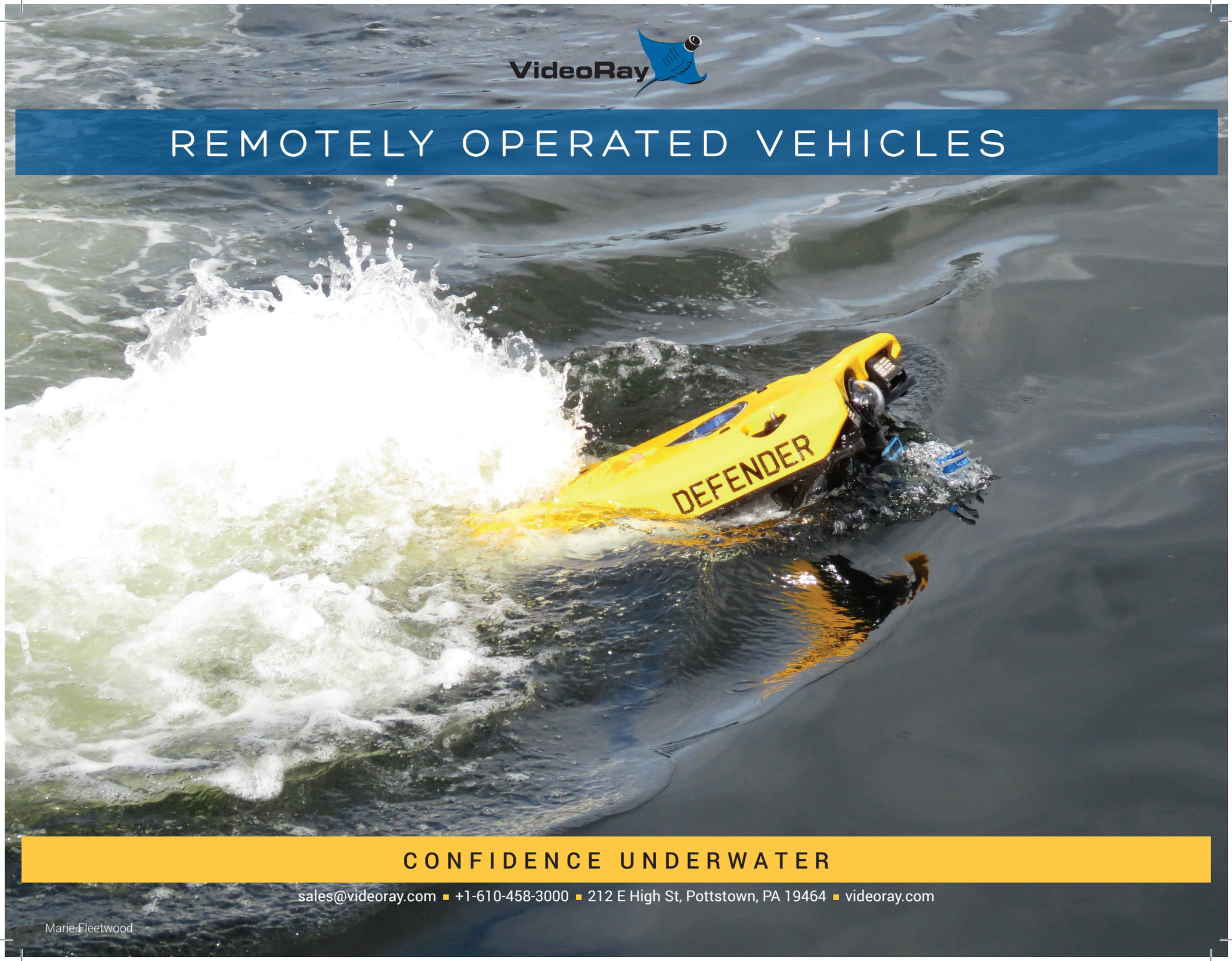

VideoRay
REMOTELY OPERATED VEHICLES
DEFENDER
CONFIDENCE UNDERWATER
sales@videoray.com ▪ +1-610-458-3000 ▪ 212 E High St, Pottstown, PA 19464 ▪ videoray.com
Marie Fleetwood

6 Pro 4 ROVs • 24 hours a day
50,000+ hours of video recorded

Costa Concordia Salvage Project - Isola del Giglio, Italy
Titan Salvage and iROV Underwater Services

Steve van Meter

CONTENT

4 Company Overview
6 Underwater Missions
7 Product Matrix
8 VideoRay Pro 4
10 Mission Specialist Series (MSS)
12 MSS Defender
14 MSS Pro 5
16 Tether
18 Global Network

Marko van Es

Company **OVERVIEW**

Alon Zehngut

ABOUT VIDEORAY LLC

VideoRay is a global leader in Underwater ROV (Remotely Operated Vehicles) technology. Established in 1999, VideoRay has worked with technology and mission partners around the world to develop and prove the ROV a tool for a wide range of applications.

With systems delivered worldwide to a diverse group of organizations for a variety of missions, VideoRays work every day finding and retrieving objects, inspecting infrastructure both inland and offshore, keeping us free from terrorism, and keeping divers safe from hazardous conditions.

We pride ourselves on industry-leading, easily operated and maintained underwater robotic systems and exceptional customer support. We stand by the quality of our products and their ability to transform the way work is performed underwater.

QUALITY POLICY

VideoRay designs, manufactures, and markets Remotely Operated Vehicles to transform the way people work underwater. Positive referrals from customers are key to our growth. By exceeding our quality system requirements and improving through annual objectives, we ensure satisfied customers and our success.

CERTIFIED
ISO9001:2015

Underwater **VISION**

RELIABILITY

In the world of rapidly developing underwater ROV technology, reliability can be a real challenge. An unreliable ROV is a poor investment if you cannot be certain that it will work when you need it most. VideoRay's reliability is well known throughout the industry and one of the many reasons we are the leading Observation ROV manufacturer. Whether you need your ROV every day, or shelve it for months at a time, you can be sure that your **VideoRay will work the way you need it to**, every time.

There are VideoRay ROV systems still in service a decade after delivery. Our ROVs require minimal maintenance, and we promise a quick turnaround when your system does need service. We engineer our systems to withstand a wide range of operational environments for extended periods of time. The nearly indestructible float block, Kevlar-reinforced tether, and CERAKOTE finish protect your ROV, ensuring continued success for years to come.

EASE OF USE

We make our systems and software easy to understand, use, and maintain. With minimal training, operators can quickly become seasoned, confident ROV pilots. Our goal is to have **self-sufficient operators** who can conduct successful missions, even if they experience minor setbacks. The easier an ROV is to understand, the easier it is for you to extend ROV capabilities throughout more of your organization. VideoRay has adopted the concept of modularity in our ROVs that makes it easy for the operator to add or subtract tools as needed.

ROV operators can take advantage of training courses led by VideoRay certified instructors, who teach basic operational skills and maintenance practices. In addition to our comprehensive owner's manual, a multi-part training video is included with every ROV purchased.

PORTABILITY

Portability is an essential element of VideoRay's ROV designs. Whether you are operating in remote areas or tight spaces, the ROV's portability allows you to accomplish your mission in otherwise difficult situations. **True portability is more than just the system's total weight.** Factors such as size, packaging, and power requirements determine how quickly you can deploy your ROV and complete your mission successfully.

The VideoRay ROV's compact size and light weight allow one person to easily transport the entire system by hand, by helicopter (North Sea compliant), in the trunk of a car, or as checked baggage on a commercial airline. Rugged waterproof cases protect the ROV from the roughest handling. Minimal size and power consumption allow the VideoRay ROV to deploy from unlikely places such as crowded docks, small boats, or the back of an automobile. The ideal place for a VideoRay mission? **Wherever you need to go.**

CUSTOMER CARE

The secret behind the VideoRay ROV's success is not just its cutting edge technology or sleek design. **It is the professionals who use them.** VideoRay is committed to providing our customers with the best technology and comprehensive customer support. What sets us apart from our competitors who make similar promises? **We develop our products with you in mind.** We understand not only how our products work, but how you need them to work. We anticipate your needs and work to address problems before they arise.

VideoRay believes that success largely depends on maintaining close customer relationships. Our philosophy is simple: when you are successful using VideoRay, then VideoRay is successful as a company. **Our focus is on your success.**

Underwater **MISSIONS**

Because VideoRay has sold over 3,750 ROV systems while maintaining close customer relationships, we have learned an enormous amount about combining the VideoRay ROV components and accessories into simple base systems and specialized accessory packages tailored to specific needs. The VideoRay ROV is designed for professionals demanding easy-to-use, portable, versatile, and cost-effective technology. Whether you are embarking on a search & rescue mission, inspecting infrastructure beyond divers' reach, conducting a compliance inspection on a submerged asset, or searching for treasures on the ocean floor, there is a VideoRay to help you.

OFFSHORE

Jack-up Rig Inspection
UWILD Inspection
Sea Chest Inspection
Ballast Tank Inspection
Mooring / Riser Inspection
Drill Monitoring

MILITARY

Explosive Ordnance Disposal
Mine Countermeasures
Search & Rescue / Recovery
Port Security Inspections
Ship Hull Inspections
Surveillance & Reconnaissance

FIRST RESPONDERS

Search & Rescue / Recovery
Drowning Victim Recovery
Under Ice Search
Port Security / Harbor Inspections
Evidence Location / Recovery
Diver Monitoring

SCIENCE & RESEARCH

Environmental Monitoring
Hydrographic Assessments
Marine Life Observation
Habitat Observation
University Research
Underwater Archaeology

AQUACULTURE

Net Inspection
Mooring Inspection
Feeding Assessment
Fish Husbandry
Fish Loss Assessment
Mort Removal

INFRASTRUCTURE

Lock & Dam Inspection
Potable Water Tank Inspection
Potable Reservoir Inspection
Bridge Footer Inspection
Culvert Inspection
Port Infrastructure Inspection

SALVAGE

Initial Damage Assessment Report
Rapid Site Survey Assessment
Commercial Diver Observation
Underwater Construction
Quality Control / Diver Safety
Confined Area Inspection

ENERGY

Hydroelectric Dam Inspection
Wind Turbine Installation
Hydro Turbine Inspection & Control
Nuclear Decommissioning Inspection
Wind Turbine Offshore Inspection
Nuclear Turbine & Cooling Pumps

Select the Right **PRODUCT**

	PRO 4	PRO 5	DEFENDER
General			
System Weight	38.5 kgs (85 lbs) without tether	34.8 kg (76.9 lbs)	32.5 kg (71.6 lbs) without tether
Cases	2 watertight + tether	2-3 Watertight + tether	2 watertight + tether
Voltage Input	100-240 VAC	100-240 VAC	90-260 VAC
Power Requirements	600 watts	1 to 2.6 kW	1 to 2.6 kW
with Accessories	800 watts	2,400 watts	2,400 watts
Depth Rating	305m (1,000 ft)	305m (1,000 ft)	400m (1,312ft); 2km (6,561ft) *optional*
Control Console			
Standard Display	15 in.	18 in.	18 in.
Video Signal	Composite	HD digital	HD digital
Extended Display	Analog and digital video out	PC digital out	PC digital out
Second Display	PLUS and IP65 Systems	Option	Option
Computer Included	Integrated computer	Integrated computer	Integrated computer
Video and Stills Capture	Via hand controller	Via hand controller	Via hand controller
Controller	Industrial USB Hand Controller	Industrial USB Hand Controller	Industrial USB Hand Controller
Splash Proof	IP65 Splash proof option	No	No
Video Overlay	Date/Time, Depth, Heading, Custom text, logo	Date/Time, Depth, Heading, Custom text, logo	Date/Time, Depth, Heading, Custom text, logo
Submersible			
Size	37.5 x 29 x 22 cm (14.7 x 11 x 8.7 in)	49.6 x 34.7 x 22.3 cm (19.6 x 14.7 x 8.8 in)	75.16 x 39.37 x 26.67 cm (29.59 x 15.5 x 10.5 in)
Weight	6.1 kgs (13.5 lbs)	10 kg (22 lbs)	17.2 kg (38 lbs)
Cameras			
Standard Camera	Analog	Digital	Digital
Tilt	180° Vertical field-of-view	180° Vertical field-of-view	180° Vertical field-of-view
Resolution	570 lines	HD 1920x1080, 1280x720	HD 1920x1080, 1280x720
Focus	Controllable	Auto focus	Auto focus
Optional Cameras	Ext. GoPro, SD, Zoom and HD	SD, Zoom, Low Light and HD	SD, Zoom, Low Light and HD
HD Option	Option	Standard	Standard
Lighting			
Type/Output	(2) x LED 3,600 lumens/ea	2 independent arrays (flood/spot) 5,760 lumens/ea	2 independent arrays (flood/spot) 5,760 lumens/ea
Propulsion			
Thrusters	2 horiz, 1 vert, lateral (option)	2 vectored horizontal, 1 vertical	4 vectored horizontal, 3 vertical
Horizontal Thrust	10 kg (22 lbs)	20.3 kg (44.7 lbs)	26.7 kg (59 lbs)
Speed	4.2 knots	> 4.4 knots	4.1 knots
Propeller Size	horiz: 90mm vert: 65mm	90mm	90mm
Navigation and Sensors			
Compass	3D-tilt compensated	3 axis IMU (AHRS)	3 axis IMU (AHRS)
Auto Depth	■	■	■
Auto Heading	■	■	■
Autonomous Tools	option	----	option
Accessory Integration	■	■	■
Tether	modular plug & play	modular plug & play	modular plug & play
Support	All VideoRay ROV systems come with free online and phone support.		
Warranty	All VideoRay ROV systems have a standard 2 year warranty		

** Specifications are subject to change. Please see VideoRay's website: www.videoray.com for current specifications*

Pro 4 CONFIGURATIONS

All Pro 4 configurations are portable, reliable, and come with VideoRay's money-back satisfaction guarantee. The Pro 4 has been engineered based on the countless hours our users have spent with VideoRay equipment over the last nineteen years. Rugged coatings, powerful lighting, optimized cameras, and one-button hand controller recording available on all VideoRay Pro 4 models. VideoRay Cockpit™ software provides an easy to use, intuitive interface for your ROV system.

	ULTRA	STANDARD	PLUS	IP65	RACK
Submersible	Type II Anodization	Type II Anodization	Type II Anodization	CERAKOTE	Type II Anodization
Integrated Control Box					
Weight	9.1 kg (20 lb)	13.6 kg (29.9 lb)	17.9 kg (39.6 lb)	18 kg (40 lb)	7.7kg (17 lb)
Main Display	13 in	15 in	15 in	15 in	15 in
Second Display	-	option	15 in	15 in	15 in
Integrated Recording	■	■	■	■	■
Recording Format	stills (.jpg) video (.wmv, .avi)	stills (.jpg) video (.wmv, .avi)	stills (.jpg) video (.wmv, .avi)	stills (.jpg) video (.wmv, .avi)	stills (.jpg) video (.mkv)
Video Out	digital or analog	digital or analog	digital or analog	digital	digital or analog
Standard Hand Controller	Logitech USB Wingman	Industrial USB Controller	Industrial USB Controller	USB IP65 Splash Proof	Industrial USB Controller
Sonar Ready	-	option	■	■	■
Splash Proof	-	option	option	IP65_ Splash Proof	-

VideoRay Cockpit Software

Pro 4 Ultra Integrated Control Box

Pro 4 Standard Base Integrated Control Box

Pro 4 Plus Base Integrated Control Box

Pro 4 IP65 Integrated Control Box

Pro 4 Rack Base Control Unit

Pro 4 OPTIONS

The VideoRay Pro 4 supports more accessories and tools than any other ROV. All VideoRay ROV systems and accessories are modular plug and play - meaning capabilities can be added or subtracted in the field with a simple hardware add-on or a quick software update. Integration of new accessories is easy. Call us for a complete list of Pro 4 accessories.

ACCESSORIES

Autonomous Control & GPS

Auxiliary Camera Systems

Cathodic Protection

GoPro Mounts and Feeds

High Definition with Standard Definition Live Feed & 4k Recording Camera

Hull Crawler

Manipulators (Rotating & Standard)

Lasers

Multibeam Imaging Sonar

Positioning and Navigation Systems

Radiation Sensors

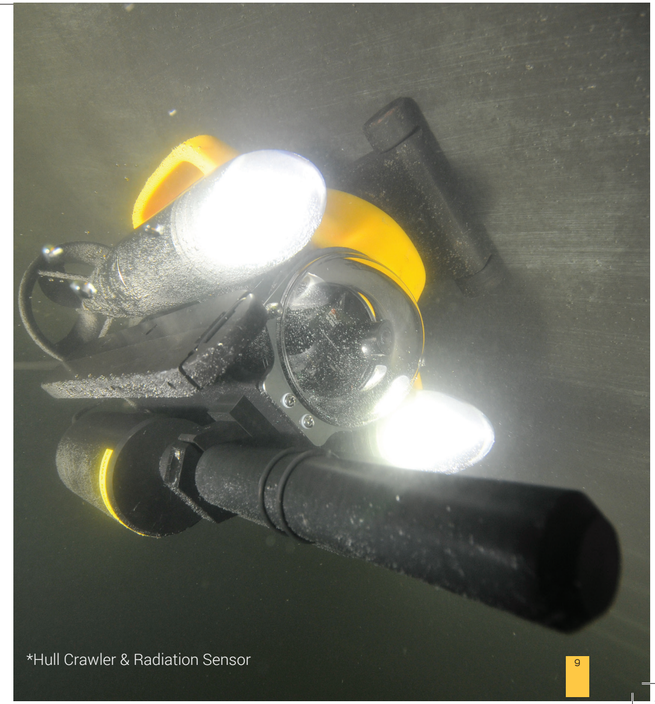
Retrieval Kits

Samplers

Ultrasonic Thickness Gauge

Video Enhancement

Water Quality Sensors



*Hull Crawler & Radiation Sensor

Mission Specialist Series **TECHNOLOGY**

The VideoRay Mission Specialist Series (MSS) vehicles are designed and built with flexibility in mind. Their design begins with the thrusters, cameras, other sensors, and tools that are needed for a typical mission. These are organized in the most efficient manner, keeping current, water visibility, portability, penetration size restrictions, tether length, imaging requirements, and other sensor and tooling requirements in mind. There are very significant advantages to the inherent modularity of every Mission Specialist system, the most significant being ease of maintenance and repair. Since all different configurations use several common modules such as thrusters, these can be stocked easily at your site or a nearby service center. Should your requirements change in the future, the purchase of a new frame will allow you to build a smaller or bigger configuration without buying a new ROV. And, as new modules are developed by vendors throughout the industry you can update your system easily and rapidly.

The VideoRay Defender is built with tougher tasks in mind. A larger system with more power, the Defender can withstand harsher environments with stronger currents. The VideoRay Pro 5 builds on the capabilities of the Pro 4 while adding increased speed and control. When you purchase a VideoRay Professional ROV system, you have the choice of the best sonars, positioning systems, metal thickness gauges, cathodic protection, water quality and radiation measuring devices, and many other underwater tools and sensors.

Marie Fleetwood

Mission Specialist **MODULARITY**

There are very significant advantages to the inherent modularity of every Mission Specialist system. One of the most significant is ease of maintenance and repair. Since all different configurations use several common modules such as thrusters, these can be stocked easily at your site or a nearby service center. Should your requirements change in the future, the purchase of a new frame will allow you to build a smaller or bigger configuration without buying a new ROV. And, as new modules are developed by vendors throughout the industry you can update your system easily and rapidly.

SYSTEM

The "business end" of the MSS ROV system is a variety of simple, modular components that will be configured into the vehicle for your missions. Cameras, lighting, purpose designed frames, hydrodynamic flotations, and tailored propulsion layouts are all important factors to consider in the vehicle's design.

DEPTH RATING
The VideoRay MSS ROV systems are depth rated up to 2 kilometers (6,561 feet).

CAMERAS
Pick a camera to suit your needs - we have HD, SD, low light, dynamic range - the right camera for your mission.

LIGHTING
Super bright LED lighting modules can go anywhere. Toggle between spot and flood for best illumination.

FRAME
Purpose built framework customized to carry your valuable sensor packages.

PROPULSION
Configure our industry leading thrusters into the perfect arrangement for power and precision vehicle control.

TOP-SIDE CONTROL
A hallmark of all VideoRay systems is a powerful and compact surface control console. It provides all power, display, computer, and control equipment in a compact form factor.

TOOLS & SENSORS

The VideoRay MSS ROV System can seamlessly integrate a variety of tooling and sensor packages.

MODULES
State of the art navigation modules relay vehicle attitude and information. AHRS (Attitude, Heading and Reference Systems) - 3-axis Inertial Measurement Unit (IMU) combined with a 3-axis magnetic sensor 3D compass, depth, and more.

SENSORS
Integrate a wide variety of data gathering sensors such as sonar, DVLs, and water parameter sensors.

TOOLING
Get the job done with a variety of intervention tools such as manipulators and NDT (Non-destructive testing) tools.

POSITIONING
Know precisely where your vehicle is at all times, mark targets, and get GPS positions with our navigation and positioning systems.

AUTONOMY
Simplifies and enhances the VideoRay user experience by providing automatic navigation to underwater locations all while following a pre-defined mission regardless of changing currents and rough sea conditions.

Mission Specialist **DEFENDER**

The Defender configuration is designed for greater control of the vehicle position, heavier payloads, and demanding intervention such as rendering unexploded ordinance safe or cleaning nets for offshore fish farms. With a large number of vectored thrusters, the ability of the Mission Specialist to control a large number of thrusters is highlighted in this module. The addition of third party software from Greensea Systems or Seebyte makes the Defender a popular configuration for very demanding applications.

SPECS

Submersible	75.16, 39.37, 26.67 cm (29.59, 15.5, 10.5 in)
Weight	17.2 kg (38 lbs)
Depth	305 m (1,000 ft), 1,000 m (3,280 ft)
Max Speed	4.1 knots
Control Box	Integrated Computer
Weight (sub and panel)	36.7 kg (81 lbs)
Main Display	HD Daylight Viewable Monitor
Recording Format	up to 1920 x 1080, 25 FPS
Communications	Ethernet/RS-485
Hand Controller	Standard

Additional Options
Deep Surface Deployment up to 1,125 m tether length

**The MSS Defender system has been configured for general use applications. If you need specific tools, accessories, or ROV flight characteristics, please contact VideoRay directly at sales@videoray.com or call +1 (610) 458 3000 Option 2.

PAYLOADS

Sonar - Multibeam
- BlueView M Series
- BluePrint 750d
- BluePrint 1200d
- Tritech Gemini ik
- Tritech Gemini is

Sonar - Scanning
- Tritech MicronNav

Rotating Manipulator - 5 Heads
- Parallel Jaw
- V-Jaw
- Sampler Jaw
- Trident Jaw
- Cutter Jaw

Navigation
- USBL
- Navigation Package
  - GPS
  - DVL
  - Software Upgrades

Cavitation Cleaner

Joshua Vela Fonseca

Mission Specialist **PRO 5**

The Pro 5 configuration is designed for speed and efficiency, with a maximum forward speed of over 4.4 knots. The Pro 5 is designed to handle missions with size, space, weight, and deployment speed constraints, such as infrastructure inspections beyond the reach of divers, search & recovery, exploring the sea floor up to 305m, and various others. The Pro 5 builds on the strengths of the Pro 4, with more thrust, longer tether lengths, higher resolution video, and the advantages of VideoRay's MSS modular systems.

SPECS

Submersible	49.6 x 34.7 x 22.3 cm (19.6 x 14.7 x 8.8 in)
Weight	10 kg (22 lbs)
Depth	305 m (1,000 ft)
Max Speed	> 4.4 knots
Control Box	Integrated i7 Computer
Weight (sub and panel)	34.8 kg (76.9 lbs)
Main Display	HD Daylight Viewable Monitor
Recording Format	up to 1920 x 1080, 25 FPS
Communications	Ethernet/RS-485
Hand Controller	Standard

**While the MSS Pro 5 utilizes the same components as the MSS Defender, not all accessories and payloads are interchangeable between systems. If you have any specific questions regarding the payload capacity of the MSS Pro 5, please contact VideoRay directly at sales@videoray.com or call +1 (610) 458 3000 Option 2.

PAYLOADS

Sonar
- BluePrint Oculus 750d
- BluePrint Oculus 1200d

Manipulator
- Dual Axis (Rotating)
- Single Axis (Stationary)

USBL
- SeaTrac USBL
- Micron USBL

Joshua Vela Fonseca

VideoRay TETHER

VideoRay tether is available in three different buoyancies: standard neutrally buoyant tether ideal for working with longer lengths, neutral professional performance tether which is a smaller diameter and optimized for working in currents, and negatively buoyant "sinking" tether, which is used on deep dives and long 'deck' runs. For most operations, any of the neutrally buoyant tethers will suffice. However, VideoRay's tether modularity allows to plug and play different lengths and types of tether customizing a solution right for your mission.

PERFORMANCE

Diameter	9.6 mm (.38 in)
Buoyancy	Neutral
Lengths Available	40 m (130 ft), Custom
Breaking Strength	454 kg (1,000 lb)

NEGATIVE

Diameter	7.62 mm (.3 in)
Buoyancy	Negative
Lengths Available	75 m (250 ft), 152 m (500ft), 305 m (1,000 ft)
Breaking Strength	454 kg (1,000 lb)

NEUTRAL

Diameter	11.7 mm (.46 in)
Buoyancy	Neutral
Lengths Available	75 m (250 ft), 152 m (500 ft), Custom
Breaking Strength	454 kg (1,000 lb)

FIBER

Fiber tether is available for depths over 450m (1,476 ft)

TETHER DEPLOYMENT SYSTEM (TDS)

Tether management cases are designed to store, manually payout, and retrieve your tether while keeping it protected and clean. Both our Standard and Extended TDS cases have a retractable handle and wheels for easy transportation and consist of rugged Pelican 1620 hard cases with custom slip rings, manual winch handles, and 4.5 m (15 ft) leads of tether to the Control Panel.

Standard TDS

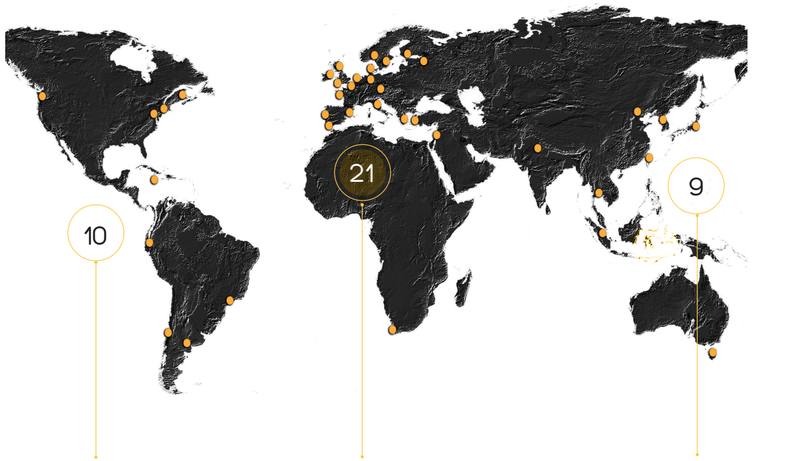
Extended TDS

Neutral Tether

VideoRays are often deployed ahead of or instead of human divers. VideoRay ROVS can keep the diver away from dangerous, unknown situations, providing the diver valuable information, thus significantly reducing cost and enhancing safety.

Steve van Meter

Global NETWORK



Americas

VideoRay Headquarters located in Pottstown, PA.

Full Authorized Service Centers at VideoRay's Worldwide Headquarters in Pennsylvania, Houston, and Chile.

Europe, ME, Africa

More than 20 Dealers throughout Europe, South Africa, and the Middle East.

Full Authorized Service Centers in the UK, Norway, Denmark, France, and the Netherlands.

Pacific Rim

Dealers located in Singapore, Japan, Malaysia, and India.

Full Authorized Service Centers in Australia, Russia, Singapore, Republic of Korea, and Japan.

VideoRay Professionals

VideoRay has established a sprawling global network of Dealers and Partners fully capable of providing the highest quality sales, support, and service. These companies represent the best in class offering of the finest products in underwater technology around the globe with unparalleled knowledge and professionalism.

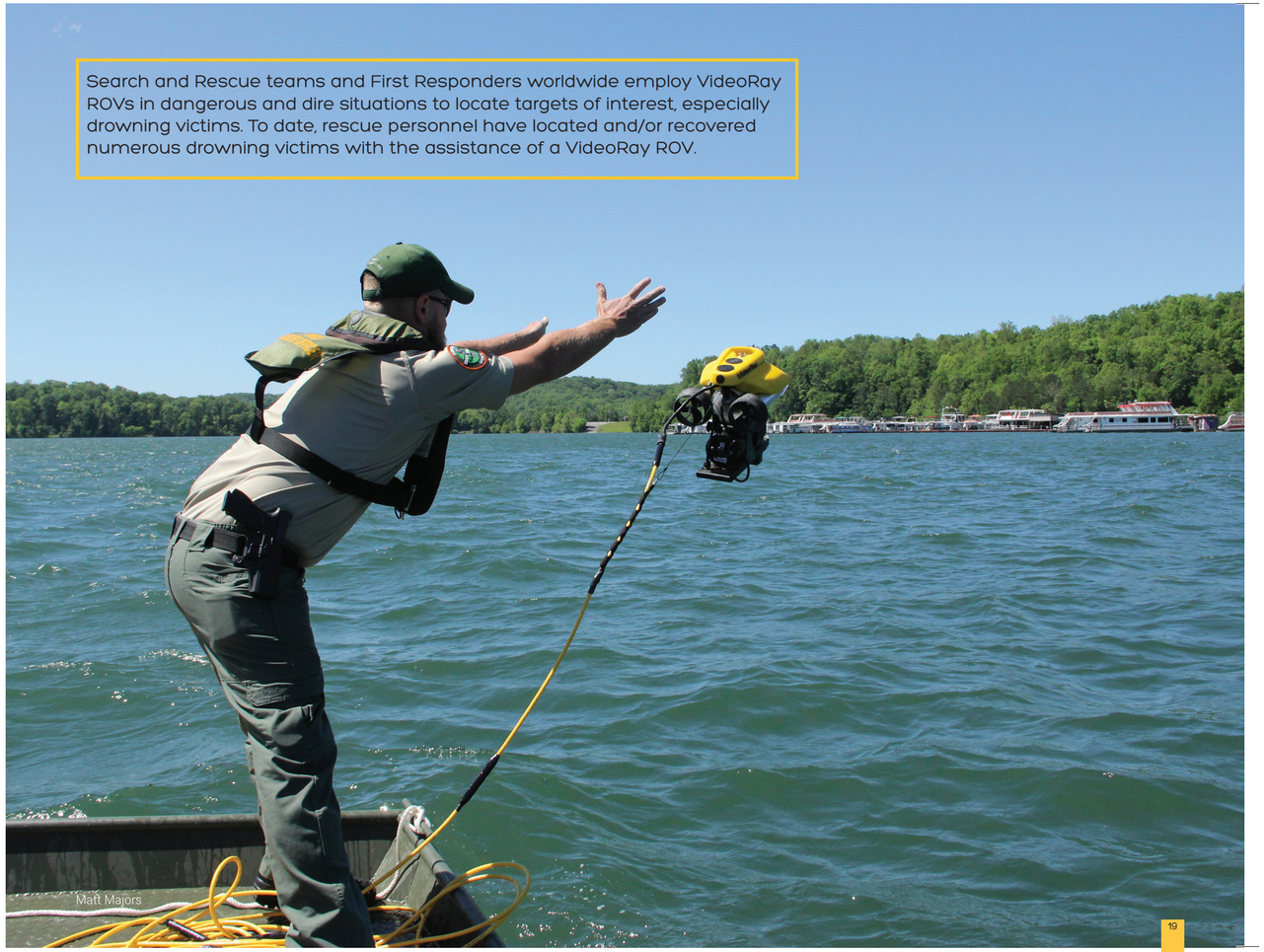
Each VideoRay Dealer:

- Owns the latest VideoRay ROV demonstration equipment
- Performs on-site demonstrations
- Answers any questions about parts, options, and accessories
- Is able to either perform ROV repairs or direct you to the nearest Authorized Service Center
- Maintains the highest level of professionalism

Authorized Service Centers

VideoRay has strategically placed fully Authorized Service Centers (ASCs) throughout the world to accommodate our global clientele. ASCs have been trained to quickly diagnose and repair any issues with your VideoRay ROV. They keep an inventory of parts and spares for quick turnaround in an effort to minimize downtime.

Search and Rescue teams and First Responders worldwide employ VideoRay ROVs in dangerous and dire situations to locate targets of interest, especially drowning victims. To date, rescue personnel have located and/or recovered numerous drowning victims with the assistance of a VideoRay ROV.



VideoRay

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