Breakthrough for the Emergency Department

mesuron

Introduces the

Avalon-H90

The Problem

Heart Attack

In the United States, someone has a **heart attack every 40 seconds**. Heart problems are the #1 reason for death in 2020 according to the CDC. Oxygen starved heart muscle begins to die within 70 minutes from onset. The clock is running. Directing the patient to the appropriate treatment is the goal. **Only 25 %** of the Emergency Room patients with Acute Chest Pain are suffering from an actual heart problem. There are approximately **7 million** such visits per year, the second most common complaint.

What tools are available to Emergency Room ("ER") physicians to determine if a patient with Acute Chest Pain is having a heart problem? Until now, only the Electrocardiogram, the Troponin blood test, and family history (if available) is in the ER. Each of these tools has its limitations, but they are all that is available to the ER physician, as other diagnostic tools take too long to implement or cannot be used for Acute Chest Pain ("ACP") patients.

One of the biggest challenges in hospital Emergency Rooms ("ER"s) is the difficulty in correctly identifying patients with actual heart problems. They may need immediate attention.

The Current Technology

- **Only two of the testing regimes are commonly used in the ER**, along with the family history at the time of the ACP patient arrival:
  - **Electrocardiogram ("ECG")** has a sensitivity for heart attack below 50%, and for ischemia, even less.
  - **Troponin blood tests** can take over an hour *after* a heart attack to deliver results and are not sensitive for ischemia. If the pain is related to a heart attack, **the patient has only 70 minutes to prevent damaged muscle.**

  That is it!

- All the other diagnostic tools for stabilized chest pain such as: Stress test, Coronary CT, Heart MRI, and SPECT, **are not useful for the ACP patients due to ER inapplicability**, long testing periods and/or restricted patient access for medical personnel. For example, SPECT, considered the gold standard for ischemia detection, takes 12-72 hours to deliver results and therefore cannot be used on Acute Chest Pain patients.

The Need

- **It is critical to quickly, efficiently and with high confidence identify those that are suffering pain due to a heart condition vs. those experiencing pain from non-heart related matters. An incorrect decision puts the patient at unnecessary risk, expense, and delays addressing the actual medical issues.**

- **There is a need for a medical device/protocol that can assist the attending Emergency Department ("ED") physicians to *rapidly and more accurately* refer the true cardiac problem patients for more invasive treatment.**

TIME IS HEART MUSCLE

The Solution: Avalon-H90

The Avalon-H90 is a MagnetoCardioGraphy ("MCG") device designed for use in hospital Emergency Department ERs to quickly, non-invasively, with high sensitivity, at rest, detect ventricular myocardial repolarization abnormalities that reflect several myocardial problems, including ischemia in Acute Chest Pain patients.

The Solution: Avalon-H90

Time to Treatment is Essential

- **The Avalon-H90 takes approximately 5 minutes to deliver test results that can separate high and low risk cardiac patients and help the physician to make early decisions.**

- The ***ability to rapidly decide*** to go or not to go to more invasive heart related analysis/treatment is essential to improve patient outcomes and reduce hospital costs. The Avalon-H90 also helps the ED to promptly focus on the underlying issue in the non-cardiac ACP patient, avoiding delays in addressing the actual medical issue.

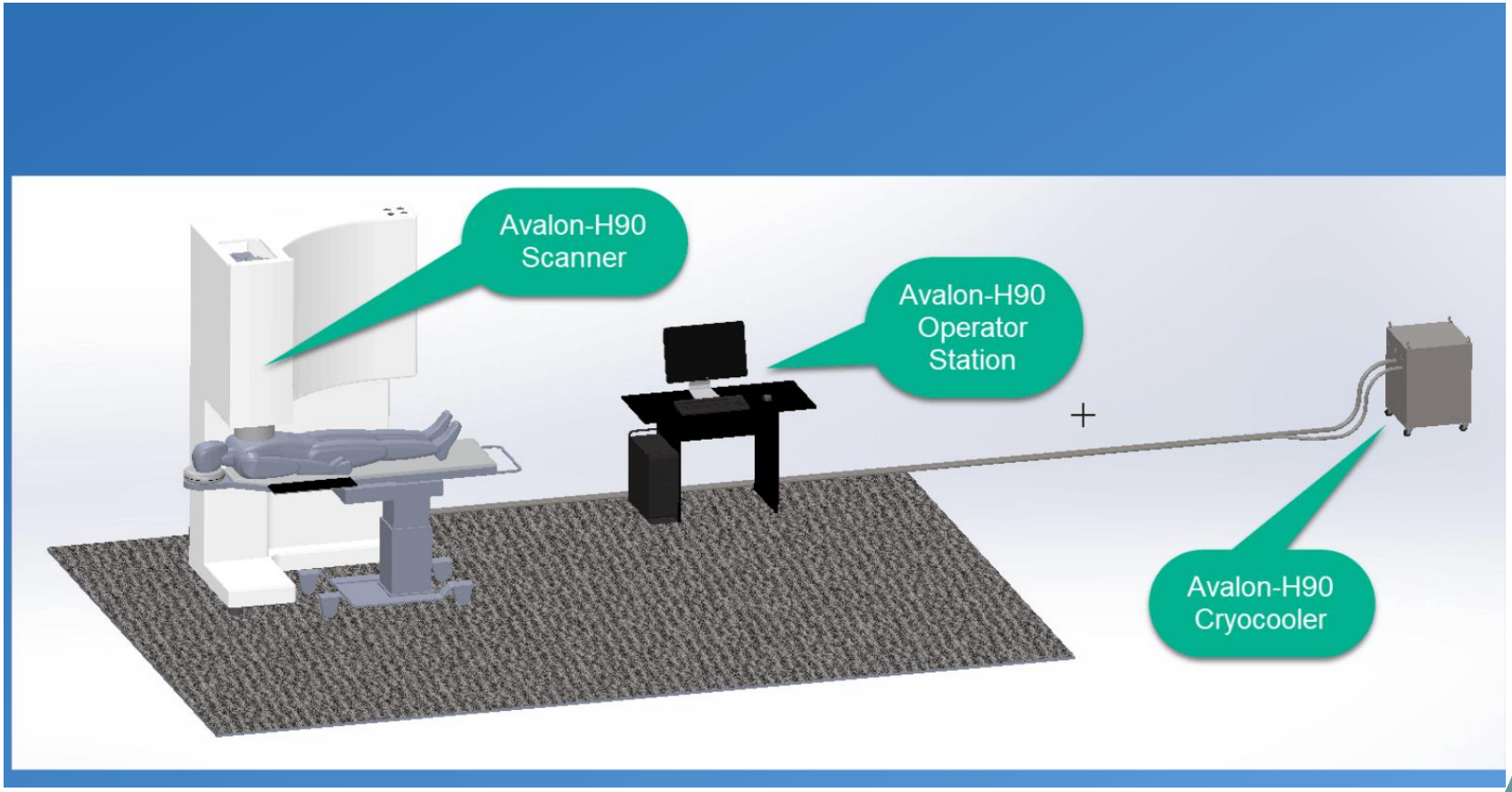
Avalon-H90: The Process

Patient arrives at Emergency Room with acute chest pain.

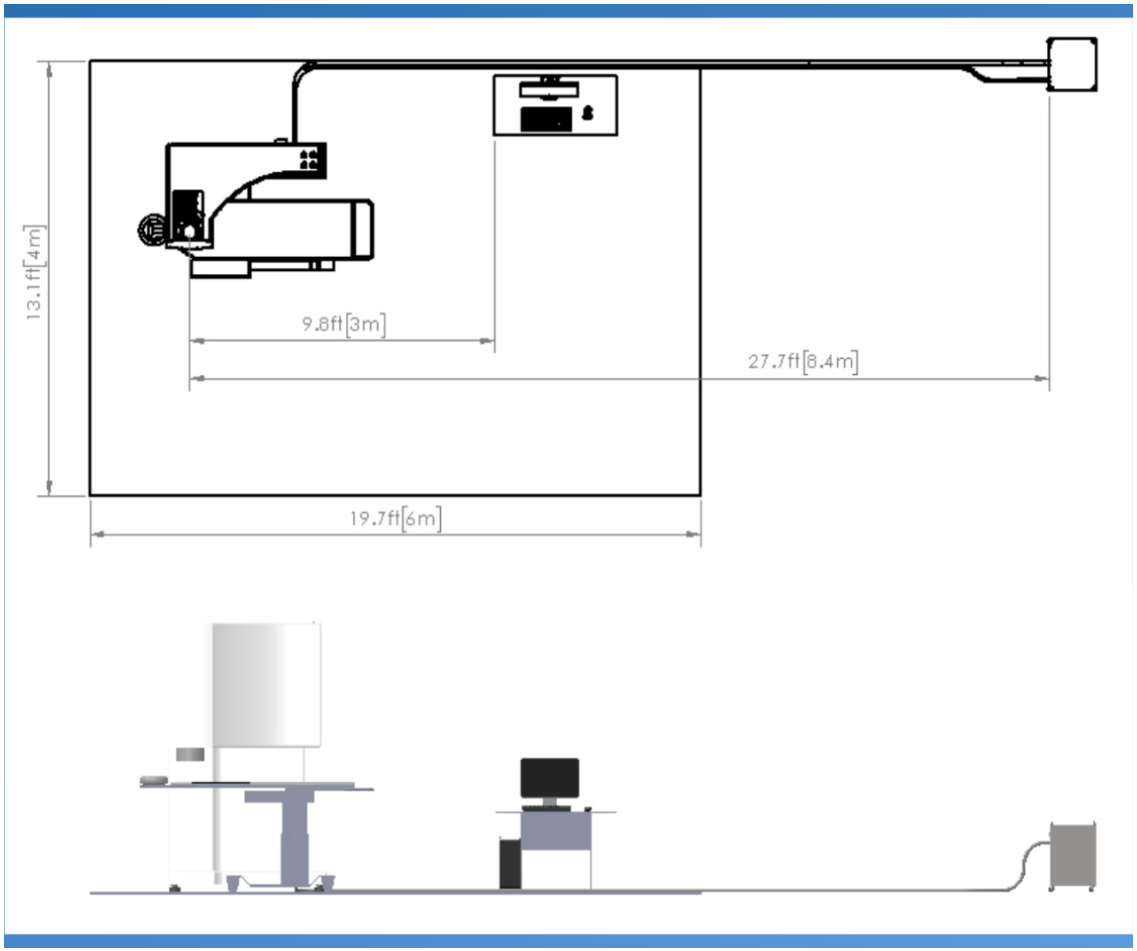
Patient is screened for Myocardial abnormalities. The only prep required is removal of metallic objects from the patient.

After a ~90 second measurement, with no contact, no radiation, with nothing attached to the patient, no injections, the Avalon-H90 calculates scores with supporting analytics to assist the physician with the referral decision.

Avalon-H90: Components



Avalon-H90: The Layout



Avalon-H90: The How

- The Avalon-H90 uses a large array of proprietary integrated, single chip, SQUID sensors to measure and analyze the heart muscle activity in three dimensions within one ~90 second recorded observation.
- The SQUIDS are operating at ~4 Kelvin without the traditional use of liquid helium, enabled by the Avalon-H90's proprietary chamber with integrated cooling system; its low (~3.5 KW) power consumption enables an "always on" status.
- No magnetically shielded room is required due to the proprietary Avalon-H90's noise cancellation system; this breakthrough technology enables its use in magnetically noisy environments such as a hospital ER.
- Measurements are completely non-invasive and are made while the patient is at rest.
- The Avalon-H90 has very low maintenance and no consumables except electric power.

Avalon-H90: What It Measures

Ventricular Repolarization Dynamics Analysis – ("VRDA")

- Avalon-H90's unique three-dimensional observations of electrical current activity of the whole cardio-cycle enables the Avalon-H90 to analyze the patient for high and low risk ventricle repolarization abnormalities. Each dimension is scored for changes of dynamics of electrical activity position and orientation.
- VRDA analysis detects the multidimensional dynamics of the electrical activity caused by differences in functions of Electrical Action Potential ("EAP") of normal heart tissues and abnormal ones with hypoxia; it is also robust enough to also to detect abnormalities without hypoxia due to changes in muscle chemistry related to insufficient blood supply.
- Early detection of heart disease makes this technology applicable to post-transplant monitoring and wellness clinics.
- **VRDA detection of hypoxia abnormalities are very similar to SPECT, without the injection of radioactive tracer and significant time delay.**

Avalon-H90: Analysis of Normal Patient

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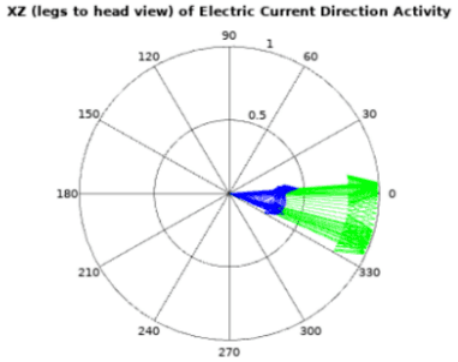

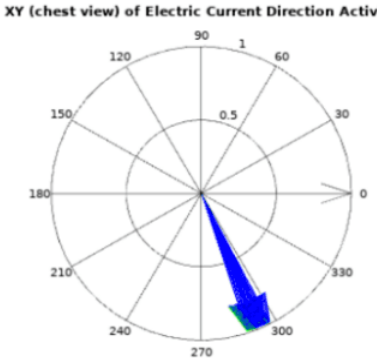

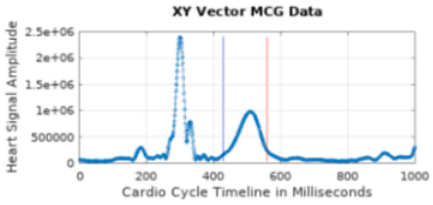

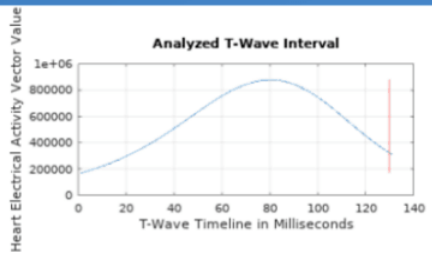

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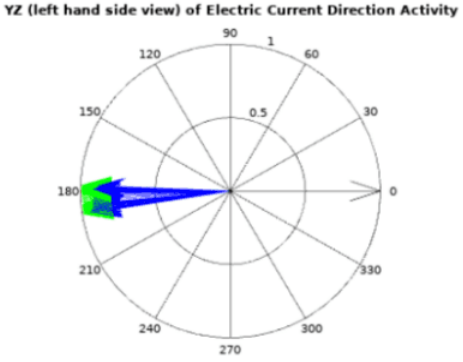

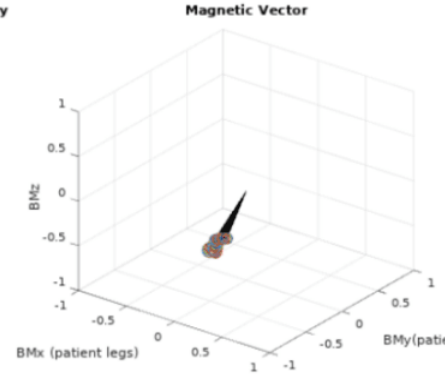

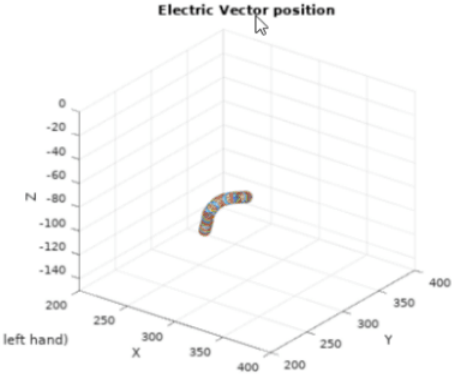

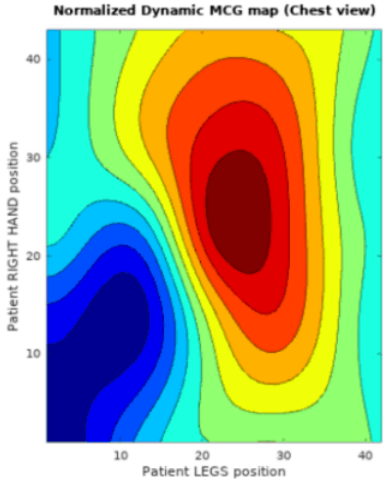

VRDA scores (Heart T-Wave Electric Current Dynamics Model)

T-Wave Electric Current Angle Deviation	:45.6877
XY T-Wave Electric Current Rotation Deviation	:27.6452
XZ T-Wave Electric Current Rotation Deviation	:44.1763
YZ T-Wave Electric Current Rotation Deviation	:34.2231

Avalon-H90: Analysis of Abnormal Patient

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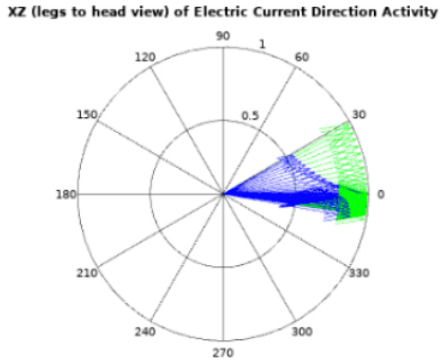

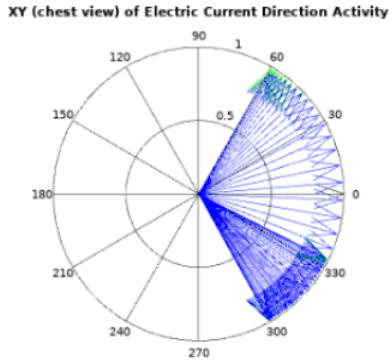

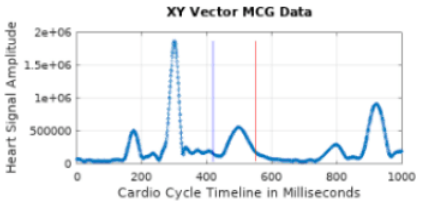

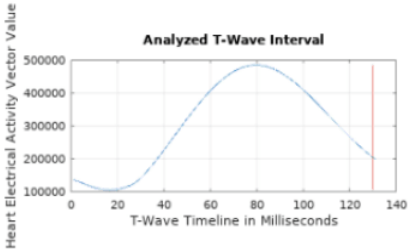

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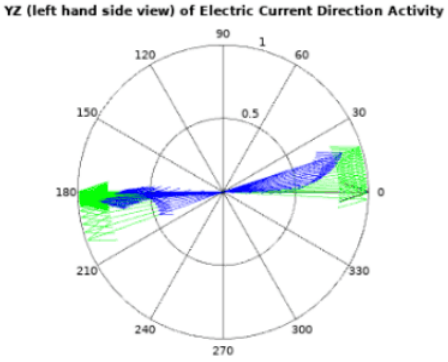

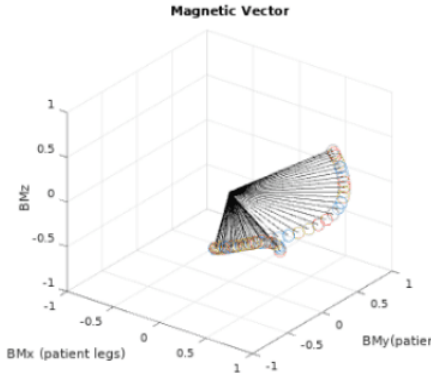

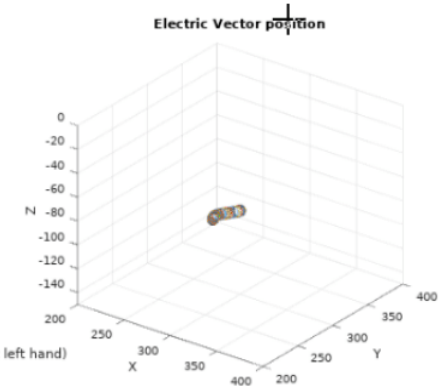

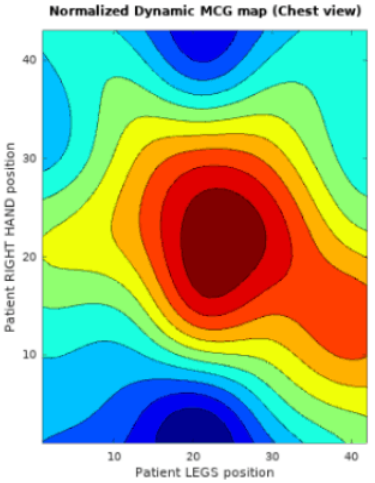

VRDA scores (Heart T-Wave Electric Current Dynamics Model)

T-Wave Electric Current Angle Deviation	:283.4291
XY T-Wave Electric Current Rotation Deviation	:269.2205
XZ T-Wave Electric Current Rotation Deviation	:161.0148
YZ T-Wave Electric Current Rotation Deviation	:231.687

Avalon-H90: Market Estimation

- The global medical device market size was valued at USD $425.5 Billion in 2018 and is expected to reach USD $612.7 Billion by 2025, growing at a CAGR of 5.4% 2018 to 2025.
- With over 6,000 registered hospitals, just in the US alone, nearly all of which have an ER, ED, ICU, or Chest Pain Unit, the US market could potentially support ~$2.8B in total sales. Additionally:
  - Early detection of heart disease would make the Avalon-H90 attractive to Wellness Clinics and for annual checkups.
  - The Avalon-H90 captures a large dataset, covering the entire heartbeat, opening the door for periodic analytic software updates and any future diagnostic packages, in addition to annual maintenance and training revenues.
- **The Avalon-H90 is a fully developed prototype.**

Current Status: Evaluation of Avalon-H90 at Mayo Clinic

- November 2021 Mesuron has entered into a know-how collaboration agreement and stock purchase agreement with Mayo Clinic to further refine its protocol algorithm and analytic software for the Avalon-H90's Ventricular Repolarization Dynamics Analysis ("VRDA") output, specifically for Acute Chest Pain patients admitted to the hospitals' Emergency Rooms in order to rapidly separate acute chest pain caused by Heart Problems from other causes not related to the heart. As part of the agreement, Mayo Clinic became a shareholder in Mesuron Inc.

- The Company is currently engaged with Mayo Clinic, Rochester MN to evaluate the Avalon-H90's performance on acute chest pain patients in hospitals' emergency rooms. Mesuron has received from Mayo Clinic a draft agreement and budget estimate to conduct the test of Avalon-H90 in location directly in one of the dedicated Mayo Clinic Emergency Rooms for a 12-month duration.

- Study Title: A prospective, blinded, observational study to assess the accuracy of magnetocardiography ("MCG") as a tool for diagnosing acute coronary syndrome ("ACS") in emergency department patients presenting with acute chest pain.

Forward-Looking Statements

Forward-Looking Statements

Certain information set forth in this presentation contains "forward-looking information", including "future-oriented financial information" and "financial outlook", under applicable securities laws (collectively referred to herein as forward-looking statements). Except for statements of historical fact, the information contained herein constitutes forward-looking statements and includes, but is not limited to, the (i) projected financial performance of the Company; (ii) completion of, and the use of proceeds from, the sale of the shares being offered hereunder; (iii) the expected development of the Company's business, projects, and joint ventures; (iv) execution of the Company's vision and growth strategy, including with respect to future M&A activity and global growth; (v) sources and availability of third-party financing for the Company's projects; (vi) completion of the Company's projects that are currently underway, in development or otherwise under consideration; (vi) renewal of the Company's current customer, supplier and other material agreements; and (vii) future liquidity, working capital, and capital requirements. Forward-looking statements are provided to allow potential investors the opportunity to understand management's beliefs and opinions in respect of the future so that they may use such beliefs and opinions as one factor in evaluating an investment.

These statements are not guarantees of future performance and undue reliance should not be placed on them. Such forward-looking statements necessarily involve known and unknown risks and uncertainties, which may cause actual performance and financial results in future periods to differ materially from any projections of future performance or result expressed or implied by such forward-looking statements.

Although forward-looking statements contained in this presentation are based upon what management of the Company believes are reasonable assumptions, there can be no assurance that forward-looking statements will prove to be accurate, as actual results and future events could differ materially from those anticipated in such statements. The Company undertakes no obligation to update forward-looking statements if circumstances or management's estimates or opinions should change except as required by applicable securities laws. The reader is cautioned not to place undue reliance on forward-looking statements.

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