

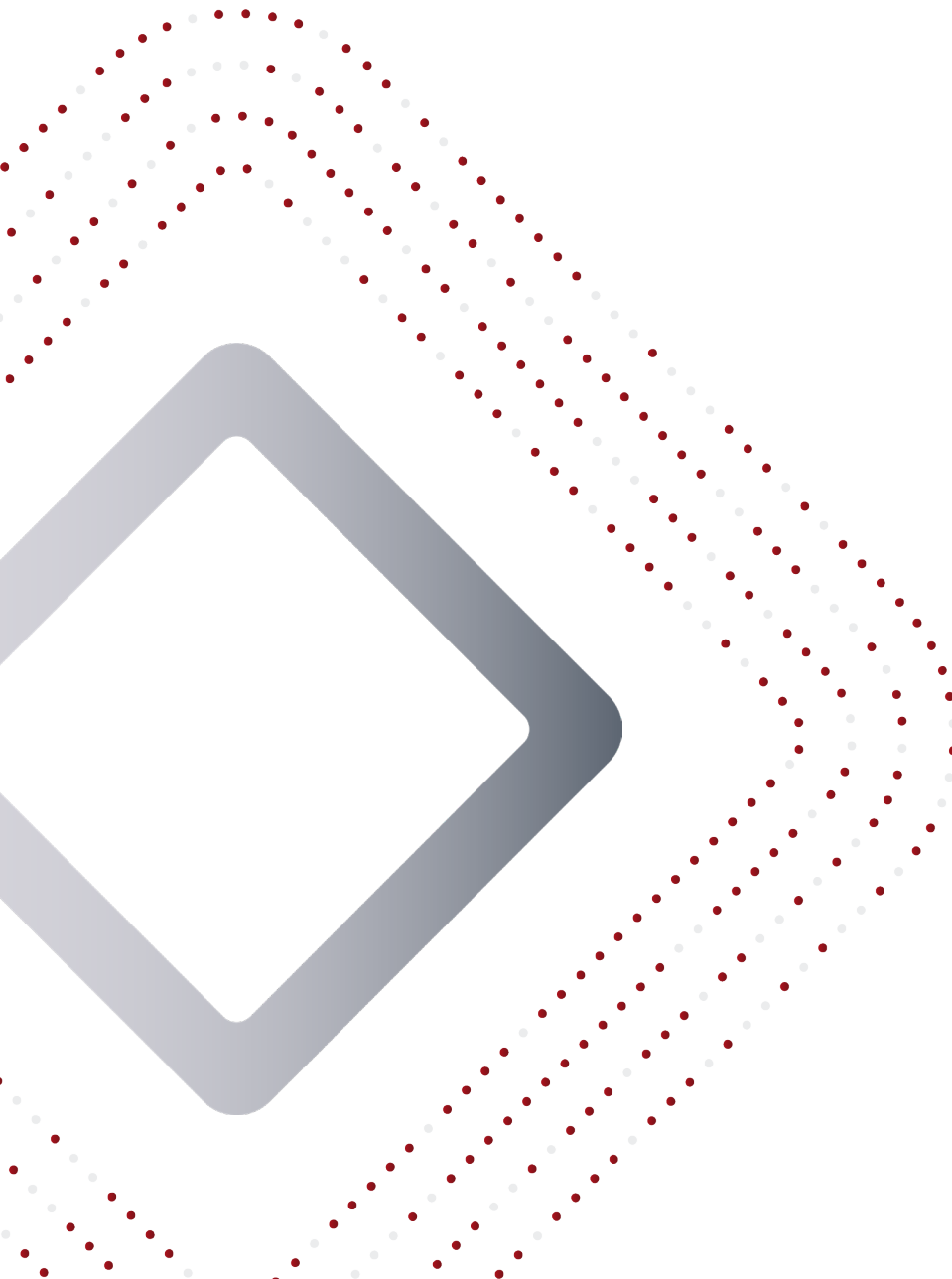


Integrating Hardware Test Engineers Early in the Design Phase

With Insights for

STARTUP PRODUCT ENGINEERING

TECH TALKS™ EBOOKS



About Andrews Cooper

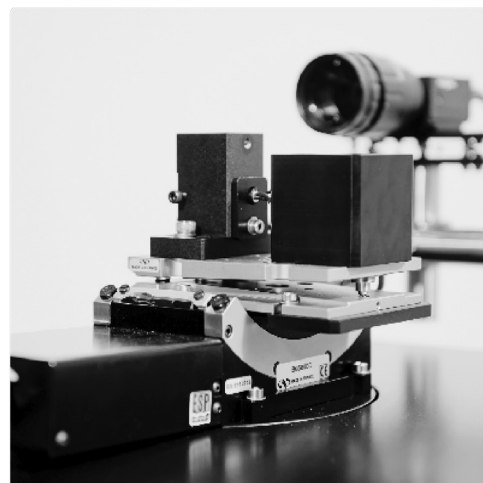
Andrews Cooper (AC) excels at advanced engineering for emerging technologies, specializing in Research & Development, Product Development, Hardware Testing, and Manufacturing Automation. We cater to ambitious, tech-focused companies seeking to innovate and lead their industries. With expertise in multiple engineering disciplines, our engineers function as force multipliers, propelling the development of HardTech solutions. With a focus on rapid development using proven methodologies, we de-risk the development process and integrate validation and testing to ensure high-quality, manufacturable products.

About this eBook

Hardware test engineering is a cornerstone of successful product development. For startups and innovators operating with limited budgets and tight deadlines, integrating testing in your product development (PD) process is crucial.

At Andrews Cooper (AC), our Hardware Test Engineers quickly partner with your design teams from the outset. Through early analysis, we help you select the right components and catch design errors before they become costly setbacks, which lowers development costs by reducing the number of design cycles needed to verify your product's performance and secure investor backing.

If you're developing a new product, this ebook describes how test engineering can derisk your concept, lead to an improved design, and streamline your PD process to save time and budget.



Looking for a snapshot of our testing capabilities? Visit our [Hardware Test page](#).

USING EARLY TEST INTEGRATION TO VALIDATE PROOF OF CONCEPT

Even in the early Proof-of-Concept (PoC) stage, integrating hardware testing can profoundly impact the design process.

By involving Hardware Test Engineers early on, you influence design decisions before physical testing is required. Our engineers can thoroughly analyze your existing design, recommend key improvements, and develop a strategy for targeted tests that focus on critical functions—such as power management, signal integrity, and component interaction.

Consulting with our test engineers during pre-design significantly de-risks your product. Potential design flaws are identified and mitigated before they become costly problems, ensuring core functionality is solid from the start. This proactive approach shortens design cycles, reduces prototyping costs, and saves time—benefits that are especially valuable for venture startups with limited budgets.

Here are three of the many areas where early hardware testing drives better design and improves product development outcomes.

Improving Component Selection

After the PoC stage, component selection is crucial. Hardware testing provides immediate feedback on how different components perform under real-world conditions, helping to inform better choices.

For example, if early testing reveals that a particular sensor struggles with accuracy due to interference, we can recommend alternatives that offer more reliable performance.

This iterative selection process ensures that the final design is built on a foundation of proven, compatible components, reducing the risk of costly redesigns later in the development cycle.



This proactive approach shortens design cycles, reduces prototyping costs, and saves time—benefits that are especially valuable for venture startups with limited budgets.

Creating Efficient Iterative Design

As your design matures, hardware testing escalates to cover more robust performance and reliability metrics. Insights gained from these tests are used to make iterative improvements, fine-tuning the design to enhance its overall performance. This continuous feedback loop helps refine the product concept, ensuring both quality and innovation.

Building Investor Confidence

By integrating hardware testing into your early product development process, we help you efficiently validate your product’s functionality, durability, and pre-compliance with industry standards.

This not only strengthens the design but also builds investor confidence by showcasing the value and viability of your concept through tangible, data-driven results.

USE CASE

Early PoC testing validates a pre-hospital medical device for a venture startup.



Demo of a pre-hospital medical device used to treat traumatic, limb-threatening injuries.

DEVELOPMENT CHALLENGE

A medical device startup gained funding to develop a pre-hospital medical device used to treat traumatic, limb-threatening injuries. It had completed a PoC but needed test engineering support to confirm the viability of overall performance.

TEST SOLUTIONS

AC Hardware Test engineers executed baseline tests, validating the PoC’s expected performance. Integrating with the PD team, they developed additional subsystem testing that revealed that the power draw on the system was lower than expected.

DESIGN IMPACTS

Insights from the device’s efficient power performance led to the selection of smaller and less expensive components, lowering COGs and reducing the form factor. The PoC was validated, and the design was modified, improving manufacturing and budget efficiency. Investor confidence and backing enabled the client to move into the next stage of the MedTech development process.

TESTING TO SOLVE HARDWARE INTERFERENCE ISSUES

It's common for new developers to underestimate the complexity and challenges of hardware interactions—especially in compact devices where components like sensors, processors, and connectivity modules are tightly packed.

AC's Hardware Test Engineering team has extensive expertise in detecting and resolving unwanted interactions between these components. By identifying and resolving issues with electromagnetic compatibility (EMC), signal integrity, and thermal performance, and much more, test engineers can optimize your product's performance and prevent costly rework later in the development process.

Ensuring Correct Component Placement

Preventing conflicts between components is crucial for maintaining signal integrity and reducing electromagnetic disturbances. This directly impacts the design by influencing component placement strategies. These strategies simplify manufacturing processes, reduce the need for shielding, and lower assembly complexity.



"We are not just exceptional test engineers; we are product designers and developers.

It provides us with a unique advantage to identify robust solutions much earlier in the development process."

—Brett Anderson
PROGRAM DIRECTOR
AC AUTOMATION



Increasing Reliability Through Product Life

Addressing hardware issues during testing not only optimizes the design but also ensures long-term reliability of component operation. By eliminating unwanted interference early on, the design is better equipped to maintain consistent performance throughout the product's lifecycle.

Reliability tests include extensive cycle testing to identify and solve any performance issues. Accelerated aging tests are added to understand and estimate the product's end of life, which can lead to improvements in design, packaging, or storage.

USE CASE

Frequency testing solves unwanted interference with AR/VR components for leading gaming technology developer.



DEVELOPMENT CHALLENGE

A leading gaming technology developer discovered performance issues while early in the development of their AR/VR system. They required testing to troubleshoot unexpected interference with their technology's audio components.

TEST SOLUTIONS

AC Hardware Test Engineering investigated their technology's audio interference issues. Investigation of the inertial measurement unit (IMU) led test engineers to conduct 20Hz–20kHz sine sweep frequency response tests to locate the sources of the interference.

DESIGN IMPACTS

Testing revealed the specific frequencies affecting the IMU, leading to design recommendations to insulate the device from those frequencies. The test-driven solution enabled our client's design team to clear their performance roadblock and green-light further development.

Ready to jump-start product success through early hardware testing?



Don't leave hardware testing as an afterthought. By integrating it early, you can streamline development, conserve resources, and ensure your product meets the market as a high-performing, reliable solution.

At Andrews Cooper, our experienced engineers, custom test fixtures, and advanced test labs are ready to support your PD life cycle—whether at your site or ours. With all engineering support under one roof, we ensure seamless communication with and rapid response to your development team. Engage our test team early to secure your product's success and set it up for a smooth market launch!

Regardless of where you are in your product lifecycle, improve your speed to market with AC's engineering teams in [Research & Development](#), [Product Development](#), [Hardware Testing](#), and [Manufacturing Automation](#).



Info@Andrews-Cooper.com

503.565.2000



www.Andrews-Cooper.com



503.256.2000



Info@Andrews-Cooper.com

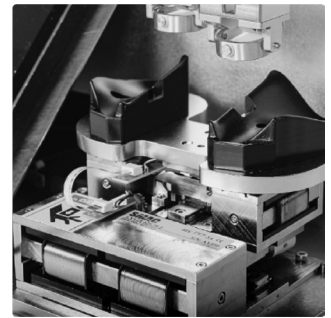


OREGON: McMinnville,
Lake Oswego, Corvallis

WASHINGTON: Bothell



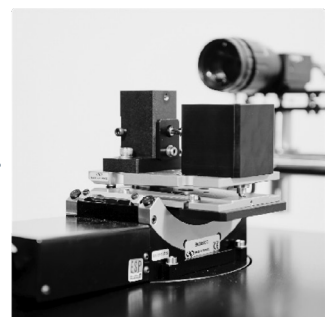
**R&D
Accelerator**




**Product
Development**



**Hardware
Testing**




**Manufacturing
Automation**



**Integrated
Engineering
Teams**



(HW2409VI-EB101)