

At-Home Quantitative Diagnostics



Client

BARDA

Practice Areas

TechBio & Life Sciences

Core Disciplines

Software Engineering
Mechanical Engineering
Systems Engineering
Electrical Engineering
Industrial Design
Optical Science
Embedded Systems

Challenge

BARDA needed a low-cost diagnostic platform capable of delivering quantitative, multiplexed biomarker measurements outside traditional laboratory environments – in at-home, point-of-care, and resource-limited settings. The system needed to extend the measurable range of conventional lateral flow immunoassays while integrating complex biological, optical, and electronic subsystems into a compact, manufacturable design accessible enough for broad deployment.

Solution

Triple Ring applied multidisciplinary expertise across biological sciences, engineering, and embedded systems to develop a scalable diagnostic platform capable of quantitative multiplexed lateral flow assay analysis. Biological, electrical, mechanical, and optical subsystems were unified into a compact platform architecture, while embedded software supported real-time quantitative biomarker analysis across multiple test channels. Design optimization throughout targeted low manufacturing cost and scalable production, with platform architecture supporting at-home, point-of-care, and low-resource deployment from the outset.

Client Impact

- Delivered a functional multiplexed diagnostic platform capable of quantifying biomarker concentrations across multiple simultaneous test channels
- Demonstrated extended quantitative measurement range compared to conventional lateral flow assay readers
- Supported deployment across diverse clinical environments including at-home and point-of-care settings
- Enabled ongoing development of a handheld version designed to further expand accessibility in remote and low-resource health-care environments

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