



Greensea - Blue Ring Collaboration: New User Experience in Underwater Vehicle Operations

Nov 30, 2022 10:14 GMT

Key strategic partnership will bring Virtual Reality and Augmented Reality to real world underwater operations

This release was originally issued on 30th November 2022 by Greensea Systems, Inc. prior to the company being merged into Greensea IQ on 1st September 2023. The content remains relevant and factual.

Greensea Systems Inc. (Greensea) and Blue Ring Imaging (Blue Ring) have announced a new collaboration that is set to open up the floodgates for rapid Augmented Reality (AR) and Virtual Reality (VR) development to enhance Greensea pilot/operator performance in the subsea sector.

The two companies were brought together through mutual involvement in the US Navy's PMS 408 Program of Record (MESR) and an uncomplicated shared desire to improve the man-machine teaming experience. In this case, the end user is the EOD (Explosive Ordnance Disposal) technician, but this collaboration, backboned by Greensea's OPENSEA platform also sets up valuable future developments in the commercial marine and offshore energy sectors. Both companies bring their own expertise to the table: Greensea provides the navigation, autonomy, and command and control and Blue Ring provides an AR/VR visualization app called "OctoView" to provide enhanced situational awareness for UxS operators. It is the Greensea OPENSEA platform that makes all this possible.

OPENSEA is an open architecture platform, allowing external partners like Blue Ring to be confident that any solutions will develop quickly with separate, protected intellectual property. This means that external partners can commit to investing in their own task, industry or vehicle optimized bolt ons to OPENSEA, safe in the knowledge that they will own these bespoke aspects of the solution that they have invested significant amounts of their own company time and money to develop.

St. Petersburg, FL Headquartered Blue Ring Imaging was set up in 2019 to create situational and battlespace awareness products for UxS operators, with a specialization in subsurface and maritime vehicles. Blue Ring sprang out of founder and CEO Casey Sapp's earlier work developing underwater multi lens, 360 3D camera systems for pioneering AR/VR content creators ranging from the military to Hollywood. Blue Ring has two products "OctoView" which is an AR/VR app connected to OPENSEA, and "OctoCam" which is an extensible multi-lens camera which integrates with UxS for enhanced situational awareness. With OctoView the company has patented key nausea mitigation controls, methodologies, and best practices so that any pilot or operator can use a head mounted display (HMD) in outdoor, rugged environments. Blue Ring's OctoView interface serves as a middleware between the operating system on the vehicle and the 3D visualization environment which only AR/VR HMDs can provide.

In short, OctoView allows the remote operation of underwater vehicles to be vastly more intuitive, hence reducing both training time for operators and task completion times for trained and untrained operators alike.

In a whitepaper published by Monterey Bay Aquarium Research Institute in 2021 utilizing Blue Ring's software and hardware, a ROV was piloted by a variety of pilots (both experienced and inexperienced) while manipulator capture tasks using Blue Ring products (OctoCom and OctoView) were timed. Capture times in stereo VR decreased by half, for both rookie and experienced pilots.

Casey Sapp CEO Blue Ring Imaging says: "The majority of the ROVs we have been working with while developing our suite of VR and AR interfaces have run on Greensea's OPENSEA open software and equipment architecture. OPENSEA is very well understood, respected and thoroughly tested in the underwater vehicle industry. Greensea provides the very latest, highest performing and lowest latency technologies to deal with the vehicle navigation and control, allowing us to concentrate on our competency- the abstraction layer that sits on top of it all."

"Of equal weight to this is Greensea's open architecture philosophy- in this regard you could say that Blue Ring and Greensea are cut from the same cloth. The two companies are in complete agreement that only open architecture can allow easy and cost-effective integration of new vehicles, equipment, and devices. This shared vision was a fundamental factor in choosing collaboration with Greensea."

Ben Kinnaman, CEO at Greensea Systems says: "I'm delighted to add Blue Ring Imaging to the list of inspiring industry partners. What they are doing in underwater AR and VR is unique to the industry and set to be game changing. VR will change the face of underwater operations, by lowering the barriers to entry of cost and skill requirement. To better understand, protect and defend our oceans we are going to have to put a lot more vehicles out there than we currently have, and our industry is running out of skilled operators. When force multipliers like Blue Ring's VR and AR interfaces work with a force multiplier like OPENSEA I foresee rapid forward progress toward the goal of getting enough of the vehicles we need doing the subsea jobs we need- faster and at lower cost."

"I founded Greensea with the mission statement to create technologies that

improve the relationship operators have with robots such that their work together could be more productive and efficient. I can think of no technology that puts us closer to that ideal than what Casey and the Blue Ring team are developing.” Kinnaman continues.

Initially the integration project between Greensea and Blue Ring, which has been part funded by the US Government’s SBIR (Small Business Innovation Research) grant program, working to a scope within the PMS 408 framework, will be conducted using a VideoRay Defender ROV optimised to conduct EOD tasks.

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About Greensea Systems

Greensea Systems Inc. was founded in 2006 to design and create a commercially available open architecture software platform to break down siloed technology in the AUV and ROV environment. The resultant open architecture software, OPENSEA® with its central library software suite, is the most powerfully integrated control and navigation technology available in the market today that is easy to use, easy to maintain, robust, and portable.

The company works with leading OEMs throughout the world providing the OPENSEA platform on hundreds of installations to the offshore and military

industries.

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