

## KEY INITIATIVES

### 1. Eliminating Barriers to Adoption of VMS

#### 1.a Universal calibration for all echo probes to eliminate the need for on-site installation

Part of the on-site installation process was to calibrate the tracking system to a particular ultrasound machine and 2-3 probes used on that machine. Initially this process took two days and was very complicated. A few years ago, we found a way to reduce the time to a few hours, but our users still found having only one particular ultrasound machine problematic. While looking into finding a way to calibrate the VMS to a particular manufacturer and model (Phillips IE33, GE E9, etc.), *the Company was able to identify a way to establish universal calibration files irrespective of the makes and models of ultrasound machine and probes. These calibration files are loaded into the system during manufacturing and then the system uses the correct calibration when it is connected to an ultrasound machine. This has eliminated the need for a person to travel to the site and install the machine and so we can now ship the VMS+3.0 and have the user unpackage it and connect it to any ultrasound machine and probe available. In these times when travel is discouraged, this is a significant benefit to the Company and reduces the cost of getting a hospital up and running. It also allows the user to employ any ultrasound machine available when they have a patient requiring the exceptional accuracy and reproducibility the VMS+3.0 provides.*

#### 1.b Remote training programs to eliminate the need for on-site training

Part of the on-site installation process was to send an application specialist to the hospital to train the sonographers in advanced scanning techniques and cardiologists in the analysis software. This process could take 2-3 days depending on the availability of the staff, who are often not fully relieved from their clinical duties during this training period. It also took many weeks to schedule the training session since busy echo services cannot free up multiple clinicians without a lot of planning. *The new VMS+ software has a number of user-friendly upgrades that make it significantly easier to operate.* Consequently, the Company has now developed an online training capability and has already used it to successfully train new users in a few hours. This has greatly reduced the time to schedule training as it can be done on an individual basis rather than as a group and can be done in multiple shorter sessions if necessary. Once again in these times when travel is discouraged, this is a significant benefit to the Company and the user. It also reduces the cost to the Company and allows for rapid use of the VMS+3.0, once it has been received by the clinic.

#### 1.c Self-contained system to eliminate need for internet connection and improve security

Healthcare providers are becoming more and more concerned about internet connections and cybersecurity. While the business initial model was to have a centralized server, which received the coordinates of the anatomical landmarks over the internet and performed the analysis and sent back the result. This model does not seem to be viable in this era of heightened risk. Accordingly, the Company has elected to encrypt the catalogues and analysis software into the VMS+.3.0 This change will *allow the devices to be self-contained and function completely inside the hospital* using the internal PACS (archive) to store and retrieve echocardiograms and the resultant analysis. This is a small cost savings for the Company which now has shut down its central analysis server and transitioned users to the new stand-alone system. This will also allow sales in areas where the internet is not available or unreliable, such as much of the developing countries where MRI machines are also not available for cardiac diagnosis.

## **2. Reducing the Cost of Goods**

### **2.a Refactor the source code for KBR to bring it to modern standards**

The Company has also re-factored (rewritten) the source code for the VMS+ to bring it up to current software standards. The original code was written over the last 17 years using multiple coding languages and approaches and it had become time-consuming to revise and maintain. *This complete review of the source code has allowed our software team to understand the algorithms at a fundamental level and identified a number of potential places for improvement.* These improvements will be discussed in future news releases.

### **2.b Eliminate the need for video capture and use direct feed from ultrasound machine to reduce hardware costs and improve image quality**

The VMS was originally created over 15 years ago, before the age of completely digital ultrasound machines, which are now the standard. The VMS+ accordingly used a video capture card in its computer to capture the images and store them digitally for analysis. With the refactoring of the source code, the Company has taken the opportunity to import the digital images from the ultrasound machine and use them for analysis. This improved the image quality, which was degraded during the video-capture step. *While the VMS+3.0 is exceptionally good at analyzing low quality images by using a “sparse-data” approach - the few dots per view - better images always lead to faster and better analysis.* The video capture cards were expensive and so the cost to manufacture the VMS+3.0 has been significantly reduced with this upgrade.

### **2.c Allow for use of smaller, more-portable computers to reduce size and cost of the VMS.**

Both the refactoring and the elimination of the video card reduced the computer requirements, with a resultant reduction in the cost of the VMS hardware. It will also allow an even smaller computer to be used in the future and thereby increase the portability and reduce the space required in a commonly-crowded echocardiography suite.

### **3. More Effective Integration within Clinical Workflow**

#### **3.a Provide templates for all views with recommended points to speed up manual point selection and reduce analysis time**

Sonographers and cardiologists continue to be challenged to speed up exam and analysis time. While the VMS+3.0 analysis takes only a few minutes, the Company has developed a template system to allow multiple anatomical landmarks to be placed at a time for each standard view. The system now leads the user through the process for each chamber of the heart and each view captured allowing for relocation of landmarks by the operator if necessary. *The operator response to this new template process has been excellent and it has decreased average analysis time and increased average accuracy* as more landmarks provide better analysis. This feature has been incorporated into a new version of the software for the VMS+3.0.

#### **3.b Allow use with all ultrasound machines in a clinic to eliminate the need to locate and access a specific machine or echo suite**

An issue raised by existing users is the challenge of scheduling a patient with a particular ultrasound machine in a particular room. With the development of a universal calibration process, the VMS+3.0 can be twinned with any the ultrasound machines in the clinic as required. This new feature eliminates the need to locate a specific ultrasound machine, which could be anywhere in the hospital. It also eliminates the need to access a specific echocardiography suite as the VMS+3.0 can be taken to an open suite and twinned with whatever ultrasound machine is available, when the patient is available.

#### **3.c Allow remote analysis of echocardiograms from central PACS (archive) database on a workstation**

Normal practice is to archive all images in a PACS server and allow for remote downloads and analysis at a workstation in a viewing room. With the refactoring of the source code and other improvements, the VMS+3.0 now uploads the probe tracking information along with the images into the PACS server in the standard DICOM format. This image file can be read on the VMS+3.0 or on any remote viewing device which has the VMS workstation module installed. The DICOM image file can still be viewed using any standard reading software as the VMS tracking information is invisible to these analysis packages.

## **About Ventripoint Diagnostics Ltd.**

Ventripoint has become an industry leader in the application of AI (Artificial Intelligence) to echocardiography. Ventripoint's VMS products are powered by its proprietary KBR technology, which is the result of a decade of development and provides accurate volumetric cardiac measurements equivalent to MRI. This affordable, gold-standard alternative allows cardiologists greater confidence in the management of their patients. Providing better care to patients serves as a springboard and basic standard for all of Ventripoint's products that guide our future developments. In addition, VMS+ is versatile and can be used with all ultrasound systems from any vendor supported by regulatory market approvals in the U.S., Europe and Canada.

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