

Real-Time Digital X-Ray Detector System for the CAT Scan in Healthcare and Non-Destructive Testing in Quality Control and Airport Security



Amol S. Karnick
President & CEO
KA Imaging

CEOCFO: *Mr. Karnick, you have a long history in the medical device industry. What attracted you to KA Imaging?*

Mr. Karnick: What attracted me to KA Imaging is the innovation of the technology, but also the inventor, Karim S. Karim PhD, who is a professor at the University of Waterloo. It was his passion, excitement and innovation on the technology that really attracted me to the company, and being able to work with him. We founded the company together about a year and a half ago, but have been working closely together for about three years on it. What we have achieved recently is getting our first Seed Round, to go along with our excitement about our technology.

CEOCFO: *Would you explain your technology?*

Mr. Karnick: What we have built is a digital X-ray system, or X-ray detector. For people go to the hospital to get a broken bone scanned, you have the source that emits the X-ray radiation and the receiver that is traditionally film. However, there has been a move now to digital X-ray. Our innovation allows you to do digital X-ray, the receiver side, at a much better performance, but also at a lower cost. The reason we can do a lower cost is we are leveraging LCD TV manufacturing. The places where they make your TVs these days, with the flat panel screens, can now make an X-ray detector, which allows us to lower the manufacturing costs. In addition, the innovation allows us to actually improve performance. We can lower dose from 20 to 40%, compared to today's flat panel X-ray detectors. We can do higher resolution, whereas today's pixel resolution is in the 150 micron range, and we can go down to 35 microns if we want. We can also get more shades of grey. Therefore, overall we can get a much better performance. In addition, we can do something called, Real-Time imaging, which is traditionally called Fluoroscopy. Today, Fluoroscopy units still are dominated by an analogue system, so we have an opportunity to bring it to a digital realm.

CEOCFO: *What are you finding when you are approaching the people who should be aware and want your technology?*

Mr. Karnick: We have been getting a very warm reception. I have been in the industry for twelve years and Karim is well connected, so between the two of us in the healthcare space, we know all of the major healthcare companies, and they are ripe for innovation. They realize that we have a much better detector that they build or buy. What happens in the X-ray industry is that there is still a great deal of buying by large OEMs of X-ray detectors, but from the other companies. However, when they see our innovations, they become engaged. Therefore, we are engaged with all of the large OEMs, the X-ray manufacturing companies or systems integrator companies, and that allows us to show them some of the early stage data, engage them and perk their interest.

CEOCFO: *Are there particular types of X-rays that it works better with, or for which it would be more appropriate, or is it across the board?*

Mr. Karnick: It works across the board. That is the advantage of our innovation. We can change what we do to match what the appropriate X-ray imaging modality is. If we are talking about real-time, and you are in the cardiac catheter suite, where they are trying to guide a stent placement, we can go into that. If you are trying to do a standard chest X-Ray, we can build one of those. If you want to do a high-resolution mammography system, we can build one of those as well. What our innovation allows us to really do is modify what we do at a very low cost.

CEOCFO: *Is there anything that would be different for the technician? Is there a learning curve?*

Mr. Karnick: From the technician's point of view, there is no difference. It is still an X-ray detector, but with better performance. Where the advantage is, in an area where they use surgical suit, they use an Ultra-P Arm, which is used in

the Fluoroscopy systems, but the interventional radiologists, or cardiologists, use Fluoroscopy to guide their procedures, which causes them to be exposed to the radiation. They do use a lead shielding, but at the end of the day they are still getting scads of radiation on them. Therefore, they are concerned about the radiation dose that they get. That is one of the reasons that these older analogue intensifier systems that are still around, because they offer the lowest X-ray radiation dose possible. Whereas, with our innovation, we can now come and match that dose, but now move it to digital, where there is a lower cost of ownership, larger field of view, less distortion at the edges, less calibration issues, and you do not have a big 70 pound image intensifier. If you remember old TVs with their cathode tube, that is essentially reversed. You essentially have a heavy weight module, so that is you put a flat panel detector, it is similar in weight to your computer monitor, so it makes a big difference in usability and portability as well.

CEOCFO: Do you expect the ground swell to come from the physicians as opposed to from the X-ray system integrators or from both groups?

Mr. Karnick: We are seeing from both ends right now. We are engaging the doctors and the systems integrators. They are the ones are exposed to the radiation, so they would love to have lower radiation on themselves as well. The system's integrators also understand the market needs and the doctors' needs, which is the reason they are engaging with us as well.

CEOCFO: What are your next steps?

Mr. Karnick: We have just closed our Seed Round, so we have some money in the bank. We are currently developing the prototype and the first image is out. We are now optimizing that 2 inch prototype with our TFT LCD manufacturer. We have a company that is building a key component, and we are in the process of optimization with them before we start building the full size detectors in the summer. The full size could be a 35 inch by 43 inch chest detector or 30 centimeter by 30 centimeter real-time digital detector.

“We have a very strong road map with products in the pipeline and other innovations where we will expand beyond healthcare. Therefore, today is a great time to engage with us and become potential investors as well.” - Amol S. Karnick

CEOCFO: Where else is your technology applicable?

Mr. Karnick: Our advantage is that we have built a better light sensor. We are doing indirect X-ray detection, which uses scintillation technology. You use a scintillator that converts X-ray energy to light; you have the light detector and the readout circuit. We improve that light detector significantly. That is how we get our better performance. Fundamentally, with our light detector, so if we look at the same X-ray detectors, we can go into non-destructive testing, such as quality control, and in security, as in airports they use X-ray to scan your luggage. Therefore, there are opportunities in those areas as well. As an improved light sensor, another area we have started to explore is biometrics. Most of the iPhones have fingerprint readers, which are becoming more common as people move to online payments, and are making payments with their phones. When using your phones you want to make sure that you have good security around that fingerprint reader, and today's fingerprint readers use light. However, our advantage on our light detector is we provide near infrared sensing as well, which give you better security on your fingerprint readers, plus allows you to image under tough conditions, so if your finger is wet, it is not an issue. This is a problem with many phones. However, using a multi-spectral light source that we have the capability of doing because of our near infrared if your finger is wet or dirty it does not matter. That will be our next step as we move out of the healthcare space and leverage our innovation.

CEOCFO: What is the plan for the next year or so?

Mr. Karnick: Our plan for our first year is to deliver the first commercial prototype, which we will have ready by the fall. We are expecting to release the first product in the non-destructive testing area by the end of 2016, and the medical side we will release by mid-2017 based on the regulator timeline. In the healthcare space you always have to through the FDA and Health Canada, as well as CE Marking in Europe, and the regulatory bodies take some time to go through with the data and approving. Therefore, we will have to go through those steps on the healthcare side, so we look to get early revenue with the non-destructive testing.

CEOCFO: What have you learned in the early stages that has improved the product and process, as well as your approach?

Mr. Karnick: We have actually had to visit our business plan a bit. What has changed in that is that we were looking at the social innovation side, social entrepreneurship, where we wanted to take the lowest cost X-ray detector to the emerging economies. We recognized that we did have a very high-value innovation, so we pivoted and decided to make a

real-time detector and sell to the Western market as well as the emerging economies. That allowed us to get the funding that we needed. What we were saying was that we would have a dual market approach. One of our investors is Grand Challenges Canada, a company that is involved in global health and taking innovations such as ours and serving the underserved globally. They really like us as well in a sense that we are not just going to be just a charity non-profit looking for handouts, but we are going to be independent. We are going to be capable of standing on our own two feet, but also serving the underserved.

CEOFCO: *Put it together for our readers. Why pay attention to KA Imaging today?*

Mr. Karnick: KA imaging today is at point where we have really grasped our technology. We have proven that the technology works fundamentally. Up until three months ago all of the innovations were coming out of Professor Karim's lab, where we were fortunate that Waterloo had a foundry and allowed him to build, but we have fundamentally proven that the technology can be built independently. That is number one. The fundamentals of the technology are well proven, so we are beyond the research phase, and now into the commercialization stage. Two, when it comes to healthcare everyone worries about the regulatory approval side, but because we have a non-destructive testing market, we can generate early revenue while we are going through this regulatory hurdle. Then long-term, we have a great many innovations in our pipeline. This is product number one, but we have something called Dual Energy or Multi-Spectral X-ray that allows you to really distinguish between soft tissue and bone. That is going to be part of our innovation coming down the pipeline, but we also have the biometrics opportunity. Therefore, fundamentally we are not just a one trick pony. We have a very strong road map with products in the pipeline and other innovations where we will expand beyond healthcare. Therefore, today is a great time to engage with us and become potential investors as well.

CEOFCO: *Final thoughts?*

Mr. Karnick: We are a young company in the early stages, but we are making a great deal of traction and making inroads with systems integrators and customers. We have been highly active and working hard. We have just closed our Seed Round and we will be opening up a convertible note over the next few months and taking more investments, but then opening up our Series A by the end of this year. By the September timeframe, we will be able to make our Series A and close by the end of the year.

Interview conducted by: Lynn Fosse, Senior Editor, CEOFCO Magazine



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