

**META**<sup>®</sup>  
Go Beyond.

Annual Report  
2021

# Inspired by Nature



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# Message from the CEO



Fellow Shareholders,

I am delighted to share with you our first annual report since we became the first NASDAQ-listed metamaterials company. When I founded META In 2011, I had a vision for how a new class of materials, called metamaterials, might be used to improve human life. Now, we are pioneering the production of metamaterials at commercial scale. We are poised to bring nanostructured “intelligence” to surfaces, enabling applications that “go beyond” what was previously possible, delivering sustainable performance across a wide range of applications and end markets.

In 2021 our company was transformed, via three acquisitions and significant capital raising, we have expanded our capabilities, intellectual property, facilities, and the size of our multinational team of subject matter experts.

- We [acquired the assets and IP of Swiss lens manufacturer, Interglass, forming the foundation of our ARfusion™](#) platform technology for smart augmented reality eyewear with prescription lenses.
- Via the [RTO of Torchlight Energy Resources](#), we gained access to the NASDAQ, enhancing our ability to raise capital and attract world-class talent.
- The [acquisition of Nanotech Security Corp.](#) accelerated our manufacturing scale up with facilities, equipment, and a highly experienced workforce, opened new verticals in nano-optic security, and strengthened our IP.

**FINANCIAL RESULTS:** META is an early growth stage, platform company, moving toward volume production for applications in multiple end markets. In 2021, total

revenue grew 264%, to \$4.1MM, compared to \$1.1MM in 2021. We expect development programs, including the contract with a confidential G10 central bank, to account for most of our revenue over the next 12 months. META is currently pursuing multi-year, multi-million-dollar contracts with several OEMs. At the end of 2021, cash and cash equivalents totaled \$50.3MM, including \$0.8MM restricted cash and \$2.8MM in short-term investments. We have no debt, except for \$3.2MM in various interest free loans from ACOA (Atlantic Canada Opportunities Agency).

We continue to actively explore and evaluate strategic, organic, and inorganic growth opportunities to broaden our platform, focusing on complementary technologies, expanding the customer base, adding manufacturing capacity, building supplier relationships, and opening new markets. Please visit the [Investors section of our website](#) for our complete financial statements and MD&A.

**FACILITIES EXPANSION:** META is scaling metamaterials application development and production capabilities across all our locations, building out roll-to-roll capabilities like the way newspapers are printed. In Dartmouth, Nova Scotia, we are completing the required renovations to our new 68,000 sq. ft. headquarters, which is expected to be operational in H1:2022. In Thurso, Quebec, we are preparing to double production capacity, expanding from the current 35,000 sq. ft. within the 105,000 sq. ft. building. In Pleasanton, California, we have expanded operations by nearly 4x, to 19,500 sq. ft., and we recently installed our first RML® (rolling mask lithography) NANOWEB® pilot scale, 300mm, roll-to-roll line. In Athens, Greece, we have leased ~15,500 sq. ft. for a new R&D facility; planning for renovations is underway.

## ABOUT META MATERIALS

META delivers previously unachievable performance, across a range of applications, by inventing, designing, developing, and manufacturing sustainable, highly functional materials. Our extensive technology platform enables leading global brands to deliver breakthrough products to their customers in consumer electronics, 5G communications, health and wellness, aerospace, automotive, and clean energy. Our nano-optic technology provides anti-counterfeiting security features for government documents and currencies and authentication for brands. Our achievements have been widely recognized, including being named a Lux Research Innovator of the Year in 2021. Learn more at [www.metamaterial.com](http://www.metamaterial.com).



**INTELLECTUAL PROPERTY:** META currently has 269 active utility and design patent documents, of which 163 patents have issued. In the U.S., we have 37 issued patents and 26 pending applications, and in 24 other countries around the world, we have 126 issued patents and 80 pending applications. META's portfolio comprises 74 patent families, of which 47 include at least one granted patent. Since the Q3 report, seven patents have issued, and 19 new applications were filed in the US, Canada, Europe, China, and Hong Kong. These newly filed applications are directed to designs (3), devices and components (11), fabrication and origination (1), and scaled manufacturing (4).

A perfect example of the promise of metamaterials – to help our customers produce products that do more with less, using sustainable materials and consuming less energy – is our [NANOWEB® 5G Reflector](#), for which META was named a [Lux Research Innovator of the Year](#) in 2021. It is perfectly transparent, yet the invisible metal mesh structures reflect radio waves as efficiently as a solid metal plate. Changing the pattern allows signals to be guided at unusual, design-specific angles. Our solution can aesthetically improve outdoor and indoor network coverage, without requiring power or a network connection, and is faster to deploy than installing additional network hardware.

Our people are a key strength of META, and I feel fortunate to lead such a talented and diverse,

multidisciplinary, and multinational team. As a company, we have 37 spoken languages. As a team, we all speak the same language: to deliver bold innovation, driven by curiosity and guided by sustainability, to improve the world as we execute.

In January, despite the challenges of COVID-19, we exhibited in person, demonstrated our wide range of applications, and presented at two major tradeshow: [CES 2022](#) in Las Vegas, and [SPIE Photonics West 2022](#) in San Francisco. We met with major OEMs across all of our verticals and generated nearly 300 leads.

At META, much of the inventing, designing, developing, and manufacturing of metamaterials is too small to see. As we scale up to reproduce these tiny structures in high volume and at low cost, bringing intelligence to surfaces all around us, I believe the world will see our potential.

We very much appreciate your continued support.

Sincerely,

George Palikaras, Ph.D.,  
President & CEO / Founder

**FORWARD LOOKING INFORMATION**

*This letter includes forward-looking information or statements within the meaning of Canadian securities laws and within the meaning of Section 27A of the Securities Act of 1933, as amended, Section 21E of the Securities Exchange Act of 1934, as amended, and the Private Securities Litigation Reform Act of 1995, regarding the Company, which may include, but are not limited to, statements with respect to the business strategies, product development, expansion plans and operational activities of the Company. Often but not always, forward-looking information can be identified by the use of words such as "pursuing", "potential", "predicts", "projects", "seeks", "plans", "expect", "intends", "anticipates", "believes" or variations (including negative variations) of such words and phrases, or statements that certain actions, events or results "may", "could", "should", "would" or "will" be taken, occur or be achieved. Such statements are based on the current expectations and views of future events of the management of the Company and are based on assumptions and subject to risks and uncertainties. Although the management of the Company believes that the assumptions underlying these statements are reasonable, they may prove to be incorrect. The forward-looking events and circumstances discussed in this release may not occur and could differ materially as a result of known and unknown risk factors and uncertainties affecting the Company, the capabilities of our facilities and the expansion thereof, research and development projects of the Company, the market potential of the products of the Company, the market position of the Company, the scalability of the Company's production ability, capacity for new customer engagements, material selection programs timeframes, the ability to reduce production costs, enhance metamaterials manufacturing capabilities and extend market reach into new applications and industries, the ability to accelerate commercialization plans, the possibility of new customer contracts, the continued engagement of our employees, the technology industry, market strategic and operational activities, and management's ability to manage and to operate the business. More details about these and other risks that may impact the Company's businesses are described under the heading "Forward-Looking Information" and under the heading "Risk Factors" in the Company's Form 10-K filed with the SEC on March 1, 2022, with SEC filing date of March 2, 2022, in the Company's Form 10-Q filed with the SEC on November 15, 2021, and in subsequent filings made by Meta Materials with the SEC, which are available on SEC's website at www.sec.gov. Although the Company has attempted to identify important factors that could cause actual actions, events or results to differ materially from those described in forward-looking statements, there may be other factors that cause actions, events or results to differ from those anticipated, estimated or intended. Accordingly, readers should not place undue reliance on any forward-looking statements or information. No forward-looking statement can be guaranteed. Except as required by applicable securities laws, forward-looking statements speak only as of the date on which they are made and the Company does not undertake any obligation to publicly update or revise any forward-looking statement, whether as a result of new information, future events, or otherwise, except to the extent required by law.*

# Company Overview

# Company Overview

"THE ONLY WAY OF DISCOVERING THE LIMITS OF THE POSSIBLE IS TO VENTURE A LITTLE WAY PAST THEM INTO THE IMPOSSIBLE."

~ ARTHUR C. CLARKE



Throughout 2021, META continued to pioneer the field of metamaterials — the extraordinary new class of functional materials with nanostructure patterns engineered to manipulate light and other forms of energy.

We're focused on creating high-performance materials and surfaces that are smart, scalable, sustainable, and efficient. Driven by a desire to improve the world, our goal is to innovate on the cutting edge, in order to:

**PROTECT** by designing & producing products that deliver levels of safety previously unheard of in transportation, law enforcement, defense, and other industries.

**DETECT** and treat disease through next-generation, non-invasive testing that improves healthcare for patients and providers alike.

**CONNECT** in ways that revolutionize wireless communications by mass-producing our transparent conductive film.

Our technology, products, and platforms are flexible and far-reaching by design. We aren't limited to serving

one industry or solving a single problem. Our platform technologies — Holography, Lithography, Wireless Sensing, and Nano-Optics — have viable and valuable applications in a wide range of industries.

As society trends towards electric vehicles, sustainable energy, personalized healthcare, and smart cities, META's opportunities to participate and lead will continue to grow.

As we mark the end of our 10<sup>th</sup> year as a business, we find ourselves in an exciting and enviable position in the market. We believe META has no direct competitors, we are the only metamaterials company trading on NASDAQ, and we now have the resources, tools, equipment and facilities we need to accelerate product development and scale up production.

We are proud of the accomplishments detailed in this 2021 annual report, and even more passionate about what we are planning for 2022.

# Company Timeline

**2012**

**University Collaborations**  
UNB, UdeM

**2011**

**1<sup>st</sup> Patent Filed**  
Algorithm Developed

**2013**

**New Head Office**  
Dartmouth,  
Nova Scotia, Canada

**IDTechEx**  
Best Manufacturing  
Technology Award  
(for NANOWEB®)

**2015**

**NRC & NSERC Grants**  
MIT Sponsored Business  
Award (for glucoWISE®)

**2017**

**Series A and OEM**  
Key supply and licensing  
partnerships with Boeing,  
Artemis Optical and Covestro

**Partnership**  
with Lockheed Martin

**Aviation Week Laureates**  
Best Aviation Product Award  
(for metaAIR®)

**2014**

**1st Major OEM Deal**  
Airbus Prototype,  
Proof of Platform

**2016**

**Acquisition**  
Acquired Rolith Inc.  
(Pleasanton, CA, USA)  
20 Patent Families

**Begin Human Testing**  
MRI & glucoWISE®

**2018**

**Acquisition**  
Acquired MediWiSe  
(London, UK)  
28 Patent Families

**metaAIR® Global  
Distribution Agreement**  
with SATAIR

**2020**

**Listed to Trade**  
on the CSE

**2019**

**metaAIR®**  
Product launch

**Samsung & Babcock**  
Partnerships

**Global Cleantech 100**  
Award

**2022**

**First**  
NANOWEB® RML®  
300mm roll-to-roll line

**CES**  
Exhibits 5G reflector and  
other technologies

**2021**

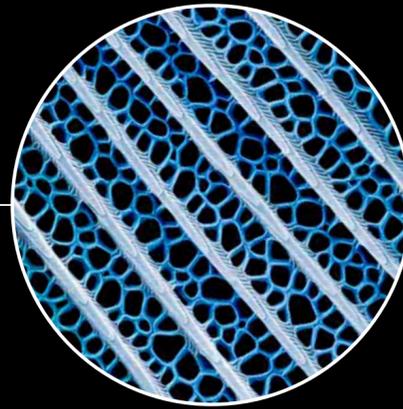
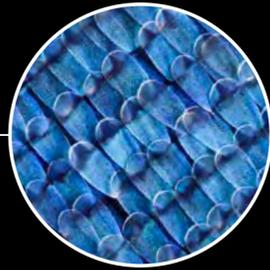
**First**  
metamaterial company  
listed on NASDAQ

**Lux Innovator of the Year**  
Award

**Acquisition**  
Acquired Nanotech  
Security Corp.



# Inspired by Nature



# Inspired by nature.

# Built with science.

Nature is full of wonders. For those of us involved, invested, or simply interested in metamaterials, the Blue Morpho butterfly (*Morpho menelaus*) is among the most remarkable.

It's one of the largest butterflies in the world, and the male's bright blue iridescent wings are eye-catching — but it's what happens at nanoscale on the wing surface that has captured our imagination.

THE SURFACE OF THE BLUE MORPHO'S BLUE WINGS IS A NATURALLY OCCURRING METAMATERIAL.

The Blue Morpho's blue hue is a structural color. The iridescent effect is caused by transparent nano-optic structures that create the bright blue color without pigment. In fact, all butterflies that appear blue, purple, or white have

nanostructures, while more common colors like orange, yellow, brown and black are the product of pigmentation.

The surface of the Blue Morpho's blue wings is a naturally occurring metamaterial.

And while appearing blue or iridescent has limited value in human society, how it happens in nature has inspired human ingenuity with regards to the potential breakthroughs that will be possible with manufactured metamaterials.

By designing nanostructures with precise shapes, geometry, size, orientation, and arrangements, we can manipulate heat, light, radio waves, and other forms of energy to produce practical effects that solve real-world problems.

At META, that means innovating breakthrough technology for aerospace & defense, automotive, clean energy, 5G communications, consumer electronics, health and wellness, banknotes, and brand protection.

Small, elegant solutions — poised to spread their wings and soar.

# Current Status

# From start-up to scale-up.

**M**ETA was founded in 2011, and our first patent was filed that same year. Over the past decade, that first trickle of ideation has grown into a powerful river of innovation, and today we have 163 issued patents and 106 pending patent applications.

Along the way, we've grown our multinational team of subject matter experts, and fostered a culture of positivity, optimism, and diversity. At last count, the META team speaks a combined 37 languages.

Together, we've been developing the tools and acquiring the space we need to scale up product development and manufacturing.

## THAT FIRST TRICKLE OF IDEATION HAS GROWN INTO A POWERFUL RIVER OF INNOVATION

Through our acquisition of Nanotech Security Corp, we added our Thurso, Quebec production facility — a 105,000 sq. ft. building on an 11-acre parcel of land.

We signed a new 10-year lease on our headquarters, the Highfield facility in Dartmouth, Nova Scotia. Now 68,000 sq. ft., it will house our holography and lithography R&D labs, the next phase of our roll-to-roll

processes, and a new 15,000 sq. ft. customer center for training and technology transfer. Eleven state-of-the-art cleanrooms are expected to be operational in Q2 of 2022.

In Pleasanton, California, we expanded operations by nearly four-fold, to 19,500 sq. ft. so the space can accommodate our RML® (rolling mask lithography), NANOWEB® wafer line, our pilot scale roll-to-roll 300mm NANOWEB® production line, and a chemistry lab for biosensor development.

Our first product — metaAIR® laser glare protection eyewear for pilots — is available to the aerospace industry, and we have launched laser glare protection for law enforcement and holoOPTIX™ holographic notch filters.

Our focus in 2022 is on investments in pilot scale manufacturing of our NANOWEB® products, expansion of our production capacity in our banknote and brand security lines and more aggressive design, development, and clinical testing of our array of medical products. These efforts represent an efficient approach to monetizing our intellectual property assets.

As we increase the width of the substrate and the speed of the line in subsequent generations, falling cost per square meter will enlarge our available markets.



# 10

YEARS

# 37

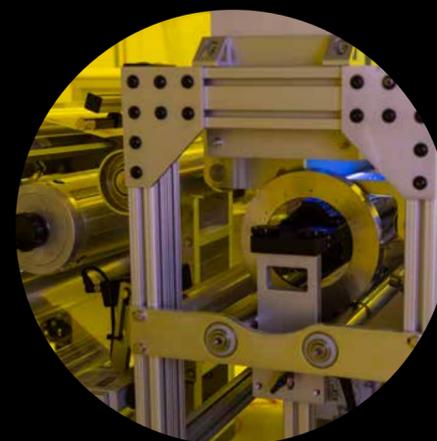
SPOKEN LANGUAGES

# 269

ACTIVE PATENT DOCUMENTS

# Products & Innovations

# A sustainable future, one industry at a time.



With metamaterials, we can transform ordinary surfaces into smart surfaces.

Imagine a clear glass window coated with transparent META film that allows high frequency 5G signals to pass unhindered or a film that reflects and directs signals at design specific angles. Change the pattern on that film and now the window blocks EMI (electromagnetic interference). Change the pattern again and it allows 5G signals to pass while blocking EMI. Power the film and it can keep the surface clear of fog and ice.

The potential applications are all around us. Surfaces that could be made to reflect, redirect, de-ice, or defog. At home, a perfectly transparent microwave door that no longer needs an obstructing metal mesh. On electric vehicles, windshields, windows, headlights, and sensors that stay clear in bad weather, receive 5G signals, and block disruptive EMI.

To say we have a lot of ideas would be an understatement. And while we won't try to cover all of them in this report, these seven examples show how metamaterials are about to change the world.

# NANOWEB®

## TRANSPARENT CONDUCTIVE FILM

[metamaterial.com/nanoweb](http://metamaterial.com/nanoweb)



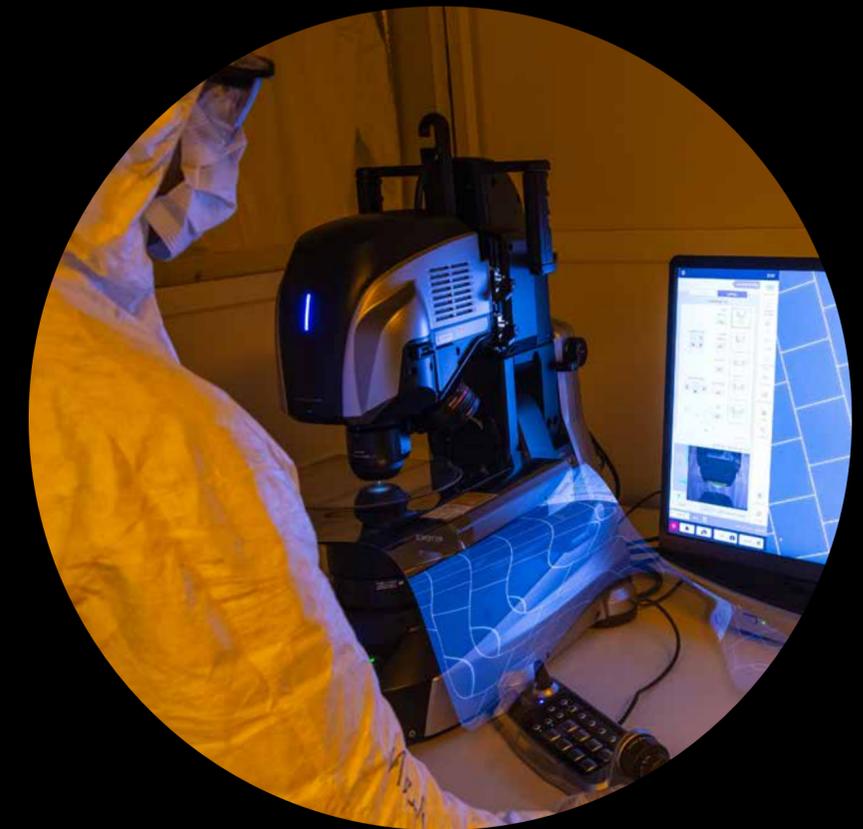
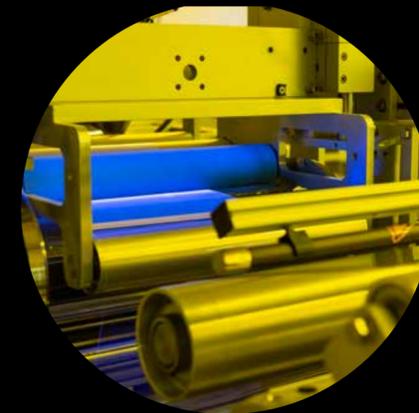
NANOWEB® is a revolutionary and superior alternative to ITO (indium tin oxide), AgNW (silver nanowire), and carbon nanotube coatings commonly used on glass or plastic surfaces like touch screens and solar panels.

META has improved on ITO and ITO-alternatives by creating a film that is low-haze, color-neutral, and more conductive — while remaining invisible to the human eye. NANOWEB® can be fabricated using readily available metals, such as copper or silver, on glass or plastic substrates, and achieves its transparency and high conductivity with the physical geometrical design of its sub-micron mesh.

And because NANOWEB® was developed using META's patented manufacturing technology Rolling Mask Lithography (RML®), it can be produced in large rolls for devices, films, and projects with large surface areas.

Practical applications include:

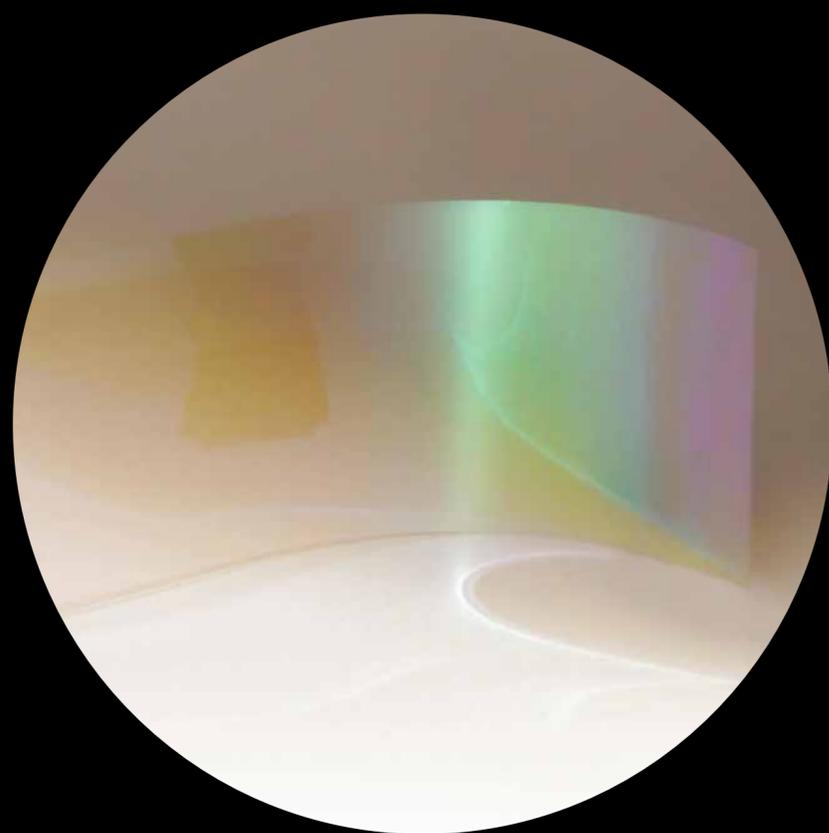
- de-fogging
- de-icing
- sensor protection
- touch screens & consumer electronics
- EMI shielding & antennas
- 5G communications infrastructure
- transparent 5G antennas



# holoOPTIX™

## HOLOGRAPHIC OPTICAL COMPONENTS

[metamaterial.com/holooptix](http://metamaterial.com/holooptix)



META's Holography platform makes it possible to design and fabricate optical components that improve on traditional lenses and mirrors by adding extraordinary optical functions.

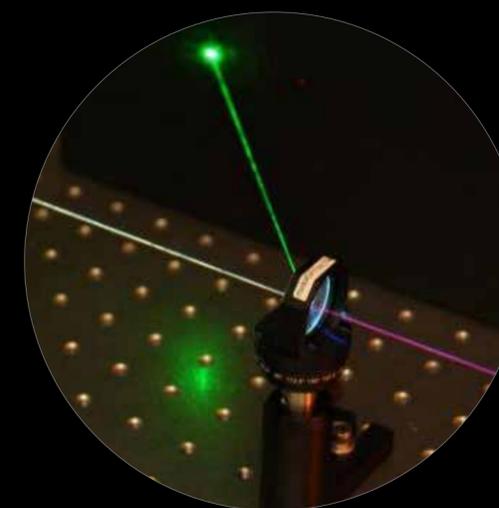
holoOPTIX™ holographic notch filters enhance surfaces like film and glass with wavelength selectivity – the ability to reject a portion of the light spectrum while transmitting all other wavelengths. This is achieved by using a laser to create interference patterns – Volume Holographic Gratings (VHG) – that selectively transmit or reflect.

META currently offers three ranges of holoOPTIX™ filters. holoOPTIX™ FLEX is based on flexible, polymer substrates and can be configured for specific applications. holoOPTIX™ STRATA has an industry-standard 1" diameter form factor. holoOPTIX™ SLANT also has a 1" form factor, and offers unique diffraction characteristics.

Practical applications:

- confocal microscopy
- multi-photon microscopy
- laser-based fluorescence instrumentation
- life science applications

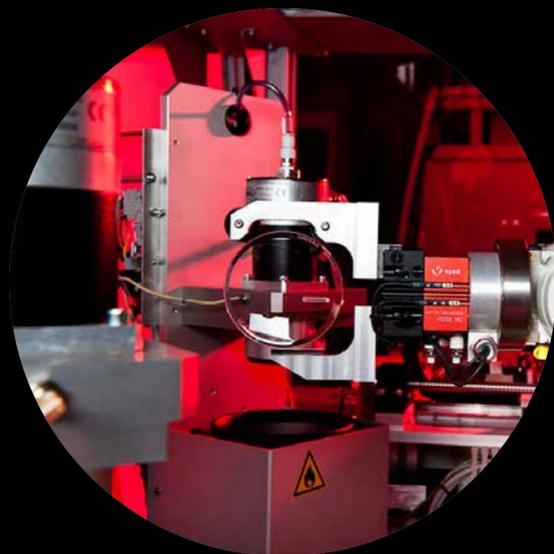
META has additional products in development that utilize its proprietary holography technology. Included in the holoOPTIX™ family of products are holographic optical elements ("HOEs"). HOEs are a core component in the display of augmented reality smart glasses products, as well as (in their larger version) in Heads-Up Displays ("HUDs"), in automobiles and aircraft.



# ARfusion™

## AUGMENTED REALITY EYEWEAR PLATFORM

[metamaterial.com/arfusion](https://metamaterial.com/arfusion)



For augmented reality (AR) glasses to become as widely adopted as smartphones, they will need to be comfortable, affordable, fashionable, and provide support for prescription lenses.

The ARfusion™ platform is a major leap forward for producing this emerging class of consumer goods. By combining precision fabrication tools with functional metamaterials and volume holograms, developers can integrate smart technologies into thin, lightweight prescription lenses capable of high-quality images and a large field of view.

To achieve this, ARfusion™ lens casting offers substantial advantages over traditional freeform surfacing with automatic prescription mold selection, curing under UV light within seconds, temperatures that are safe for holographic films, one-minute production time, far less waste, and zero post-production cleaning or polishing.



# metaAIR<sup>®</sup>

## LASER GLARE PROTECTION FOR PILOTS

meta-air.com

Shining a green laser at an aircraft has the potential to flash-blind pilots, endangering the lives of everyone on board. Even if pilots maintain control, they can suffer permanent and career-ending retinal damage.

To mitigate these risks, metaAIR<sup>®</sup> eyewear offers professional pilots the best combination of transparency, laser glare protection, and color fidelity. Tuned nanostructures allow the lens to control how light is deflected and blocked, so dangerous green lasers are neutralized while the rest of the visible light spectrum is unaffected.

META's use of metamaterials to target a specific wavelength of light is a precise solution that far outperforms competing solutions that introduce new dangers by relying on dyes that absorb an unnecessarily large part of the visible light spectrum.



AVIATION WEEK  
*Laureates*  
2018 Winner Best New Commercial Product

A' DESIGN AWARD  
& COMPETITION

AWARD WINNING DESIGN  
SILVER A' DESIGN AWARD

2019

# glucoWISE®

## NON-INVASIVE GLUCOSE MONITORING

[gluco-wise.com](http://gluco-wise.com)



glucoWISE® (in development) is a non-invasive and pain-free device that will allow people to measure their blood glucose levels any time, anywhere, without discomfort.

The device measures glucose at the capillary level by passing radio wave and optical signals through a thin part of the hand, and receiving the signals via a sensor on the opposite side. The sensors have integrated micro-composite films, which help make the skin transparent to the signals. This makes it possible for blood glucose characteristics to be accurately collected, analyzed, and displayed – regardless of age and skin type.

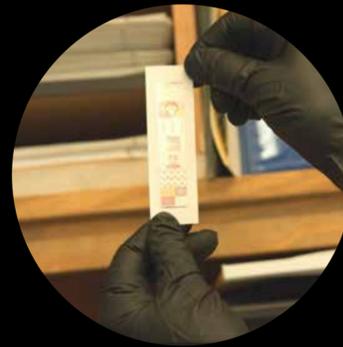
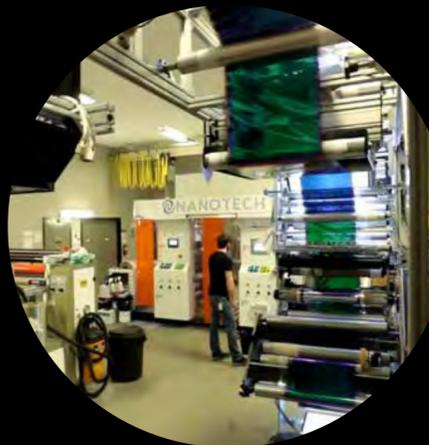
For people with a medical need to perform glucose measurements regularly, glucoWISE® will offer a convenient way to manage conditions like diabetes and avoid sudden hypoglycemic events, without ever puncturing the skin. A table top "home hub" device will be introduced first, followed by a pocket-sized portable (shown here as a rendering), and eventually a wearable version.



# KolourOptik® & LiveOptik™

## NANO-OPTIC SECURITY

[nanosecurity.ca](http://nanosecurity.ca)



With the October 2021 acquisition of Nanotech Security Corp, META added nano-optic solutions for authentication and anti-counterfeiting to its product offering.

KolourOptik® is a technology exclusive to the government secure document and banknote market. It uses sub-wavelength nanostructures and microstructures to create security for advanced banknote security. META is currently developing a currency security feature for a confidential G10 central bank customer under a 5-year frame contract.



LiveOptik™ is a brand security technology that uses nano-optics 1/10 the size of traditional holography to create security features that are easy to authenticate but difficult to replicate. In November 2021, LiveOptik™ earned META a prestigious award for its use of holography to protect tickets to a major international sporting event.

# 5G Communications

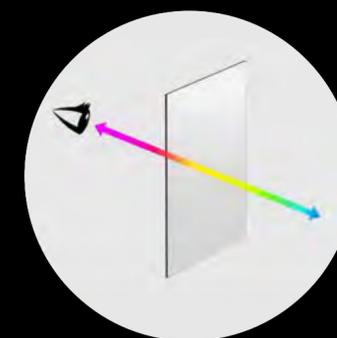
## IMPROVED NETWORK COVERAGE

[metamaterial.com/5g](http://metamaterial.com/5g)

The promise of 5G is that wireless mobile networks will be able to handle more connections, while reducing network latency and improving data rates.

Unfortunately, those high frequency signals are easily blocked or absorbed by obstacles in dense urban environments — even with line of sight. META's solution is to use NANOWEB® transparent conductive film on surfaces to reflect and redirect signals around physical obstacles, and to help signals to penetrate exterior windows and propagate within buildings without spoiling the view.

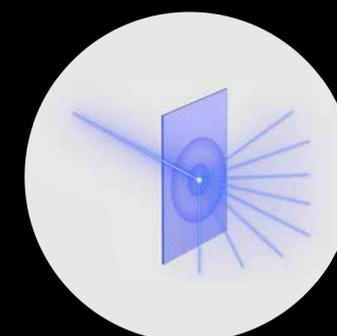
This 5G reflector technology earned META a Lux Research Innovator of the Year Award in 2021, for being sustainable, aesthetically pleasing, and cost-effective compared to hardware solutions.



Visible Light  
Optical Clarity



Microscopic  
Reflectarray  
Antenna Film



Many  
Reflection  
Modes



# Financial Highlights

# Summary Financial Data

CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS		
	2021	2020
<b>Total Revenue</b>	\$ 4,082,517	\$ 1,122,183
<b>Gross Profit</b>	\$ 3,406,544	\$ 1,118,929
Selling & Marketing	2,267,354	1,064,659
General & Administrative	29,699,601	6,707,858
Research & Development	9,497,427	4,102,791
<b>Total Operating Expenses</b>	\$ 41,464,382	\$ 11,875,308
Total Other Income (Exp) <sup>1</sup>	(53,791,486)	(1,048,590)
<b>Loss before income taxes</b>	\$ (91,849,324)	\$ (11,804,969)
Income tax recovery	852,063	193,710
<b>Net Loss</b>	\$ (90,997,261)	\$ (11,611,259)
<b>Net Loss per Share</b>	\$ (0.39)	\$ (0.08)
Weighted Average Shares	232,898,398	137,258,259

<sup>1</sup>Note: 2021 includes a \$40.5MM non-cash loss on financial instruments

BALANCE SHEET HIGHLIGHTS	
	12/31/2021
Cash and cash equivalents	50,310,110
Inventory	265,718
Assets held for sale	73,500,000
<b>Total current assets</b>	\$ 129,379,332
Intangible assets, net	28,971,824
Property, plant and equipment, net	27,018,114
Operating lease right-of-use assets	6,278,547
Goodwill	240,376,634
<b>Total assets</b>	\$ 432,024,451
Trade and other payables	13,335,470
Preferred stock dividends	73,500,000
Other current liabilities	2,803,420
<b>Total current liabilities</b>	\$ 89,638,890
Deferred revenue	637,008
Long-term debt, other	7,040,438
<b>Total non-current liabilities</b>	\$ 7,677,446
<b>Shareholders' equity</b>	\$ 334,708,115

This information should be read in conjunction with the complete financial statements and the associated management discussion and analysis, available on the Investors section of our website at [www.metamaterial.com](http://www.metamaterial.com), as well as on the SEC EDGAR website at [www.sec.gov](http://www.sec.gov)



**META**<sup>®</sup>  
Go Beyond.

