TripleRing

Ocean Microplastics Monitor

Client
Various

Practice Areas
Smart Medical Devices

Core Disciplines
Software Engineering
Mechanical Engineering
Systems Engineering
Photonics & Imaging
Embedded Systems

Challenge

Environmental researchers needed a field-deployable system capable of accurately detecting and quantifying microplastics in complex aqueous samples — where traditional benchtop instruments were too large, costly, and environmentally sensitive to operate. The system needed to perform reliably in the presence of common interferents including air bubbles, biological materials, sand, and other particulates, requiring robust miniaturization and system integration under strict delivery timelines.

Solution

Triple Ring collaborated with research partners to integrate particle detection and separation technologies into a compact, ruggedized platform capable of supporting field-based environmental monitoring. Engineering efforts focused on miniaturizing complex instrumentation while maintaining detection accuracy across diverse and unpredictable environmental sample conditions. Rapid development processes were implemented to meet strict delivery timelines, and close collaboration with research institutions supported system validation throughout.

Client Impact

- Delivered a portable microplastics monitoring system capable of accurate field-based particle detection and quantification
- Successfully replaced large laboratory instruments with a compact, ruggedized field-deployable platform
- Demonstrated reliable performance across complex real-world environmental samples containing multiple interferents
- Enabled successful demonstrations to research partners and funding organizations, advancing environmental monitoring research initiatives

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