CASE STUDY

# Validation and Improvement for World's First High-throughput Satellite Terminal

isotropic

**For us, MVG's StarLab offered accuracy at a speed which provided a unique opportunity to accelerate our compliance testing well ahead of schedule. It was simple to characterize relevant components and integrate the measurements in our modelization tool - obtaining better modelization and ultimately a better product.**

**Jeremiah Turpin,** *Chief Technical Officer for Isotropic Systems*

## The challenge

The exponential growth of wireless technology has launched the aerospace industry into a new era. Private companies, many of them start-ups, are taking the lead in what is now pegged the New Space industry to develop the necessary technology required in meeting an increasing need for the fast transfer information. This demand has been driving research and development in satellite technology, in the areas of quality, capabilities and the associated communications systems. Opportunities are ten-fold for start-ups with innovative ideas, such as Isotropic Systems.

Innovator of next-generation integrated satellite terminal technology, Isotropic Systems needed a lab-based testing system to test the performance of its products and fine tune its numerical predictions during the componentry development phase.

Named one of the "*10 hottest companies in satellite*" according to Via Satellite Magazine*, Isotropic Systems turned to the antenna testing expertise of Microwave Vision Group (MVG) which could offer a zero-CAPEX solution for highly-accurate testing and measurement.

Isotropic Systems is a satellite technology start-up, known for the development of the world's first multi-beam high throughput terminal. This terminal is infinitely scalable to precise scanning requirements, while removing the bottleneck created by other technologies, to unlock limitless bandwidth.

Delivering exponential power reduction compared to phased-array antennas for a cost which is 70-95% lower than both conventional phased-array and flat panel technology, Isotropic Systems' revolutionary transformation optics-based technology caught the eye of investment superpower, Boeing HorizonX Ventures, at the beginning of 2019.

## Third-party validation for a new tech start-up

Even with 'world-first' technology which has captured the attention of key defense, maritime, and telecommunications giants amongst others, third-party validation of numerical predictions is crucial for a start-up business proving its capabilities in a rapidly evolving industry landscape, such as in NewSpace.

Reaching new markets is challenging with never-seen-before, unvalidated technological innovation. Isotropic Systems needed access to technology that would enable them to offer investors like Boeing Horizon X Ventures, and of course potential customers, the security of third-party validated measurements to prove the performance and quality of their products, while also ensuring improvements upon numerical modelisations during product development.

Accurate testing of each categorizable antenna component and verification of numerical predictions being integral to the component and eventual product development of its satellite terminals, Isotropic Systems needed to defer the required CAPEX investment during this early stage of the company's development journey, but still reap the rewards of highly accurate testing.

## Our solution

"*The measurement services offered at our antenna testing facility at MVG, Inc. in Georgia enabled MVG to meet Isotropic Systems' needs without them having to commit to a purchase upfront. With their periodic measurement requests, MVG was able to accommodate short intervals whereby their lead engineer could work out of our Georgia facility, using our onsite StarLab technology to produce 3D patterns, and test and characterize each component as required,*" explains Jim Acree, Antenna and Measurement Services Engineer at MVG.

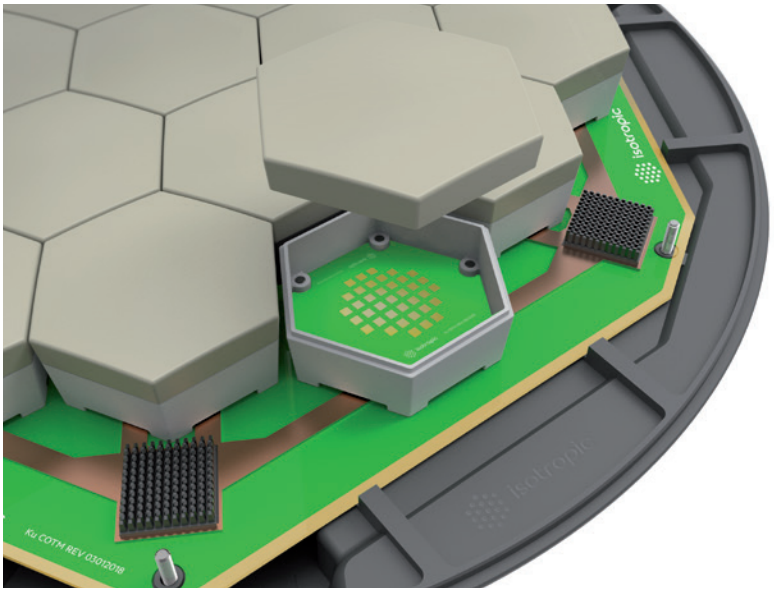
Understanding that time-to-market is crucial for start-up businesses, MVG supported the Isotropics team in completing their testing phase in a timely fashion, fuelling rapid progress in the development of their terminal.

As a solutions-focused manufacturer, this ethos extends to how we work with our customers, not just how we design our measurement systems.

By extending measurement services in our own test facilities to customers, we help solve logistical and investment challenges. They benefit from the use of our infrastructure and assets and state-of-the-art measurement technology, as they gain time and reduce expenses in R&D.

Measurements at the MVG test facility, with the latest StarLab technology, enabled Isotropic Systems to offer potential customers and investors the security of third-party validated measurements that not only proved the performance credential of


*Isotropic Systems named to the list of "10 hottest companies in satellite" by Via Satellite magazine in January 2019.



> Isotropic Systems benefits from the use of our infrastructure and assets and state-of-the-art measurement technology, as they gain time and reduce expenses in R&D."
>
> Jim Acree, *Antenna and Measurement Services Engineer at MVG*

their products, but also led to improvements in the accuracy of their original numerical predictions; getting similar results both ways, the measurement system and electromagnetic models effectively validated each other.

Jeremiah Turpin concludes: "*In the early development stages of such revolutionary products, it has been reassuring to have MVG on our side. With technical experts based in Georgia, we not only had access to StarLab testing technology, but to a wealth of expertise too, enabling us to exchange ideas. MVG produced a number of reports for us, in our own in-house style, and is on-hand with technical advice whenever required; it has been an outstanding addition to our research and development supply chain.*"

## The benefits

Being able to defer the required CAPEX investment but still reap the rewards of highly accurate testing was of enormous benefit to Isotropics in the early stages of their company growth, who were able to offer potential investors and customers the security of third-party validated measurements.

Thanks to the accuracy and speed of the StarLab, they were able to accelerate their compliance testing well ahead of schedule, characterizing relevant components and integrating the measurements into their modelization tool, which ultimately led to the development of a better product.

## Future plans for Isotropic Systems

Focused on expanding the company through strategic hiring of skilled innovators, engineers and sales professionals, Isotropics is dedicated to creating a reliable and lean supply chain and internal workforce.

In turn, this will lead to the development of formal product lines designed to unlock the ever-expanding market opportunities for HTS.

## TEST AND MEASUREMENT SERVICES WITH MVG:

**MVG offers pre-test and certification measurement services for wireless devices, stand-alone antennas, and integrated antennas. Our measurement facilities offer measurement capabilities in antenna, OTA, and SAR/HAC, in addition to advanced post-processing services.**

**We offer more than traditional "black box" measurement services:**

- Full on-site support. No matter where you are, our test engineers can assist you.
- Expertise in antenna and wireless devices measurements and in the measurement systems we develop.
- Choose the equipment that is right for you. Different measurements systems are available according to measurement specifications and the size of the device that needs to be measured.
- Select the results you need. Specific report content or formats are available upon request.

# MVG - Meeting the Testing Challenges of a Fully Connected World

The Microwave Vision Group (MVG) has developed unique expertise in the visualization of electromagnetic waves. These waves are at the heart of our daily lives: smartphones, computers, tablets, cars, trains, planes - these devices and vehicles would not work without them. MVG expertise brings measurement solutions to R&D teams for the characterization of antennas and their performance within these devices, and chamber solutions for EMC testing. MVG innovation remains focused on supplying the world with the most advanced EMF measurement technology to date.

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