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META MATERIALS INC.

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BUSINESS

On December 14, 2020, Meta Materials Inc. (formerly known as Torchlight Energy Resources, Inc.) (the "Company") and its subsidiaries, Metamaterial Exchangeco Inc. (formerly named 2798832 Ontario Inc., "Canco") and 2798831 Ontario Inc. ("Callco"), both Ontario corporations, entered into an Arrangement Agreement (the "Arrangement Agreement") with Metamaterial Inc., an Ontario corporation headquartered in Nova Scotia, Canada ("Meta" and, together with the Company, Callco and Canco, the "Parties"), to acquire all of the outstanding common shares of Meta by way of a statutory plan of arrangement (the "Arrangement") under the *Business Corporations Act* (Ontario), on and subject to the terms and conditions of the Arrangement Agreement. The description of Meta's business below supplements and should be read in conjunction with the description of the Company's legacy business described in the section entitled "Business" of the Company's Annual Report on Form 10-K for the year ended December 31, 2020, filed with the Securities Exchange Commission (the "SEC") on March 18, 2021 (the "10-K").

Business Description of Meta

Company Overview

Meta was incorporated on August 15, 2011 as Lamda Guard Canada Inc. Meta amended its articles of incorporation on March 27, 2013 and continued operations under the name Metamaterial Technologies Inc from April 30, 2013 through March 5, 2020. On March 28, 2013, Meta incorporated Lamda Guard Inc., Lamda Lux Inc., and Lamda Solar Inc., under the federal laws of Canada, as wholly-owned subsidiaries of Meta. These subsidiaries have minimal operational activity. Meta specializes in designing and producing nanocomposite transparent materials with properties not found in nature that can manipulate light and other forms of energy, either by enhancing, absorbing, reflecting or blocking them.

On September 7, 2015, Meta incorporated Metamaterial Technologies USA Inc. ("MTI USA"), as a wholly-owned subsidiary, and on May 25, 2016, MTI USA acquired the assets and operations of Rolith Inc. On March 31, 2018, Meta acquired 100% of the ordinary shares of a business operating as Medical Wireless Sensing Ltd. ("MediWise"), incorporated in the United Kingdom.

On March 5, 2020, Metamaterial Inc. (formerly known as Continental Precious Minerals Inc. ("CPM") and Metamaterial Technologies Inc. ("MTI") completed a business combination by way of a three-cornered amalgamation pursuant to which MTI amalgamated with Continental Precious Minerals Subco Inc. ("CPM Subco") a wholly-owned subsidiary of CPM to become "Metacontinental Inc.," (such transaction constituting the "RTO"). The RTO was completed pursuant to the terms and conditions of an amalgamation agreement dated August 16, 2019 between CPM, MTI and CPM Subco, as amended March 4, 2020. Following completion of the RTO, Metacontinental Inc. is carrying on the business of the former MTI, as a wholly-owned subsidiary of CPM. In connection with the RTO, CPM changed its name, effective March 2, 2020, from Continental Precious Minerals Inc. to Metamaterial Inc. The common shares of CPM were delisted from the TSX Venture Exchange on March 4, 2020 and were posted for trading on the CSE on March 9, 2020 under the symbol "MMAT".

Description of Business, Operational Overview and Business Objective

Meta has generated a portfolio of intellectual property and is now moving toward commercializing products at a performance and price point combination that has the potential to be disruptive in multiple market verticals. Meta's platform technology includes holography, lithography and medical wireless sensing. The underlying approach that powers all of Meta's platform technologies comprises advanced materials, metamaterials and functional surfaces. These materials include structures that are patterned in ways that manipulate light, heat and electromagnetic waves in unusual ways. Meta's advanced structural design technologies and scalable manufacturing methods provide a path to broad commercial opportunities in aerospace, medical, automotive, energy and other industries.

Controlling light, electricity and heat have played key roles in technological advancements throughout history. Advances in electrical and electromagnetic technologies, wireless communications, lasers, and computers have all been made possible by challenging our understanding of how light and other types of energy naturally behave, and how it is possible to manipulate them.

Over the past 20 years, techniques for producing nanostructures have matured, resulting in a wide range of groundbreaking solutions that can control light and heat at very small scales. Some of the areas of advancement that have contributed to these techniques are photonic crystals, nanolithography, plasmonic phenomena and nanoparticle manipulation. From these advances, a new branch of material science has emerged — metamaterials. Metamaterials are composite structures, consisting of conventional materials such as metals and plastics, that are engineered by Meta scientists to exhibit new or enhanced properties relating to reflection, refraction, diffraction, filtering, conductance and other properties that have the potential for multiple commercial applications.

A metamaterial typically consists of a multitude of structured unit nano-cells that are comprised of multiple individual elements. These are referred to as meta-atoms. The individual elements are usually arranged in periodic patterns that, together, can manipulate light, heat or electromagnetic waves. Development strategies for metamaterials and functional surfaces focus on structures that produce unusual and exotic electromagnetic properties by manipulating light in ways that have never been naturally possible. They gain their properties not as much from their composition as from their exactingly designed structures. The precise shape, geometry, size, orientation, and arrangement of these nanostructures affect the electromagnetic waves of light to create material properties that are not easily achievable with conventional materials.

Meta's platform technology (holography, lithography and medical wireless sensing) is being used to develop potentially transformative and innovative products for: aerospace and defense, automotive, energy, healthcare, consumer electronics, and data transmission. Meta has many product concepts currently in different stages of development with multiple customers in diverse market verticals. Meta's business model is to co-develop innovative products or applications with industry leaders that add value. This approach enables Meta to understand market dynamics and ensure the relevance and need for Meta's products.

Holography Technology

Holography is a technique where collimated visible wavelength lasers are used to directly write an interference pattern inside the volume of light-sensitive material (photopolymer) in order to produce highly transparent optical filters and holographic optical elements. For some product lines that require large surface areas, this is combined with a proprietary scanning technique, where the lasers, optically or mechanically, directly write nano-patterns to cover large surface areas with nanometer accuracy.

Meta's principal products that employ holography technology are its metaAIR® laser glare protection eyewear, metaAIR laser protection films for law enforcement and metaOPTIX notch filters. Meta co-developed its metaAIR laser protection eyewear product with Airbus S.A.S. that has been engineered to provide laser glare protection for pilots, military and law enforcement using Meta's holography technology. metaAIR® is a holographic optical filter developed using nano-patterned designs that block and deflect specific colors or wavelengths of light. Meta launched metaAIR® with strategic and exclusive distribution partner, Satair, a wholly owned Airbus company and started producing and selling metaAIR® in April 2019. The scale-up and specification for the raw photopolymer material used to produce the eyewear was successfully finalized in late 2019 and commercialized in 2020.

Meta launched its laser protection films for law enforcement use in late 2020. These films are designed to be applied to face shields and helmet visors providing the wearer with the same type of laser eye protection afforded to pilots by metaAIR glasses while preserving peripheral vision critical to law enforcement duties. metaOPTIX notch filters are optical filters that selectively reject a portion of the spectrum, while transmitting all other wavelengths. They are used in applications where it is necessary to block light from a laser, as in machine vision applications and in confocal or multi-photon microscopy, laser-based fluorescence instrumentation, or other life science applications. metaOPTIX notch filters were commercially launched by Meta in November 2020.

Meta has additional products in development that utilize its proprietary holography technology. Included in the metaOPTIXTM 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.

Meta operates its holographic division from Dartmouth, Nova Scotia, Canada.

Lithography Technology

In order to meet the performance, fabrication-speed, and/or cost criteria required for many potential applications that require large area and low cost nanopatterning. Meta has developed a new nanolithography method called “Rolling Mask” lithography (registered trademark RML®), which combines the best features of photolithography, soft lithography and roll-to-plate/roll-to-roll printing capability technologies. Rolling Mask lithography utilizes a proprietary UV light exposure method where a master pattern is provided in the form of a cylindrical mask. These master patterns are designed by Meta and over the years they have become part of a growing library of patterns, enriching the intellectual property of Meta. The nanostructured pattern on the mask is then rolled over a flat surface area writing a nano-pattern into the volume of a light-sensitive material (a photoresist), creating patterned grooves, metal is then evaporated and fills the patterned grooves. The excess metal is then removed by a known post-process called lift-off. The result is an invisible conductive metal mesh-patterned surface (registered trademark NanoWeb®) that can be fabricated onto any glass or plastic transparent surface in order to offer high transparency, high conductivity and low haze smart materials.

Meta’s current principal prototype product in lithography technology is its transparent conductive film, NanoWeb®. The lithography division operates out of Meta’s wholly owned U.S. subsidiary, which can produce meter-long samples of NanoWeb®, at a small volumes scale, for industry customers/partners.

There are six NanoWeb®-enabled products and applications that are currently in early stages of development including NanoWeb® for Transparent EMI Shielding, NanoWeb® for 5G signal enhancement, NanoWeb Transparent Antennas, NanoWeb® for Touch Screen Sensors, NanoWeb® for Solar cells and NanoWeb® for Transparent Heating to de-ice and de-fog. Currently these products are in the design and prototyping phase and Meta is performing market trials with potential customers.

Throughout 2020, Meta was ordering and upgrading its equipment at its California facility to efficiently supply NanoWeb samples in larger volumes. Meta has entered into a collaboration agreement with Crossover Solutions Inc. to commercialize the NanoWeb-enabled products and applications for the automotive industry and with ADI Technologies to help secure contracts with the U.S. Department of Defense.

Wireless Sensing Technology

Wireless sensing is the ability to cancel reflections (anti-reflection) from the skin to increase the Signal-to-Noise-Ratio transmitted through body tissue to enable better medical diagnostics. This breakthrough wireless sensing technology is made using proprietary patterned designs, printed on metal-dielectric structures on flexible substrates that act as anti-reflection (impedance-matching) coatings when placed over the human skin in combination with medical diagnostic modalities, such as MRI, ultrasound systems, non-invasive glucometers etc. For example, as a medical imaging application, Meta is developing metaSURFACETM, or RadiWiseTM, an innovation which allows up to 40 times more energy to be transmitted through the human tissue, instead of being reflected. The benefit is increased diagnostic speed and imaging accuracy leading to patient throughput increases for healthcare providers. The metaSURFACETM device consists of proprietary non-ferrous metallic and dielectric layers that are exactingly designed to interact (resonate) with radio waves allowing the waves to “see-through the skin.”

Meta is developing wireless sensing applications from its London, UK office and advancing the wireless sensing technology with Innovate UK grants.

Overall Performance, Industry Trends and Economic Factors

In Q1 2019, Meta completed the setup of its metaAIR® eyewear production facility and started providing its eyewear to several airlines for in-market flight tests through its distributor, Satair (an Airbus Company). Meta sold 50 units during 2019 and it is further increasing its reach to airlines through Airbus and Satair. Satair prepared a series of marketing initiatives to promote Meta’s laser glare protection eyewear solution to increase market awareness in the existing laser glare protection market. During May 2019, Meta received the prestigious Silver A’ Design Award in Safety Clothing and Personal Protective Equipment Design Category, from the A’ Design Award and Competition in Italy for its metaAIR® eyewear.

In January 2019, Meta was named one of the Global Cleantech 100 companies in the world, out of over 13,000 innovators from over 90 countries. Also in January 2019, Meta, Dalhousie University and Mitacs announced a CAD$1,620,000 collaboration to explore different areas of application of metamaterial including absorption enhancement of ultra-thin solar cells, light emission enhancement for LEDs, development of next-generation optics for augmented reality applications and development of a wearable thin-film glucose sensor. This was Mitacs' largest supported project in Atlantic Canada.

In June 2019, Meta's quality management system was awarded ISO 9001: 2015 certificate in the area of design, development, manufacturing, and distribution of metamaterials for applications in Photonics, Transportation, Renewable Energy, Aviation, Space and Defense.

In June 2019, Meta entered into a statement of work ("SOW") with a third party for the purchase of manufacturing equipment. The SOW was initiated based on the Industrial and Regional Benefits, IRB, general investment funding between the third party and the Government of Canada. Meta received the funding of CAD$1,300,000 in two tranches, one in June 2019 and the second in October 2019 and acquired the related equipment in July 2019. The CAD$1,300,000 received under the SOW is repayable based on 10% of the revenue from the sale of holographic film for augmented or virtual reality that is produced using the related manufacturing equipment.

During Q2 2019, the team at Meta's wholly owned U.K. based subsidiary, Mediwise, tested, in a clinical environment, its medical device prototypes that increased the image quality of 1.5T MRI scans.

In August 2019, Meta, through its U.S. wholly owned subsidiary, MTI USA, signed an agreement with SOFWERX, an innovation hub acting as a partnership intermediary for the United States of America Government as represented by United States Special Operation Command to develop NanoWeb® films for de-fogging applications to be applied on wearable equipment such as gas masks and diving masks. During Q4 2019, Meta's designs were reviewed with the SOFWERX team and in Q1 2020 Meta demonstrated a working prototype to SOFWERX resulting in approval to move to the next stage including delivery of 40 samples.

During December 2019, Meta received a purchase order for its second holographic product HOEs from an established consumer electronic industry leader.

During Q4 2019, the engineering team worked on a plan to set up lithographic capabilities in Canada and enhance the lithography fabrication equipment at Meta's facility located in Silicon Valley, California.

During 2019 and throughout 2020, Meta was paid to deliver NanoWeb® proof of concept and product samples to large blue-chip Original Equipment Manufacturers in Japan, Israel, USA, South Korea, Germany, and China. In addition, Meta secured purchase orders and delivered NanoWeb® samples for testing in solar and energy product applications from BDC Capital Inc.

On April 3, 2020, Meta closed a secured debenture financing from BDC Capital Inc., a wholly owned subsidiary of the Business Development Bank of Canada, in the amount of CAD$5,000,000 (the "Secured Debenture Financing"). Additionally, and also on April 3, 2020, Meta received an additional CAD$500,000 in Unsecured Convertible Debentures.

On May 26, 2020, Meta's Chief Financial Officer and Corporate Secretary resigned.

On June 1, 2020, Mark Gosine was appointed Corporate Secretary and Keith Abriel was appointed Interim Chief Financial Officer.

During Q3 of 2020, Meta signed a three-year supply deal with Covestro Deutschland AG, which will provide early access to new photo-sensitive holographic film materials, the building block of Meta's holographic product. This agreement will not only allow early access to Covestro's R&D library of photopolymer films but will also accelerate Meta's product development and speed of innovation. Target markets include photonics/optical filters and holographic optical elements, diffusers, laser eye protection, optical combiners, and AR (augmented reality) applications.

On December 13, 2020, Keith Abriel, Meta's Interim Chief Financial Officer resigned.

On December 14, 2020, Meta announced the hiring of Mr. Kenneth L. Rice Jr. as Chief Financial Officer and Executive Vice President. Mr. Rice replaced Meta's Interim Chief Executive Officer, Keith Abriel and, assuming the Arrangement is completed, he will be named Chief Financial Officer of the Combined Company.

On December 17, 2020, Meta announced the hiring of Dr. Jonathan Waldern as Chief Technical Officer.

Meta also entered into a cooperation framework agreement with Covestro Deutschland AG. Under the agreement, Covestro is obligated to provide EUR 800,000 to Meta in exchange for a license to the Interglass patents and certain support services. This will enable Meta to invest in and expand its capabilities in design, development, and manufacturing of metaFUSIONTM products for smart eyewear in augmented reality and other advanced applications. This highly integrated solution combines embedded metamaterial and functional film elements with precision cast corrective lenses, which are required by over 50% of potential users in the market.

In fourth quarter 2020, Meta entered into a contribution agreement with Atlantic Canada Opportunities Agency ("ACOA" and the "ACOA Contribution"), for funding from the Regional Relief and Recovery Fund ("RRRF"), under ACOA's Regional Economic Growth Through Innovation — Business Scale-up and Productivity stream. The RRRF is part of the Federal government's COVID-19 economic response plan. Pursuant to the contribution agreement, Meta will receive an interest-free loan of up to CAD$390,000, repayable in 36 monthly installments starting April 1, 2023. The amount available to be drawn under the loan is based on eligible expenses incurred by Meta since March 15, 2020.

Also on November 29, 2020, Meta entered into a commitment letter (the "Commitment Letter"), with a shareholder of Meta, pursuant to which the shareholder will provide up to CAD$5,500,000 in debt financing (the "Bridge Loan") to fund Meta's continued operations while Meta works toward completion of the Arrangement with Torchlight. Pursuant to the Commitment Letter, Meta will be able to draw up to CAD$500,000 monthly beginning in November 2020. The Bridge Loan bears interest at the rate of 8% per annum, payable monthly in arrears. The principal amount and any accrued but unpaid interest will be due and payable on the 10th business day after the closing of the Arrangement, or on November 29, 2022 if the Arrangement does not close before that date. To date, Meta has drawn CAD$1,000,000 under the Bridge Loan. At the option of the holder, the Bridge Loan or any portion of the Bridge Loan and accrued but unpaid interest is convertible into Meta Shares at a conversion price of CAD$0.50 per share, subject customary adjustments. Meta may repay the Bridge Loan in whole or in part, without penalty, at any time on or after March 28, 2021.

Research and Product Development; Intellectual Property

Meta has 6 registered trademarks, 58 patents granted in 22 patent families and 44 patents pending. Meta believes that its combination of patents and additional intellectual property that is being held confidential by way of multiple trade secrets provides Meta with an important competitive advantage, marketing benefits, and licensing revenue opportunities. In addition, Meta acquired specialized lens casting production equipment and intellectual property, including more than 70 patents, from Interglass Technology AG (Switzerland).

Covid-19 Impact

During Q1-2020, the COVID-19 outbreak was declared a pandemic by the World Health Organization. This has resulted in governments worldwide enacting emergency measures to combat the spread of the virus. In response to this, Meta's management implemented a Work From Home policy for management and non-engineering employees in all three locations, and further developed additional safety protocols to address the pandemic. Engineering staff in all three locations are continuing to work on given tasks and are following strict safety guidelines. Although Meta's supply chain has slowed down to a degree, Meta is currently able to maintain inventory of long lead items and is working with its suppliers to optimize future supply orders.

COVID-19 has negatively impacted Meta's 2020 sales of metaAIR® laser protection eyewear product as worldwide restrictions on travel are significantly impacting the airline industry and purchasing of metaAIR® eyewear may not be the primary focus of airlines post COVID-19, however, Meta is pursuing sales in adjacent markets including consumer, military and law enforcement. The situation is dynamic and the ultimate duration and magnitude of the impact on the economy and the financial effect on Meta's business is not known at this time.

Meta's scheduled purchase of equipment to upgrade its California lab facility has been delayed due to supply chain issues as a result of COVID-19. This may result in Meta requiring more capital to execute on its business plan.

Transactions With Related Parties

Related party transactions impacting the accompanying consolidated financial statements for the year ended December 31, 2020 are summarized below:

- The Consulting fees includes $176,946 (2019 — $186,982) to directors of Meta related to advisory services provided.
- Technology license fees of $14,602 (2019 — $50,807) to Lamda Guard Technologies Ltd ("LGTL"), a shareholder of Meta, to allow the use of certain patents to Meta as per an exclusive technology license agreement.
- Reimbursement of rent and utilities from LGTL to MediWise of $46,554 (2019 — $41,153) for using a portion of MediWise's premises in the U.K.
- As at December 31, 2020, Meta had a loan balance of $312,528 (December 31, 2019 — $345,033) due to LGTL that is unsecured and repayable in full on demand.

Competition

The lithography and holography materials industries in which Meta operates are subject to rapid change and are characterized by intense competition to develop new technologies and proprietary products. Meta faces potential competition from many different sources, including larger and better-funded companies. While Merta believes that Meta's unique strategy provides it with competitive advantages, Meta has identified several companies which are active in the arena. Not only must Meta compete with other companies that are focused on lithography technology, any products that Meta may commercialize will have to compete with existing technologies and new technologies that may become available in the future.

Employees and Human Capital

As of March 31, 2021, Meta had 51 full-time equivalent employees, 36 of whom were engaged in research and development activities. None of Meta's employees are represented by a labor union or covered under a collective bargaining agreement.

Meta's human capital resources objectives include, as applicable, identifying, recruiting, retaining, incentivizing and integrating Meta's existing and new employees, advisors and consultants. The principal purposes of our equity and cash incentive plans are to attract, retain and reward personnel through the granting of stock-based and cash-based compensation awards, in order to increase stockholder value and the success of Meta by motivating such individuals to perform to the best of their abilities and achieve our objectives.

Facilities

On August 31, 2020, Meta announced it had signed a lease for an approximately 53,000 square foot facility in Nova Scotia, Canada, which will host Meta's holography and lithography research and development labs and the next phase of Meta's volume manufacturing. Meta expects to open the facility in Q2 of 2021, following leasehold improvements. The term of the lease for the new facility is ten years, commencing on January 1, 2021. Commencing in September 2021, Meta will pay monthly basic rent of CAD$28,708 and additional rent for its proportionate share of operating costs and property taxes of CAD$24,910 per month, subject to periodic adjustments. In conjunction with signing the lease, Meta has entered into a loan agreement with the landlord in the amount of CAD$500,000 to fund leasehold improvements. The loan carries an interest rate of 5% per annum and is repayable in equal monthly blended payments of principal and interest over a period of seven years, and as of the date hereof remains available and undrawn. Meta also has research and development facilities in London, England, Pleasanton, California and Dartmouth, Nova Scotia.

Legal Proceedings

As of the date hereof, there are no material legal proceedings, and no contemplated legal proceedings known to be material, to Meta or its expected subsidiaries, to which Meta or its expected subsidiaries is a party or of which any of Meta or its expected subsidiaries' respective property is the subject matter.