LIQUIDMETAL TECHNOLOGIES INC
Form 10-K
March 05, 2019

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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2018
TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from _____ to _____

Commission File No. 001-31332

LIQUIDMETAL TECHNOLOGIES, INC.
(*Exact name of Registrant as specified in its charter*)

Delaware	**33-0264467**
(State or other jurisdiction of incorporation or organization)	*(I.R.S. Employer Identification No.)*

20321 Valencia Circle

Lake Forest, CA 92630
(Address of principal executive offices, zip code)

Registrant's telephone number, including area code: **(949) 635-2100**

Securities registered pursuant to Section 12(b) of the Act: None

Securities registered pursuant to Section 12(g) of the Act:

Title of each Class
Common Stock, $0.001 par value

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer
Accelerated filer Non-accelerated filer Smaller reporting company
Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes No

The aggregate market value of the registrant's common stock held by non-affiliates of the registrant as of June 29, 2018 was approximately $126,921,923. For purposes of this calculation only, (i) shares of common stock are deemed to have a market value of $0.26 per share, the closing price of the common stock as reported on the "OTCQB Venture Marketplace" on June 29, 2018 and (ii) each of the executive officers, directors and persons holding more than 10% of the outstanding common stock as of June 29, 2018 is deemed to be an affiliate. The number of shares of common stock outstanding as of March 1, 2019 was 914,316,624.

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PART I

Forward-Looking Statements

This Annual Report on Form 10-K of Liquidmetal Technologies, Inc. contains “forward-looking statements” that may state our management’s plans, future events, objectives, current expectations, estimates, forecasts, assumptions or projections about the company and its business. Any statement in this report that is not a statement of historical fact is a forward-looking statement, and in some cases, words such as “believes,” “estimates,” “projects,” “expects,” “intends,” “may,” “anticipate,” “plans,” “seeks,” and similar expressions identify forward-looking statements. Forward-looking statements involve risks and uncertainties that could cause actual outcomes and results to differ materially from the anticipated outcomes or results. These statements are not guarantees of future performance, and undue reliance should not be placed on these statements. It is important to note that our actual results could differ materially from what is expressed in our forward-looking statements due to the risk factors described in the section of this report entitled “Risk Factors” (Item 1A of this report) as well as the following risks and uncertainties:

- Our history of operating losses and the uncertainty surrounding our ability to achieve or sustain profitability;
- Our limited history of developing and selling products made from our bulk amorphous alloys;
- Our limited history in licensing our technology to third parties;
- Lengthy customer adoption cycles and unpredictable customer adoption practices;
- Our ability to identify, develop, and commercialize new product applications for our technology;
- Competition from current suppliers of incumbent materials or producers of competing products;
- Our ability to identify, consummate, and/or integrate strategic partnerships;
- The potential for manufacturing problems or delays; and
- Potential difficulties associated with protecting or expanding our intellectual property position.

We undertake no obligation to update publicly any forward-looking statements, whether as a result of new information, future events or otherwise.

Item 1. Business

In this Annual Report on Form 10-K, unless the context indicates otherwise, references to “the Company”, “Liquidmetal Technologies”, “our Company”, “we”, “us”, and similar references refer to Liquidmetal Technologies, Inc. and its subsidiaries.

Overview

We are a materials technology and manufacturing company that develops and commercializes products made from amorphous alloys. Our Liquidmetal® family of alloys consists of a variety of proprietary bulk alloys and composites that utilize the advantages offered by amorphous alloy technology. We design, develop, manufacture, and sell custom products and parts from bulk amorphous alloys to customers in a wide range of industries. We also partner with third-party manufacturers and licensees to develop and commercialize Liquidmetal alloy products.

Amorphous alloys are, in general, unique materials that are distinguished by their ability to retain a random atomic structure when they solidify, in contrast to the crystalline atomic structure that forms in other metals and alloys when they solidify. Liquidmetal alloys are proprietary amorphous alloys that possess a combination of performance, processing, and potential cost advantages that we believe will make them preferable to other materials in a variety of applications. The amorphous atomic structure of bulk alloys enables them to overcome certain performance limitations caused by inherent weaknesses in crystalline atomic structures, thus facilitating performance and processing characteristics superior in many ways to those of their crystalline counterparts. Our alloys and the molding technologies we employ result in parts that exhibit exceptional dimensional control and repeatability that rivals precision machining, excellent corrosion resistance, brilliant surface finish, high strength, high hardness, high elastic limit, alloys that are non-magnetic, and the ability to form complex shapes common to the injection molding of plastics. All of these characteristics are achievable from the molding process, so design engineers do not have to select specific alloys to achieve one or more of the characteristics as is the case with crystalline materials. We believe these advantages could result in Liquidmetal alloys supplanting high-performance alloys, such as titanium and stainless steel, and other incumbent materials in a wide variety of applications. Moreover, we believe these advantages could enable the introduction of entirely new products and applications that are not possible or commercially viable with other materials.

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General Corporate Information

We were originally incorporated in California in 1987, and we reincorporated in Delaware in May 2003. Our principal executive office is located at 20321 Valencia Circle, Lake Forest, California 92630. Our telephone number at that address is (949) 635-2100. Our Internet website address is www.liquidmetal.com and all of our filings with the Securities and Exchange Commission ("SEC") are available free of charge on our website.

Our Technology

The performance, processing, and potential cost advantages of Liquidmetal alloys are a function of their unique atomic structure and their proprietary material composition.

Unique Atomic Structure

The atomic structure of Liquidmetal alloys is the fundamental feature that differentiates them from other alloys and metals. In the molten state, the atomic particles of all alloys and metals have an amorphous atomic structure, which means that the atomic particles appear in a completely random structure with no discernible patterns. However, when non-amorphous alloys and metals are cooled to a solid state, their atoms bond together in a repeating pattern of regular and predictable shapes or crystalline grains. This process is analogous to the way ice forms when water freezes and crystallizes. In non-amorphous metals and alloys, the individual crystalline grains contain naturally occurring structural defects that limit the potential strength and performance characteristics of the material. These defects, known as dislocations, consist of discontinuities or inconsistencies in the patterned atomic structure of each grain. Unlike other alloys and metals, bulk Liquidmetal alloys can retain their amorphous atomic structure throughout the solidification process and therefore do not develop crystalline grains and the associated dislocations. Consequently, bulk Liquidmetal alloys exhibit superior strength and other superior performance characteristics compared to their crystalline counterparts.

Prior to 1993, commercially viable amorphous alloys could be created only in thin forms, such as coatings, films, or ribbons. However, in 1993, researchers at the California Institute of Technology ("Caltech") developed the first commercially viable amorphous alloy in a bulk form. We obtained the exclusive right to commercialize the bulk amorphous alloy through a license agreement with Caltech and have developed the technology to enable the commercialization of bulk amorphous alloys.

Proprietary Material Composition

The constituent elements and percentage composition of Liquidmetal alloys are critical to their ability to solidify into an amorphous atomic structure. We have several different alloy compositions that have different constituent elements in varying percentages. The raw materials that we use in Liquidmetal alloys are readily available and can be purchased from multiple suppliers.

Advantages of Liquidmetal Alloys

Liquidmetal alloys possess a unique combination of performance, processing, and potential cost advantages that we believe makes them superior in many ways to other commercially available materials for a variety of existing and potential future product applications. The unique combined process results of precise dimensional control and repeatability, surface finish, strength, hardness, elasticity, and corrosion resistance are uncommon in crystalline material alternatives. Additionally, the ability to leverage various molding processes and related tooling technologies provides the ability to deliver a broad range of material characteristics in a complex shaped component.

Performance Advantages

Our bulk Liquidmetal alloys provide several distinct performance advantages over other materials, and we believe that these advantages make the alloys desirable in applications that require high precision and repeatability, high yield strength, strength-to-weight ratio, elasticity, corrosion resistance and hardness.

Processing Advantages

The processing of a material generally refers to how a material is shaped, formed, or combined with other materials to create a finished product. Bulk Liquidmetal alloys possess processing characteristics that we believe make them preferable to other materials in a wide variety of applications. In particular, our alloys are amenable to processing options that are similar in many respects to those associated with plastics. Additionally, unlike most metals and alloys, our bulk Liquidmetal alloys are capable of being thermoplastically molded in bulk form. Thermoplastic molding consists of heating a solid piece of material until it is transformed into a moldable state, although at temperatures much lower than the melting temperature, and then introducing it into a mold to form near-to-net shaped products. Accordingly, thermoplastic molding can be beneficial and economical for net-shape fabrication of high-strength products. Liquidmetal alloys also have superior net-shape casting capabilities as compared to high-strength crystalline metals and alloys. “Net-shape casting” is a type of casting that permits the creation of near-to-net shaped products that reduce costly post-cast processing or machining.

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Cost Advantages

Liquidmetal alloys have the potential to provide cost advantages over other high-strength metals and alloys in certain applications. Because bulk Liquidmetal alloys have processing characteristics similar in some respects to plastics, which lend themselves to near-to-net shape molding, Liquidmetal alloys can in many cases be shaped efficiently into intricate, engineered products. This capability can eliminate or reduce certain post-molding steps, such as machining and re-forming, and therefore has the potential to significantly reduce processing costs associated with making parts in high volume.

Our Strategy

The key elements of our strategy include:

- *Focusing Our Marketing Activities on Select Products with Optimized Gross-Margins.* We have focused and continue to focus our marketing activities on select products with optimized gross margins for the long term. This strategy is designed to align our product development initiatives with our processes and cost structure, and to reduce our exposure to more commodity-type product applications that are prone to unpredictable demand and fluctuating pricing. Our focus is primarily on products that possess design features that take advantage of our existing and developing manufacturing technology and that command a price commensurate with the performance advantages of our alloys. In addition, we will continue to engage in prototype manufacturing, both for internally manufactured products and for products that will ultimately be licensed to or manufactured by ourselves and/or third parties.

- *Pursuing Strategic Partnerships in Order to More Rapidly Develop and Commercialize Products*. We have and continue to actively pursue and support strategic partnerships that will enable us to leverage the resources, strength, and technologies of other companies in order to more rapidly develop and commercialize products. These partnerships may include licensing transactions in which we license full commercial rights to our technology in a specific application area, or they may include transactions of a more limited scope in which, for example, we outsource manufacturing activities or grant limited licensing rights. We believe that utilizing such a partnering strategy will enable us to reduce our working capital burden, better fund product development efforts, better understand customer adoption practices, leverage the technical and financial resources of our partners, and more effectively handle product design and process challenges.

- *Advancing the Liquidmetal® Brand*. We believe that building our corporate brand will foster continued adoption of our technology. Our goal is to position Liquidmetal alloys as a superior substitute for materials currently used in a variety of products across a range of industries. Furthermore, we seek to establish Liquidmetal alloys as an enabling technology that will facilitate the creation of a broad range of commercially viable new products. To enhance industry awareness of our company and increase demand for Liquidmetal alloys, we are engaged in various brand development strategies that could include collaborative advertising and promotional campaigns with select customers, industry conference and trade show appearances, public relations, and other means.

Applications for Liquidmetal Alloys

There are a very broad number of markets where Liquidmetal alloys have application opportunities. Some of the more prominent markets include: medical/ dental, automotive, non-consumer electronics, and sporting equipment. We believe that these areas are consistent with our strategy in terms of market size, building brand recognition, and providing an opportunity to develop and refine our processing capabilities. Although we believe that strategic partnership transactions could also create valuable opportunities beyond the parameters of these target markets, we anticipate continuing to pursue these markets both internally and in conjunction with partners.

Medical Devices

We are engaged in product development efforts relating to various medical devices that could be made from bulk Liquidmetal alloys. We believe that the unique properties of bulk Liquidmetal alloys provide a combination of performance and cost benefits that could make them a desirable replacement for incumbent materials, such as machined stainless steel and titanium, or components made from other more traditional metalworking technologies currently used in various medical device applications. Our ongoing emphasis has been on minimally invasive surgical instrument applications for Liquidmetal alloys. These include, but are not limited to, specialized blades, clamps, tissue suturing components, tissue manipulation devices and orthopedic instruments utilized for implant surgery procedures, dental devices, and general surgery devices. The potential value offered by our alloys is higher performance in some cases and cost reduction in others, the latter stemming from the ability of Liquidmetal alloys to be net shape molded into components, thus reducing costs of secondary processing common with other metalworking processes. The status of most components in the prototyping phase is subject to non-disclosure agreements with our customers.

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Automotive Components

We are engaged in product development efforts relating to various automotive components that could be made from bulk Liquidmetal alloys. We believe that the unique properties of bulk Liquidmetal alloys provide the combination of long-lasting surface finish, corrosion resistance, strength, and precision required by most automotive applications. The potential value offered by our alloys is higher performance in some cases and cost reduction in others, the latter stemming from the ability of Liquidmetal alloys to be net shape molded into components, thus reducing costs of secondary processing common with existing processes.

Components for Non-Consumer Electronic Products

We design, develop and produce components for non-consumer electronic devices utilizing our bulk Liquidmetal alloys and believe that our alloys offer enhanced performance and design benefits for these components in certain applications. Our strategic focus is primarily on parts that command a price commensurate with the performance advantages of our alloys. These product categories in the non-consumer electronics field include, but are not limited to, aerospace components, medical devices, sporting goods, leisure products, automotive components and industrial machines. We believe that there are multiple applications and opportunities in the non-consumer electronics product category for us to produce parts that command the higher margin and premium prices consistent with our core business strategy.

We believe that the continued miniaturization of, and the introduction of advanced features to non-consumer electronic devices is a primary driver of growth, market share, and profits in our industry. The high strength-to-weight ratio and elastic limit, along with the processing advantages of bulk Liquidmetal alloys enable the production of smaller, thinner, but stronger electronic parts. We also believe that the strength characteristics of our alloys could facilitate the creation of a new generation of non-consumer electronic devices which currently may not be viable because of strength limitations of conventional metal parts in the marketplace today. Lastly, we believe that our alloys offer style and design flexibility, such as shiny metallic finishes, to accommodate the changing tastes of our customers.

On August 5, 2010, we entered into a license transaction with Apple Inc. (“Apple”) pursuant to which, for a one time license fee, we granted to Apple a perpetual, worldwide, fully-paid, exclusive license to commercialize our intellectual property in the field of “consumer electronic” products, as defined in the license agreement. As a result, we will not pursue application of our bulk Liquidmetal alloys in the consumer electronics field. However, we continue to work with Apple to develop and advance research and development in the amorphous alloy space to benefit both consumer and non-consumer electronics fields. For more information regarding our transaction with Apple, see “ – Licensing Transactions” below.

Sporting Goods and Leisure Products

We are developing a variety of applications for Liquidmetal alloys in the sporting goods and leisure products area.

In the sporting goods industry, we believe that the high strength, hardness, corrosion resistance, and elasticity of our bulk alloys have the potential to enhance performance in a variety of products including, but not limited to, golf clubs, tennis rackets, archery, sporting arms and scuba equipment. We further believe that many sporting goods products are conducive to our strategy of focusing on high-margin products that meet our design criteria.

In the leisure products category, we believe that bulk Liquidmetal alloys can be used to efficiently produce intricately engineered designs with high-quality finishes, such as premium watchcases and knives. We further believe that Liquidmetal technology can be used to make high-quality, high-strength jewelry from precious metals.

Licensing Transactions

Eontec License Agreement

On March 10, 2016, in connection with the 2016 Purchase Agreement, we entered into a Parallel License Agreement (the “License Agreement”) with DongGuan Eontec Co., Ltd., a Hong Kong corporation (“Eontec”) pursuant to which we each agreed to cross-license our respective technologies. The Company’s Chairman and CEO, Professor Lugee Li, is also a major shareholder and Chairman of Eontec.

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The License Agreement provides for the cross-license of certain patents, technical information, and trademarks between us and Eontec. In particular, we granted to Eontec a paid-up, royalty-free, perpetual license to our patents and related technical information to make, have made, use, offer to sell, sell, export and import products in certain geographic areas outside of North America and Europe. In turn, Eontec granted to us a paid-up, royalty-free, perpetual license to Eontec's patents and related technical information to make, have made, use, offer to sell, sell, export and import products in certain geographic areas outside of specified countries in Asia. The license granted by us to Eontec is exclusive (including to the exclusion of us) in the countries of Brunei, Cambodia, China (P.R.C and R.O.C.), East Timor, Indonesia, Japan, Laos, Malaysia, Myanmar, Philippines, Singapore, South Korea, Thailand and Vietnam. The license granted by Eontec to us is exclusive (including to the exclusion of Eontec) in North America and Europe. The cross-licenses are non-exclusive in geographic areas outside of the foregoing exclusive territories.

Beyond the License Agreement, we collaborate with Eontec to accelerate the commercialization of amorphous alloy technology. This includes but is not limited to developing technologies to reduce the cost of amorphous alloys, working on die cast machine technology platforms to pursue broader markets, sharing knowledge to broaden our intellectual property portfolio, and utilizing Eontec's volume production capabilities as a third party contract manufacturer.

Apple License Transaction

On August 5, 2010, we entered into a license transaction with Apple Inc. ("Apple") pursuant to which (i) we contributed substantially all of our intellectual property assets to a newly organized special-purpose, wholly-owned subsidiary, called Crucible Intellectual Property, LLC ("CIP"), (ii) CIP granted to Apple a perpetual, worldwide, fully-paid, exclusive license to commercialize such intellectual property in the field of consumer electronic products, as defined in the license agreement, in exchange for a license fee, and (iii) CIP granted back to us a perpetual, worldwide, fully-paid, exclusive license to commercialize such intellectual property in all other fields of use.

Under the agreements relating to the license transaction with Apple, we were obligated to contribute, to CIP, all intellectual property developed through February 2016. We are also obligated to maintain certain limited liability company formalities with respect to CIP at all times after the closing of the license transaction.

Visser Precision Cast, LLC License Transaction

On June 1, 2012, we entered into a Master Transaction Agreement (the "Visser MTA") with Visser Precision Cast, LLC ("Visser") relating to a strategic transaction for manufacturing services and financing. On May 20, 2014, we and Visser entered into a settlement agreement significantly amending the Visser MTA, whereby we granted to Visser a fully paid-up, royalty-free, irrevocable, perpetual, worldwide, non-transferable, nonexclusive sublicense to all of our

intellectual property developed on or prior to May 20, 2014 (the "Effective Date"). Visser does not have any rights, now or in the future, to our intellectual property developed after the Effective Date. The license to our intellectual property developed on or prior to the Effective Date does not include the right to use the "Liquidmetal" trademark or any of our other trademarks, except in certain defined situations, as set forth in the amended and restated agreement.

In addition, the settlement amended and restated the two warrants we issued to Visser in June 2012 to purchase 15,000,000 shares of our common stock at an exercise price of $0.22 per share. The amended and restated warrant agreement includes the effect of anti-dilution adjustments and is exercisable for 21,317,094 shares at an exercise price $0.16 per share under the anti-dilution provisions of the warrants. On March 22, 2017 Visser exercised, on a cashless basis, all 21,317,094 warrants, resulting in the issuance of 4,241,386 shares of our common stock. Upon exercise, we reclassified $975,000 of the associated warrant liability to permanent equity, with $4,000 being allocated to common stock and $971,000 to additional paid in capital. (see Note 11 in the accompanying footnotes to the consolidated financial statements).

Other License Transactions

On January 31, 2012, the Company entered into a Supply and License Agreement for a five year term with Engel Austria Gmbh ("Engel") whereby Engel was granted a non-exclusive license to manufacture and sell injection molding machines to the Company's licensees. Since that time, the Company and Engel have agreed on an injection molding machine configuration that can be commercially supplied and supported by Engel. On December 6, 2013, the companies entered into an Exclusivity Agreement for a ten year term whereby the Company agreed, with certain exceptions and limitations, that the Company and its licensees would purchase amorphous alloy injection molding machines exclusively from Engel, and this exclusivity right was granted in exchange for certain royalties to be paid by Engel to the Company based on a percentage of the net sales price of such injection molding machines.

The Company's Liquidmetal Golf subsidiary has the exclusive right and license to utilize the Company's Liquidmetal alloy technology for purposes of golf equipment applications. This right and license is set forth in an intercompany license agreement between Liquidmetal Technologies and Liquidmetal Golf. This license agreement provides that Liquidmetal Golf has a perpetual and exclusive license to use Liquidmetal alloy technology for the purpose of manufacturing, marketing, and selling golf club components and other products used in the sport of golf. The Company owns 79% of the outstanding common stock in Liquidmetal Golf.

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In June 2003, the Company entered into an exclusive license agreement with LLPG, Inc. (“LLPG”). Under the terms of the agreement, LLPG has the exclusive right to commercialize Liquidmetal alloys, particularly precious-metal based compositions, in jewelry and high-end luxury product markets. The Company, in turn, will receive royalty payments over the life of the contract on all Liquidmetal products produced and sold by LLPG. The exclusive license agreement with LLPG expires on December 31, 2021.

In March 2009, the Company entered into a license agreement with Swatch Group, Ltd. (“Swatch”) under which Swatch was granted a non-exclusive license to the Company’s technology to produce and market watches and certain other luxury products. In March 2011, this license agreement was amended to grant Swatch exclusive rights as to watches and all third parties (including the Company), but non-exclusive as to Apple, and the Company’s license agreement with LLPG was simultaneously amended to exclude watches from LLPG’s rights. The Company will receive royalty payments over the life of the contract on all Liquidmetal products produced and sold by Swatch. The license agreement with Swatch will expire on the expiration date of the last licensed patent.

Our Intellectual Property

Our intellectual property consists of patents, trade secrets, know-how, and trademarks. Protection of our intellectual property is a strategic priority for our business, and we intend to vigorously protect our patents and other intellectual property. Our intellectual property portfolio includes more than 20 owned or licensed U.S. patents relating to the composition, processing, and application of our alloys, as well as more than 40 foreign counterpart patents and patent applications.

Our initial bulk amorphous alloy technology was developed by researchers at the California Institute of Technology (“Caltech”). We have acquired patent rights that provide us with the exclusive right to commercialize the amorphous alloys and other amorphous alloy technology developed at Caltech through a license agreement (“Caltech License Agreement”) with Caltech. In addition to the patents and patent applications that we license from Caltech, we are building a portfolio of our own patents to expand and enhance our technology position. These patents and patent applications primarily relate to various applications of our bulk amorphous alloys and the processing of our alloys. The patents expire on various dates between 2019 and 2036. Our policy is to seek patent protection for all technology, inventions, and improvements that are of commercial importance to the development of our business, except to the extent that we believe it is advisable to maintain such technology or invention as a trade secret.

In order to protect the confidentiality of our technology, including trade secrets, know-how, and other proprietary technical and business information, we require that all of our employees, consultants, advisors and collaborators enter into confidentiality agreements that prohibit the use or disclosure of information that is deemed confidential. The agreements also obligate our employees, consultants, advisors and collaborators to assign to us developments, discoveries and inventions made by such persons in connection with their work with us.

Research and Development

We are engaged in ongoing research and development programs that are driven by the following key objectives:

- *Enhance Material Processing and Manufacturing Efficiencies.* We are working with our strategic partners to enhance material processing and manufacturing efficiencies. We plan to continue research and development of processes and compositions that will decrease our cost of making products from Liquidmetal alloys.

- *Optimize Existing Alloys and Develop New Compositions.* We believe that one of the key technology drivers of our business will continue to be our proprietary alloy compositions. We plan to continue research and development on new alloy compositions to reduce the cost of our proprietary alloy compositions, as well as to generate a broader class of amorphous alloys with a wider range of specialized performance characteristics. We believe that our ability to optimize our existing alloy compositions, and reduce their costs, will enable us to better tailor our alloys to our customers' specific application requirements. Current efforts also include collaboration with Eontec, under the terms of the License Agreement, in developing alternative, low-cost, alloy compositions.

- *Develop New Applications.* We will continue the research and development of new applications for Liquidmetal alloys. We believe the range of potential applications will broaden as we expand the forms, compositions, and methods of processing of our alloys.

We conduct our research and development programs internally, as well as through strategic relationships with third parties. Currently, our internal research and development efforts are conducted by a team of five scientists, engineers, and technicians each of whom we either employ directly or engage as a consultant.

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In addition to our internal research and development efforts, we enter into cooperative research and development relationships with leading academic institutions. We have entered into development relationships with other companies for the purpose of identifying new applications for our alloys and establishing customer relationships with such companies. Some of our product development programs are partially funded by our customers. We are also engaged in negotiations with other potential customers regarding possible product development relationships. Our research and development expenses for the years ended December 31, 2018, 2017 and 2016 were $2.4 million, $2.0 million and $2.3 million, respectively.

Raw Materials

Liquidmetal alloy compositions are comprised of many elements, many of which are generally available commodity products. While we believe that each of these raw materials is readily available in sufficient quantities from multiple sources on commercially acceptable terms, we continue to seek opportunities to secure stocks of essential elements in advance to manage lead-times and cost. Due to our inherent dependency on these alloy compositions for the manufacture of Liquidmetal products, any substantial increase in the price or interruption in the supply of these materials could have an adverse effect on our business.

Manufacturing

During 2017, we purchased and relocated to a new manufacturing facility, which will allow for the expansion of our ability to (i) provide on-site manufacturing of customer products, (ii) provide our customers and strategic partners a venue to inspect, collaborate, and demonstrate the latest developments of our alloy composition development and manufacturing processes, and (iii) us being able to provide multiple platforms for manufacturing customer products. Additionally, as further validation of our on-site processes and focus on product quality, we have renewed our ISO 9001:2015 certification and will continue to add new customer quality process and procedures to secure additional quality certifications in future periods. This will allow for the continued growth of the customer base we are able to serve.

In addition, our current manufacturing strategy is to partner with global companies that are contract manufacturers and alloy producers. We seek third party companies with proven track records of success who can gain specialized skills and knowledge of our alloys through close collaborations with our team of scientists and engineers. We believe that partnering with these global companies will allow us to forgo the capital intensive requirements of maintaining our own larger scale manufacturing facilities and allow us to grow the number of applications for the technology much faster than could be accomplished on our own.

Customers

During 2018, there were three major customers, who together accounted for 66% of our revenue. During 2017, there were five major customers, who together accounted for 63% of our revenue. During 2016, there were three major customers, who together accounted for 73% of our revenue. As of December 31, 2018, three customers represented 90%, or $108,000, of the total outstanding trade accounts receivable. As of December 31, 2017, three customers represented 84%, or $131,000, of the total outstanding trade accounts receivable. As of December 31, 2016, two customers represented 100%, or $95,000, of the total outstanding trade accounts receivable. In the future, we expect that a significant portion of our revenue may continue to be concentrated in a limited number of customers, even if our bulk alloys business grows.

Competition

Our bulk Liquidmetal alloys face competition from other materials, including metals, alloys, plastics and composites, which are currently used in the commercial applications that we pursue. For example, we face significant competition from plastics, zinc and stainless steel in our non-consumer electronics components business, and titanium and composites will continue to be used widely in medical devices and sporting goods. Many of these competitive materials are produced by domestic and international companies that have substantially greater financial and other resources than we do. Based on our experience developing products for a variety of customers, we believe that the selection of materials by potential customers will continue to be product-specific in nature, with the decision for each product being driven primarily by the performance needs of the application and, secondarily, by cost considerations and design flexibility. Because of the relatively high strength of our alloys, dimensional precision, and the design flexibility of our process, we are most competitive when the customer is seeking a higher strength, as well as greater design flexibility, than currently available with other materials. However, if currently available materials, such as plastics, are strong enough for the application, our alloys are often not competitive in those applications with respect to price. We also believe that our alloys are generally not competitive with the cost of some of the basic metals, such as steel, aluminum or copper, when such basic metals can be processed by simple traditional metalworking processes into shapes and components that are satisfactory for their intended applications. Our alloys are generally more competitive with respect to price compared to components machined from various metals, such as titanium, stainless steel and other higher performance crystalline metals. Our alloys could also face competition from new materials that may be developed in the future, including new materials that could render our alloys obsolete.

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We experience and will continue to experience indirect competition from the competitors of our customers. Because we rely on our customers to market and sell finished goods that incorporate our components or products, our success will depend in part on the ability of our customers to effectively market and sell their own products and compete in their respective markets.

Backlog

Because of the minimal lead-time associated with orders of bulk alloy parts, we generally do not carry a significant backlog. The backlog as of any particular date gives no indication of actual sales for any succeeding period.

Sales and Marketing

We direct our marketing efforts towards customers that will incorporate our components and products into their finished goods. Our goal is to educate customers on the benefits of our technology and help them gain adequate knowledge to apply the technology to their upcoming product application designs. To that end, we have business development personnel who, in conjunction with engineers and scientists, will actively identify potential customers that may be able to benefit from the introduction of Liquidmetal alloys to their products. We currently have three full-time employees engaged in sales and marketing activities. Additionally, we have expanded our outside sales forces to complement our internal team, as evidenced through the continued partnering with territorial market sales representatives.

Employees

As of December 31, 2018, we had 25 full-time employees and no part time employees. As of that date, none of our employees were represented by a labor union. We have not experienced any work stoppages and we consider our employee relations to be favorable.

Governmental Regulation

Government regulation of our products will depend on the nature and type of product and the jurisdictions in which the products are sold. For example, medical instruments incorporating our Liquidmetal alloys will be subject to regulation in the United States by the FDA and corresponding state and foreign regulatory agencies. Medical device

manufacturers to whom we intend to sell our products may need to obtain FDA approval before marketing their medical devices that incorporate our products and may need to obtain similar approvals before marketing these medical device products in foreign countries.

Environmental Law Compliance

Our operations are subject to national, state, and local environmental laws in the United States. We believe that we are in material compliance with all applicable environmental regulations. While we continue to incur costs to comply with environmental regulations, we do not believe that such costs will have a material effect on our capital expenditures, earnings, or competitive position.

Golf Subsidiary

From 1997 until September 2001, we were engaged in the retail marketing and sale of golf clubs through a majority-owned subsidiary, Liquidmetal Golf. The retail business of Liquidmetal Golf was discontinued in September 2001. However, in December 2012, we recommenced activities and discussions with potential partners regarding the development of golf club components for golf original equipment manufacturers that will integrate these components into their own clubs and then sell them under their respective brand names. Such activities continued, on a limited basis, through 2018. Liquidmetal Technologies owns 79% of the outstanding common stock in Liquidmetal Golf.

Our Liquidmetal Golf subsidiary has the exclusive right and license to utilize our Liquidmetal alloy technology for purposes of golf equipment applications. This right and license is set forth in an intercompany license agreement between Liquidmetal Technologies and Liquidmetal Golf. This license agreement provides that Liquidmetal Golf has a perpetual and exclusive license to use Liquidmetal alloy technology for the purpose of manufacturing, marketing, and selling golf club components and other products used in the sport of golf. In consideration of this license, Liquidmetal Golf has issued 4,500,000 shares of Liquidmetal Golf common stock to Liquidmetal Technologies, which comprises Liquidmetal Technologies' 79% ownership interest in Liquidmetal Golf.

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Item 1A. Risk Factors

*Investing in our securities involves a high degree of risk. The risks described below are not the only ones facing us. Additional risks not currently known to us or that we currently believe are immaterial also may impair our business, operations, liquidity and stock price materially and adversely. You should carefully consider the risks and uncertainties described below in addition to the other information included or incorporated by reference in this Annual Report on Form 10-K. If any of the following risks actually occur, our business, financial condition or results of operations would likely suffer. In that case, the trading price of our common stock could fall and you could lose all or part of your investment***.**

We have incurred significant operating losses in the past and may not be able to achieve or sustain profitability in the future.

We have experienced significant cumulative operating losses since our inception. Our operating loss for the fiscal years ended December 31, 2018, 2017, and 2016 were $9.0 million, $8.6 million, and $9.9 million, respectively. We had an accumulated deficit of approximately $252.8 million at December 31, 2018, and approximately $245.4 million at December 31, 2017. We anticipate that we may continue to incur operating losses for the foreseeable future. Consequently, it is possible that we may never achieve positive earnings and, if we do achieve positive earnings, we may not be able to achieve them on a sustainable basis.

We have a limited history of developing and selling products made from our bulk amorphous alloys.

We have a relatively limited history of producing bulk amorphous alloy components and products on a mass-production scale. Furthermore, our suppliers' ability to produce our products in desired quantities and at commercially reasonable prices is uncertain and is dependent on a variety of factors that are outside of its control, including the nature and design of the component, the customer's specifications, and required delivery timelines.

We rely on assumptions about the markets for our products and components that, if incorrect, may adversely affect our profitability.

We have made assumptions regarding the market size for, and the manufacturing requirements of, our products and components based in part on information we received from third parties and also from our limited history. If these assumptions prove to be incorrect, we may not achieve anticipated market penetration, revenue targets or profitability.

Our historical results of operations may not be indicative of our future results.

As a result of our limited history of developing and marketing bulk amorphous alloy components and products, as well as our new manufacturing strategy of partnering with contract manufacturers and alloy producers, our historical results of operations may not be indicative of our future results.

We primarily rely on limited suppliers for mold making, manufacturing and alloying of our bulk amorphous alloys and parts, as well as the manufacturing of our bulk amorphous alloy production machines.

We currently have three suppliers who fulfill the mold making and manufacturing of our bulk amorphous alloy parts. Our suppliers may allocate their limited capacity to fulfill the production requirements of their other customers. In the event of a disruption of the operations of our suppliers, we may not have other manufacturing sources immediately available. Such an event could cause significant delays in shipments and may adversely affect our revenue, cost of goods sold and results of operations.

We currently have two suppliers who fulfill our alloying/manufacturing of bulk amorphous alloys. In the event of a disruption of the operations of our alloy suppliers, we may not have other alloying sources immediately available. Such an event could cause significant delays in shipments and may adversely affect our revenue, cost of goods sold and results of operations.

Our bulk amorphous alloy production machines are manufactured by two suppliers. Orders for additional machines are estimated to be built with a 13 to 26-week lead time. If we require more production machines to manufacture customer parts due to an unexpected demand, we may experience delays in shipment, increased cost of goods sold or loss in revenues. Additionally, in the event of a disruption in the operations of our production machine suppliers, we may not have other machine manufacturers immediately available. Such an event could cause significant delays in fulfilling customers' orders and may adversely affect our revenue, cost of goods sold and results of operations.

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If we cannot establish and maintain relationships with customers that incorporate our components and products into their finished goods, we will not be able to increase our revenue and commercialize our products.

Our business is based upon the commercialization of a new and unique materials technology. Our ability to increase our revenues will depend on our ability to successfully maintain and establish relationships with customers who are willing to incorporate our proprietary alloys and technology into their finished products. However, we believe that the size of our company and the novel nature of our technology and manufacturing process may continue to make it challenging to maintain and establish such relationships. In addition, we rely and will continue to rely to a large extent on the manufacturing, research, and development capabilities, as well as the marketing and distribution capabilities, of our customers in order to commercialize our products. Our future growth and success will depend in large part on our ability to enter into these relationships and the subsequent success of these relationships. Even if our products are selected for use in a customer's products, we still may not realize significant revenue from that customer if that customer's products are not commercially successful.

It may take significant time and cost for us to develop new customer relationships, which may delay our ability to generate additional revenue or achieve profitability.

Our ability to generate revenue from new customers is generally affected by the amount of time it takes for us to, among other things:

identify a potential customer and introduce the customer to Liquidmetal alloys;

work with the customer to select and design the parts to be fabricated from Liquidmetal alloys;

make the molds and tooling to be used to produce the selected part;

make prototypes and samples for customer testing;

work with our customers to test and analyze prototypes and samples; and

with respect to some types of products, such as medical devices, obtain regulatory approvals.

We believe that our average sales cycle (the time we deliver a proposal to a customer until the time our customer fully integrates our Liquidmetal alloys into its product) could be a significant period of time. Our history to date has

demonstrated that the sales cycle could extend beyond one year. The time it takes to transition a customer from limited production to full-scale production runs will depend upon the nature of the processes and products into which our Liquidmetal alloys are integrated. Moreover, we have found that customers often proceed very cautiously and slowly before incorporating a fundamentally new and unique type of material into their products.

After we develop a customer relationship, it may take a significant amount of time for that customer to develop, manufacture, and sell finished goods that incorporate our components and products.

Our experience has shown that our customers will perform numerous tests and extensively evaluate our components and products before incorporating them into their finished products. The time required for testing, evaluating, and designing our components and products into a customer's products, and in some cases, obtaining regulatory approval, can be significant, with an additional period of time before a customer commences volume production of products incorporating our components and products, if ever. Moreover, because of this lengthy development cycle, we may experience a delay between the time we accrue expenses for research and development and sales and marketing efforts and the time when we generate revenue, if any. We may incur substantial costs in an attempt to transition a customer from initial testing to prototype and from prototype to final product. If we are unable to minimize these transition costs, or to recover the costs of these transitions from our customers, our operating results will be adversely affected.

A limited number of our customers generate a significant portion of our revenue.

For the near future, we expect that a significant portion of our revenue may be concentrated in a limited number of customers. A reduction, delay, or cancellation of orders from one or more of these customers or the loss of one or more customer relationships could significantly reduce our revenue and harm our business. Unless we establish long-term sales arrangements with these customers, they will have the ability to reduce or discontinue their purchases of our products on short notice.

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We expect to rely on our customers and licensees to market and sell finished goods that incorporate our products and components, a process over which we will have little control.

Our future revenue growth and ultimate profitability will depend in part on the ability of our customers and licensees to successfully market and sell their finished goods that incorporate our products. We may have little control over our customers' and licensees' marketing and sales efforts. These marketing and sales efforts may be unsuccessful for various reasons, any of which could hinder our ability to increase revenue or achieve profitability. For example, our customers may not have or devote sufficient resources to develop, market, and sell their finished goods that incorporate our products. Because we typically will not have exclusive sales arrangements with our customers, they will not be precluded from exploring and adopting competing technologies. Also, products incorporating competing technologies may be more successful for reasons unrelated to the performance of Liquidmetal products or the marketing efforts of our customers and licensees.

Our growth depends on our ability to identify, develop, and commercialize new applications for our technology.

Our future growth and success will depend in part on our ability to identify, develop, and commercialize, either alone or in conjunction with our customers and partners, new applications and uses for Liquidmetal alloys. If we are unable to identify and develop new applications, we may be unable to develop new products or generate additional revenue. Successful development of new applications for our products may require additional investment, including costs associated with research and development and the identification of new customers. In addition, difficulties in developing and achieving market acceptance of new products would harm our business.

We may not be able to effectively compete with current suppliers of incumbent materials or producers of competing products.

The future growth and success of our Liquidmetal alloy business will depend in part on our ability to establish and retain a technological advantage over other materials for our targeted applications. For many of our targeted applications, we will compete with manufacturers of similar products that use different materials many of which have substantially greater financial and other resources than we do. These different materials may include plastics, zinc, titanium alloys, metal injection molding, or stainless steel, among others, and we will compete directly with suppliers of the incumbent material. In addition, in each of our targeted markets, our success will depend in part on the ability of our customers to compete successfully in their respective markets. Thus, even if we are successful in replacing an incumbent material in a finished product, we will remain subject to the risk that our customer will not compete successfully in its own market.

Our bulk amorphous alloy technology is still at an early stage of commercialization relative to many other materials.

Our bulk amorphous alloy technology is a relatively new technology as compared to many other material technologies, such as plastics and widely-used high-performance crystalline alloys. Historically, the successful commercialization of a new material technology has required the persistent improvement and refining of the technology over a sometimes lengthy period of time. Accordingly, we believe that our company's future success will be dependent on our ability to continue expanding and improving our technology platform by, among other things, constantly refining and improving our processes, optimizing our existing amorphous alloy compositions for various applications, and developing and improving new bulk amorphous alloy compositions. Our failure to further expand our technology base could limit our growth opportunities and hamper our commercialization efforts.

Future advances in materials science could render Liquidmetal alloys obsolete.

Academic institutions and business enterprises frequently engage in the research and testing of new materials, including alloys and plastics. Advances in materials science could lead to new materials that have a more favorable combination of performance, processing, and cost characteristics than our alloys. The future development of any such new materials could render our alloys obsolete and unmarketable or may impair our ability to compete effectively.

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Our growth depends upon our ability to retain and attract a sufficient number of qualified employees.

Our business is based upon the commercialization of a new and unique materials technology. Our future growth and success will depend in part on our ability to retain key members of our management and scientific staff, who are familiar with this technology and the potential applications and markets for it. We do not have “key man” or similar insurance on any of the key members of our management and scientific staff. If we lose their services or the services of other key personnel, our financial results or business prospects may be harmed. Additionally, our future growth and success will depend in part on our ability to attract, train, and retain scientific engineering, manufacturing, sales, marketing, and management personnel. We cannot be certain that we will be able to attract and retain the personnel necessary to manage our operations effectively. Competition for experienced executives and scientists from numerous companies and academic and other research institutions may limit our ability to hire or retain personnel on acceptable terms. In addition, many of the companies with which we compete for experienced personnel have greater financial and other resources than we do. Moreover, the employment of otherwise highly qualified non-U.S. citizens may be restricted by applicable immigration laws.

We may not be able to successfully identify, consummate, integrate, or derive benefit from strategic partnerships.

As part of our business strategy, we intend to pursue strategic partnering transactions that provide access to new technologies, products, markets, and manufacturing capabilities. These transactions could include licensing agreements, joint ventures, or business combinations. We believe that these transactions will be particularly important to our future growth and success due to the size and resources of our company and the novel nature of our technology. For example, we may determine that we may need to license our technology to a larger manufacturer in order to penetrate a particular market. In addition, we may pursue transactions that will give us access to new technologies that are useful in connection with the composition, processing, or application of Liquidmetal alloys. We may not be able to successfully identify any potential strategic partnerships. Even if we do identify one or more potentially beneficial strategic partners, we may not be able to consummate transactions with these strategic partners on favorable terms or obtain the benefits we anticipate from such a transaction.

We may derive some portion of our revenue from sales outside the United States, which may expose the Company to foreign commerce risks.

We may sell a portion of our products to customers outside of the United States, and our operations and revenue may be subject to risks associated with foreign commerce, including transportation delays and foreign tax and legal compliance.Moreover, customers may sell finished goods that incorporate our components and products outside of the United States, which indirectly expose us to additional foreign commerce risks.

A substantial increase in the price or interruption in the supply of raw materials for our alloys could have an adverse effect on our profitability.

Our proprietary alloy compositions are comprised of many elements, all of which are generally available commodity products. Although we believe that each of these raw materials is currently readily available in sufficient quantities from multiple sources on commercially acceptable terms, if the prices of these materials substantially increase or there is an interruption in the supply of these materials, such increase or interruption could adversely affect our profitability. For example, if the price of one of the elements included in our alloys substantially increases, we may not be able to pass the price increase on to our customers.

Our business could be subject to the potentially adverse consequences of exchange rate fluctuations.

We expect to conduct business in various foreign currencies and will be exposed to market risk from changes in foreign currency exchange rates and interest rates. Fluctuations in exchange rates between the U.S. dollar and such foreign currencies may have a material adverse effect on our business, results of operations, and financial condition and could specifically result in foreign exchange gains and losses. The impact of future exchange rate fluctuations on our operations cannot be accurately predicted. To the extent that the percentage of our non-U.S. dollar revenue derived from international sales increases in the future, our exposure to risks associated with fluctuations in foreign exchange rates will increase further.

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Our inability to protect our licenses, patents, trademarks, and proprietary rights in the United States and foreign countries could harm our business.

We own several patents relating to amorphous alloy technology, and we have other rights to amorphous alloy patents through an exclusive license from the California Institute of Technology. Our success depends in part on our ability to obtain and maintain patent and other proprietary right protection for our technologies and products in the United States and other countries. If we are unable to obtain or maintain these protections, we may not be able to prevent third parties from using our proprietary rights. Specifically, we must:

protect and enforce our owned and licensed patents and intellectual property;

exploit our owned and licensed patented technology; and

operate our business without infringing on the intellectual property rights of third parties.

Our licensed technology is comprised of several issued United States patents covering the composition, method of manufacturing, and application and use of the family of Liquidmetal alloys. We also hold several United States and corresponding foreign patents covering the manufacturing processes of Liquidmetal alloys and their use. Those patents have expiration dates between 2019 and 2036. The laws of some foreign countries do not protect proprietary rights to the same extent as the laws of the United States, and we may encounter significant problems and costs in protecting our proprietary rights in these foreign countries.

In August 2010, we entered into a license transaction with Apple Inc. (“Apple”) pursuant to which (i) we contributed substantially all of our intellectual property assets to a newly organized special-purpose, wholly-owned subsidiary, called Crucible Intellectual Property, LLC (“CIP”), (ii) CIP granted to Apple a perpetual, worldwide, fully-paid, exclusive license to commercialize such intellectual property in the field of consumer electronic products, as defined in the license agreement, and (iii) CIP granted back to us a perpetual, worldwide, fully-paid, exclusive license to commercialize such intellectual property in all other fields of use.

Patent law is still evolving relative to the scope and enforceability of claims in the fields in which we operate. Our patent protection involves complex legal and technical questions. Our patents and those patents for which we have license rights may be challenged, narrowed, invalidated, or circumvented. We may be able to protect our proprietary rights from infringement by third parties only to the extent that our proprietary technologies are covered by valid and enforceable patents or are effectively maintained as trade secrets. Furthermore, others may independently develop similar or alternative technologies or design around our patented technologies. Litigation or other proceedings to defend or enforce our intellectual property rights could require us to spend significant time and money and could otherwise adversely affect our business.

Other companies or individuals may claim that we infringe their intellectual property rights, which could cause us to incur significant expenses or prevent us from selling our products.

Our success depends, in part, on our ability to operate without infringing on valid, enforceable patents or proprietary rights of third parties and without breaching any licenses that may relate to our technologies and products. Future patents issued to third parties may contain claims that conflict with our patents and that compete with our products and technologies, and third parties could assert infringement claims against us. Any litigation or interference proceedings, regardless of their outcome, may be costly and may require significant time and attention from our management and technical personnel. Litigation or interference proceedings could also force us to:

stop or delay using our technology;

stop or delay our customers from selling, manufacturing or using products that incorporate the challenged intellectual property;

pay damages; or

enter into licensing or royalty agreements that may be unavailable on acceptable terms.

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Evolving regulation of corporate governance and public disclosure may result in additional expenses and continuing uncertainty.

Changing laws, regulations and standards relating to corporate governance and public disclosure, including the SEC XBRL mandate, new SEC regulations and International Financial Reporting Standards ("IFRS"), are creating uncertainty for public companies. As a result of these new rules and the size and limited resources of our company, we will incur additional costs associated with our public company reporting requirements, and we may not be able to comply with some of these new rules. In addition, these new rules could make it more difficult or more costly for us to obtain certain types of insurance, including director and officer liability insurance, and this could make it difficult for us to attract and retain qualified persons to serve on our board of directors.

We are presently evaluating and monitoring developments with respect to new and proposed rules and cannot predict or estimate the amount of the additional costs we may incur or the timing of such costs. These new or changed laws, regulations, and standards are subject to varying interpretations, in many cases due to their lack of specificity, and as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices.

We are committed to maintaining high standards of corporate governance and public disclosure. As a result, we intend to invest resources to comply with evolving laws, regulations, and standards, and this investment may result in increased general and administrative expenses and a diversion of management time and attention from revenue-generating activities to compliance activities. If our efforts to comply with new or changed laws, regulations, and standards differ from the activities intended by regulatory or governing bodies due to ambiguities related to practice, regulatory authorities may initiate legal proceedings against us and our business may be harmed.

The time and cost associated with complying with government regulations to which we could become subject could have a material adverse effect on our business.

Some of the applications for our Liquidmetal alloys that we have identified or may identify in the future may be subject to government regulations. For example, any medical devices made from our alloys likely will be subject to extensive government regulation in the United States by the Food and Drug Administration ("FDA"). Any medical device manufacturers to whom we sell Liquidmetal alloy products may need to comply with FDA requirements, including premarket approval or clearance under Section 510(k) of the Food Drug and Cosmetic Act before marketing Liquidmetal alloy medical device products in the United States. These medical device manufacturers may be required to obtain similar approvals before marketing these medical devices in foreign countries. Any medical device manufacturers with which we jointly develop and sell medical device products may not provide significant assistance to us in obtaining required regulatory approvals. The process of obtaining and maintaining required FDA and foreign regulatory approvals could be lengthy, expensive, and uncertain. Additionally, regulatory agencies can delay or

prevent product introductions. The failure to comply with applicable regulatory requirements can result in substantial fines, civil and criminal penalties, stop sale orders, loss or denial of approvals, recalls of products, and product seizures.

To the extent that our products have the potential for dual use, such as military and non-military applications, they may be subject to import and export restrictions of the U.S. government, as well as other countries. The process of obtaining any required U.S. or foreign licenses or approvals could be time-consuming, costly, and uncertain. Failure to comply with import and export regulatory requirements can lead to substantial fines, civil and criminal penalties, and the loss of government contracting and export privileges.

The existence of minority shareholders in our Liquidmetal Golf subsidiary creates potential for conflicts of interest.

We directly own 79% of the outstanding capital stock of Liquidmetal Golf, our subsidiary that has the exclusive right to commercialize our technology in the golf market. The remaining 21% of the Liquidmetal Golf stock is owned by approximately 95 shareholders of record. As a result, conflicts of interest may develop between us and the minority shareholders of Liquidmetal Golf. To the extent that our officers and directors are also officers or directors of Liquidmetal Golf, matters may arise that place the fiduciary duties of these individuals in conflicting positions.

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Our executive officers, directors and insiders and entities affiliated with them hold a significant percentage of our common stock, and these shareholders may take actions that may be adverse to your interests.

As of December 31, 2018, our executive officers, directors and insiders and entities affiliated with them, in the aggregate, beneficially owned approximately 47.4% of our common stock. As a result, these shareholders, acting together, will be able to significantly influence all matters requiring shareholder approval, including the election and removal of directors and approval of significant corporate transactions such as mergers, consolidations and sales of assets. They also could dictate the management of our business and affairs. This concentration of ownership could have the effect of delaying, deferring or preventing a change in control or impeding a merger or consolidation, takeover or other business combination, which could cause the market price of our common stock to fall or prevent you from receiving a premium in such a transaction.

Our stock price has experienced volatility and may continue to experience volatility.

During 2018, the highest bid price for our common stock was $0.29 per share, while the lowest bid price during that period was $0.10 per share. The trading price of our common stock could continue to fluctuate widely due to:

limited current liquidity and the possible need to raise additional capital;

quarter-to-quarter variations in results of operations;

announcements of technological innovations by us or our potential competitors;

changes in or our failure to meet the expectations of securities analysts;

new products offered by us or our competitors;

announcements of strategic relationships or strategic partnerships;

future sales of common stock, or securities convertible into or exercisable for common stock;

adverse judgments or settlements obligating us to pay damages;

future issuances of common stock in connection with acquisitions or other transactions;

acts of war, terrorism, or natural disasters;

industry, domestic and international market and economic conditions, including the global macroeconomic downturn over the last three years and related sovereign debt issues in certain parts of the world;

low trading volume in our stock;

developments relating to patents or property rights;

government regulatory changes; or

other events or factors that may be beyond our control.

In addition, the securities markets in general have experienced extreme price and trading volume volatility in the past. The trading prices of securities of many companies at our stage of growth have fluctuated broadly, often for reasons unrelated to the operating performance of the specific companies. These general market and industry factors may adversely affect the trading price of our common stock, regardless of our actual operating performance. If our stock price is volatile, we could face securities class action litigation, which could result in substantial costs and a diversion of management's attention and resources and could cause our stock price to fall.

Future sales of our common stock could depress our stock price.

Sales of a large number of shares of our common stock, or the availability of a large number of shares for sale, could adversely affect the market price of our common stock and could impair our ability to raise funds in additional stock offerings. In the event that we propose to register additional shares of common stock under the Securities Act of 1933 for our own account, certain shareholders are entitled to receive notice of that registration and to include their shares in the registration, subject to limitations described in the agreements granting these rights.

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A limited public trading market exists for our common stock, which makes it more difficult for our shareholders to sell their common stock in the public markets.

Our common stock is currently traded under the symbol “LQMT” and currently trades at a low volume, based on quotations on the “Over-the-Counter” exchanges, meaning that the number of persons interested in purchasing our common stock at or near bid prices at any given time may be relatively small or non-existent. This situation is attributable to a number of factors, including the fact that we are a small company which is still relatively unknown to stock analysts, stock brokers, institutional investors, and others in the investment community that generate or influence sales volume, and that even if we came to the attention of such persons, they tend to be risk-averse and might be reluctant to follow an unproven company such as ours or purchase or recommend the purchase of our stock until such time as we became more viable. Additionally, many brokerage firms may not be willing to effect transactions in our securities. As a consequence, there may be periods of several days or more when trading activity in our stock is minimal or non-existent, as compared to a seasoned issuer which has a large and steady volume of trading activity that will generally support continuous sales without an adverse effect on share price. We cannot give you any assurance that a broader or more active public trading market for our common stock will develop or be sustained, or that trading levels will be sustained.

We have never paid dividends on our common stock, and we do not anticipate paying any cash dividends in the foreseeable future.

We have paid no cash dividends on our common stock to date. We currently intend to retain our future earnings, if any, to fund the development and growth of our businesses, and we do not anticipate paying any cash dividends on our capital stock for the foreseeable future. In addition, the terms of existing or any future debts may preclude us from paying dividends on our stock. As a result, capital appreciation, if any, of our common stock will be the sole source of gain for the foreseeable future for our common shareholders.

FINRA sales practice requirements may also limit a shareholder’s ability to buy and sell our stock.

The Financial Industry Regulatory Authority (“FINRA”) has adopted rules that require in recommending an investment to a customer a broker-dealer must have reasonable grounds for believing that the investment is suitable for that customer. Prior to recommending speculative low priced securities to their non-institutional customers, broker-dealers must make reasonable efforts to obtain information about the customer's financial status, tax status, investment objectives and other information. Under interpretations of these rules, FINRA believes that there is a high probability that speculative low priced securities will not be suitable for at least some customers. The FINRA requirements make it more difficult for broker-dealers to recommend that their customers buy our common stock, which may limit your ability to buy and sell our stock and have an adverse effect on the market for our shares.

Antitakeover provisions of our certificate of incorporation and bylaws and provisions of applicable corporate law could delay or prevent a change of control that you may favor.

Provisions in our certificate of incorporation, our bylaws, and Delaware law could make it more difficult for a third party to acquire us, even if doing so would be beneficial to our shareholders. These provisions could discourage potential takeover attempts and could adversely affect the market price of our shares. Because of these provisions, you might not be able to receive a premium on your investment in such a transaction. These provisions:

- authorize our board of directors, without shareholder approval, to issue up to 10,000,000 shares of “blank check” preferred stock that could be issued by our board of directors to increase the number of outstanding shares and prevent a takeover attempt;
- limit shareholders’ ability to call a special meeting of our shareholders; and
- establish advance notice requirements to nominate directors for election to our board of directors or to propose matters that can be acted on by shareholders at shareholder meetings.

The provisions described above, as well as other provisions in our certificate of incorporation, our bylaws, and Delaware law could delay or make more difficult transactions involving a change in control of us or our management.

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We rely extensively on information technology in our operations, and any material failure, inadequacy, interruption, or security breach of that technology could have a material adverse impact on our business.

We rely extensively on information technology systems across our operations, including reporting results of operations, collection and storage of personal data of customers, employees and other stakeholders, and various other processes and transactions. Some of these systems are managed by third-party service providers. We use third-party technology and systems for a variety of reasons, including, without limitation, encryption and authentication technology, employee email, content delivery to customers, back-office support, and other functions. Failure to follow applicable regulations related to those activities, or to prevent or mitigate data loss or other security breaches, including breaches of our business partners' technology and systems could expose us and/or our customers and vendors to a risk of loss or misuse of such information, which could adversely affect our operating results, result in regulatory enforcement, other litigation and potential liability, and otherwise harm our business. Our ability to effectively manage our business and coordinate the production, distribution, and sale of our products depends significantly on the reliability and capacity of these systems and third-party service providers. Although we have developed systems and processes that are designed to protect customer information and prevent data loss and other security breaches, including systems and processes designed to reduce the impact of a security breach at a third party provider, such measures cannot provide absolute security.

We have exposure to similar security risks faced by other companies that have data stored on their information technology systems. To our knowledge, we have not experienced any material breach of our cybersecurity systems. If we or our third-party service providers systems fail to operate effectively or are damaged, destroyed, or shut down, or there are problems with transitioning to upgraded or replacement systems, or there are security breaches in these systems, any of the aforementioned could occur as a result of natural disasters, software or equipment failures, telecommunications failures, loss or theft of equipment, acts of terrorism, circumvention of security systems, or other cyber-attacks, including denial-of-service attacks, we could experience delays or decreases in product sales, and reduced efficiency of our operations. Additionally, any of these events could lead to violations of privacy laws, loss of customers, or loss, misappropriation or corruption of confidential information, trade secrets or data, which could expose us to potential litigation, regulatory actions, sanctions or other statutory penalties, any or all of which could adversely affect its business, and cause it to incur significant losses and remediation costs.

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Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our principal executive office and principal research and development offices are located in Lake Forest, California and consist of approximately 41,000 square feet. We purchased the facility in February of 2017.

We currently expect that the foregoing facility will meet our anticipated manufacturing, research, warehousing, and administrative needs for the foreseeable future.

Item 3. Legal Proceedings

None.

Item 4. Mine Safety Disclosures

Not Applicable.

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PART II

Item 5. Market for Registrant's Common Equity, Related Shareholder Matters and Issuer Purchases of Equity Securities

Our common stock is currently quoted on the "OTCQB Venture Marketplace" under the symbol "LQMT." On March 1, 2019, the last reported sales price of our common stock was $0.17 per share. As of March 1, 2019, we had 209 active record holders of our common stock.

The following table sets forth, on a per share basis, the range of high and low bid information for the shares of our common stock for each full quarterly period within the two most recent fiscal years and any subsequent interim period for which financial statements are included, as reported by the "OTCQB Venture Marketplace." These quotations reflect inter-dealer prices, without retail mark-up, mark-down or commission and may not necessarily represent actual transactions.

2018	**High**	**Low**
Fourth Quarter	$0.20	$0.10
Third Quarter	$0.26	$0.16
Second Quarter	$0.29	$0.23
First Quarter	$0.26	$0.20
2017	**High**	**Low**
Fourth Quarter	$0.42	$0.19
Third Quarter	$0.44	$0.27
Second Quarter	$0.32	$0.19
First Quarter	$0.25	$0.18

We have never paid a cash dividend on our common stock. We do not anticipate paying any cash dividends on our common stock in the foreseeable future, and we plan to retain our earnings to finance our operations and future growth.

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Stock Price Performance

The stock price performance graph below compares the cumulative total return of our common stock against the cumulative total return of the Standard & Poor's Small Cap 600 NASDAQ U.S. index and the Russell 2000 ® index for the past five fiscal years. The graph indicates a measurement point of December 31, 2013, and assumes a $100 investment on such date in our common stock, the Standard & Poor's Small Cap 600 and the Russell 2000 ® indices. With respect to the payment of dividends, the Company has not paid any dividends on its common stock, but the Standard & Poor's Small Cap 600 and the Russell 2000 ® indices assume that all dividends were reinvested. The stock price performance graph set forth shall not be deemed "soliciting material" or to be "filed" with the SEC, and will not be incorporated by reference into any filing under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, except to the extent that the Company specifically incorporates this graph by reference into such a filing.

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Item 6. Selected Financial Data

The following selected financial data insofar as it relates to the years ended December 31, 2018, 2017, 2016, 2015, and 2014 has been derived from our audited financial statements. The information that follows should be read in conjunction with the audited consolidated financial statements and notes thereto for the period ended December 31, 2018 included in Part IV of this Form 10-K. See also Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations".

($ in thousands, except for per share data)

	Year Ended December 31,				
	2018	**2017**	**2016**	**2015**	**2014**
Statement of Operations Data:					
Total revenue	$532	$321	$480	$125	$603
Net loss and comprehensive loss	$(7,434)	$(8,690)	$(18,752)	$(7,317)	$(6,558)
Net loss and comprehensive loss applicable to Liquidmetal Technologies shareholders	$(7,433)	$(8,687)	$(18,744)	$(7,309)	$(6,546)
Per Share:					
Net loss- basic	$(0.01)	$(0.01)	$(0.03)	$(0.02)	$(0.01)
Net loss- diluted	$(0.01)	$(0.01)	$(0.03)	$(0.02)	$(0.01)
Weighted-average common shares outstanding (basic)	$910,546,059	$897,273,890	$640,157,919	$470,955,041	$441,439,018
Weighted-average common shares outstanding (diluted)	$910,546,059	$897,273,890	$640,157,919	$470,955,041	$441,439,018

	Year Ended December 31,				
	2018	**2017**	**2016**	**2015**	**2014**
Balance Sheet Data:					
Current assets	$35,748	$42,188	$59,698	$5,302	$10,466
Total assets	$47,851	$55,075	$61,367	$7,273	$12,284
Current liabilities	$554	$464	$3,638	$1,974	$860
Total liabilities	$2,335	$3,512	$6,541	$2,889	$3,721
Common stock	$914	$909	$886	$477	$464
Accumulated deficit	$(252,809)	$(245,376)	$(236,689)	$(217,945)	$(210,636)
Shareholders' equity (deficit)	$45,516	$51,563	$54,826	$4,384	$8,563

Common shares issued and outstanding have increased from 464,482,219 as of December 31, 2014 to 914,206,832 as of December 31, 2018. The increase is primarily due to the issuance of shares to investors in private placements, the issuance of shares to investors upon the settlement of convertible debt, and the issuance of shares to employees.

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Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

This management's discussion and analysis should be read in conjunction with the consolidated financial statements and notes included elsewhere in this report on Form 10-K.

This management's discussion and analysis, as well as other sections of this report on Form 10-K, may contain "forward-looking statements" that involve risks and uncertainties, including statements regarding our plans, future events, objectives, expectations, estimates, forecasts, assumptions or projections. Any statement that is not a statement of historical fact is a forward-looking statement, and in some cases, words such as "believe," "estimate," "project," "expect," "intend," "may," "anticipate," "plan," "seek," and similar expressions identify forward-looking statements. These statements involve risks and uncertainties that could cause actual outcomes and results to differ materially from the anticipated outcomes or results, and undue reliance should not be placed on these statements. These risks and uncertainties include, but are not limited to, the matters discussed under the caption "Risk Factors" in Item 1A of this report and other risks and uncertainties discussed in filings made with the Securities and Exchange Commission (including risks described in subsequent reports on Form 10-Q, Form 10-K, Form 8-K, and other filings). Liquidmetal Technologies, Inc. disclaims any intention or obligation to update or revise any forward-looking statements, whether as a result of new information, future events, or otherwise.

OVERVIEW

We are a materials technology company that develops and commercializes products made from amorphous alloys. Our Liquidmetal® family of alloys consists of a variety of proprietary bulk alloys and composites that utilize the advantages offered by amorphous alloy technology. We design, develop and sell custom products and parts from bulk amorphous alloys to customers in various industries. We also partner with third-party manufacturers and licensees to develop and commercialize Liquidmetal alloy products.

Amorphous alloys are, in general, unique materials that are distinguished by their ability to retain a random atomic structure when they solidify, in contrast to the crystalline atomic structure that forms in other metals and alloys when they solidify. Liquidmetal alloys are proprietary amorphous alloys that possess a combination of performance, processing, and potential cost advantages that we believe will make them preferable to other materials in a variety of applications. The amorphous atomic structure of bulk alloys enables them to overcome certain performance limitations caused by inherent weaknesses in crystalline atomic structures, thus facilitating performance and processing characteristics superior in many ways to those of their crystalline counterparts. Our alloys and the molding technologies we employ result in components that exhibit exceptional dimensional control and repeatability that rivals precision machining, excellent corrosion resistance, brilliant surface finish, high strength, high hardness, high elastic limit, alloys that are non-magnetic, and the ability to form complex shapes common to the injection molding of plastics. All of these characteristics are achievable from the molding process, so design engineers do not have to select specific alloys to achieve one or more of the characteristics as is the case with crystalline materials. We believe these

advantages could result in Liquidmetal alloys supplanting high-performance alloys, such as titanium and stainless steel, and other incumbent materials in a wide variety of applications. Moreover, we believe these advantages could enable the introduction of entirely new products and applications that are not possible or commercially viable with other materials.

Our revenues are derived from i) selling our bulk amorphous alloy custom products and parts for applications which include, but are not limited to, non-consumer electronic devices, medical products, automotive components, and sports and leisure goods; ii) selling tooling and prototype parts such as demonstration parts and test samples for customers with products in development; and iii) product licensing and royalty revenue. We expect that these sources of revenue will continue to significantly change the character of our revenue mix as operations are scaled.

Our cost of sales consists primarily of the costs of manufacturing, which include raw alloy and internal labor required to operate our on-site production cells. Selling, general, and administrative expenses currently consist primarily of salaries and related benefits, travel, consulting and professional fees, depreciation and amortization, insurance, office and administrative expenses, and other expenses related to our operations.

Research and development expenses represent salaries, related benefits expenses, consulting and contract services, expenses incurred for the design and testing of new processing methods, expenses for the development of sample and prototype products, and other expenses related to the research and development of Liquidmetal bulk alloys. Costs associated with research and development activities are expensed as incurred. We plan to enhance our competitive position by improving our existing technologies and developing advances in amorphous alloy technologies. We believe that our research and development efforts will focus on the discovery of new alloy compositions, the development of improved processing technology, and the identification of new applications for our alloys.

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SIGNIFICANT TRANSACTIONS

Manufacturing Facility Purchase

On February 16, 2017, we purchased a 41,000 square foot manufacturing facility located in Lake Forest, CA, where operations commenced during July 2017. The purchase price for the property was $7,818,000.

2016 Purchase Agreement

On March 10, 2016, we entered into a Securities Purchase Agreement (the “2016 Purchase Agreement”) with Liquidmetal Technology Limited, a Hong Kong company (the “Investor”), which is 100% owned by our Chairman and CEO, Professor Lugee Li (“Professor Li’). The 2016 Purchase Agreement provided for the purchase by the Investor of a total of 405,000,000 shares of our common stock for an aggregate purchase price of $63,400,000. The transaction occurred in multiple closings, with the Investor having purchased 105,000,000 shares at a purchase price of $8,400,000 (or $0.08 per share) at the initial closing on March 10, 2016 and the remaining 200,000,000 shares at $0.15 per share and 100,000,000 shares at $0.25 per share for an aggregate purchase price of $55,000,000 on October 26, 2016.

In addition to the shares issuable under the 2016 Purchase Agreement, we issued to the Investor a warrant to acquire 10,066,809 shares of common stock (of which 2,609,913 of the warrant shares vested on March 10, 2016 and the remaining 7,456,896 warrant shares vested on October 26, 2016 at an exercise price of $0.07 per share). The warrant will expire on the tenth anniversary of its issuance date.

Further, the 2016 Purchase Agreement provided that the Investor would have the right to designate three members of our board of directors, with one such member serving as Chairman. The 2016 Purchase Agreement also provided that, with certain limited exceptions, if we were to issue any shares of common stock at any time through the fifth anniversary of the 2016 Purchase Agreement, the Investor will have a preemptive right to subscribe for and to purchase at the same price per share (or at market price, in the case of issuance of shares pursuant to stock options) the number of shares necessary to maintain its ownership percentage of our issued shares of common stock.

Eontec License Agreement

On March 10, 2016, in connection with the 2016 Purchase Agreement, we entered into a Parallel License Agreement (the "License Agreement") with DongGuan Eontec Co., Ltd., a Hong Kong corporation ("Eontec") pursuant to which we each entered into a cross-license of our respective technologies.

The License Agreement provides for the cross-license of certain patents, technical information, and trademarks between us and Eontec. In particular, we granted to Eontec a paid-up, royalty-free, perpetual license to our patents and related technical information to make, have made, use, offer to sell, sell, export and import products in certain geographic areas outside of North America and Europe, and Eontec granted to us a paid-up, royalty-free, perpetual license to Eontec's patents and related technical information to make, have made, use, offer to sell, sell, export and import products in certain geographic areas outside of specified countries in Asia. The license granted by us to Eontec is exclusive (including to the exclusion of us) in the countries of Brunei, Cambodia, China (P.R.C and R.O.C.), East Timor, Indonesia, Japan, Laos, Malaysia, Myanmar, Philippines, Singapore, South Korea, Thailand and Vietnam. The license granted by Eontec to us is exclusive (including to the exclusion of Eontec) in North America and Europe. The cross-licenses are non-exclusive in geographic areas outside of the foregoing exclusive territories.

Beyond the License Agreement, we collaborate with Eontec to accelerate the commercialization of amorphous alloy technology. This includes but is not limited to developing technologies to reduce the cost of amorphous alloys, working on die cast machine technology platforms to pursue broader markets, sharing knowledge to broaden our intellectual property portfolio, and utilizing Eontec's volume production capabilities as a third party contract manufacturer.

During March 2017, we signed contracts with Eontec to purchase two hot-crucible amorphous metal molding machines ("Machines") at a total purchase price of $780,000. The Machines were delivered to our new manufacturing facility located in Lake Forest, CA in April 2017 and were operational during the fourth quarter of 2017.

2014 Purchase Agreement

On August 20, 2014, we entered into a common stock purchase agreement ("2014 Purchase Agreement") with Aspire Capital Fund LLC ("Aspire Capital"), which provided that, upon the terms and subject to the conditions and limitations set forth therein, Aspire Capital would be committed to purchase up to an aggregate of $30,000,000 worth of our common stock, $0.001 par value, over the 36-month term of the 2014 Purchase Agreement.

On March 9, 2016, we terminated the 2014 Purchase Agreement. As of the date of termination, we had received an aggregate of $1,568,000 under the 2014 Purchase Agreement through the issuance of 12,500,000 shares of our common stock at a weighted average price of $0.13 per share.

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Line of Credit Facility

In February 2015, we entered into a $2,000,000 line of credit facility, with a fixed interest rate of 2.1%, which originally matured on February 13, 2016. The facility was extended through August 25, 2016, with reductions in available borrowings and associated collateral requirements to $1,000,000. On August 26, 2016, we fully repaid all outstanding principal and accrued interest balances due under the facility. As of such date, all collateral to the facility was released. Interest expense applicable to these borrowings was $0 for the year ended December 31, 2018, $0 for the year ended December 31, 2017, and $9 for the year ended December 31, 2016.

July 2012 Private Placement

On July 2, 2012, we entered into a private placement transaction (the “July 2012 Private Placement”) pursuant to which we issued $12,000,000 in principal amount of senior convertible notes that were due on September 1, 2013. The notes were convertible into shares of our common stock at a conversion price of $0.352 per share. The notes bore interest at 8% per annum and were payable in twelve equal monthly installments of principal and interest beginning on October 1, 2012. As of July 17, 2013, we had issued 163,641,547 shares of common stock in full satisfaction of the notes (see note 14 in the accompanying footnotes to the consolidated financial statements).

As a part of the July 2012 Private Placement, we issued warrants to purchase 18,750,000 shares of our common stock at an exercise price of $0.384 per share (reduced to $0.17 per share under the anti-dilution and price reset provisions of the warrants; see note 11 in the accompanying footnotes to the consolidated financial statements).

Apple License Transaction

On August 5, 2010, we entered into a license transaction with Apple Inc. (“Apple”) pursuant to which (i) we contributed substantially all of our intellectual property assets to a newly organized special-purpose, wholly-owned subsidiary, called Crucible Intellectual Property, LLC (“CIP”), (ii) CIP granted to Apple a perpetual, worldwide, fully-paid, exclusive license to commercialize such intellectual property in the field of consumer electronic products, as defined in the license agreement, in exchange for a license fee, and (iii) CIP granted back to us a perpetual, worldwide, fully-paid, exclusive license to commercialize such intellectual property in all other fields of use.

Under the agreements relating to the license transaction with Apple, we were obligated to contribute, to CIP, all intellectual property that we developed through February 2012. Subsequently, this obligation was extended to apply to all intellectual property developed through February 2016. We are also obligated to maintain certain limited liability

company formalities with respect to CIP at all times after the closing of the license transaction.

Visser Precision Cast, LLC License Agreement

On June 1, 2012, we entered into a Master Transaction Agreement (the "Visser MTA") with Visser Precision Cast, LLC ("Visser") relating to a strategic transaction for manufacturing services and financing. On May 20, 2014, we and Visser entered into a settlement agreement significantly amending the Visser MTA, whereby we granted to Visser a fully paid-up, royalty-free, irrevocable, perpetual, worldwide, non-transferable, nonexclusive sublicense to all of our intellectual property developed on or prior to May 20, 2014 (the "Effective Date"). Visser does not have any rights, now or in the future, to our intellectual property developed after the Effective Date. The license to our intellectual property developed on or prior to the Effective Date does not include the right to use the "Liquidmetal" trademark or any of our other trademarks, except in certain defined situations, as set forth in the amended and restated agreement.

In addition, the settlement amended and restated the two warrants we issued to Visser in June 2012 to purchase 15,000,000 shares of our common stock at an exercise price of $0.22 per share. The amended and restated warrant agreement includes the effect of anti-dilution adjustments and is exercisable for 21,317,094 shares at an exercise price $0.16 per share under the anti-dilution provisions of the warrants (see Note 11 in the accompanying footnotes to the consolidated financial statements).

Other License Transactions

On January 31, 2012, we entered into a Supply and License Agreement for a five year term with Engel Austria Gmbh ("Engel") whereby Engel was granted a non-exclusive license to manufacture and sell injection molding machines to our licensees. Since that time, we and Engel have agreed on an injection molding machine configuration that can be commercially supplied and supported by Engel. On December 6, 2013, the companies entered into an Exclusivity Agreement for a ten year term whereby we agreed, with certain exceptions and limitations, that we and our licensees would purchase amorphous alloy injection molding machines exclusively from Engel in exchange for certain royalties to be paid by Engel to us based on a percentage of the net sales price of such injection molding machines.

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Our Liquidmetal Golf subsidiary has the exclusive right and license to utilize our Liquidmetal alloy technology for purposes of golf equipment applications. This right and license is set forth in an intercompany license agreement between Liquidmetal Technologies and Liquidmetal Golf. This license agreement provides that Liquidmetal Golf has a perpetual and exclusive license to use Liquidmetal alloy technology for the purpose of manufacturing, marketing, and selling golf club components and other products used in the sport of golf. We own 79% of the outstanding common stock of Liquidmetal Golf.

In June 2003, we entered into an exclusive license agreement with LLPG, Inc. (“LLPG”). Under the terms of the agreement, LLPG has the exclusive right to commercialize Liquidmetal alloys, particularly precious-metal based compositions, in jewelry and high-end luxury product markets. We, in turn, will receive royalty payments over the life of the contract on all Liquidmetal products produced and sold by LLPG. The exclusive license agreement with LLPG expires on December 31, 2021.

In March 2009, we entered into a license agreement with Swatch Group, Ltd. (“Swatch”) under which Swatch was granted a non-exclusive license to our technology to produce and market watches and certain other luxury products. In March 2011, this license agreement was amended to grant Swatch exclusive rights as to watches and all third parties (including us), but non-exclusive as to Apple, and our license agreement with LLPG was simultaneously amended to exclude watches from LLPG’s rights. We will receive royalty payments over the life of the contract on all Liquidmetal products produced and sold by Swatch. The license agreement with Swatch will expire on the expiration date of the last licensed patent.

RESULTS OF OPERATIONS

	For the years ended December 31,								
	2018			**2017**			**2016**		
	in 000's	**% of Revenue**		**in 000's**	**% of Revenue**		**in 000's**	**% of Revenue**	
Revenue:									
Products	$484			$255			$453		
Licensing and royalties	48			66			27		
Total revenue	**532**			**321**			**480**		
Cost of sales	1,164	219	%	696	217	%	553	115	%
Gross loss	**(632)**	-119	%	**(375)**	-117	%	**(73)**	-15	%
Selling, marketing, general and administrative	5,899	1109	%	6,265	1952	%	7,472	1557	%
Research and development	2,429	457	%	1,962	611	%	2,342	488	%
Total operating expense	8,328			8,227			9,814		

Operating loss	**(8,960)**	**(8,602)**	**(9,887)**
Change in value of warrants, gain (loss)	1,267	(143)	(4,117)
Change in value of option liabilities, loss	-	-	(2,613)
Loss on contract modification	-	-	(2,126)
Interest expense	-	-	(9)
Interest income	259	55	-
Net loss	**$(7,434)**	**$(8,690)**	**$(18,752)**

(a) Year Ended December 31, 2018 Compared to Year Ended December 31, 2017

Revenue and operating expenses

The revenue and operating expenses category of statements of operations items represent those items that pertain to our core operations in the bulk alloy manufacturing and licensing business as follows:

Revenue. Total revenue increased by $211 thousand to $532 thousand for the year ended December 31, 2018 from $321 thousand for the year ended December 31, 2017. The increase for the period was attributable to a continued focus on small scale pre-production orders, and qualifying multi-cavity production tools, in an effort to build a significant, recurring, funnel of production business.

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Cost of sales. Cost of sales was $1,164 thousand, or 219% of total revenue, for the year ended December 31, 2018, an increase from $696 thousand, or 217% of total revenue, for the year ended December 31, 2017. The increase in our cost of sales for the year ended December 31, 2018 was primarily attributable to additional markdowns on raw materials inventory, totaling $642,000 for the year ended December 31, 2018, as compared to $279,000 for the year ended December 31, 2017. The cost to manufacture products and components from our bulk amorphous alloys is variable and differs based on the unique design of each product. Given the continued development and refinement of our manufacturing efforts during the year ended December 31, 2018, our cost of sales as a percentage of products revenue is not necessarily representative of our future cost percentages and is expected to show continued improvement over time with increases in volume, lower costs for raw materials, and continuous refinements to our internal processes. When we begin increasing our products revenues with shipments of routine, commercial products and components through our manufacturing facility and/or third party contract manufacturers, we expect to lower raw material and consumable costs through volume purchases, reduced labor and fixed overhead burdens on end products, and have more stable and predictable cost of sales percentages on product sales.

Gross loss. Our gross profit (loss) increased by ($257) thousand from $(375) thousand as of December 31, 2017 to $(632) thousand as of December 31, 2018. Our gross margin percentage decreased from (117)% as of December 31, 2017 to (119)% as of December 31, 2018. As discussed above under “Cost of sales”, inventory markdowns and early pre-production orders are resulting in a higher cost mix, relative to revenue, than would otherwise be incurred in an on-site production environment, with higher volumes and more established operating processes, or through contract manufacturers. As such, our gross profit percentages have fluctuated and may continue to fluctuate based on volume and quoted production prices per unit and may not be representative of our future business. If and when we begin increasing our products revenues with shipments of routine, commercial products and components through future orders to our manufacturing facility and/or third party contract manufacturers, we expect our gross profit percentages to stabilize, increase and be more predictable.

Selling, marketing, general, and administrative expenses. Selling, marketing, general, and administrative expenses decreased by $0.4 million to $5.9 million, or 1109% of revenue, for the year ended December 31, 2018 from $6.3 million, or 1952% of revenue, for the year ended December 31, 2017. The decrease in expense from the prior year was due to lower costs associated with employee compensation, specific overall reductions in stock-based compensation due to prior period headcount reductions.

Research and development expenses. Research and development expenses increased by $467 thousand to $2.4 million, or 457% of revenue, for the year ended December 31, 2018, from $2.0 million, or 611% of revenue, for the year ended December 31, 2017. The increase in expense was mainly due to additional costs in qualifying new alloy compositions and tooling designs, with the goal of reducing input costs in the future. We continue to (i) perform research and development of new Liquidmetal alloys and related processing capabilities, (ii) develop new manufacturing techniques, and (iii) contract with consultants to advance the development of Liquidmetal alloys and related production processes.

Operating loss. Operating loss increased by $0.4 million from $8.6 million for the year ended December 31, 2017 to $9.0 million for the year ended December 31, 2018. Fluctuations in our operating loss are primarily attributable to variations in operating expenses, as discussed above.

We continue to invest in our technology infrastructure to expedite the adoption of our technology, but we have experienced long sales lead times for customer adoption of our technology. Until that time when we can either (i) increase our revenues with shipments of routine, commercial products and parts through a combination of our manufacturing center or third party contract manufacturers or (ii) obtain significant licensing revenues, we expect to continue to have operating losses for the foreseeable future.

Non-operational expenses

Our statement of operations contains various, significant items that are non-operational in nature. These categories of expenses may have significant gains and losses based on the volatility of our stock price as follows:

Change in value of warrants, gain (loss). The change in value of warrants was a non-cash gain of $1,267 thousand for the year ended December 31, 2018, which resulted from periodic valuation adjustments for warrants issued in connection with the 2016 Purchase Agreement. The gain noted during the year ended December 31, 2018 compared to a loss of $143 thousand during the year ended December 31, 2017 was primarily due to a decrease in our stock price during 2018 from $0.23 as of December 31, 2017 to $0.11 as of December 31, 2018. This upward trend was offset by the effect of current year exercises and reductions in other assumptions impacting the valuation model. Changes in the value of our warrants are non-cash and do not affect the core operations of our business.

Interest income. Interest income was $259 thousand and $55 for the years ended December 31, 2018 and 2017, respectively, from interest earned on cash deposits.

Net loss. Our annual net losses of $7.4 million as of December 31, 2018 and $8.7 million as of December 31, 2017 are reflective of operating expenses associated with our on-going business as well as non-operational expenses, discussed above, primarily related to losses in our warrant and option valuations, which are not reflective of our on-going business.