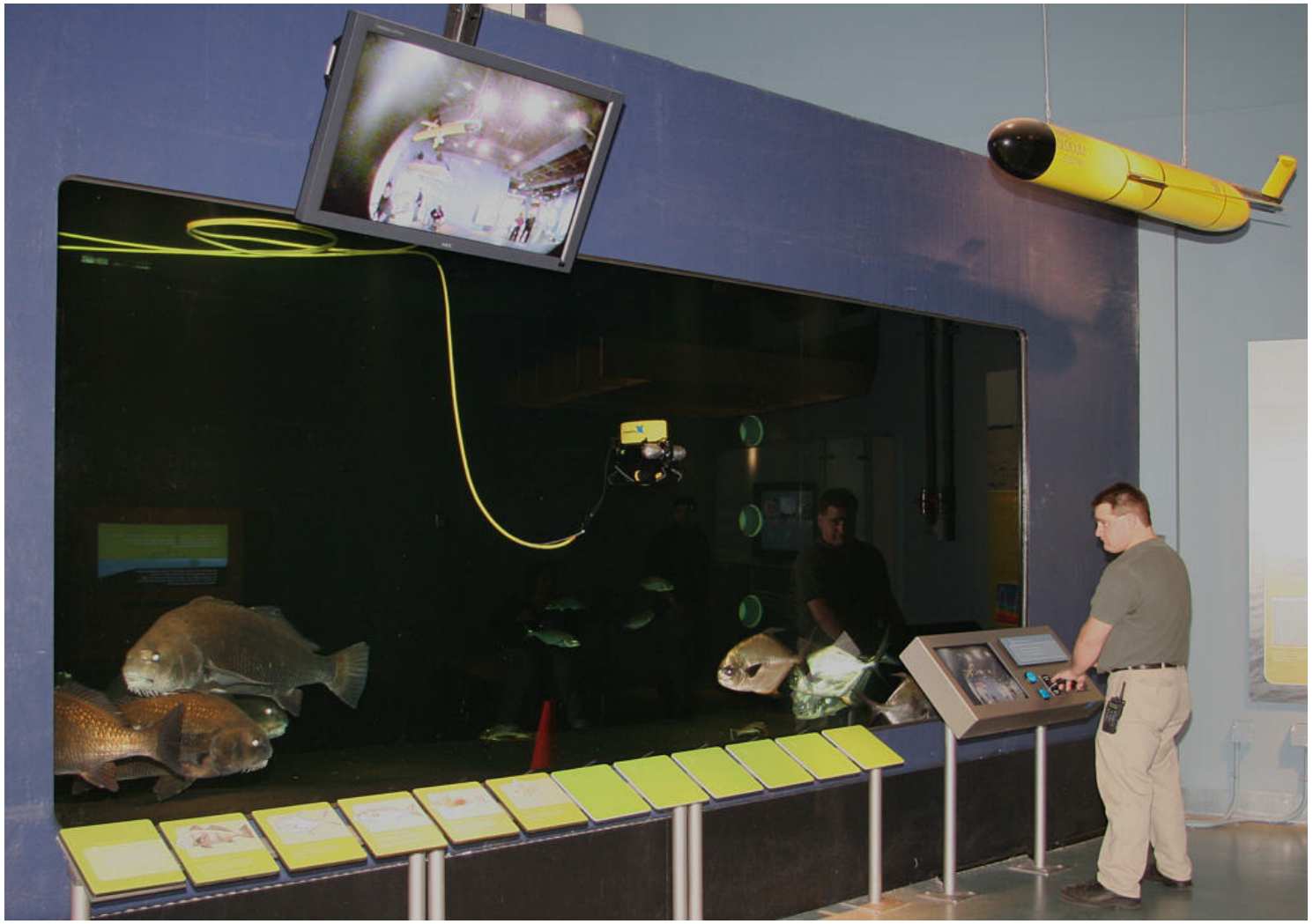
1 VideoRay Pro 3

1 year

Newark, New Jersey, USA

www.libertysciencecenter.com

Liberty Science Center



Liberty Science Center

The VideoRay is operated in a 7,000 gallon brackish water aquarium with several fish from the Hudson River and NY/NJ Harbor. Visitors control a custom joystick to navigate the VideoRay inside the tank and watch the video feed on two monitors. The VideoRay was modified to reduce its speed to protect the fish.

Marine Resources Development Foundation (MRDF)

Science, Research & Education

"Hands-on" research and education, primarily in a manned underwater laboratory

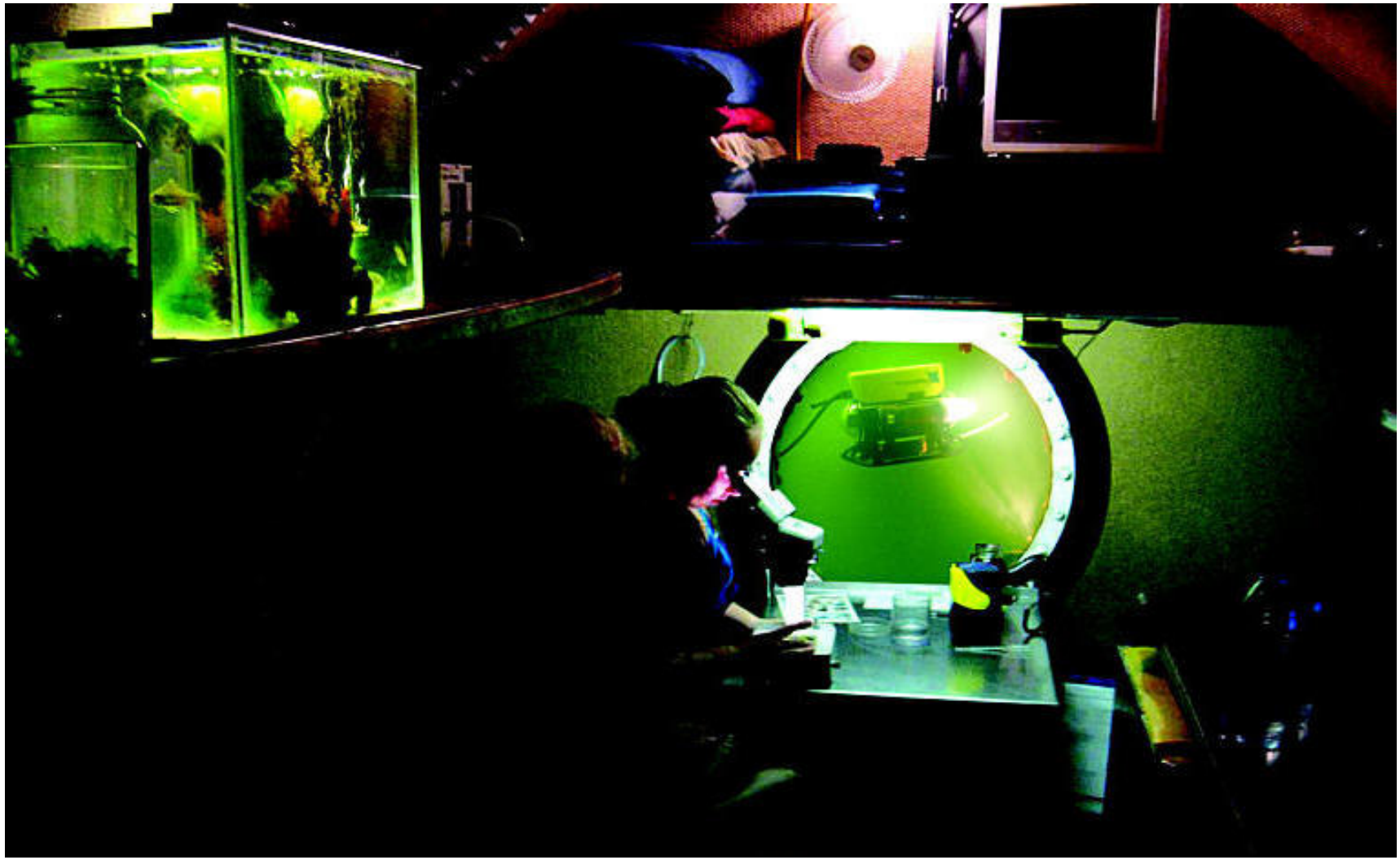
1 VideoRay Pro 3

3 years

Key Largo, Florida, USA

www.mrdf.org

Marine Resources Development Foundation



Marine Resources Development Foundation

Used for "hands-on" research and education, primarily in our manned underwater laboratory. Periodically used offsite for other research purposes such as underwater archeology. Many hundreds of students pilot the VideoRay each year from our underwater lab. The VideoRay is also used remotely over the Internet.

Monterey Bay Aquarium

Aquarium/Education

1.2 million gallon saltwater tank, occasionally in 300,000 gallon saltwater tank – both with marine life

1 VideoRay Pro 3

4 years

Monterey, California, USA

www.montereybayaquarium.org

Monterey Bay Aquarium

Monterey Bay Aquarium

Majority – The VideoRay is used to recover items that have fallen in 1.2 million gallon exhibit or for the recovery of fish mortalities.

Occasionally – The VideoRay is used to investigate and video record exhibit infrastructure. It has been used to document exhibit damage, inspect difficult to access exhibit space, and used to record video images to get different exhibit perspectives for presentations and demonstrations.

National Marine Aquarium

Aquarium

Freshwater and saltwater tanks with marine life

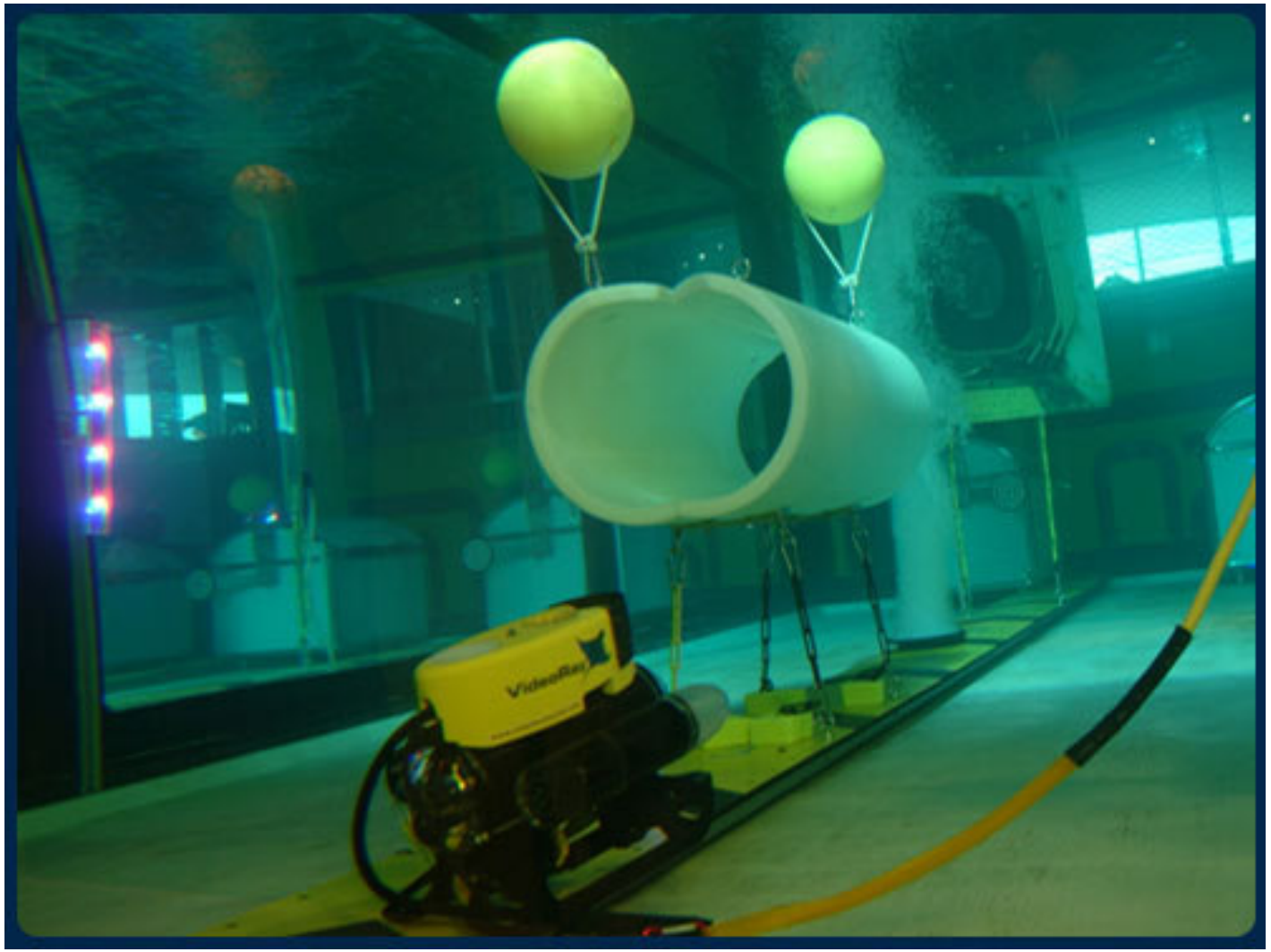
2 VideoRay Pro 3 GTOs

3 years

Plymouth, United Kingdom

www.national-aquarium..co.uk

National Marine Aquarium



National Marine Aquarium

Visitors drive the VideoRays during SubMission shows. It is also used in other tanks for recovery of lost items and inspection of animals.

Offsite – The VideoRay is regular monitoring of Scylla artificial reef (http://www.national-aquarium.co.uk/scyllaReef.aspx?m=science) and working with groups like National Lobster Hatchery & Devonport Naval Dockyard.

The VideoRay at NMA was also used in an Internet Promotion where people completed a skills challenge by driving the VideoRay online.

Nauticus

Science Center

870 gallon freshwater tank

3 VideoRay Scouts

2 years

Norfolk, Virginia, USA

www.Nauticus.org

Nauticus

The VideoRay is mainly used in exhibit space for guests to pilot them around.

Before that, they were used to check our intake pipes under our cruise terminal and for ROV workshops.

Television coverage at Nauticus:

http://www.youtube.com/watch?v=meS7aIFwWpU

NRG! Exhibits

Travelling exhibit for Museums & Science Centers

300 gallon freshwater tank

2 VideoRay Scouts

2 years

Kirkland, Washington, USA

www.nrg-exhibits.com

NRG! Exhibits

Our VideoRay Scout is in a small tank and visitors drive it, to see what an ROV does in the context of searching for sunken treasure.

Tenji

Aquarium

Fresh and saltwater with marine life

Have used Scouts, Explorers and Pro 3s, but do not own

Damariscotta, Maine, USA

www.tenji.com

Tenji

Tenji has used VideoRays for

1. Education purposes to show the public what lives below the waters (both in saltwater and freshwater), as well as educate people about ROVs in general,
2. As a tool for managing large aquarium exhibits.

Underwater World - Singapore

Aquarium

26,000 gallon freshwater tank with marine life

290,000 gallon saltwater tank with marine life

2 VideoRay Scouts

½ year

Singapore

www.underwaterworld.com.sg

Underwater World - Singapore

VideoRays are set up in two large tanks (a 100 m3 freshwater tank and a 1100 m3 saltwater tank). Guests pay S$2 to drive the VideoRay around in the tank for three minutes.

West Marine

Retail Sales

100 gallon freshwater tank

1 VideoRay Scout at each location

1 year

San Diego, California, USA/Ft. Lauderdale, Florida, USA

www.westmarine.com

West Marine

The VideoRays are sold by West Marine and showcased in freestanding store display kiosks that allow customers to try a VideoRay.

Installation / Configuration

Many exhibits utilize custom installations

- Tether length
- Control panel kiosk
- Special ROV frame

Issues – Cartridge Seal Wear

Some of these exhibits have the world's most often used VideoRays when these systems are operated more than 8 hours a day, 7 days a week.

Special considerations have to be taken to ensure the cartridge seals don't fail.

Particularly when visitors leave the vertical thruster running.

Solution

VideoRay has provided the following modifications

- The control panel has been modified to reverse the
- The control program to cut the thruster after several minutes of inactivity.

Issues – Corrosion

Constant operation saltwater or fresh water with harsh pool chemical enviroments has led to some cases of corrosion.

Solution

The most common techniques used in other industries have been used effectively:

- Frequent fresh water bath
- Proper adjustment of chemicals

Other Possibilities:

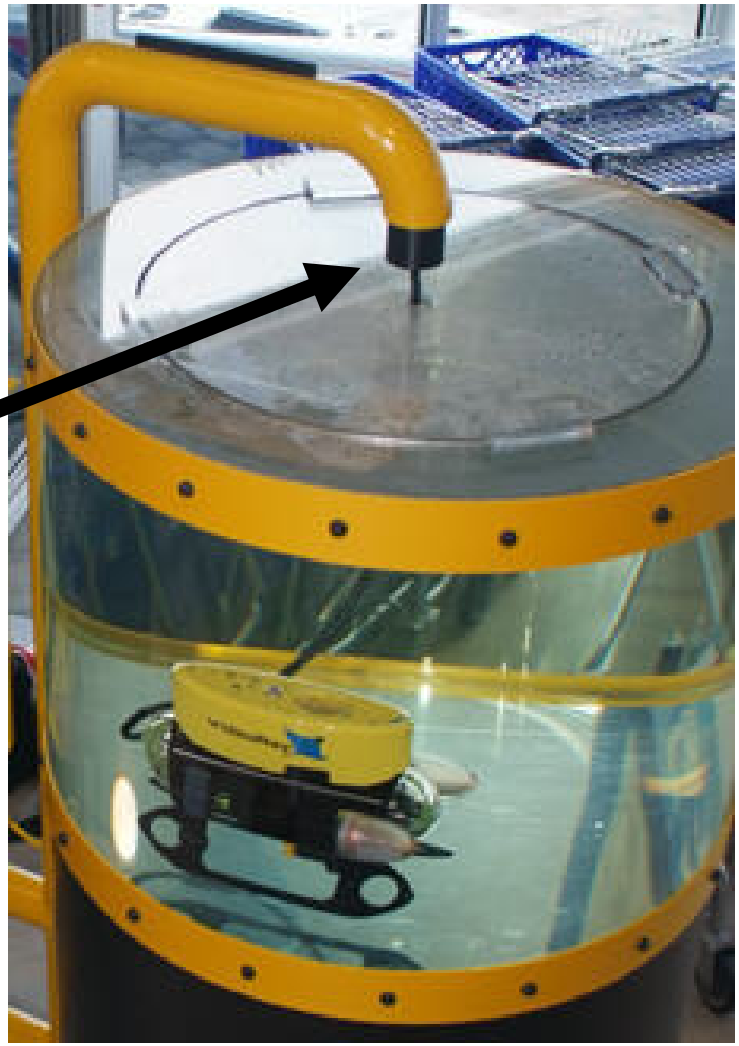
- Use of zinc anodes for cathodic protection
- Reduce the use of parts subject to corrosion and replace them with plastic. (This limits depth rating)

Tether Coiling

Visitors tend to drive the VideoRay in circles causing the tether to become coiled.

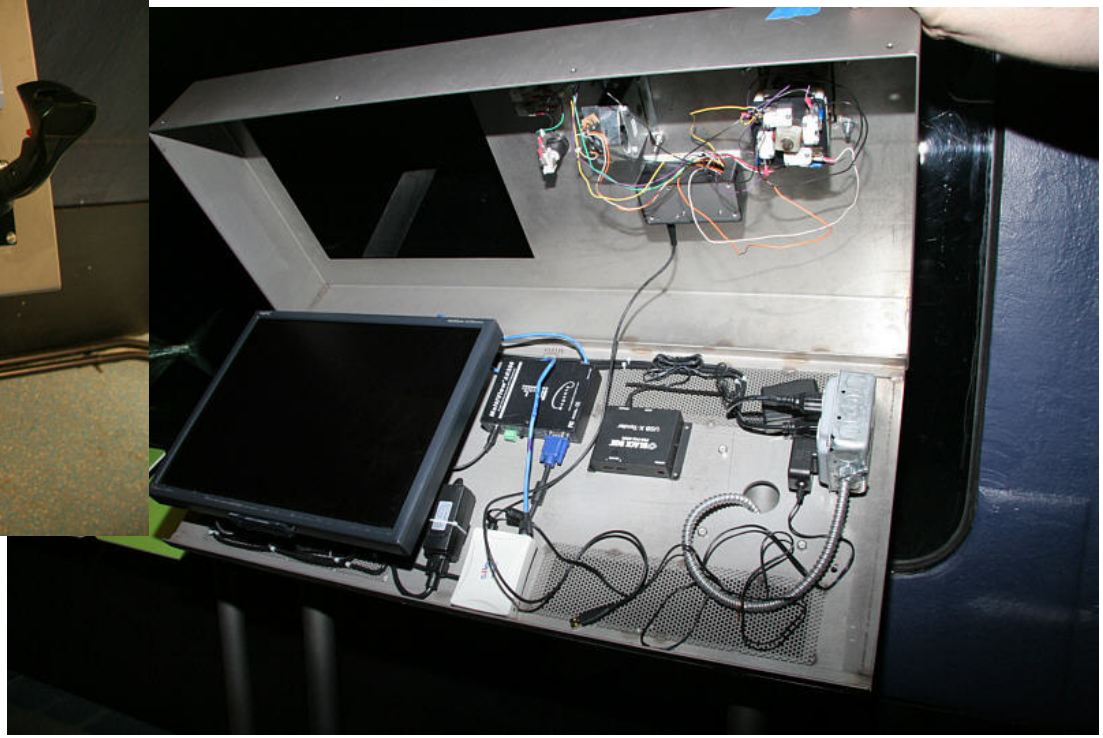
Solution

A slip ring similar to the one used in the tether deployment system can be installed.



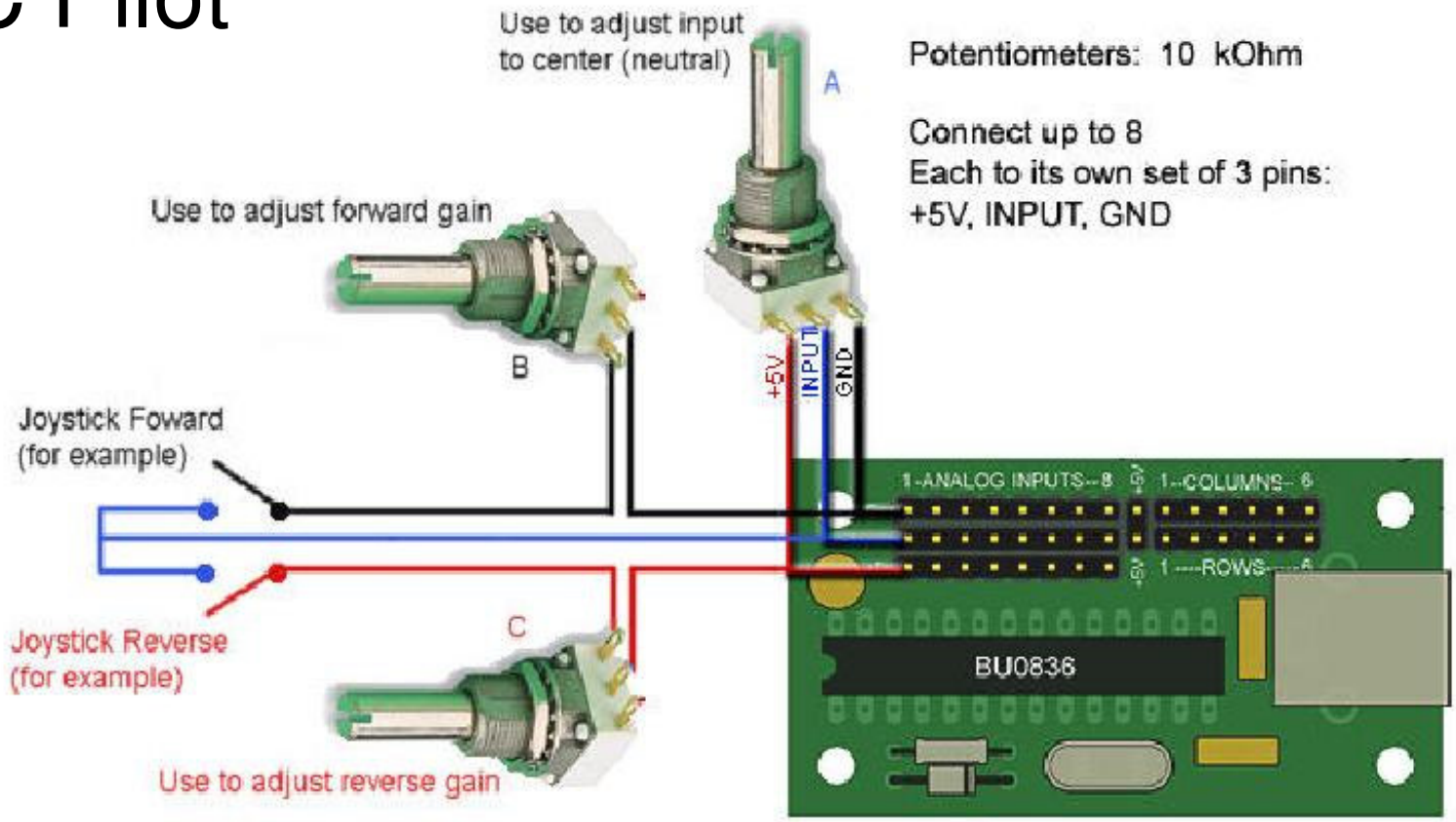
Possibilities

Joystick modifications for kiosk



Possibilities

Easy to use joystick interface for use with PC Pilot

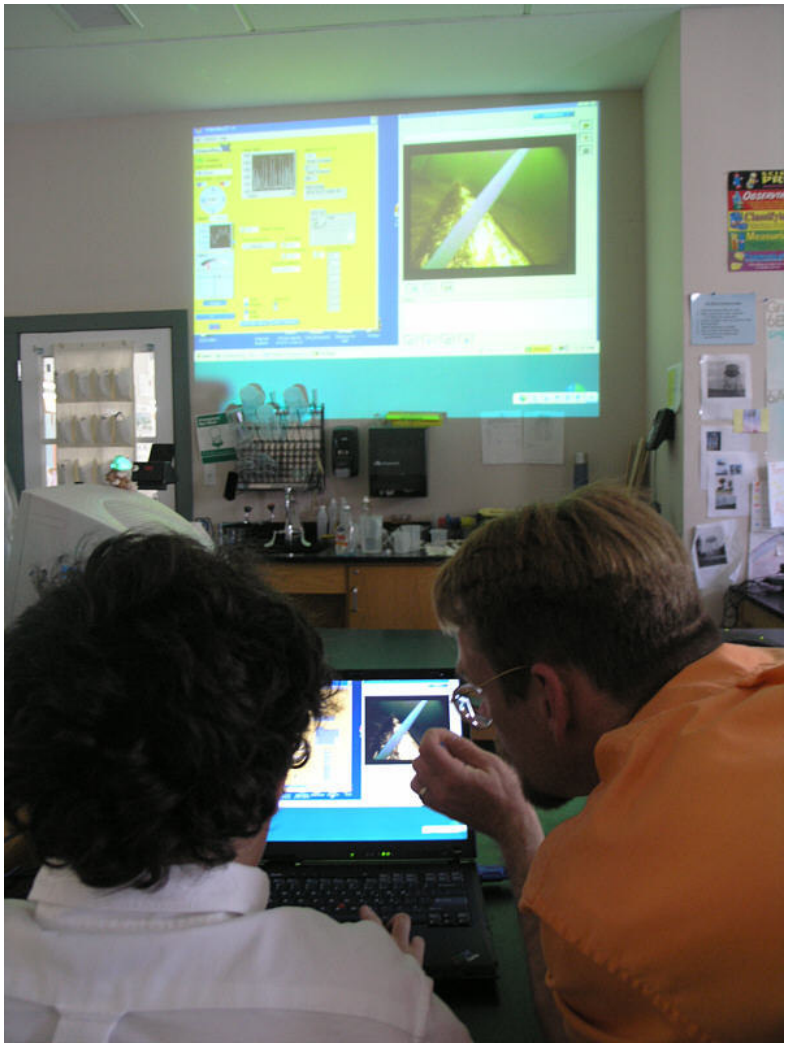


VideoRay

Possibilities

Internet Access

- Remote observation
- Distance learning
- Collaboration
- Handicapped access



Possibilities

Immersive Technologies

- More intuitive experience
- Simulations
- Handicapped access

In the Public Eye

Where will VideoRay Show Up Next?...

Questions?