

Price (as of November 16, 2015)	\$0.35
Beta:	2.24
Price/Book:	20.5x
Debt/Equity Ratio:	N/A
Listed Exchange:	CSE & OTCQX

Note: All currency is in US Dollars



Source: Morningstar.com

## Recent News

**02-Oct-15:** Micromem engages with Corinthian Partners, LLC as consultants to assess the technology and business model.

**21-Aug-15:** The Company issues 940,000 options to purchase the Company's common shares.

**31-Jul-15:** The Company completes private placement of 122,768 common shares for a gross proceeds of \$55,000.

**22-Jun-15:** Micromem invoices Chevron \$0.4 million for the achieving development milestone.

**11-May-15:** The Company begins deployment of real time Power Line Condition Monitoring sensor platform.

**27-Apr-15:** Micromem receives milestone payment of \$0.4 million from Castrol innoVentures.

**27-Apr-15:** Castrol innoVentures approves the Company's Laser Induced Breakdown Spectroscopy prototype.

**05-Mar-15:** The Company enters into a Joint Product Development Agreement (JPDA) with Chevron for design and development of cement integrity sensor prototypes.

**Shares Outstanding:** 197,176,368

**Market Cap:** \$69,011,728

**52 Week (Low-High):** \$0.33 - \$0.80

## Research Pioneer in Sensing Technology

Micromem Technologies Inc. ("Micromem" or "Company") is a Canadian technology company engaged in design, engineering, development and delivery of patented and customized magnetic sensors and related sensor solutions. Micromem's primary subsidiary, Micromem Applied Sensor Technology, Inc. ("MAST"), focuses on magnetic sensor based solutions with applications in the oil & gas, automotive and power transmission industries. Currently, the Company's 23 patents related to these technologies are being processed at the United States Patent and Trademark Office ("USPTO") along with 11 recently filed provisional patents. Micromem collaborates with strategic partners including leading world class companies such as Chevron, Saudi Aramco, Castrol, Flextronics, General Motors, and others enabling joint product development, product funding and subsequent commercialization opportunities. While the magnetic sensor technology has wide industry applications, we identified the following as the primary investment factors.

## Investment Rationale

### Focusing on product differentiation through customized solutions

Micromem's ability to cater to customers' complex business or process challenges through customized magnetic sensor based solutions sets them apart from the competition. After entering into a Joint Product Development Agreement ("JPDA"), the Company designs and develops unique sensor based solutions using technologies such as Micro-Electro-Mechanical Systems ("MEMS") and Nano-Electro-Mechanical Systems ("NEMS"). The Company engages in developing detailed product prototypes, which are then set-up live with the client to undergo rigorous field testing. Micromem's customer specific product focus enables it to be the top research expert in MEMS and NEMS.

### Strategic partnerships with industry leaders should provide recognition

Partnerships with leading companies such as Chevron, Saudi Aramco, Flextronics, Castrol innoVentures, and Eversource in diverse industries should provide significant recognition to Micromem. The Company also has collaborations with research institutes and technology companies such as SRI International, Scientific & Biomedical Microsystems and Entanglement Technologies. The Company stands to gain from transfer of research know-how from research institutes and, in turn, help strategic partners achieve operational efficiencies. Increasing sensor technology adoption by the partners should also open up new opportunities in several arenas.

### Business model facilitates lower capital needs and higher long-term profitability

Micromem employs JPDA's with clients, which include sharing of development costs, payable by the client on completion of certain milestones. This reduces the burden of development costs being incurred solely by the Company, resulting in lower capital and operating costs. Further, proposed revenue avenues include license fees, royalty streams and/or product sales through contract manufacturing. Notably, the Company has entered into a contract manufacturing agreement for commercialization of the oil plug sensor suite, which is estimated to generate revenues of \$18.8 million in the next 10 years. Further, per the announcement on June 3, 2015, the Company is targeting deployment of 50 million MEMS based units for the next five years, worth approximately \$2.5 billion in revenues (US\$50/unit).

### **Strong competitive advantage due to growing portfolio of patents**

Micromem has a robust portfolio of patents, which continues to expand. Focus on growing the patents helps Micromem compete effectively in a technology driven sensor industry. As mentioned earlier, 23 patents are currently being processed at the USPTO along with 11 newly filed provisional patents. Recently, the Company was also awarded two patents associated with Multi-Modal Fluid Condition Sensor Platform. These patents cover oil and other fluids and have potential applications in numerous industries. In addition, Micromem owns more than forty patents in the Magnetic Random Access Memory space. Currently, the Company is seeking to sell these patents to interested buyers.

### **Expanding end markets offers substantial revenue generation opportunities**

As per International Data Corporation (“IDC”), the total number of sensor enabled devices is expected to reach 212 billion by 2020. The number of sensors used in an automobile is expected to double to 200 by 2020. The global gas sensors market is also estimated to grow at a CAGR of 5.1% from 2013 to reach \$2.5 billion by 2020. Therefore, Micromem’s sensor based solutions, serving the oil & gas, automobile and utilities industries, offer substantial revenue generating potential.

## **Business Overview**

Micromem collaborates with clients and offers customized sensor based solutions. The core technology, employed through its MAST Inc. subsidiary, is technically known as MEMS or NEMS. The Company develops miniaturized mechanical and electro-mechanical systems and elements and enters into JPDAs with clients for product funding, patenting and subsequent commercialization. The technology uses microfabrication techniques of manufacturing with its physical dimensions ranging from one micron to several millimeters. Some of Micromem’s strategic partners include Chevron, Castrol, Saudi Aramco, Flextronics and General Motors. Micromem also contracts Rapid Prototypes, Inc., owned by Mr. Von Herzen (who is also a Director at Micromem) for product development, design services and engineering services.

Micromem has three patents on the Multi-Modal Fluid Condition Sensor Platform and System and expects three more to be granted through 2016. Further, twenty three of the patents are currently being processed and eleven provisional patents have been filed recently at the USPTO.

Prior to focusing on the MEMS and NEMS technologies, the Company focused on Magnetic Random Access Memory (MRAM) technology, a non-volatile magnetic memory technology using thin film elements. However, in early 2008, the Company decided to no longer focus on the MRAM space due to increasing competition and high capital expenditures. In 2011, the Company wrote off all development costs associated with MRAM technology and is currently seeking buyers for its MRAM patents.

**Exhibit 1: Summary of Micromem’s core solutions (USD Millions)**

Industry	Solution	Client	Preliminary Estimated Contract Value	Estimated Client Market Value	Estimated Global Market Value
Oil & Gas	Detection of Wear Materials in Oil	Castrol	\$ 2.3	\$ 100.0	\$ 600.0
	Monitoring Gas Pipe Corrosion	Eversource	\$ 0.4	\$ 5.0	\$ 250.0
	Measuring Cement Integrity	Chevron	\$ 9.3	\$ 100.0	\$ 1,000.0
	Tracking Particles through Injection Wells	Chevron	\$ 4.1	\$ 200.0	\$ 315.0
	Measuring Interwell Tracer Chemicals in Real-Time	Chevron			
	Detection of Nanoparticles in Oil	Chevron	\$ 0.2	\$ 50.0	\$ 750.0
	Lab Unit to Detect Nanoparticles in Flowing Oil Stream	Saudi Aramco	\$ 0.3	\$ 69.0	\$ 750.0
Utilities	Measure Partial Discharge on Transformers, Real Time Diagnosis, Real Time Consulting	Eversource	\$ 5.4	\$ 20.0	\$ 700.0
	Monitoring Condition, in Real Time, for Pervasive Deployment on Distribution & Transmission Catenaries	Eversource	\$ 0.6	\$ 5.0	\$ 250.0
Automotive	Measure Levels & Conditions in Oil Pan	Flextronics	\$ 18.8	\$ 18.8	\$ 90.0

Source: Investor Presentation

We now offer a detailed description of Micromem’s applications and products, strategic partners and its business model.

## Applications and Products

### Oil & Gas Applications

Micromem’s sensor based solutions are used in numerous applications in the oil & gas industry. These sensors cater to the industry’s concerns for operational monitoring, maintenance, safety and environmental impact.

#### Detection of Wear Materials in Oil

In 2014, Micromem entered into a JPDA with Castrol innoVentures to develop a MEMS solution known as Laser Induced Breakdown Spectroscopy (“LIBS”). LIBS is used to analyze different wear elements in lubricating fluids. The solution is field deployable in wind turbine gearboxes, ocean going vessels and heavy duty construction equipment. On June 3, 2015, the Company announced the field deployment of ten units starting late fall of 2015 for these industrial applications.

The final goal of the JPDA is to deploy 50 million sensor based solutions, or units, over the next five years for the automobile industry. The Company is estimating a sales price of \$50 per sensor based solution and plans to market the sensors through the client’s distribution network.

The value of the preliminary contract between Micromem and Castrol innoVentures is \$2.3 million. The total estimated value of the agreement with Castrol innoVentures stands at \$100 million. Further, the Company estimates the global market value for the technology at \$600 million.

In 2014, the Company was successful in passing the Proof of Concept (“POC”) stage. Micromem has received \$488,800 of product funding in 2014 from Castrol innoVentures and anticipates additional funding of \$1.2 million by December 31, 2015.

#### **Monitoring Gas Pipe Corrosion**

In 2014, Micromem commenced early development of a sensor integrated robotic platform for deployment inside distribution gas pipelines in collaboration with Eversource. The robotic platform’s objective is to establish a corrosion profile of the gas pipeline along with digital mapping and database of the non-corroded pipeline. The technology also enables real-time monitoring of pipeline corrosion. The preliminary estimated contract value stands at \$350,000. Further, Eversource’s market value is estimated at \$5 million and the global market value at \$250 million.

Currently, Micromem has created a prototype of the technology and plans to demonstrate the prototype to the client soon.

#### **Exhibit 2: Sensor integrated platform enables monitoring and mapping of gas pipelines**

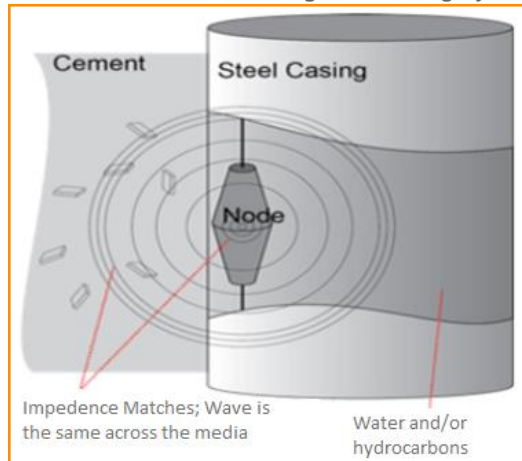


*Source: Investor Presentation*

#### **Measuring Cement Integrity**

Micromem and Chevron entered into a JPDA in 2014. The objective of the collaboration is to develop a sensor integrated platform known as Power Scavenging Sensor Suite that can be deployed into steel-casted cement reinforced oil wells. The Power Scavenging Sensor Suite is used to measure and evaluate the structural integrity of the cement surrounding the steel casing. The preliminary contract value is estimated at \$9.3 million. Chevron’s market value is estimated at \$100 million and the global market value at more than \$1 billion.

In the near future, Micromem plans to complete the POC and develop the first prototype for client evaluation. Further, the Company anticipates this technology’s applications in non-oil industry sectors as well.

**Exhibit 3: Solutions for testing cement integrity**

Source: Investor Presentation

### Detection of Nanoparticles in Oil

Micromem entered into two separate JPDAs with Chevron and Saudi Aramco. Both the partnerships aim to develop detection platforms that can be deployed to flowing oil streams, enabling the identification of magnetic nanoparticles. The technology is capable of detecting nanoparticle concentrations at levels as low as 100 parts per trillion. Currently, the collaboration with Saudi Aramco includes the development of a laboratory for deployment of the technology at a flowing oil stream. Recently, the Company achieved the detection of twenty nanometer particle in a flowing oil stream at one parts per billion concentrations. This was the first such detection at these levels in the world.

**Exhibit 4: Prototype of product to detect nanoparticles in oil**

Source: Investor Presentation

The preliminary value of the Chevron contract is estimated at \$178,000 and the total client contract value at \$50 million. Similarly, the preliminary value of the Saudi Aramco contract is estimated at \$300,000 and the total client contract value at \$69 million. The estimated global market for the technology stands at \$750 million.

The product has successfully been delivered to Saudi Aramco after the POC stage. Currently, Micromem is awaiting finalized internal designs from Saudi Aramco for deployment in their operating wells. Further, the Company has begun improving the sensor platform design to be shock resistant for deployment directly in the oil wells.

### **Tracking Particles through Injection Wells**

In 2013, Micromem entered into an agreement with Chevron for the development and testing of fluorescent magnetic nanoparticles and its applications in interwell tracers. Interwell tracers are chemical or radioactive substances that facilitate tracking of a fluid's flow. Such fluid tracking enables oil & gas explorers to understand the quantitative aspects of a reservoir.

This collaboration was the result of the earlier success in the nanoparticle detector platform contract with Chevron, which was discussed above. The preliminary value of the contract is estimated at \$4.1 million. The technology has passed the POC phase and an engineering prototype has been successfully developed. Provisional patents have been filed with the USPTO, which have now been assigned to Chevron, thus making them responsible for the patent prosecution.

### **Real-Time Interwell Tracer Detection Platform**

In 2014, Micromem entered into a collaboration program with Chevron. This JPDA was aimed at developing a real-time detection platform that facilitates identification of already existing interwell tracer chemicals. This customized product is known as Well-Head Real-Time Detector (WHRTD). WHRTD can measure tracer chemicals to levels of 300 parts per trillion. Such high measurement levels reduce the reservoir operator's time and effort to collect samples and significantly reduce tracer costs.

The preliminary contract value is included in the \$4.1 million contract with Chevron. The global market value for this technology and magnetic nanoparticles tracking technology (mentioned earlier) are together estimated at \$315 million. Recently, at Chevron's request, Micromem submitted a roll out proposal for supply of two thousand units which the Company expects to commence in 2016 and continue over the next four years. The Company has estimated a selling price of \$100,000 per unit, valuing the proposal at \$200 million.

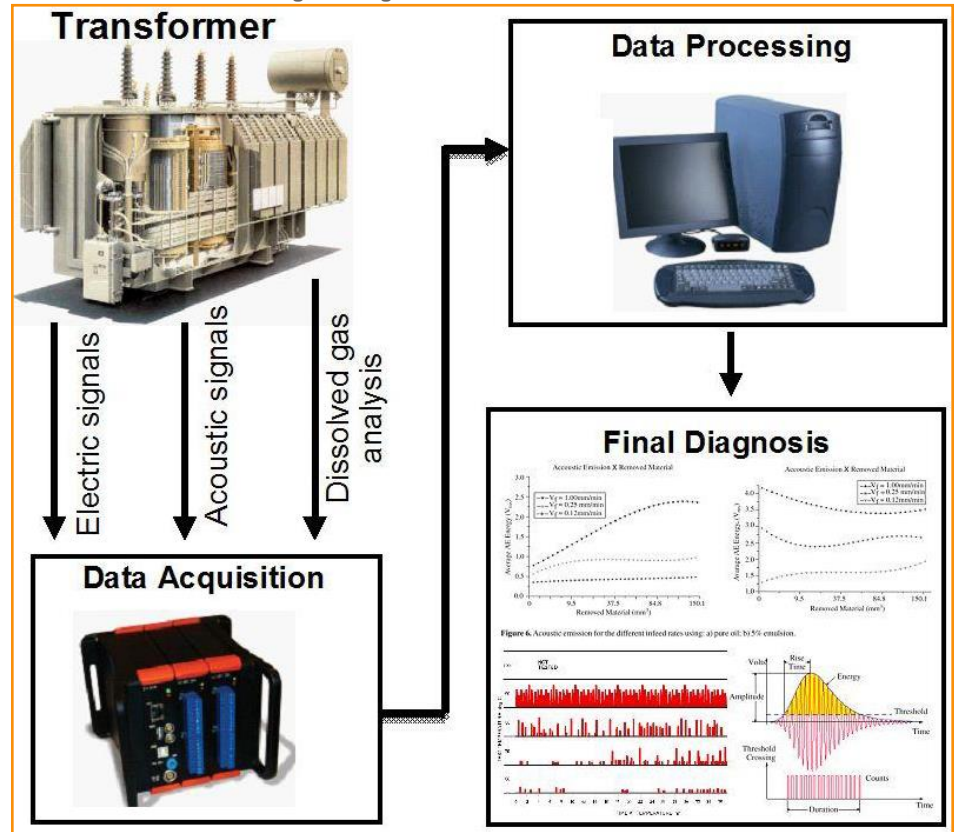
### **Applications in the Utility Industry**

The primary applications in this industry facilitate structural integrity, real time monitoring and safety.

### **Measure Partial Discharge on Transformers, Real Time Diagnosis and Expert Advice**

Micromem entered into a strategic partnership with Eversource for the development of transformers integrated with partial discharge detection platforms. These transformers also facilitate the real-time monitoring, diagnosis and expert assistance based on the data transmitted from the embedded sensors. Exhibit 5 provides an insight into the various functions and operational flowsheet of the technology:

Exhibit 5: Flowchart showing working of transformer sensor solutions



Source: Investor Presentation

The preliminary contract value is estimated at \$5.4 million. The total client contract is estimated at more than \$20 million and the global market value at \$700 million.

The Company has successfully established the ability of detecting partial discharges using small sensors integrated inside the transformer. The project is entering the next phase which is associated with engineering a prototype for evaluation of the technology capability.

**Power Line Condition-Monitoring Device in Real Time**

Micromem entered into a second strategic partnership with Eversource for the development of a monitoring sensor, which can be deployed in distribution and transmission catenaries. This device facilitates real-time monitoring of power transmission lines.

The preliminary value of the contracts was estimated at \$600,000. The total client contract value and global market value for the technology is estimated at \$5 million and \$250 million respectively.

As the next step, the Company plans to construct an engineering prototype to evaluate the feasibility of the future phases of product development.

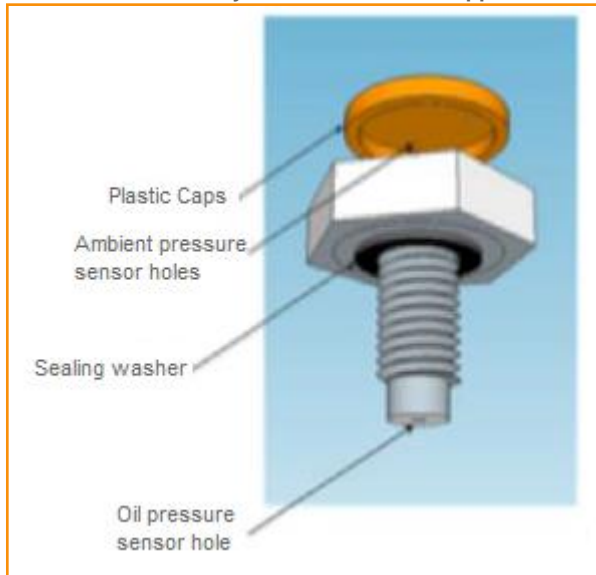
**Automotive Applications**

The third significant sector targeted by Micromem is the automotive industry. Micromem’s objective is to develop and commercialize sensors with breakdown preventive features in automobiles including heavy commercial vehicles. Currently, the Company is developing one sensor based solution in this space and anticipates numerous future opportunities.

### Oil Pan Plug Sensor Suite

In 2014, Micromem signed an exclusive agreement with Flextronics to develop, test and commercialize an oil pan plug sensor integrated suite. The sensor suite enables real time monitoring of oil levels and conditions. In 2013, Micromem and General Motors had co-developed the product. Out of the six provisional patents associated with this product, two have been allotted by the USPTO. One of the allotted patents is the Multi Modal Fluid Condition technology offering a product called Smart Bolt system that measures engine oil level irrespective of parking angle and slope.

**Exhibit 6: Smart Bolt system for automotive applications**



Source: Investor Presentation

The preliminary value of the contract is estimated at \$18.8 million. Micromem estimates the total market value for the technology at \$90 million.

Micromem’s future strategy involves commercializing the oil plug sensor suite including the Smart Bolt system. In September 2014, Micromem entered in to a contract with Flextronics International Ltd., for the manufacture and distribution of the oil pan plug sensor suite. Commercialization is expected to generate, at a minimum, annual revenues of \$18.8 million over the next nine years.

### Company Timeline

Exhibit 7 below presents the reverse chronological timeline of the evolution of Micromem, summarizing some key annual events for the Company since 1985.

**Exhibit 7: Historical events in reverse chronological order**

Dates	Events
<b>Oct 2, 2015</b>	Micromem engaged Corinthian Partners, LLC for a strategic review. Currently, Corinthian has engaged Micromem with two multinationals. A Data Use Agreement was executed with one multinational and a proposal for a joint product development was submitted by Micromem to the other multinational.
<b>Aug 21, 2015</b>	Issued 940,000 options to purchase common shares of the Company as a part of its stock option plan.



<b>July 31, 2015</b>	The Company closed the private placement of 122,768 common shares for gross proceeds of \$55,000.
<b>July 8, 2015</b>	Pending patents related to the AROMA technology project released in July 21, 2015.
<b>June 22, 2015</b>	The Company invoiced \$423,358 to Chevron towards milestone payment for the successful completion of development milestone.
<b>June 5, 2015</b>	Micromem granted 675,000 common stock options and 450,000 common shares to four independent members of the Company's Board of Directors.
<b>May 11, 2015</b>	The Company began the deployment of low cost real time power line condition monitoring sensor platform (PLM platform).
<b>April 28, 2015</b>	The Company was granted its second oil pan plug patent by the US Patent Office.
<b>April 27, 2015</b>	The Company announced the completion of design and integration of a microfluidic cell front-end (MCF) to their patented sensor platform designed for detecting wear tools in lubricating fluids.
<b>April 27, 2015</b>	The Laser Induced Breakdown Spectroscopy (LIBS) and MEMS approved by the Castrol Innoventures.
<b>April 27, 2015</b>	Micromem received a milestone payment of \$0.4 million from Castrol Innoventures for achieving the development milestone.
<b>March 10, 2015</b>	Patents were filed on four projects that the Company had undertaken and enhanced to cover the United States, Canada and Europe.
<b>March 5, 2015</b>	Entered into a second Joint Product Development Agreement (JPDA) with Chevron for the design and development of cement integrity sensor prototypes.
<b>March 4, 2015</b>	The Company successfully demonstrated the installation of the mounting system that will be used to house its patent pending Power Line Condition Monitoring sensor suite using an Unmanned Aerial Vehicle (UAV).
<b>March 2, 2015</b>	The Company (CSE: MRM, OTCQX: MMTIF) included in the newly Launched Canadian Securities Exchange Composite Index.
<b>Jan 23, 2015</b>	The Company awarded with first of the six patent filings related with Multi-Modal Fluid Condition Sensor Platform and System.
<b>Jan 20, 2015</b>	The Company entered into a supplemental agreement with Northeast Utilities (NU) to improve the longevity and functionality of transformer through the use of sensor technology.
<b>November 2014</b>	Successfully demonstrated stage gate two of the Transformer Partial Discharge Proof of Concept (POC).
<b>November 2014</b>	Completed first phase of Joint Product Development program with Castrol innoVentures on MEMS-based sensor solution.
<b>November 2014</b>	The Company entered into a Joint Product Development Agreement with Chevron for \$1.8 million.

<b>October 2014</b>	The United States Patent and Trademark Office awarded a second patent for Fluid Condition Sensor to the Company.
<b>October 2014</b>	Micromem entered into a Joint Product Development Agreement with Castrol innoVentures.
<b>October 2014</b>	The United States Patent and Trademark Office awarded a second patent for Oil Pan Plug Sensor.
<b>September 2014</b>	Micromem entered into a contract with Flextronics International Ltd., for the manufacture and worldwide distribution of Oil Pan Plug Sensor Suite.
<b>August 2014</b>	Micromem completed and delivered the first client driven prototype development for Saudi Aramco.
<b>October 2008</b>	Micromem incorporated 7070179 Canada Inc., as its wholly-owned subsidiary.
<b>November 2007</b>	Micromem incorporated MAST as its wholly owned subsidiary.
<b>May 2001</b>	Pageant International, the Company's subsidiary, was incorporated under the laws of Turks & Caicos Islands.
<b>December 2000</b>	The Company entered into an agreement with Estancia Limited and Richard Lienau for purchasing 50% ownership interests in the patents related to vertical element magnetic memory technology.
<b>January 1999</b>	Completed the acquisition of Pageant Technologies for the purchase price of \$30 million.
<b>October 1985</b>	The Company was formed under the name of Mine Lake Minerals Inc. Subsequently changes name to Avanti Capital Corp and to Micromem Technologies Inc. on January 11, 1999.

*Source: Company Press Releases*

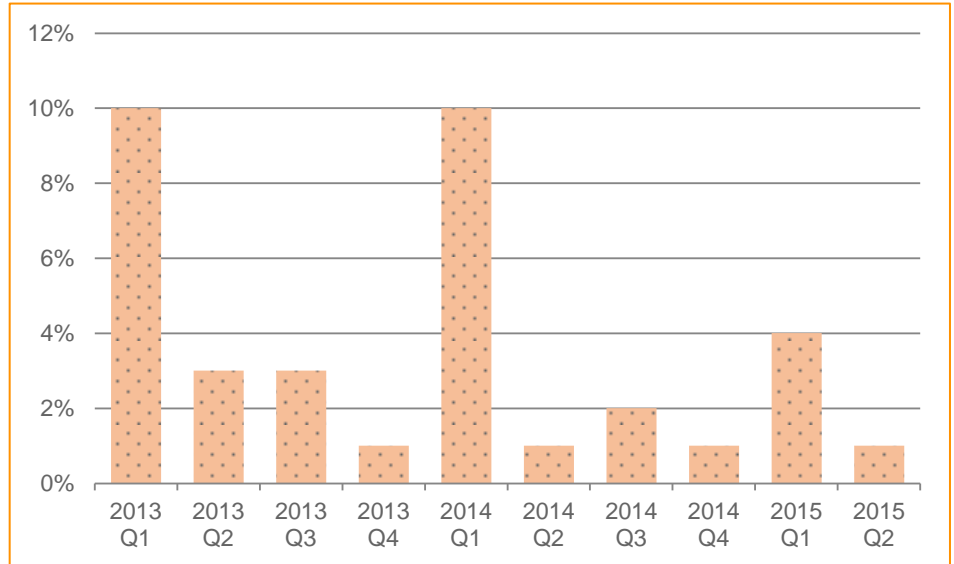
## Industry Overview

The Company, through its product and solutions, caters to various industries such as oil and gas, automotive, power generation and distribution. We now discuss industry trends related to Micromem's product offerings.

### Positive growth expectations for Sensors and Measurement Industry

As per the Germany based AMA Association for Sensors and Measurement, the global market for sensor and measurement is estimated to be between \$70 and \$120 billion. In a recent survey, AMA Association estimates that the sensor industry has witnessed 4% year-over-year revenue growth in the second quarter of 2015. Despite a 1% decrease in sequential revenues in 2Q15, the outlook for the industry remains positive due to increasing order inflows.

**Exhibit 8: Change in incoming orders have remained positive over several quarters**



Source: AMA Association for Sensors and Measurement

Exhibit 8 shows the sequential increase in order inflow. Since 2013, the sensor and measurement market has grown every quarter. It is expected that overall revenues in the sensor and measurement market will witness a sequential growth of 4% in the third quarter of 2015.

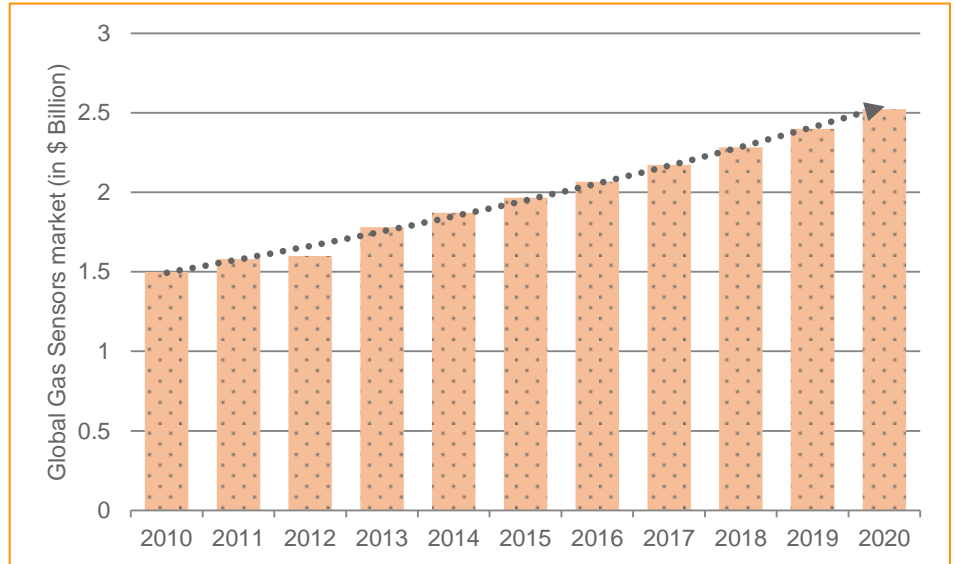
**Recovery in Exploration and Production (E&P) capex could increase sensor deployment**

Micromem could face challenges in the near term due to reduction in Exploration and Production (E&P) capital expenditures. The decline in oil prices since September 2014 has prompted companies to not only slash exploration spending but also lay off thousands of workers. According to Evercore ISI’s 2015 Mid-Year Global E&P Spending Outlook, global E&P spending is expected to fall by 20% to \$590 billion in 2015. About 70% of the survey respondents are ready to revise their capital expenditures upward by at least 10%, if oil prices stay above \$70/bbl. Further, the E&P spending outlook suggests that the current oversupply situation is likely to improve in 2016 and there could be a recovery in crude oil prices. Such expected improvement in crude oil prices could spur capital expenditures from oil and gas companies across the world, benefitting related component and solution providers such as Micromem.

**Continuous innovation should benefit sensors solution providers**

Technology innovation, enhanced production process and increasing need to ensure occupational safety, drives demand for sensors in variety of industrial applications. Demand for sensors in the oil and gas industry is expected to increase substantially due to increasing adoption of wireless and smart sensing technologies. Wireless gas sensors are used in hazardous or extreme applications, as they can be remotely accessed through an electronic device. According to Grand View Research, the global gas sensors market is estimated at \$1.78 billion in 2013 and is expected to grow at a CAGR of 5.1% through 2020 to reach \$2.5 billion:

Exhibit 9: Global gas sensors market is expected to grow at a CAGR 5.1%



Source: Grand View Research

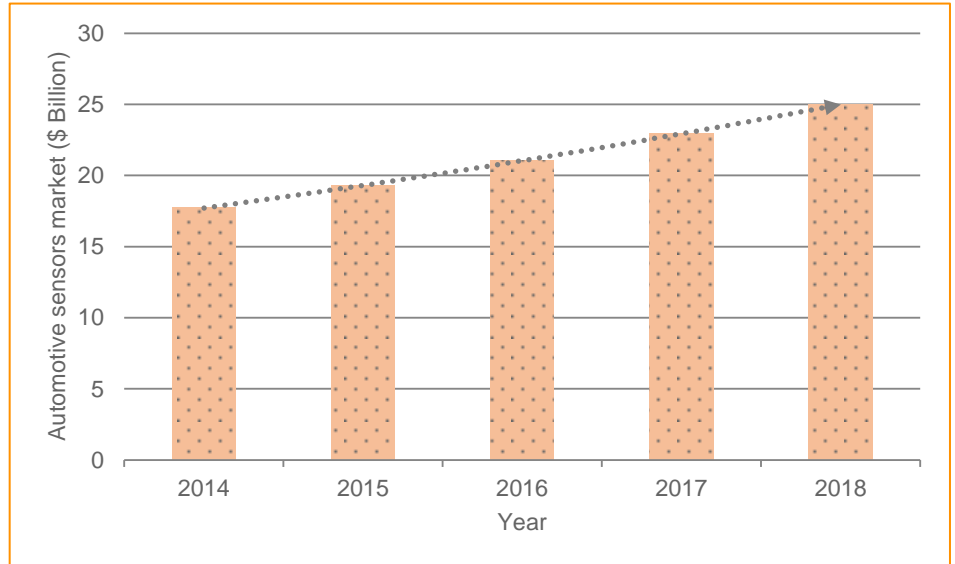
Further, growing concerns over aging oil and gas pipelines across the world should cause demand for corrosion and leak detection systems to increase. According to MarketsandMarkets, the global leak detection market is estimated to grow at a CAGR of 7.1% from 2015 to reach \$2.71 billion by 2020.

**Progressive use of sensors in automobiles should bode well for Micromem**

The global automotive industry, post the 2008 recession, has grown significantly. Export of new light trucks and cars across the world is expected to increase to 110 million by 2020 from the current level of 85 million (Source: Automotive sensors and electronics conference, May 2015). Further, continued auto sales in emerging markets could help strengthen the growth. According to JPMorgan, auto sales in emerging markets grew at a seasonally adjusted rate of 3.7% in September 2015, on a month-on-month basis, versus 2.7% in August 2015.

With increasing customers’ demand for luxury, the automobile industry has witnessed substantial growth in the use of electronic applications. The number of sensors required for a vehicle is expected to increase to 200 by 2020 as compared to the current level of 60 to 100 sensors. The automotive sensors market is expected to grow at a CAGR of 9% to reach \$25 billion by 2018 (Source: Automotive sensors and electronics conference, May 2015) (see Exhibit 10).

Exhibit 10: Global Automotive sensors market to grow at CAGR 9%



Source: Automotive sensors and electronics conference 2015

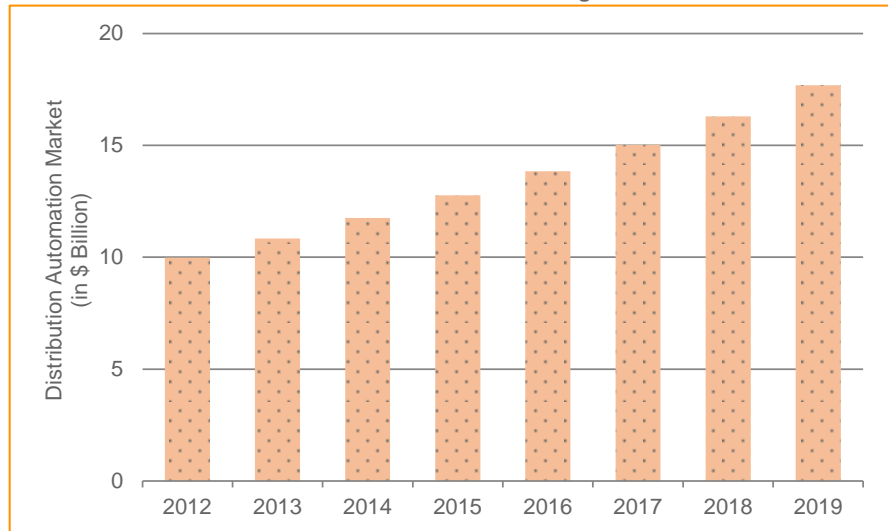
With increasing demand for product miniaturization and improved functionalities of the motor vehicle, technologies like MEMS and NEMS will find greater use in the automobile market. Micromem should benefit from the expected growth in the automotive sensor market.

**Utilities should continue to focus on reducing power outages**

Power outages remain major challenge for global power distribution companies. According to the Edison Electric Institute, 70% of the power outages in the US are due to inclement weather; 11% due to animals getting in contact with power lines; and the balance is due to vehicle and construction accidents, human error and maintenance problems. Therefore, it is important to monitor powerlines and safe guard electrical equipment to reduce outages and transmission losses. The global distribution automation market is estimated at \$9.9 billion in 2012 and forecast to grow at a CAGR of 8.5% to reach \$17.7 billion till the end of 2019 (Source: Transparency Market Research). Exhibit 11 shows the estimated growth in the global distribution automation market.

Further, implementation of regulations imposed by Environmental Protection Agency (EPA) in the US would require significant retirement of coal-fired power plants and higher dependence on new gas-fired power plants. It could substantially increase the investment for development of transmission infrastructure.

Exhibit 11: Distribution Automation market estimated to grow at a CAGR of 8.5%



Source: Transparency Market Research

## SWOT Analysis

### Strengths

#### Niche products and customized solutions

The Company's ability to provide customized solutions helps to position itself as a unique player in multiple industries. To explain, Micromem typically enters into JPDAs with clients in a sector and works on customized solutions for these clients, unlike other manufacturers, who market standard commercial products. The Company currently provides customized solutions in multiple sectors - detection of wear materials in oil, monitor gas pipeline corrosion, measure cement integrity, detect nano-particles in oil, measure partial discharge on transformers, monitor powerlines and detect engine oil and fluid impurities.

#### Partnerships with Industry Leaders

The Company's ability to cater to the customized needs of industry leaders should place itself firmly as a top research partner. Through joint development agreements, Micromem develops solutions for Chevron, Saudi Aramco, General Motors, Eversource and Castrol innoVentures. Further, it could strengthen the Company's position in each sector and enhance its ability to attract other business opportunities within each sector in the future.

#### Application of NEMS and MEMS should result in product differentiation

Micromem has been developing sensor technology platforms for commercial applications since 2008. Over the years, it has gained significant expertise in the field of MEMS and NEMS for designing and developing sensor platforms. These sensor based solutions are very small, typically addressing a complex business or process problem. The Company, through strong research capabilities, has developed a broad-based patent portfolio. Currently, it has 11 provisional patents filed at USPTO and another 23 patents are being processed. Expertise in the field of NEMS and MEMS should help Micromem differentiate itself from other sensor manufacturers.

### Weaknesses

#### History of losses

The Company's inability to be profitable since inception remains an area of concern. For the nine months ended July 2015, Micromem reported a net loss of \$2.9 million as compared to \$3.1 million in July 2014. Increase in losses could be attributed to the higher operating expenses and lack of sales growth. Commercialization of technologies and solutions should help the Company to enhance its sales growth and profitability.

### **Unsuccessful Foray into MRAM technology**

Earlier, beginning in 1999, Micromem was active in the MRAM technology. As noted before, the Company has shifted its focus to develop solutions based on MEMS and NEMS technologies in 2008. In 2011, the Company, decided not to pursue memory technology any longer and ceased all operations related to MRAM technology. It is currently attempting to sell all the memory related intellectual properties (IPs), but has yet to identify a buyer. As lifecycles for technology related products are generally short, an early exit from this technology could have helped to the Company improve its focus on other applications and new generation technologies.

### **Opportunities**

#### **R&D Partnerships**

Association with research organizations and technology partners could support Micromem with information, technical know-how, and standards and procedures. It has partnered with university research institutes, government and private lab R&D partners and technology partners. The Company's university research partners are SRI International, Scientific & Biomedical Microsystems, Entanglement Technologies, Inc., Freescale Semiconductor, Exponent and Flextronics.

#### **Growth in use of sensors should benefit Micromem**

Micromem should benefit from the growth in the use of sensors in various industry applications. Innovation in technology applications, requirements for efficient product processes and the need for occupational safety, drive demand for application sensors in end markets such as automobile, oil and gas and power.

#### **Utilities' focus on reducing power outages should provide growth**

Given today's deregulating utility landscape and increased dependence on power by mission-critical equipment, the requirement for reducing power outages have become increasingly important. Therefore, companies offering sensor based solutions to curb power outages should benefit.

### **Threats**

#### **Competition**

The Company experiences competition from sensors manufacturers for various industrial applications such as oil & gas, automotive, power generation and distribution. Micromem's ability to compete successfully will depend on the rate at which customers incorporate the Company's technologies in their products, rate of customers' success in selling those products, ability to protect their intellectual properties, the Company's ability to develop and launch new offerings and the time to taken to bring these customized solutions into the market. Inability to compete effectively could affect the Company's revenue generation capabilities.

#### **Uncertainties related to Commercialization**

Micromem principally depends on commercializing its technologies and solutions to generate revenue and improve its growth prospects. It develops sensor based solutions under joint development partnerships with its customers. As the Company's solutions are in development stage, they are yet to provide economic benefits to its customers. Failure or prolonged delay in commercialization could affect the Company's abilities to generate revenue and improve earnings.

#### **Rapid Changes in Technology**

As the Company operates in a rapidly moving technology environment, continuous innovation and research and development play a critical role. Product life cycles are typically short and the Company needs to frequently research and launch new products, services and solutions. Failure in product innovation could diminish the Company's advantages.

## Financial Performance

We now discuss the financial performance of Micromem Technologies Inc. for the nine months ended July 31, 2015. The fiscal year calendar of the company runs from November 1 through October 31.

**Exhibit 12: Table showing Company's historical cash burn rate**

Quarters	Oct-13	Jan-14	Apr-14	Jul-14	Oct-14	Jan-15	Apr-15	Jul-15
Net operating cash flow	\$(0.71)	\$(0.54)	\$(0.73)	\$(1.20)	\$(0.42)	\$(0.77)	\$ 0.22	\$(0.17)
Net investing cash flow	(0.10)	(0.27)	(0.95)	(0.55)	(1.63)	(0.40)	(0.59)	(0.51)
Net financing cash flow	1.54	1.50	1.40	1.09	2.41	0.57	0.20	0.58
Cash position (quarter end)	0.82	1.52	1.23	0.58	0.94	0.34	0.17	0.07
<b>Burn Rate per month</b>	<b>\$(0.27)</b>	<b>\$(0.27)</b>	<b>\$(0.56)</b>	<b>\$(0.58)</b>	<b>\$(0.68)</b>	<b>\$(0.39)</b>	<b>\$(0.12)</b>	<b>\$(0.23)</b>
<b>Survival period (in months)</b>	<b>3.06</b>	<b>5.67</b>	<b>2.19</b>	<b>0.99</b>	<b>1.37</b>	<b>0.87</b>	<b>1.40</b>	<b>0.33</b>

Source: Company Quarterly filings

Exhibit 12 presents Micromem's burn rate analysis for the last eight quarters. At normalized operation levels, the Company burns an average of \$0.4 million per month resulting in a survival period of 1.8 months. However, as of the quarter July 2015, Micromem had a cash balance of \$0.07 million, resulting in a survival period of less than one month. This position necessitates imminent funding needs for Micromem. In addition to financing, the Company may also be able to manage its cash position through potential new cost sharing product development partners brought in by its investment bank, Corinthian Partners.

**Exhibit 13: Balance Sheet as of July 31, 2015**

Balance Sheet as of July 31	2015	2014	% change
<b>Assets</b>			
Current Assets:			
Cash and short term investments	\$ 74,808	\$ 576,668	-87.0%
Deposit and other receivables	137,438	546,413	-74.8%
Total Current Assets	212,246	1,123,081	-81.1%
Property and equipment, net	16,197	23,319	-30.5%
Deferred development costs	4,900,327	2,559,973	91.4%
Intangible assets, net	62,895	82,247	-23.5%
Patents, net	269,090	189,940	41.7%
<b>Total Assets</b>	<b>\$ 5,460,755</b>	<b>\$ 3,978,560</b>	<b>37.3%</b>
<b>Liabilities and Shareholders' Equity</b>			
Current Liabilities:			
Accounts payable and accrued liabilities	1,565,334	860,614	81.9%
<b>Total Current Liabilities</b>	<b>\$ 1,565,334</b>	<b>\$ 860,614</b>	<b>81.9%</b>
Shareholders' Equity			
Share Capital	73,102,919	62,877,591	16.3%
Contributed surplus	27,085,641	32,528,882	-16.7%
Deficit	(96,293,139)	(92,288,527)	4.3%
<b>Total Shareholders' Equity</b>	<b>\$ 3,895,421</b>	<b>\$ 3,117,946</b>	<b>24.9%</b>
<b>Total Liabilities and Shareholders' Equity</b>	<b>\$ 5,460,755</b>	<b>\$ 3,978,560</b>	<b>37.3%</b>

Source: Company Quarterly filings

Exhibit 13 shows the Company's Balance Sheet as of July 31, 2015 and 2014. As of July 31, 2015, the Company's cash balance stood at \$0.07 million, down 87% from \$0.56 million during the previous year. This is not sufficient for the Company to meet its operating expenses. In addition, deposit and other receivables decreased 81% to \$0.2 million for nine months ended July 31, 2015 compared to \$1.1 million for the nine month



ended July 31, 2014. The Company's accounts payable and accrued liabilities increased by 81.9%, aiding the Company's cash management activities.

Deferred development costs increased by 91% to \$4.9 million in July 2015 from \$2.5 million in 2014. This is indicative of the increased development activities being undertaken up to July 31, 2015 by the Company. The Company also increased its patent assets by 41% to \$0.25 million in July 2015 from \$0.18 million in July 2014.

**Exhibit 14: Income Statement for the nine months ended July 31, 2015**

Income Statement for the nine months ended July 31	2015	2014	% Change
<b>Revenue</b>			
Interest	\$ -	\$ -	NM
<b>Costs and expenses:</b>			
Administration	\$ 298,866	\$ 251,351	18.9%
Professional, other fees and salaries	1,552,178	1,459,782	6.3%
Stock-based compensation	603,687	379,253	59.2%
Development costs	199,391	682,990	-70.8%
Travel and entertainment	133,224	273,517	-51.3%
Amortization of property and equipment	5,286	5,521	-4.3%
Amortization of intangible assets and patents	67,262	-	NM
Foreign exchange loss	56,564	24,303	132.7%
Net loss before income taxes	(2,916,458)	(3,076,717)	-5.2%
Income taxes	-	-	
<b>Net loss and comprehensive loss</b>	<b>\$ (2,916,458)</b>	<b>\$ (3,076,717)</b>	<b>-5.2%</b>
<b>Loss per share-basic and diluted</b>	<b>\$ (0.015)</b>	<b>\$ (0.018)</b>	<b>-16.6%</b>
Weighted average number of shares	191,454,573	168,351,746	13.7%

Source: Company Quarterly filings

Exhibit 14 presents the Income Statement for the nine months ended July 31, 2015 and 2014. Micromem has not generated licensing or royalty revenues as it is in the product development stage. Micromem reduced its net loss per share by 17% to \$0.015 per share during the nine months ended July 31, 2015 against the net loss of \$0.018 during the same period in 2014. This decrease in net loss was achieved despite equity issuance. During the nine months ended July 31, 2015, administrative expenses increased 19% to \$0.30 million from \$0.25 million for the nine months ended in the previous year. Further, during the nine months ended July 31, 2015, the Company's development costs decreased by 71% to \$0.1 million compared to \$0.6 million during the same period in 2014. This highlights the fact that the realization value of the Company's deferred development costs is at par with the carrying value, implying that the Micromem is not aggressive in capitalizing development expenses. However, we noted that the Company's compensation expenses including professional & other fees, salaries and stock-based compensation increased by 17% to \$2.1 million for the nine months ended July 31, 2015 from \$1.8 million during the same period in 2014.

## Exhibit 15: Cash Flow Statement for the nine months ended July 31, 2015

Cash flow statement for nine months ended July 31	2015	2014	% change
<b>Cash flows from operating activities:</b>			
<b>Net loss</b>	<b>\$ (2,916,458)</b>	<b>\$ (3,076,717)</b>	<b>-5.2%</b>
Adjustments:			
Amortization of patents and intangible assets	67,262	-	NM
Amortization of property and equipment	5,286	5,521	-4.3%
Stock based compensation	603,687	379,253	59.2%
Increase (Decrease) in deposits and other receivables	735,328	(311,672)	335.9%
(Decrease) Increase in accounts payable and accrued liabilities	791,501	566,533	39.7%
<b>Net cash used in operating activities</b>	<b>\$ (713,394)</b>	<b>\$ (2,437,082)</b>	<b>-70.7%</b>
<b>Cash flow from investing activities:</b>			
Purchase of property and equipment	-	(16,808)	-100.0%
Patents	(158,384)	(148,206)	6.9%
Deferred development costs	(3,117,453)	(1,631,896)	91.0%
Deferred development costs billed	1,782,632	-	NM
<b>Net cash used in investing activities</b>	<b>\$ (1,493,205)</b>	<b>\$ (1,796,910)</b>	<b>-16.9%</b>
<b>Cash flow from financing activities</b>			
Issue of common shares	1,345,419	3,976,991	-66.2%
Bridge loans advances	-	29,157	-100.0%
Bridge loan repayments	-	(17,071)	-100.0%
<b>Net cash provided by financing activities</b>	<b>\$ 1,345,419</b>	<b>\$ 3,989,077</b>	<b>-66.3%</b>
<b>Increase (decrease) in cash</b>	<b>\$ (861,180)</b>	<b>\$ (244,915)</b>	<b>251.6%</b>
Cash, beginning of period	935,987	821,283	14.0%
<b>Cash, end of period</b>	<b>\$ 74,807</b>	<b>\$ 576,368</b>	<b>-87.0%</b>

Source: Company Quarterly filings

Exhibit 15 presents the Cash Flow statement for the nine months ended July 31, 2015 and 2014. During the nine months ended July 31, 2015, the net cash used in operating activities reduced by 70% to \$0.7 million, compared to \$2.4 million in the same period in the preceding year. This was primarily attributed to efficient working capital management by the Company's management. Micromem depends on its strategic partners and capital markets for funding its development activities. During the nine months ended July 31, 2015, the Company's incurred development costs of \$3.1 million, was a 90% increase over the same period in the previous year. However, during the current period, 60% of the development costs were borne by the strategic partners against no costs being reimbursed by Micromem during the same period in 2014. The recovery of development expenses shows that Micromem's joint ventures may help its cash situation in the coming quarters. Finally, during the nine months ended July 31, 2015, the Company raised \$1.3 million through equity issuance, 66% less than the equity raised in the same period in the previous year. As mentioned earlier, in the near future, the Company must raise funds to meet its cash burn levels.

## Key Risk Factors

### No history of Operating Revenue

Micromem, to date, has not reported any revenue from licensing fees, royalties or product sales. The Company is currently in the product development stage and may require significant capital for meeting its development costs. Failure to raise sufficient capital, or secure product funding from strategic partners may adversely affect the development and commercialization plans.

### Competitions from larger companies

Micromem's ability to compete against larger players depends on various factors ranging from rate of its technological adoption, competitive advantage, protection of intellectual properties, etc. To successfully compete, Micromem has to continuously develop, innovate and commercialize new products and solutions.

### Rapid technological innovation in the industry

Short product life cycles are inherent in this industry due to continuous and rapid innovation. The ability of the Company to respond to these changes depends on its ability to focus and R&D success. The Company's inability to compete effectively may result in its customers shifting to competitors' technology.

### Market risks related to commercialization of MEMS and NEMS technology

Micromem is pursuing JPDA's with the expectation of technology being adopted by the existing and prospective strategic partners. However, successful commercialization is limited to the applications of Company's sensor technology and its demand. Unexpected declines in demand for its sensor technology or unsuccessful commercialization could affect the Company's future.

### Intellectual property claims against the company

Micromem has in excess of forty patents on MRAM technology and a number of provisional patents filed with the USPTO for the MEMS and NEMS technologies. As mentioned earlier, Micromem and its strategic partners jointly develop these technologies with rights and ownership retained by Micromem. Such conditions could result in intellectual property claims against Micromem having adverse effect on the collaborative relationship, negatively affecting the development of the technologies.

### Foreign exchange risk related with the business

Micromem's business is global. This makes the Company's future revenue streams vulnerable to foreign exchange fluctuation. The Company's failure to successfully hedge its currency risk could negatively affect the future earnings of the business.

## Shareholding Pattern

Exhibit 16 below shows the total number of shares and options outstanding. No shareholder holds greater than 5% of the common shares outstanding.

**Exhibit 16: As of October 27, 2015**

Shares Outstanding	197,176,368
Options Outstanding	9,817,000
Fully Diluted	206,993,368

Source: Company Investor Presentation

## Management and Directors

### Joseph Fuda, President and CEO

Mr. Joseph Fuda has been serving as the President, CEO and Director since February 2002. Before his current role, he was the Manager for Strategic Alliances at Micromem. Prior to joining Micromem, Mr. Fuda served in various executive positions in public and private such as IPO Capital Corp. Mr. Fuda brings to the table successful capital raising capabilities and negotiation skills. Among other achievements, Mr. Fuda's successful corporate endeavors include raising over \$250 million and closing of numbers business deal including a successful sale of a wind farm to a North American based energy company.

### Dan Amadori, CFO

Mr. Amadori has served as Chief Financial Officer of Micromem Technologies since June 2004. With over 30 years of experience in the financial services sector, Mr. Amadori has been successful in conducting several transactions in various industries. He also founded a successful M&A advisory firm called Lamerac Financial Corp. Mr. Amadori graduated with a Bachelor of Commerce from McGill University and an MBA from Ivey Business School. He is also a qualified Chartered Accountant.

### Steven Van Fleet, Director and President

Mr. Van Fleet has been serving as a Director of Micromem Technologies since 2002 and President of MAST since 2008. He has held numerous technical positions and business development roles in the paper and pulp industry. He has worked at several companies including International Paper, Reed Paper, Weyerhaeuser, MacMillan Bloedel, and Boise Cascade. At these companies, he has managed the research and development divisions and has applied emerging technologies to solve business issues. Further, he also owned a company that assisted IBM and focused on semiconductors clean room automation and analytics. Mr. Van Fleet holds a Bachelor of Science in Applied Science from Miami University.

### Dr. Brian Von Herzen, Director

Dr. Von Herzen is currently serving as a Director at Micromem Technologies. Prior to his involvement with Micromem, he served as CEO at Rapid Prototypes Inc. Rapid Prototypes offered turnkey electronic engineering design technologies that employed programmable logic devices that enabled minimizing the time to market new electronic products. He has immense experience in the development and designing of integrated circuits and electronic systems. Dr. Von Herzen is also a member of the Board of Directors at Climate Foundation and Bright Energy Storage Technologies, LLP. Mr. Von Herzen graduated from Caltech, Princeton and during his time there also received the Hertz Foundation Fellowship.

### Salvatore Fuda, Chairman

Mr. Salvatore Fuda was appointed as the Chairman of the Board of the Company on January 11, 1999 and has served as a Director since 1992. He also held positions as President and Chief Executive Officer of the Company from year 2000-2002. He also served as President and CEO of Ontex Resources Limited. Formerly, he served as a Chairman at various companies including Echo Energy Canada Inc., Leader Capital Corp., Multimedia WTM Corporation, Footmaxx Holdings Inc. and Goldstone Resources Inc.

**David Sharpless**

Mr. David Sharpless has served as a director of Micromem since March 2001. Mr. Sharpless is also currently the Chairman of Maverick Inc., a family investment corporation. He served as the President, International of CIT's Vendor Technology Finance unit. At CIT, he was responsible for CIT's operations in Canada, Europe, Latin America, Asia Pacific, Australasia. Earlier, Mr. Sharpless was the Deputy Chairman of Newcourt Credit Group Inc.'s, where he was responsible for international operations. Mr. Sharpless is a graduate of Osgoode Hall Law School.

**Larry Blue**

Mr. Blue has served as a Director of Micromem since November 2005. He is also currently Executive Vice President and Chief Operating Officer at Bell and Howell. . Prior to Bell and Howell, Mr. Blue served as the Chief Executive Officer for Hi-G-Tek, an active RFID company specializing in sensors and seals. Prior to that, Mr. Blue was the Vice President and General Manager of the RFID Tag business unit at Symbol Technologies. Under his leadership, RFID tag revenues more than doubled and Symbol was second in market share in the industry. Mr. Blue has over 25 years of industry experience in large and small companies, including IBM and Hughes, and over 20 years of technical management experience in a variety of industries including communications, semiconductors, networking and multimedia technologies. Mr. Blue holds an MSEE from Duke University.

**Oliver Nepomuceno**

Mr. Nepomuceno has served as a Director of Micromem since June 2006. He is currently an investment officer for Crystal Business S.A., an investment company based in Lugano, Switzerland. At Crystal Business, Mr. Nepomuceno also oversees portfolio management for private clients. Prior to that Mr. Nepomuceno previously served as a Director of Echo Energy Canada Inc.

**Alex Dey**

Mr. Dey has been a Director of Micromem since 2012. He operated as Alex Dey, Chartered Accountant until August 2004 at which point he retired from private practice. He continues to provide professional services to a number of small businesses.

## Sources

- SEC/EDGAR Filings
- SEDAR Filings
- Company Press Releases
- Company Investor Presentation
- Transparency Market Research
- Automotive Sensors and Electronics Conference 2015
- Grand View Research
- AMA Association for Sensors and Measurement
- Evercore ISI 2015 Mid-Year Global E&P Spending Outlook
- Edison Electric Institute
- IDC Reports

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RBME will buy, sell or hold shares, options, rights, or warrants to purchase shares of Micromem at its lawful discretion and this can happen at any time.