



# Underwater Explorer Submarine: Radiation, Chemical, and Biological Detection System

**DiveRAD-ST (Search Tool) Gamma and Neutron**

## Features

- Self-Propelled Submarine Robot
- Battery Operated

### Scientific Package

- Onboard Data Storage
- High Definition Camera – Video / Still
- Gamma and Neutron Radiation Detectors
- Underwater Motor Control and Video Tether Cable – 100 Feet (328 Meters)
- Base Station Electronics and Software
- App Compatible

## Situation

Cameras and thermal sensors are popular applications for **ROBOT** technology.

Data collection by ROBOTS is a great advance.

Unfortunately, detection for underwater radiation, chemical, biological contamination is still performed manually by divers, aquatic ecosystem biologists, and marine science engineers.

**NOW take personnel out of harm's way in underwater radiation, chemical, and biological detection.**

**US Nuclear Corp offers underwater Sensor Detection with the DiveRAD™ Series.**

### The DiveRAD™ Detector System

Includes:

#### The QYSEA Fifish

- Remote Submarine Robot
- Self-Propelled
- Submersible Platform
- Video / Still Camera
- VR Headset

### The DiveRAD™ Detector Series

DiveRAD™-ST

- Controllers
- Base Station Electronics and Software
- Location Marker Time Clock
- Hard Shell Case for DiveRAD™ System
- **Optional:** Training



## TECHNICAL ASSOCIATES OVERHOFF TECHNOLOGY

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# Underwater Explorer

## Submarine Radiation, Chemical, and Biological Detection System

### DiveRAD-ST (Search Tool) Gamma and Neutron

## Easy to Use: DiveRAD™ Underwater Explorer

- Rugged, Submersible
- Wide Range Covered
- Electronics Ground Station:
  - Laptop**
  - DiveRAD™ Software**
- Underwater Motorcontrol and Video Tether Cable  
100 Feet (328 Meters)

### Scientific Package - Waterproof Case

- » Gamma Search Tool
- » Sensitive: 1  $\mu$ R/HR Resolution
- » **Optional:** Neutron Detection
- Wide Range Covered
- Battery Operated
- Onboard Data Storage Serial Port
- Engineering Units - User Specified
- Unique Data Collection Software Included
- **Detector: IP68**
- **Electronics: IP 68**

### Description: DiverRAD-ST™

- Radiation Detector
- Measures Gamma radiation and Neutron levels.
- Measures Dose Rate
- Quantify Gamma and Radiation Level – mR/h – Engineering Units: User Selectable: cps, mSv/h etc.
- GAMMA & Neutron source detection: Emitters in water, on boat bottoms, ocean mounted platforms, etc.

### Detectors:

- Gamma: Scintillation NaI(Tl)
- Neutron: Zinc Sulfide (ZnS)



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## Submarine Radiation, Chemical, and Biological Detection System

### DiveRAD-ST (Search Tool) Gamma and Neutron

ON BOARD – DiveRAD-ST	
Detector:	2" x 2" Scintillator NaI(Tl) 2" dia Zinc Sulfide (ZnS)
<b>Electronics:</b>	
Pre Amp	
High Voltage	
Microprocessor	
Battery Pack	
Camera – Video and Still Photographs	

DiveRAD™ BASE STATION ELECTRONICS
<b>INCLUDES:</b>
DiveRAD-E Electronics
DiveRAD-E Software
LAPTOP WITH INSTALLED SOFTWARE
<b>ELECTRONICS - DiveRAD-E</b>
Data Downloader
Data Archive and Retrieval – DiveRAD-ST
Video Cable
Power: Rechargeable Battery Pack

### DiveRAD-ST™ Performance with No Shielding ~ Using Co-60 and 2" NaI(Tl) Detector

- 1 Curie Co-60 source is 0.38 Rem/hr at 1 meter (3.8 E5 µRem/hr)
- 2 inch diameter (2 inches thick) NaI(Tl) Detector sensitivity to Co-60 is 900 cpm per µR/hr.
- Typical background at 10 uR/hr induces a count rate of about 9,000 cpm in an unshielded detector.

Co-60 Gamma Detection with DiveRAD-ST (Search Tool)			
	ACTIVITY	DISTANCE	TIME TO DETECT
	1 Ci	1 Meter	1 Sec
	1 Ci	3.5 Meters	1 Min
	1,000 Ci	5 Meters	30 Min

- These calculations are based upon a 2 inch by 2 inch NaI(Tl) detector.
- The 2 x 2 inch NaI(Tl) detector's sensitivity for Gamma emitters from 50 KeV to 1.3 MeV ± 15% for Curies detected.
- The 2" diameter Zinc Sulfide Neutron probe detects a wide energy range of Neutrons. It has been optimized to favor slow Neutron sensitivity. Thermal neutrons are detected by means of the boron n-alpha reaction. Probe delivers approximately 60 cpm per neutron/cm2/second and requires a 900 volt supply. The probe is 8" long x 2" in diameter. It is completely insensitive to gammas in fields below 10R/hr



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### DiveRAD-ST (Search Tool) Gamma and Neutron



## Diverad Series Underwater Explorer



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# Underwater Explorer

## Submarine Radiation, Chemical, and Biological Detection System

### DiveRAD-ST (Search Tool) Gamma and Neutron

#### DiveRAD™ Detector System Includes:

#### The DiveRAD™ Detector System

Includes:

##### The QYSEA Fifish

Remote Submarine Robot

Self-Propelled

Submersible Platform

Video / Still Camera

VR Headset

Motor Control and Video Tether Cable 100 feet

Hard Shell Case for Fifish 6

#### The DiveRAD™ Detector Series

Contollers

Base Station Electronics – DiveRAD-E

Unique Data Collection Software

Cables, Cords and Connectors

Filters: Glass Fiber, Charcoal and Others

Hard Shell Case for DiveRAD™ System

**Optional:** Training



Hard Shell Case for Fifish 6  
and Accessories



Brilliant Pictures (Video and Stills), Link to Laptop – Ground Station,  
Cell Phone via App, Download to Printer



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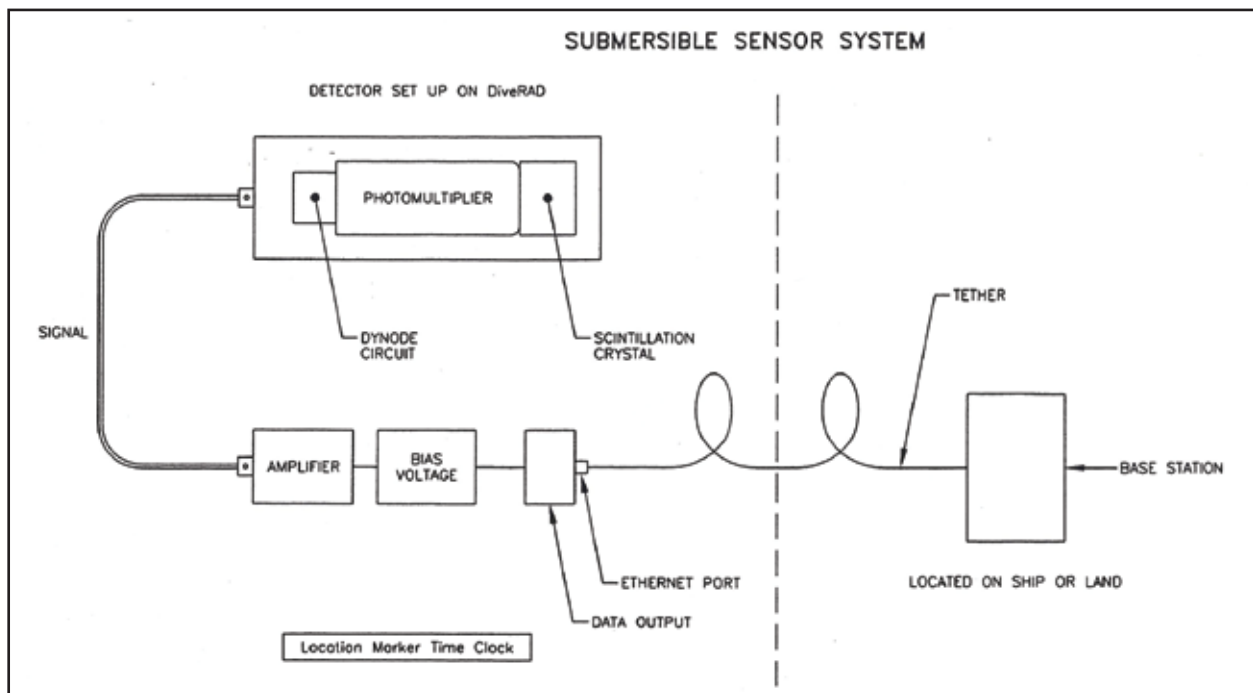
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# Underwater Explorer

## Submarine Radiation, Chemical, and Biological Detection System

### DiveRAD-ST (Search Tool) Gamma and Neutron



DiveRAD-ST Detector Set Up



Patrol Boat Base Station



DiveRAD with Controller and Mounted Cell Phone Video



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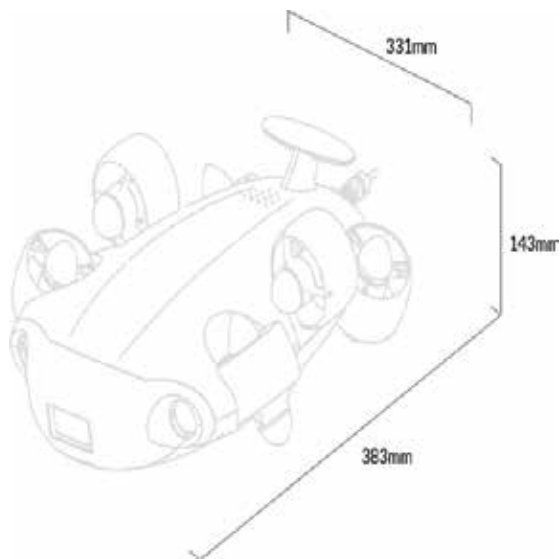
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# Underwater Explorer

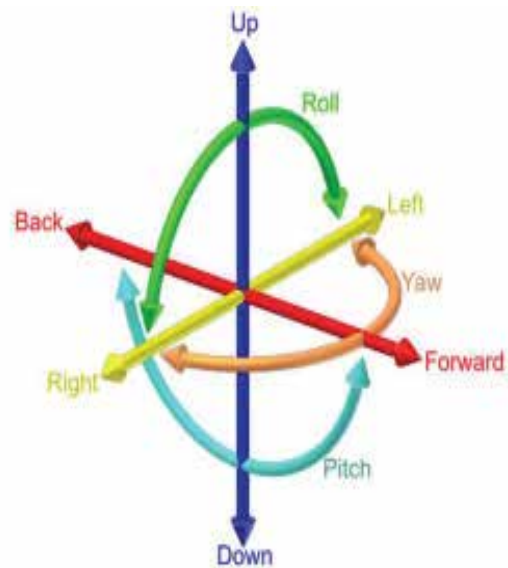
## Submarine Radiation, Chemical, and Biological Detection System

### DiveRAD-ST (Search Tool) Gamma and Neutron

#### QYSEA Robot Submarine



Dimensions



Maneuverability



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## QYSEA Robotic Submarine Specifications

### Design

Omni Directional Robotic Submarine

- Tether – Motor Control and Video
- Tether: Standard 100 feet (328 meters) on Spool
- Breaking Force: 80 kgf
- Posture Lock
- Hovering  $\pm$  1 cm
- Depth Rating: 100 feet (328 meters)
- Thrusters: (6) - (4) Vector (2) Horizontal
- Speed Maximum: 3 knots (still water - 1.5 m/s)
- Temperature: -10°C ~ 60°C (14°F - 140°F)
- Dimensions: 383mm x 331mm x 143mm  
(15 in x 13 in x 5 5/8 in)

### Robotic Submarine Controller

WiFi Supported

- Battery Life: 4 hours
- Data Archive: Micro SD Card Slot
- Input in FAT32 (no greater than 32GB)
- Download in EXFAT (no greater than 64GB)

### Power

Max Dive Time: 4 hours

- Rated Capacity: 9000mAh / 97.2 Wh
- Voltage: 12.6 V
- Charging Time: 1.0 Hour with FIFISH Quick charge
- Battery Type: Li-ion Panasonic 18650
- Charger / AC Adapter

### Camera

1/2.3 SONY CMOS

- Video Tether 100 meters (328 feet)
- Auto / Manual
- Ultra-Wide Angle Lens
- Photo Resolution: 4000 x 3000
- Photo Format: JPEG, DNG
- Video Resolution: 1080P FHD, 720HD
- Stabilization: EIS (Electronic Image Stabilization)
- Internal Storage: 64 GB
- Brightness: 4000 Lumen

### App

- Compatible:
  - iOS 10.0.0 or Later
  - Android 5.0 or later
  - Samsung S7 or later
  - Huawei Mate 9 or later
  - MiMix 2 or later
- Live Streaming: 720P, 25/30fps  
480P, 25/30fps
- Number of Stream Users: Max 2 Receivers



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